

January 30, 2024

### TRANSMITTAL VIA EMAIL 01/30/2024

Ms. Lori Babcock
Michigan Department of Environment, Great Lakes, and Energy
Materials Management Division
Bay City District Office
401 Ketchum St, Suite B
Bay City, Michigan 48708

SUBJECT: 2023 Annual Groundwater Monitoring and Corrective Action Report §257.90(e)

inclusive of the Semiannual Progress Report §257.97(a)

JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residuals (CCR) Units

Dear Ms. Babcock:

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) Bottom Ash Pond CCR Unit and Landfill CCR Unit at the JC Weadock Power Plant Site. 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). This 2023 Annual Groundwater Monitoring and Corrective Action report documents activities from January 2023 through December 2023.

This letter along with the May 2023 and July 2023 semiannual groundwater sampling reports for the Weadock Bottom Ash Pond (Enclosures 3 and 4), four quarterly groundwater sampling reports for the Weadock Landfill (Enclosures 5 through 8), and a technical memorandum discussing the nature and extent of contamination characterization (Enclosure 9) collectively comprise the 2023 Annual Groundwater Monitoring and Corrective Action Report and meet the requirements of §257.90(e) as documented in the enclosed checklists developed for each unit (Enclosures 1 and 2).

The Weadock Landfill was in assessment monitoring at the beginning and at the end of the period covered by this report. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and is continuing semiannual assessment monitoring in accordance with §257.95. The Weadock Bottom Ash Pond was in assessment monitoring at the beginning of the period covered by this report. At the end of the period covered by this report, the Weadock Bottom Ash Pond had been certified as closed and assessment monitoring had concluded.



This annual groundwater monitoring and corrective action report includes a Semiannual Progress Report, prepared as a requirement of §257.97(a) of the Federal Coal Combustion Residual (CCR) Rule, describes progress towards selecting and implementing any additional remedy for the Weadock Landfill after the completion of the Assessment of Corrective Measures, JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Unit<sup>1</sup>, dated September 11, 2019. Groundwater management alternatives considered to be technically feasible at the Weadock Landfill upon completing source containment through the construction of the soil-bentonite slurry wall and construction of an impermeable final cover system that could potentially address the residual arsenic under <u>known</u> groundwater conditions were identified in the report as: 1) Post-remedy monitoring, 2) Groundwater capture/control, 3) Impermeable barrier, 4) Active geochemical sequestration, and 5) Passive geochemical sequestration.

### **Weadock Bottom Ash Pond Closure Activities**

In 2023, Consumers Energy performed assessment monitoring for the Weadock Bottom Ash Pond while continuing to evaluate corrective measures per §257.96 and §257.97. A public meeting was conducted on June 12, 2023, at least 30 days prior to the final remedy selection, as required under §257.96(e). On July 21, 2023, Consumers Energy posted the JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit 40 CFR 257.97(a) Selection of Remedy Letter Report<sup>2</sup> (Remedy Selection Report) to the operating record and public-facing CCR website. The Remedy Selection Report identified Source Removal with Post Remedy Monitoring as the final remedy for the former bottom ash pond to address the potential for residual beryllium and lithium. Groundwater data collected post-CCR removal demonstrates that the remedy is complete per the criteria set forth in §257.98(c) and the remedy is protective of human health and the environment as presented in the Completion of Remedy Letter Report<sup>3</sup> and the Weadock Bottom Ash Pond CCR unit was certified closed<sup>4</sup>. Therefore, the July 2023 assessment groundwater monitoring report documents the final assessment monitoring data evaluation for the Weadock Bottom Ash Pond.

### **Weadock Landfill Closure Activities**

For the Weadock Landfill, Consumers Energy completed construction of a soil-bentonite slurry wall (Weadock Slurry Wall) that enclosed the landfill with the exception of a 1,600 ft venting feature<sup>5</sup>. Later, construction of the Weadock Slurry Wall was extended to include the previous

<sup>&</sup>lt;sup>1</sup>TRC. 2019. Assessment of Corrective Measures – JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company. September.

<sup>&</sup>lt;sup>2</sup> Consumers Energy. 2023. JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit, 40 CFR 257.97(a) Selection of Remedy Letter Report. July 21.

<sup>&</sup>lt;sup>3</sup> Consumers Energy. 2023. JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit, 40 CFR 257.98(e) Completion of Remedy Letter Report. November 10.

<sup>&</sup>lt;sup>4</sup> Consumers Energy. 2023. JC Weadock Bottom Ash Pond 40 CFR 257.102(c) Closure by Removal Certification. November 10.

<sup>&</sup>lt;sup>5</sup> Natural Resource Technology. 2005. Phase II Groundwater Discharge Evaluation, Final Report.



vent<sup>6</sup>. EGLE approved the construction certification reports on June 24, 2009 and December 19, 2018, respectively. This engineered barrier is monitored in accordance with the *Landfill Hydrogeological Monitoring Plan*<sup>7</sup>, prepared by TRC, dated February 2021 approved and incorporated by reference into the renewed Solid Waste Operating License No. 9640 dated March 11, 2021.

Additionally, Consumers Energy submitted draft revisions of the closure plan (2016 Closure Plan) for the Weadock Landfill to EGLE for review and concurrence pursuant to the requirements of solid waste operating license. Changes in the closure plan were required due to the forecasted early retirement of coal-fired units at the generating complex in May 2023. Final grades were proposed to be reduced, but other improvements to the final cover system and stormwater drainage were incorporated into the plan with state-specific variances requested. EGLE approved the variances and provisional design elements in the renewed solid waste operating license on March 11, 2021. The final closure plan was approved by EGLE on April 17, 2022. Consumers Energy will update the final closure plan pursuant to 257.102(d) once the detail engineering is completed.

## Weadock Landfill Groundwater Sampling Results: May and October 2023 Events

Statistical analysis from the quarterly groundwater monitoring events performed in 2023 at the Weadock Landfill verified that there were no Appendix IV constituents present at statistically significant levels above the established Groundwater Protection Standard (GWPS) within Weadock Landfill groundwater monitoring system. Results are presented in the enclosed quarterly groundwater monitoring report (Enclosures 5 through 8). Additionally, monitoring performed under the Weadock Groundwater Surface-Water Interface (GSI) Compliance Plan demonstrates protection of human health and the environment with criteria determined to be protective at the point of exposure.

Significant observations from the event summary are as follows:

- No Appendix IV constituents have been observed at statistically significant levels above GWPS for the Weadock Landfill groundwater monitoring system;
- Arsenic was determined to be present at statistically significant levels above the GWPS at one of the three downgradient monitoring wells at the time of the initial semiannual monitoring event (April and May 2018); however, based on the revised groundwater monitoring system (12 perimeter wells, post soil-bentonite slurry wall construction), arsenic is not present at statistically significant levels above the GWPS;

<sup>&</sup>lt;sup>6</sup> Golder Associates, Inc. 2018. J.C. Weadock Generating Facility, Slurry Wall Vent Closure Construction Documentation Report. October 30.

<sup>&</sup>lt;sup>7</sup> TRC. 2021. Landfill Hydrogeological Monitoring Plan – JC Weadock Power Plant, Essexville, Michigan. Prepared for Consumers Energy Company. February.



- Arsenic and molybdenum concentrations at monitoring well MW-55 have been reviewed through an Alternate Source Demonstration provided in Appendix G of the 2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report; JC Weadock Solid Waste Disposal Area (Enclosure 8) indicating elevated levels of constituents at that location are not related to materials management within the Weadock Landfill.
- ➤ 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 and there are currently no adverse effects on human health or the environment from either surface water or groundwater due to the CCR management at the Weadock Landfill as discussed in the enclosed Second Semiannual 2023 Nature and Extent Data Summary, JC Weadock, Consumers Energy, Essexville, Michigan (Enclosure 9).

### **Conclusions**

Closure by removal has been completed at the Weadock Bottom Ash Pond in accordance with §257.102(c). Consumers Energy completed the final remedy selection in July 2023, and certified the completion of the selected remedy and closure by removal November 2023. Therefore, as of November 2023, the Weadock Bottom Ash Pond was deemed a closed CCR unit under 40 CFR §257. Accordingly, the CCR unit is not subject to post-closure care requirements or any other requirements under 40 CFR §257 of the CCR Rule. Therefore, ongoing assessment and post-remedy (i.e., corrective action) monitoring was concluded at the Weadock Bottom Ash Pond in 2023 and no further monitoring activities for the Weadock Bottom Ash Pond are planned at this time However, there are additional considerations to be reviewed for the Weadock Landfill that is also located with the licensed acreage of the Weadock Solid Waste Disposal Area and immediately adjacent to the Weadock Bottom Ash Pond. The first phase of partial closure focused on construction approximately 22.5 acres of final cover commenced in May 2023. Consumers Energy will continue monitoring conditions during the execution of the final closure construction including performance of the soil-bentonite slurry wall. The drinking water and GSI pathways are protected by quarterly monitoring performed under the Michigan-approved hydrogeological monitoring plan that includes a GSI Compliance Monitoring Program.

The final remedy for the Weadock Landfill will be formally selected per §257.97 and Michigan Solid Waste requirements once the selected option is reviewed and commented on by EGLE and a public meeting is conducted at least 30-days prior to the final selection as required under §257.96(e).

The next semiannual progress report will be submitted in six months by July 31, 2024. Please feel free to contact me with any questions or clarifications.



Sincerely,

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Mr. Joe Firlit, Consumers Energy

Ms. Darby Litz, TRC

Mr. Jacob Krenz, TRC

### **Enclosures:**

- 1) CCR Annual Groundwater Report Requirements: § 257.90(e). Checklist for the Weadock Bottom Ash Pond CCR Unit.
- 2) CCR Annual Groundwater Report Requirements: § 257.90(e). Checklist for the Weadock Landfill CCR Unit.
- 3) May 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, JC Weadock Site, Bottom Ash Pond CCR Unit. (TRC, July 21, 2023).
- 4) July 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, JC Weadock Site, Bottom Ash Pond CCR Unit. (TRC, January 30, 2024).
- 5) First Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. (TRC, April 27, 2023).
- 6) 2023 Semiannual Groundwater Monitoring Report and Second Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. (TRC, July 21, 2023).



- 7) Third Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. (TRC, October 30, 2023).
- 8) 2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. (TRC, January 30, 2024).
- 9) Second Semiannual 2023 Nature and Extent Data Summary, JC Weadock, Consumers Energy, Essexville, Michigan. (TRC, January 30, 2024).

## CCR Annual Groundwater Report Requirements: § 257.90(e) Checklist for the Weadock Bottom Ash Pond CCR Unit 2023 Annual Report

Requirement	Reference
At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent	
available:	
(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to	(2) (3)
include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;	Figure 2 (2),(3)
(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative	
description of why those actions were taken;	Not Applicable - no installation or decommissioning
(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater	
samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and	(2)(3)
whether the sample was required by the detection monitoring or assessment monitoring programs;	Section 2.2 Assessment Monitoring (2),(3)
(4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from	
detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant	(2)(3)
increase over background levels); and	Corrective Action Progress Report (1); Section 1.1 Program Summary (2),(3)
(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.	Nature and Extent Data Summary <sup>(4)</sup>
(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and	
corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:	
(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program	(2) (3)
in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(2),(3)</sup>
(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program	
in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(2),(3)</sup>
(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in	(2)(3)
appendix III to this part pursuant to § 257.94(e):	Section 1.1 Program Summary (2),(3)
(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an	(2)(3)
increase; and	Section 1.1 Program Summary (2),(3)
(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Section 1.1 Program Summary (2),(3)
(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more	(1)
constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(2),(3)</sup>
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an	(2)(3)
increase;	Section 1.1 Program Summary (2),(3)
(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Section 1.1 Program Summary (2),(3)
(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(3)</sup>
(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(2),(3)</sup>
(v) Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(3)</sup>
(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.1 Program Summary <sup>(3)</sup>

## Notes:

- (1) 2023 Annual Groundwater Monitoring and Corrective Action Report JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residuals CCR Units. Consumers Energy. January 30, 2024.
- (2) May 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, JC Weadock Site, Bottom Ash Pond CCR Unit. TRC. July 21, 2023.
- (3) July 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, JC Weadock Site, Bottom Ash Pond CCR Unit . TRC. January 30, 2024.
- (4) Second Semiannual 2023 Nature and Extent Data Summary, JC Weadock, Consumers Energy, Essexville, Michigan . TRC. January 29, 2024.

## CCR Annual Groundwater Report Requirements: § 257.90(e) Checklist for the Weadock Landfill CCR Unit 2023 Annual Report

Requirement	Reference
At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent	
available:	
(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to	(2) (2) (4) (5)
include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;	Figure 2 (2),(3),(4),(5)
(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative	
description of why those actions were taken;	Not Applicable - no installation or decommissioning
(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater	
samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and	- (2) (3) (4) (5)
whether the sample was required by the detection monitoring or assessment monitoring programs;	Section 3.2 (2),(3),(4),(5)
(4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from	
detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant	(2) (3) (4) (5)
increase over background levels); and	Corrective Action Progress Report (1); Section 1.2 Program Summary (2),(3),(4),(5)
(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.	Nature and Extent Data Summary <sup>(6)</sup> ; Certified ASD <sup>(3)(5)</sup>
(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and	
corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:	
(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program	(2) (3) (4) (5)
in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.2 Program Summary <sup>(2),(3),(4),(5)</sup>
(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program	(2) (3) (4) (5)
in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.2 Program Summary <sup>(2),(3),(4),(5)</sup>
(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in	Section 1.2 Program Summary (2),(3),(4),(5); Certified ASD (3)(5)
appendix III to this part pursuant to § 257.94(e):	Section 1.2 Program Summary (2007) (Certified ASD (2007)
(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an	Section 1.2 Program Summary (2),(3),(4),(5); Certified ASD (3)(5)
increase; and	
(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Section 1.2 Program Summary (2),(3),(4),(5)
(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more	(2) (3) (4) (5)
constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.2 Program Summary <sup>(2),(3),(4),(5)</sup>
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an	(2)(3)(4)(5)
increase;	Section 1.2 Program Summary (2),(3),(4),(5)
(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Section 1.2 Program Summary (2),(3),(4),(5)
(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Not Applicable - final remedy still under evaluation
(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Corrective Action Progress Report (1)
(v) Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy	40
selection; and	Corrective Action Progress Report <sup>(1)</sup> ; final remedy still under evaluation
(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.	Corrective Action Progress Report (1); final remedy still under evaluation

### Notes:

- (1) 2023 Annual Groundwater Monitoring and Corrective Action Report JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residuals CCR Units. Consumers Energy. January 30, 2024.
- (2) First Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. TRC. April 27, 2023.
- (3) 2023 Semiannual Groundwater Monitoring Report and Second Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. TRC. July 21, 2023.
- (4) 2023 Third Quarter Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. TRC. October 30, 2023.
- (5) 2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Solid Waste Disposal Area, Essexville, Michigan. TRC. January 30, 2024.
- (6) Second Semiannual 2023 Nature and Extent Data Summary, JC Weadock, Consumers Energy, Essexville, Michigan . TRC. January 29, 2024.



# May 2023 Assessment Monitoring Data Summary and Statistical Evaluation

JC Weadock, Bottom Ash Pond CCR Unit

**Essexville**, Michigan

July 2023

Darby Litz

Hydrogeologist/Project Manager

**Prepared For:** 

Consumers Energy Company

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## 1.0 Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90 – 257.98) apply to the JC Weadock Bottom Ash Pond CCR Unit (Weadock Bottom Ash Pond).

Consumers Energy is continuing assessment monitoring in accordance with §257.95 of the CCR Rule for the Weadock Bottom Ash Pond in Essexville, Michigan (Figure 1). This monitoring report has been prepared to provide the summary of the May 2023assessment groundwater monitoring results, data quality review, and statistical data evaluation for the Weadock Bottom Ash Pond groundwater monitoring system.

## 1.1 Program Summary

Groundwater monitoring for the Weadock Bottom Ash Pond commenced after the installation of the monitoring well network in December 2015 to establish background conditions. Detection monitoring was initiated on October 17, 2017 in conformance with the self-implementing schedule in the CCR Rule.

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

- Boron at JCW-MW-15010;
- Calcium at JCW-MW-15009;
- Field pH at JCW-MW-15009 (low), JCW-MW-15010 (high), JCW-MW-15028 (high); and
- Sulfate at JCW-MW-15009.

On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. On January 14, 2019, Consumers Energy provided notification that beryllium and lithium were present at statistically significant levels above the Groundwater Protection Standards (GWPSs) in one of the downgradient monitoring wells (JCW-MW-15009) at the Weadock Bottom Ash Pond. The notification of the GWPS exceedance was followed up with a Response Action Plan Submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on March 15, 2019 laying out the preliminary understanding of water quality and actions that were underway to mitigate or eliminate unacceptable risk associated with the identified release from the CCR unit. The Assessment of Corrective Measures (ACM) (TRC, September 2019) was initiated on April 14, 2019 and submitted on September 11, 2019 in accordance with the schedule in §257.96 and the requirements of the Response Action Plan.



The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1). Although site-specific constituents of concern (COCs) (i.e., arsenic [Weadock Landfill], beryllium and lithium [Weadock Bottom Ash Pond]) have been identified in groundwater monitoring locations at concentrations exceeding their respective GWPS, COCs are 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 the Weadock Bottom Ash Pond.

Evaluation of groundwater under the CCR Rule focuses on the following constituents that are collected unfiltered in the field:

**CCR Rule Monitoring Constituents** 

Appendix III	Apper	ndix IV				
Boron	Antimony	Mercury				
Calcium	Arsenic	Molybdenum				
Chloride	Barium	Radium 226/228				
Fluoride	Beryllium	Selenium				
рН	Cadmium	Thallium				
Sulfate	Chromium					
Total Dissolved Solids (TDS)	Cobalt					
	Fluoride					
	Lead					
	Lithium					

Prior to remedy selection, Consumers Energy will also collect a sufficient number of samples to evaluate Michigan state-specific constituents as follows:

Additional Monitoring Constituents (Michigan Part 115/PA 640 )

Detection Monitoring	Assessment Monitoring
Iron	Copper
	Nickel
	Silver
	Vanadium
	Zinc

<sup>&</sup>lt;sup>1</sup> 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.



Consumers Energy will continue to evaluate corrective measures for the Weadock Bottom Ash Pond per §257.96 and §257.97 and is continuing semiannual assessment monitoring in accordance with §257.95.

## 1.2 Site Overview

The Weadock Bottom Ash Pond is located within the JC Weadock Power Plant site, which is located south of the DE Karn Power Plant site, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). The Weadock Bottom Ash Pond is located immediately west of the JC Weadock Solid Waste Disposal Area (*i.e.* Weadock Landfill) and outside of the soil-bentonite slurry wall (Figure 2). The Weadock Landfill is being monitored in accordance with the EGLE-approved *Landfill Hydrogeological Monitoring Plan*, JC Weadock Solid Waste Disposal Area (February 2021). In addition to the Weadock Bottom Ash Pond and Weadock Landfill, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 and continued to operate through April 15, 2016.

The Weadock Bottom Ash Pond was formerly the primary settling/detention structure for the National Pollutant Discharge Elimination System (NPDES) Treatment System prior to discharge and characterized as an existing CCR surface impoundment. Consumers Energy ceased hydraulic loading to the Weadock Bottom Ash Pond in April 2018 and has allowed the area to dewater by gravity. The active dewatering and excavation work was completed between February and July 2020. The excavation extended to six inches below known CCR elevations established from previous investigations. Excavated CCR has been placed in the neighboring Weadock Landfill that is constructed with of a fully encapsulation soil-bentonite slurry wall keyed into a competently confining clay unit. The Weadock Bottom Ash Pond has been restored by backfilling and grading the surface with clean fill in accordance with the plan to promote stormwater drainage, minimize ponding of surface water, and to reduce the potential of infiltration and migration of residual arsenic and any future COCs. Consumers Energy submitted for review and approval, J.C. Weadock Generating Facility Bottom Ash Pond CCR Removal Documentation Report (Weadock Bottom Ash Pond Closure Report) on August 26, 2020 to satisfy requirements for completing the removal of solid waste which rendered the need for a solid waste operating license unnecessary. EGLE approved the removal documentation report satisfying state requirements to close on December 1, 2020. Groundwater conditions post-CCR removal continue to be monitored.

## 1.3 Geology/Hydrogeology

The majority of Weadock Bottom Ash Pond area is comprised of surficial CCR and sand fill. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling.



The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 ft bgs. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well graded sand present at depths ranging from 10 to 20 ft-bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.

The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft-bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft-bgs.

The Weadock Bottom Ash Pond and Weadock Landfill are bounded by several surface water features (Figure 1): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. The shallow groundwater flow direction in the vicinity of the Weadock Bottom Ash Pond is to the north toward the discharge channel and to the east toward the Saginaw River. Historical groundwater flow beneath the Weadock Landfill was directed north to the discharge channel due to the bentonite/soil slurry wall. Originally, the slurry wall enclosed the historical fly ash disposal area with the exception of a small segment along the perimeter dike that is designed to vent along the discharge channel immediately upgradient from the NPDES external outfall to prevent water from building up within the facility. In July 2018, this vent was closed and the slurry wall reduced porewater flux around the entire perimeter of the landfill. Following the closure of the vent, the static water level elevations inside of the slurry wall are generally significantly different (>1 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairs.

In previous investigations, bedrock groundwater was generally encountered around 578 ft (NAVD88), which is several feet lower than the shallow groundwater. Groundwater flow direction was generally to the northeast under a very shallow gradient. Given the different groundwater flow regime in the bedrock than the shallow saturated unit, bedrock wells near the



surface water bodies are several feet below the surface water elevation. Based on the fact that the shallow sand and the bedrock are separated by over 50 ft of clay, the bedrock unit does not appear to be hydraulically connected to the shallow sand.



## 2.0 Groundwater Monitoring

## 2.1 Monitoring Well Network

In accordance with 40 CFR 257.91, Consumers Energy established a groundwater monitoring system for the Weadock Bottom Ash Pond, which consists of eight monitoring wells (four background monitoring wells and four downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

Groundwater around the Weadock Bottom Ash Pond was characterized as radial based on the eight initial background sampling events prior to commencing detection monitoring; therefore, the four downgradient wells (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028) were installed in the accessible areas along the perimeter of the Weadock Bottom Ash Pond. Following the cessation of hydraulic loading, groundwater near the Weadock Bottom Ash Pond continues to flow to the north toward the discharge channel and to the west near the Saginaw River; therefore, the compliance wells continue to accurately represent the quality of groundwater passing the waste boundary that ensures detection of groundwater contamination such that all potential contaminant pathways are monitored.

Four monitoring wells located south of the Weadock Bottom Ash Pond provide data on background groundwater quality that has not been impacted by a CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019). Analysis for the establishment of these wells as background is detailed in the *Groundwater Statistical Evaluation Plan* (Stats Plan) for the Weadock Bottom Ash Pond, dated October 17, 2017.

## 2.2 May 2023 Assessment Monitoring

Per §257.95, all wells in the CCR unit monitoring program must be sampled at least semiannually. TRC conducted the first semiannual assessment monitoring event of 2023 for Appendix III and IV constituents at Bottom Ash Pond CCR Unit in accordance with the *JC Weadock Monitoring Program Sample Analysis Plan* (TRC, 2018) (SAP). The semiannual assessment monitoring event was performed on May 1 and 2, 2023. The Bottom Ash Pond downgradient monitoring well network (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028), and background monitoring wells (MW-15002, MW-15008, MW-15016, and MW-15019) were sampled during the semiannual assessment monitoring event. The locations of the monitoring wells are depicted on Figure 2.

The May 2023 sampling event consisted of collecting static water level measurements from the Weadock Bottom Ash Pond groundwater monitoring system. Static water level measurements were also collected at other site wells to support preparation of a groundwater contour map. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2.



Eurofins Environment Testing in St. Louis, Missouri, provided the radiological analysis of the groundwater samples. The remaining Appendix III and IV constituents were analyzed by Consumers Energy Laboratory Services in Jackson, Michigan in accordance with the SAP. The analytical results for the background monitoring wells are summarized in Table 3. The analytical results for the Weadock Bottom Ash Pond downgradient monitoring wells are summarized in Table 4. Analytical results from the May 2023monitoring event are included in the attached laboratory reports (Appendix C).

## 2.2.1 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the May 2023assessment monitoring event are provided in Table 1. These data were used to construct the groundwater contour map (Figure 3). Groundwater elevations at the Weadock site are generally within the range of 579 to 596 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at a similar or slightly higher elevation relative to the surrounding surface water features measured by the NOAA gauging station data.

Figure 3 shows that groundwater near the Weadock Bottom Ash Pond continues to flow to the north toward the discharge channel and to the west near the Saginaw River. The average hydraulic gradient throughout the bottom ash pond area during the May 2023 event is estimated at 0.0060 ft/ft. The gradient was calculated using the monitoring well pairs JCW-MW-15028/JCW-MW-15009, JCW-MW-15007/JCW-MW-15010, and MW-15016/MW-15002. Using the mean hydraulic conductivity of 16 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated seepage velocity observed in May 2023 is 0.32 ft/day or 116 ft/year. The general flow direction is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient monitoring wells are appropriately positioned to detect the presence of Appendix III/IV constituents that could potentially migrate from the Weadock Bottom Ash Pond.

## 2.2.2 Data Quality

Data was evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. 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 Appendix A.



## 3.0 Assessment Monitoring Statistical Evaluation

Assessment monitoring is continuing at the Weadock Bottom Ash Pond 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 May 2023 groundwater data in accordance with the assessment monitoring program.

## 3.1 Establishing Groundwater Protection Standards

The 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. In accordance with §257.95(h) and the Stats Plan, GWPSs were established for the Appendix IV constituents following the preliminary assessment monitoring event as documented in the Groundwater Protection Standards technical memorandum (Appendix C of the 2018 Annual Groundwater Monitoring Report (TRC, January 2019). The GWPS is established as the higher value 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 constituents without an established MCL.

## 3.2 Data Comparison to Groundwater Protection Standards

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 *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 monitoring well data exceeds the GWPS for any Appendix IV constituent. As documented in the January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, beryllium and lithium were present at statistically significant levels above the federal GWPS in one downgradient monitoring well within the Weadock Bottom Ash Pond groundwater monitoring system.

Confidence intervals were established per the statistical methods detailed in the *Statistical Evaluation of May 2023Assessment Monitoring Sampling Event* technical memorandum provided in Appendix B. For each Appendix IV constituent, the concentrations were first compared directly to the respective GWPSs. Constituent-well combinations that included a direct exceedance of the GWPSs were retained for further statistical analysis using confidence limits.

Previously, beryllium and lithium at JCW-MW-15009 were present at a statistically significant levels; however, the lower confidence limit for all Appendix IV constituents are below their respective GWPSs since May 2019. Overall, the assessment monitoring statistical evaluations have confirmed that beryllium, and lithium are the only Appendix IV constituents that have been present at statistically significant levels above the GWPS. The statistical evaluation of this semiannual assessment monitoring event data indicate that no appendix IV constituents are



currently present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Weadock Bottom Ash Pond:

Constituent GWPS #Downgradient Wells Observed

No constituents are present at statistically significant levels exceeding the GWPS

Source removal of CCR has been completed, as reported in the *Weadock Bottom Ash Pond Removal Documentation Report* (Golder, August 2020) and approved by the EGLE on December 18, 2020. Beryllium and lithium concentrations have been below the GWPS at JCW-MW-15009 for the past eight semi-annual sampling events. A summary of the confidence intervals for May 2023 is provided in Table 5.



## 4.0 Conclusions and Recommendations

Corrective action has been triggered and assessment monitoring is ongoing at the Weadock Bottom Ash Pond CCR unit. A summary of the May 2023 assessment monitoring event is presented in this report. Overall, the statistical assessments have confirmed that there are no Appendix IV constituents present at statistically significant levels above the GWPS. Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Weadock Bottom Ash Pond under the *J.C. Weadock Generating Facility Bottom Ash Pond Closure Plan* (Golder, January 2018) and the CCR Rule's closure by removal provisions in §257.102(c).

Consumers has formally selected the Source Removal with Post Remedy Monitoring remedy for the Weadock Bottom Ash Pond per §257.97(a) to meet the standards set forth in §257.97(b) (Consumers Energy, July 2023). An attainment monitoring program will be developed and used to demonstrate compliance with the GWPSs established under § 257.95(h) by showing that concentrations of the constituents triggering corrective action (i.e. beryllium and lithium) are below the GWPSs (i.e. upper confidence limit below GWPSs) for a period of three consecutive years using the statistical procedures and performance standards in § 257.93(f) and (g). Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98. The next semiannual monitoring event is tentatively scheduled for the fourth calendar quarter of 2023.



## 5.0 References

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



## **Tables**

Table 1

## Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	TOC	2 1 1 11 11 11		n In	terval	Мау	May 1, 2023		
Well Location	Elevation (ft)	Geologic Unit of Screen Interval		Elevation (ft)		Depth to Water (ft BTOC)	Groundwater Elevation (ft)		
Background Monitori	na Wells				I	(11 = 1 = 0)	(1-7)		
MW-15002	587.71	Sand	580.9	to	570.9	6.41	581.30		
MW-15008	585.36	Sand with clay	578.7	to	568.7	4.31	581.05		
MW-15016	586.49	Sand	581.2	to	578.2	3.25	583.24		
MW-15019	586.17	Sand and Sand/Clay	579.5	to	569.5	5.21	580.96		
Bottom Ash Pond: Do	wngradient Monito			1 1	L				
JCW-MW-15007	587.40	Sand	582.7	to	579.2	3.24	584.16		
JCW-MW-15009	589.64	Sand	581.9	to	576.9	8.70	580.94		
JCW-MW-15010	597.76	Sand	579.7	to	578.2	17.19	580.57		
JCW-MW-15028	589.64	Sand	567.7	to	564.7	6.95	582.69		
Landfill: Downgradier	nt Monitoring Wells	(outside slurry wall)		1 1	J.		*		
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3	to	573.3	16.92	579.81		
JCW-MW-18004	593.04	Sandy Clay	583.9	to	578.9	12.23	580.81		
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0	to	575.0	8.22	582.67		
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8			12.39	588.33		
MW-50	593.36	Sand	577.8	to	574.8	13.51	579.85		
MW-51	594.29	Sand and Clay	577.8	to	574.8	14.37	579.92		
MW-52	594.90	Sand	579.3	to	576.3	14.98	579.92		
MW-53	593.68	Sand and Clay	579.1	to	576.1	13.79	579.89		
MW-53R	594.25	Sand and Clay	580.4	to	575.4	14.40	579.85		
MW-54R	593.89	Clay and Sand	581.3	to	576.3	13.75	580.14		
MW-55	593.82	Sand	581.5	to	578.5	14.03	579.79		
OW-57R OUT	591.00	Sandy Clay	577.0	to	572.0	9.85	581.15		
Landfill: Static Water	Level Only (inside						•		
JCW-OW-18001	595.84	Fly Ash and Sand	581.1	to	576.1	6.51	589.33		
JCW-OW-18002	593.63	Sand	578.9	to	573.9	9.68	583.95		
JCW-OW-18003	593.99	Sand and Clay	580.5	to	575.5	7.65	586.34		
JCW-OW-18004	594.19	Sandy Clay	584.6	to	579.6	5.95	588.24		
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9	to	577.9	6.43	594.18		
MW-20	592.73	NR	~581.1	to	~578.1	5.86	586.87		
OW-51	593.62	Clay and Sand	578.9	to	575.9	9.41	584.21		
OW-53	593.64	Clay and Sand	579.0	to	576.0	6.53	587.11		
OW-54	594.10	Clay and Sand	580.0	to	577.0	5.80	588.30		
OW-55	594.67	Clay (or Sand and Clay)	580.9	to	577.9	6.10	588.57		
OW-56R	592.01	Ash and Sand	577.5	to	572.5	5.30	586.71		
OW-57R IN	590.86	Sandy Clay	575.7	to	570.7	5.53	585.33		
OW-61	602.15	Ash and Sand	588.0	to	585.0	6.65	595.50		
Landfill: Leachate He	adwells		•						
LH-103R	612.70	Fly Ash	30.2	to	33.2	22.26	590.44		
LH-104	596.56	Fly Ash	8.0	to	11.0	7.40	589.16		

## Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

Table 2

## Summary of Field Parameters JC Weadock Bottom Ash Pond - RCRA CCR Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Background			,	. ,	,	,	,
MW-15002	5/1/2023	0.48	-80.3	7.2	413	9.0	3.1
MW-15008	5/1/2023	0.22	-106.3	6.6	1,032	9.0	8.9
MW-15016	5/2/2023	0.37	-43.9	6.9	914	8.1	3.0
MW-15019	5/1/2023	0.49	-99.3	6.6	1,457	8.1	3.5
Weadock Bottom Ash Pond							
JCW-MW-15007	5/2/2023	0.12	-116.0	7.0	6,025	7.7	8.7
JCW-MW-15009	5/2/2023	0.16	-178.5	5.8	2,394	8.8	6.3
JCW-MW-15010	5/2/2023	0.13	-250.3	7.1	1,271	9.9	8.9
JCW-MW-15028	5/2/2023	0.34	-176.0	7.6	4,318	9.5	4.5

### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celsius.

NTU - Nephelometric Turbidity Unit.

### Table 3

## Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	5/1/2023	5/1/2023	5/1/2023	5/1/2023
				MI Non-			Backe	ground	
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		раско	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	< 20	107	347	211
Calcium	mg/L	NC	NC	NC	500EE	48.4	108	175	159
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	64.5	259	106	302
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	14.9	10.5	253	94.2
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	351	877	889	1,170
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 9.0	7.2	6.6	6.9	6.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	1	2	1
Barium	ug/L	2,000	2,000	2,000	1,200	63	71	58	317
Beryllium	ug/L	4	4.0	4.0	33	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	170	350	440	< 10	24	64	13
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	< 0.183	< 0.249	< 0.127	0.31
Radium-228	pCi/L	NC	NC	NC	NC	< 0.547	< 1.16	< 1.01	< 0.859
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.547	< 1.16	< 1.01	< 0.859
Selenium	ug/L	50	50	50	5.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	729	17,900	1,970	21,500
Copper	ug/L	1,000**	1,000E	1,000E	20	1	< 1.0	< 1.0	< 1.0
Nickel	ug/L	NC	100	100	120	< 2	2	6	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	5	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000€	260	< 10	< 10	< 10	< 10

## Notes:

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

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

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 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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) JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	JCW-MW-15007	JCW-MW-15009	JCW-MW-15010	JCW-MW-15028
					Sample Date:	5/2/2023	5/2/2023	5/2/2023	5/2/2023
				MI Non-					
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^				
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	212	170	1,100	508
Calcium	mg/L	NC	NC	NC	500EE	207	526	199	198
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	1,810	36.2	25	1,110
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	175	1,490	273	122
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	3,630	2,260	936	2,520
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	7.0	5.8	7.1	7.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	8	< 1	14	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	189	19	285	381
Beryllium	ug/L	4	4.0	4.0	33	< 1	1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	55	79	78	56
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	0.216	< 0.134	0.304	0.448
Radium-228	pCi/L	NC	NC	NC	NC	< 0.579	< 0.944	< 0.740	0.968
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.579	< 0.944	< 0.740	1.42
Selenium	ug/L	50	50	50	5.0	3	2	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	1,460	13,900	417	585
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	< 1	1	< 1	< 1
Nickel	ug/L	NC	100	100	120	6	13	4	4
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	17	< 2	< 2	8
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	< 10	< 10	< 10	< 10

#### Notes:

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

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

 $MCL-Maximum\ Contaminant\ Level,\ EPA\ Drinking\ Water\ Standards\ and\ Health\ Advisories,\ April,\ 2012.$ 

NC - no criteria; -- - not analyzed.

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- <sup>E</sup> Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

 $\ensuremath{\mathsf{RED}}$  value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

July 2023

Table 5

## Summary of Assessment Monitoring Statistical Evaluation – May 2023 JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

Constituent	Units	GWPS	JCW-M\	W-15007	JCW-MW-15010	
Constituent	Offics	GWF3	LCL	UCL	LCL	UCL
Arsenic	ug/L	21	13	56	3.3	17
Barium	ug/L	2,000	480	2,000		
Selenium	ug/L	50	1.0	68		

#### Notes:

Only compliance well/constituent pairs with one or more concentrations exceeding the GWPS within

the 8 most recent semiannual sampling events are included on this table.

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.

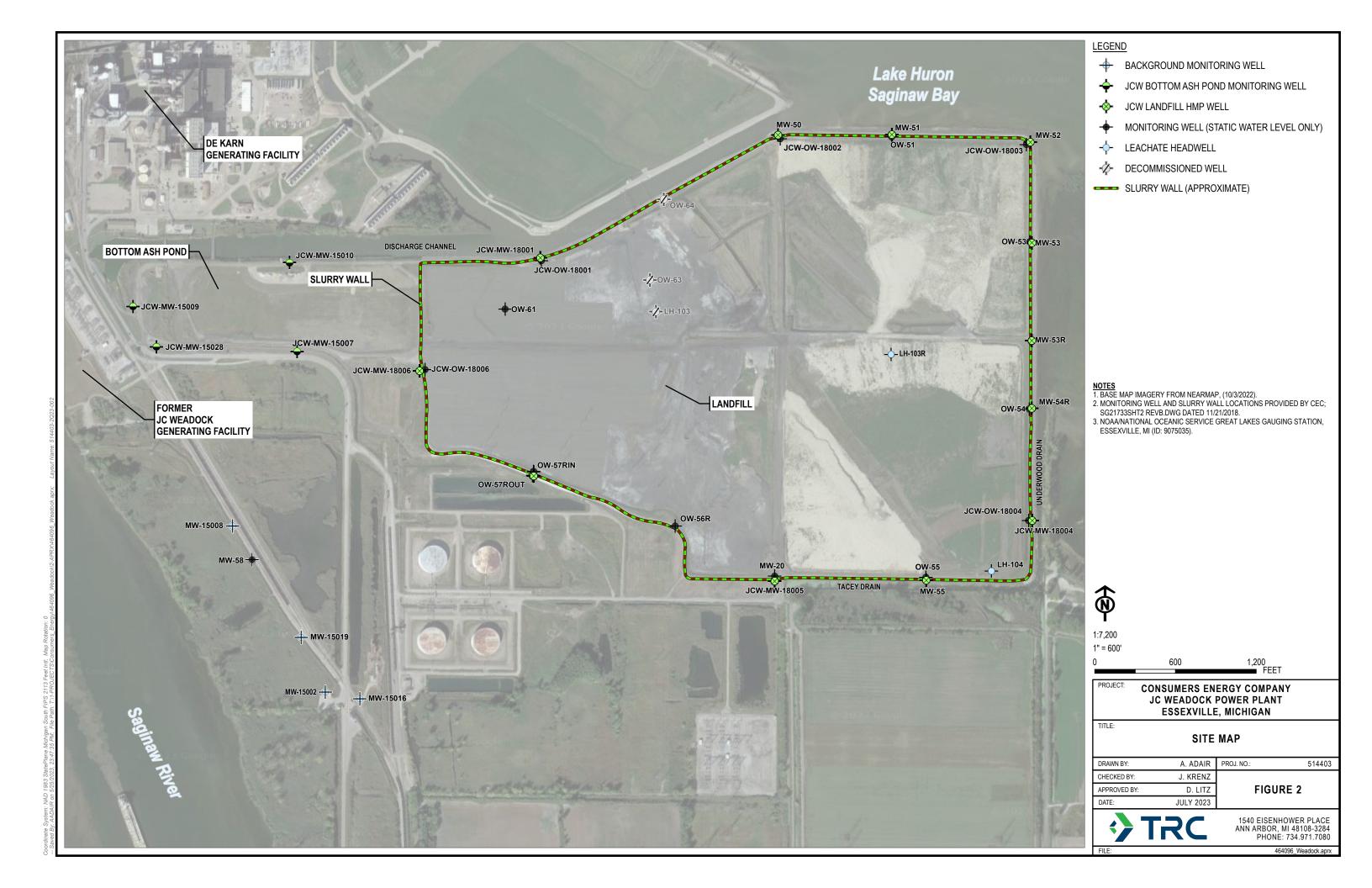
-- - Not Applicable; constituent concentrations for the 8 most recent semiannual sampling events were below the GWPS.

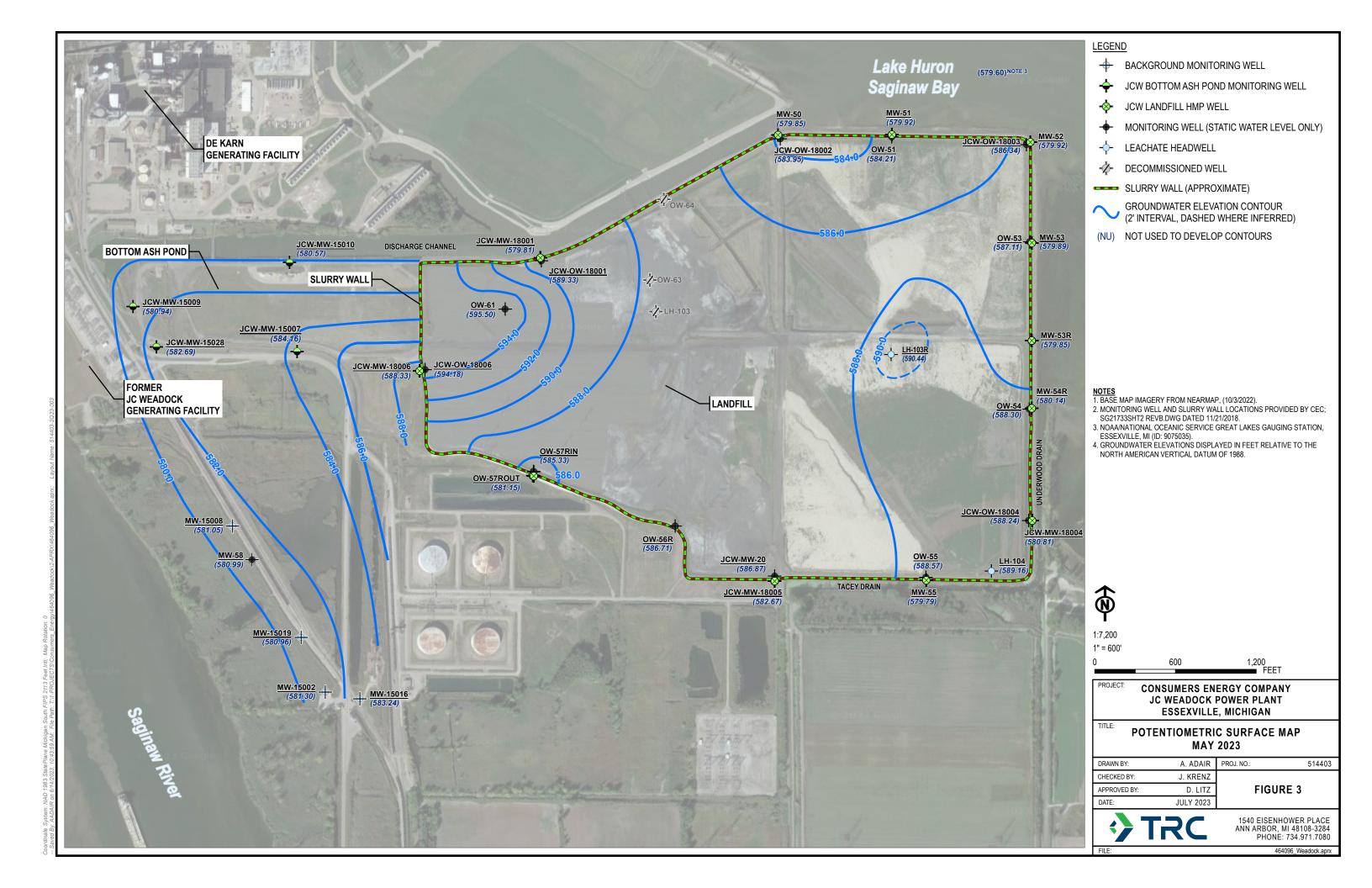
Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL

is greater than the GWPS.



## **Figures**







## **Appendix A Data Quality Reviews**

## Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0404.

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

■ MW-15002

■ MW-15008

MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses:
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium 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**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- The field duplicate pair samples were DUP-Background and MW-15019; all criteria between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

## Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock Bottom Ash Pond

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for total metals, anions, alkalinity, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0405.

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

- JCW-MW-15007
- JCW-MW-15009
- JCW-MW-15010

JCW-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 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**

- One equipment blank (EB-JCW-BAP) and one field blank (FB-JCW-BAP) were collected. Total iron was detected in EB-JCW-BAP at 22 μg/L and in FB-JCW-BAP at 20 μg/L. There is no adverse impact on the data usability due to this issue since the results for total iron in the groundwater samples in this data set were >10x the blank concentrations.
- MS and MSD analyses were performed on sample JCW-MW-15009 for total metals, anions, and total alkalinity. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory for all parameters and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-JCW-BAP and JCW-MW-15007; all criteria between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.

## Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock/Karn DEK Background

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-184759-1 Revision 1.

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

■ MW-15002

■ MW-15008

■ MW-15016

MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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;
- 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.

- The reviewed 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**

- Target analytes were not detected in the method blanks (MBs) with the following exception.
  - Radium-226 was detected in MB 160-611074/1-A at 0.1185 +/- 0.0829 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.</li>
- One field blank (FB-Background) was collected. Target analytes were not detected in the field blank sample.
- LCS/LCSD recoveries and relative percent differences for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this SDG.
- The field duplicate pair samples were DUP-Background/MW-15019. All criteria were met.
- Carrier recoveries were within 40-110%.

#### Attachment A

Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn/JC Weadock Background

— CCR Monitoring Program

Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15019	5/1/2023	Radium 226	Detected result is potentially a false positive due to method blank contamination.
DUP-BACKGROUND	5/1/2023	Naululli 220	Detected result is potentially a raise positive due to metriod plank containination.

## Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock Bottom Ash Pond

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-184760-1.

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

JCW-MW-15007

■ JCW-MW-15009

■ JCW-MW-15010

■ JCW-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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;
- 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.

- The reviewed 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**

- Target analytes were not detected in the method blanks (MBs) with the following exception.
  - Radium-226 was detected in MB 160-611074/1-A at 0.1185 +/- 0.0829 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.</li>
- One equipment blank (EB-JCW-BAP) was collected. Target analytes were not detected in the equipment blank sample.
- LCS/LCSD recoveries and relative percent differences (RPDs) for all target analytes were within laboratory control limits.
- MS/MSD duplicate analyses were not performed on a sample from this SDG.
- The field duplicate pair samples were DUP-JCW-BAP/JCW-MW-15007. All criteria were met.
- Carrier recoveries were within 40-110%.

#### Attachment A

Summary of Data Non-Conformances for Groundwater Analytical Data JC Weadock Bottom Ash Pond – CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JCW-MW-15007	5/2/2023		Detected result is potentially a false positive due to method blank contamination (normalized absolute difference
JCW-MW-15010	5/2/2023	Radium 226	Detected result is potentially a raise positive due to method blank contamination (normalized absolute difference   <1.96).
JCW-MW-15028	5/2/2023		<1.90).



# Appendix B Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event



June 29, 2023 Date:

To: J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

514403.0001.0000 Phase 002, Task 002 **Project No.:** 

Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event Subject:

JC Weadock Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), beryllium and lithium were present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019. Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule<sup>1</sup> at the JC Weadock Power Plant Bottom Ash Pond.

An assessment monitoring event was conducted on May 2 and 3, 2023. 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.

The statistical evaluation of the assessment monitoring event data indicates that no constituents are present at statistically significant levels that exceed the GWPSs in downgradient monitoring wells at the Weadock Bottom Ash Pond.

#### **GWPS** Constituent **#Downgradient Wells Observed**

No constituents are present at statistically significant levels above the GWPSs.

Both beryllium and lithium at downgradient well JCW-MW-15009 were previously present at statistically significant levels; however, beryllium and lithium concentrations have been below their respective GWPS for eight semiannual events.

<sup>&</sup>lt;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).

#### **Assessment Monitoring Statistical Evaluation**

The four downgradient wells (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028) are located in accessible areas along the downgradient perimeter of the Weadock Bottom Ash Pond. Following the assessment monitoring sampling event, compliance well data for the Weadock Bottom Ash Pond 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 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 is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample standard deviation, and a selected confidence level (i.e., 99 percent), an upper and lower confidence limit is calculated. The true mean concentration, with 99 percent confidence, will fall between the 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 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 1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight sampling events (October 2019 through May 2023) were retained for further analysis. Arsenic at JCW-MW-15007 and JCW-MW-15010, barium at JCW-MW-15007, and selenium at JCW-MW-15007 had individual results exceeding their respective GWPSs within this time period.

Groundwater data were 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, as appropriate, were calculated for each of the CCR Appendix IV

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<sup>&</sup>lt;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.

constituents using a per test<sup>3</sup> 99 percent confidence level, i.e., a significance level (α) of 0.01. The following narrative describes the methods employed and the results obtained. The Sanitas<sup>™</sup> 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.

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. Initially, the assessment monitoring results were observed visually for potential trends. No outliers or visual trends were identified.

The Sanitas<sup>TM</sup> 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 pertest 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 about data transformations, as appropriate. The data sets for arsenic at JCW-MW-15007 and JCW-MW-15010, and barium at JCW-MW-15007 were found to be normally distributed. A Non-parametric confidence interval was used for selenium at JCW-MW-15007 due to a high percentage of non-detects in the dataset. The confidence interval test compares the lower confidence limit to the GWPS.

The statistical evaluation of the Appendix IV parameters shows no constituents present at statistically significant levels that exceed the GWPSs. The results of the assessment monitoring statistical evaluation are consistent with the previous assessment monitoring data statistical evaluation. Although no Appendix IV constituents are present at statistically significant levels above the GWPS based on this

<sup>&</sup>lt;sup>3</sup> Confidence level is assessed for each individual comparison (i.e. per well and per constituent)

data evaluation, corrective action has been triggered as a result of data collected during the previous assessment monitoring events. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

#### **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Attachment 1 Sanitas™ Output Files

## **Table**

				Sa	ample Location:					J	CW-MW-150	07				
					Sample Date:	10/15/2019	10/15/2019	5/14/2020	10/13/2020	5/12/2021	5/12/2021	10/12/2021	10/12/2021	5/10/2022	10/4/2022	5/2/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS											
Appendix III							Field Dup				Field Dup		Field Dup			
Boron	ug/L	NC	NA	619	NA	470	460	335	329	233	240	503	532	255	570	212
Calcium	mg/L	NC	NA	302	NA	130	120	217	413	280	294	265	267	275	493	207
Chloride	mg/L	250*	NA	2,440	NA	1,200	1,200	2,870	5,810	3,780	3,830	2,820	2,790	3,470	2,880	1,810
Fluoride	ug/L	4,000	NA	1,000	NA	< 5,000 <sup>(1)</sup>	< 5,000 <sup>(1)</sup>	< 1,000	1,160	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	44	43	57.2	4.47	29.0	29.8	82.1	82.5	28.4	773	175
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	2,300	2,400	5,080	11,200	7,200	7,280	5,070	4,920	7,000	6,910	3,630
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.1		7.6	7.3	7.1		7.0		7.2	6.9	7.0
Appendix IV																
Antimony	ug/L	6	NA	1	6	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	34	35	19	61	31	31	17	45	24	67	8
Barium	ug/L	2,000	NA	1,300	2,000	970	970	1,180	2,400	1,680	1,670	1,620	1,590	1,540	412	189
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1.0	< 1	1	< 1	< 1	1	1	3	2	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	< 5,000 <sup>(1)</sup>	< 5,000 <sup>(1)</sup>	< 1,000	1,160	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	70	67	103	94	70	69	144	151	81	147	55
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	9.7	9.6	< 5	< 5	8	8	7	7	5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.659	0.442	0.728	1.71	1.32	1.01	1.35	1.02	1.09	< 0.184	0.216
Radium-228	pCi/L	NC	NA	NA	NA	0.796	0.543	0.698	1.67	1.27	1.43	1.63	1.66	1.21	< 0.585	< 0.579
Radium-226/228	pCi/L	5	NA	3.32	5	1.45	0.986	1.43	3.38	2.59	2.45	2.98	2.68	2.30	< 0.585	< 0.579
Selenium	ug/L	50	NA	2	50	< 1.0	< 1.0	< 1	< 1	4	3	< 1	< 1	< 1	68	3
Thallium	ug/L	2	NA	2	2	< 2.0	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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) Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences. and/or concentrations of other constituents present.

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				Sa	ample Location:				.ICW-M	W-15009			
				06	Sample Date:	10/15/2019	5/14/2020	10/13/2020	5/12/2021	10/13/2021	5/10/2022	10/4/2022	5/2/2023
					Campio Bato.	10/10/2010	0/11/2020	10/10/2020	0/12/2021	10/10/2021	O/ TO/LOLL	10/1/2022	0/2/2020
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS								
Appendix III													
Boron	ug/L	NC	NA	619	NA	330	141	263	255	289	202	239	170
Calcium	mg/L	NC	NA	302	NA	520	314	560	574	615	526	566	526
Chloride	mg/L	250*	NA	2,440	NA	18	3.19	5.96	14.8	28.7	34.5	32.6	36.2
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
Sulfate	mg/L	250*	NA	407	NA	1,400	611	1,060	1,450	1,410	1,310	1,460	1,490
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	2,100	1,370	1,910	2,230	2,400	2,270	2,380	2,260
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	6.1	7.2	6.6	5.6	6.0	5.9	6.3	5.8
Appendix IV													
Antimony	ug/L	6	NA	1	6	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	< 1.0	< 1	1	< 1	3	< 1	< 1	< 1
Barium	ug/L	2,000	NA	1,300	2,000	66	58	51	23	23	17	23	19
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	1	< 1	1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	2	< 1	< 1	< 1	1	1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	94	18	53	89	112	80	92	79
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	9.3	10	9	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.175	< 0.125	< 0.352	0.333	0.388	< 0.601	0.174	< 0.134
Radium-228	pCi/L	NC	NA	NA	NA	0.548	< 0.491	< 0.495	0.720	0.922	1.11	0.753	< 0.944
Radium-226/228	pCi/L	5	NA	3.32	5	0.723	< 0.491	< 0.495	1.05	1.31	1.45	0.927	< 0.944
Selenium	ug/L	50	NA	2	50	2.0	1	< 1	< 1	< 1	< 1	1	2
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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) Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences. and/or concentrations of other constituents present.

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				Sa	ample Location:					JCW-M	W-15010				
					Sample Date:	10/14/2019	5/14/2020	10/13/2020	10/13/2020	5/11/2021	10/13/2021	5/10/2022	5/10/2022	10/4/2022	5/2/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS										
Appendix III									Field Dup				Field Dup		
Boron	ug/L	NC	NA	619	NA	1,400	2,070	2,000	2,030	1,080	1,190	1,200	1,200	1,080	1,100
Calcium	mg/L	NC	NA	302	NA	110	286	218	204	128	142	165	165	170	199
Chloride	mg/L	250*	NA	2,440	NA	140	90.4	105	106	67.8	50.7	41.7	41.9	30.5	25
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
Sulfate	mg/L	250*	NA	407	NA	30	553	254	255	74.7	77.0	167	167	207	273
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	600	1,500	982	997	607	667	838	806	836	936
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.3	7.7	7.1		7.2	7.1	7.1		7.1	7.1
Appendix IV															
Antimony	ug/L	6	NA	1	6	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	13	4	4	4	6	22	5	5	13	14
Barium	ug/L	2,000	NA	1,300	2,000	180	400	220	221	148	221	219	220	276	285
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	84	116	96	97	70	92	74	73	71	78
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5.0	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	< 0.134	0.409	< 0.442	< 0.445	< 0.410	0.389	< 0.488	< 0.415	0.318	0.304
Radium-228	pCi/L	NC	NA	NA	NA	0.412	< 0.467	< 0.493	< 0.566	0.700	0.858	0.932	1.37	0.652	< 0.740
Radium-226/228	pCi/L	5	NA	3.32	5	0.536	0.781	< 0.493	< 0.566	0.898	1.25	0.952	1.50	0.970	< 0.740
Selenium	ug/L	50	NA	2	50	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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				Sa	ample Location:				J(	CW-MW-150	28			
					Sample Date:	10/14/2019	5/14/2020	5/14/2020	10/13/2020	5/12/2021	10/12/2021	5/10/2022	10/4/2022	5/2/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS									
Appendix III								Field Dup						
Boron	ug/L	NC	NA	619	NA	550	570	562	644	563	620	633	547	508
Calcium	mg/L	NC	NA	302	NA	170	205	204	221	235	205	199	192	198
Chloride	mg/L	250*	NA	2,440	NA	640	823	806	811	921	974	1,070	1,350	1,110
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
Sulfate	mg/L	250*	NA	407	NA	120	128	122	99.8	102	97	93.7	106	122
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	1,500	2,210	2,240	2,070	2,130	2,360	2,500	2,460	2,520
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.8	8.1	-	7.9	7.7	7.8	7.7	7.7	7.6
Appendix IV														
Antimony	ug/L	6	NA	1	6	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	< 1.0	< 1	1	< 1	3	11	< 1	9	< 1
Barium	ug/L	2,000	NA	1,300	2,000	230	324	331	332	342	363	351	385	381
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1	< 1	< 1	< 1	< 1	2	1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	48	60	60	53	51	66	54	52	56
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5.0	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.576	0.515	< 0.136	0.697	0.621	0.819	0.49	0.646	0.448
Radium-228	pCi/L	NC	NA	NA	NA	0.585	0.733	< 0.399	< 0.468	0.997	1.19	0.944	1.23	0.968
Radium-226/228	pCi/L	5	NA	3.32	5	1.16	1.25	< 0.399	1.15	1.62	2.00	1.43	1.87	1.42
Selenium	ug/L	50	NA	2	50	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

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**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.

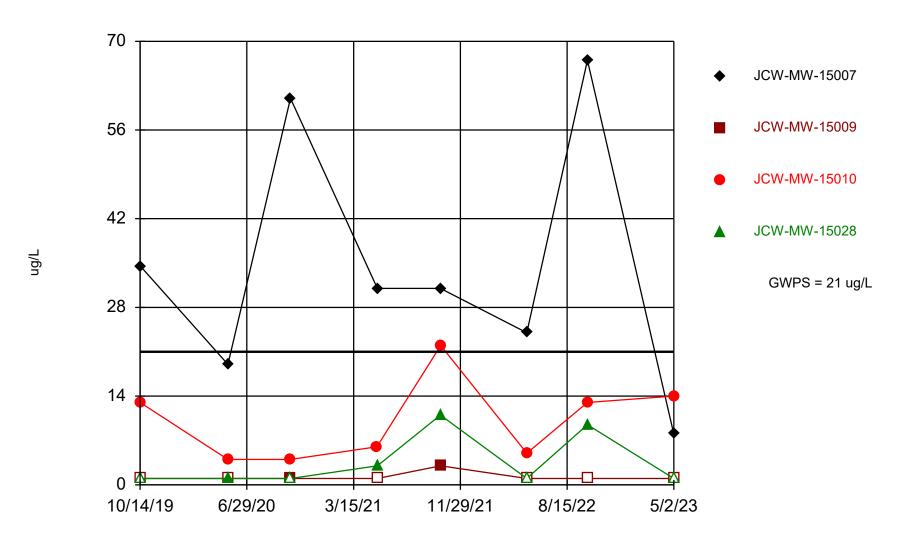
All metals were analyzed as total unless otherwise specified.

(1) Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences. and/or concentrations of other constituents present.

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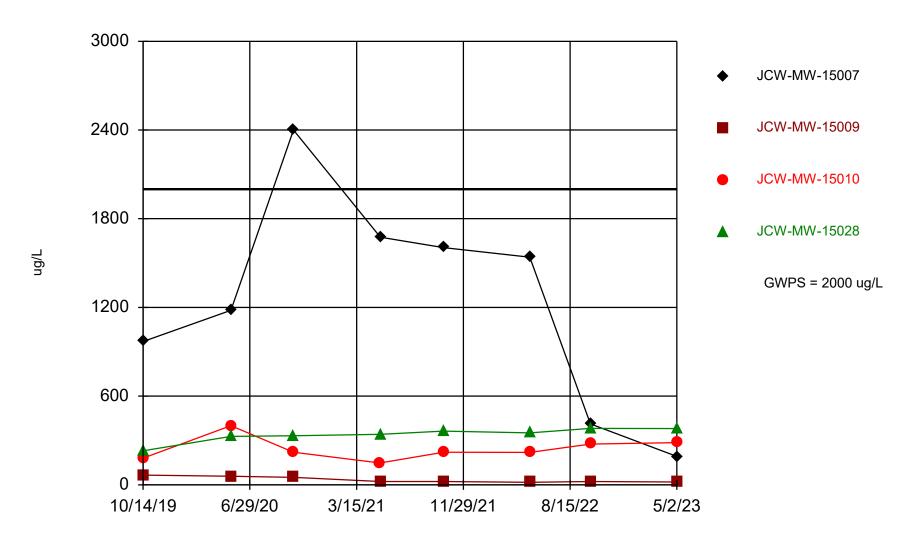
## Attachment 1 Sanitas™ Output Files

## Arsenic Comparison to GWPS



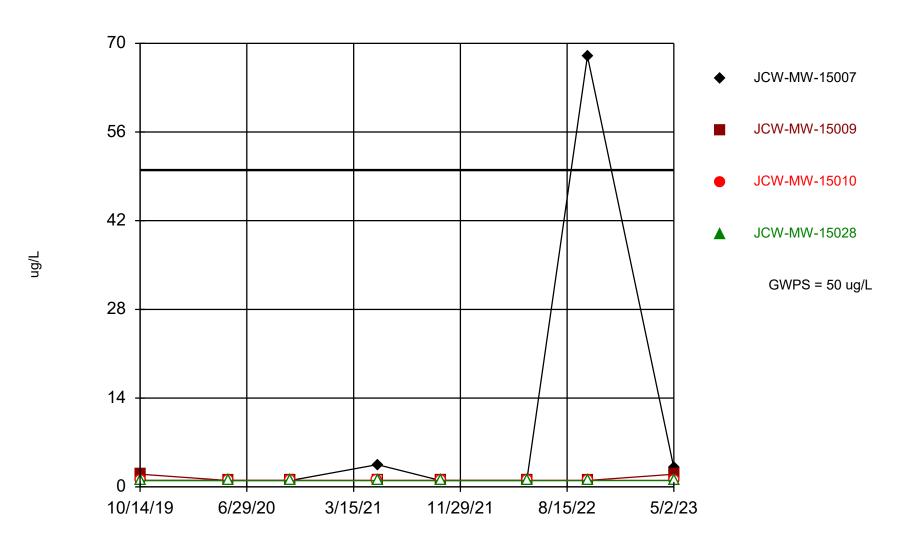
Time Series Analysis Run 5/30/2023 11:34 AM

## Barium Comparison to GWPS



Time Series Analysis Run 5/30/2023 11:36 AM

## Selenium Comparison to GWPS



Time Series Analysis Run 5/30/2023 11:37 AM

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG

### **Summary Report**

Constituent: Arsenic, Total Analysis Run 5/30/2023 11:38 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 10/14/2019 and 5/2/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 10 Wells = 4 Minimum Value = 1 Maximum Value = 67 Mean Value = 12.34 Median Value = 4.5 Standard Deviation = 16.85 Coefficient of Variation = 1.365 Skewness = 1.947

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-15007	8	0	8	67	34.44	31	20.13	0.5845	0.5599
JCW-MW-15009	8	6	1	3	1.25	1	0.7071	0.5657	2.268
JCW-MW-15010	8	0	4	22	10.13	9.5	6.446	0.6367	0.6362
JCW-MW-15028	8	4	1	11	3.563	1	4.204	1.18	1.103

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### **Summary Report**

Constituent: Barium, Total Analysis Run 5/30/2023 11:38 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 10/14/2019 and 5/2/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 0 Wells = 4 Minimum Value = 17 Maximum Value = 2400 Mean Value = 466 Median Value = 280.5 Standard Deviation = 583.8 Coefficient of Variation = 1.253 Skewness = 1.879

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	<u>CV</u>	<u>Skewness</u>
JCW-MW-15007	8	0	192	2400	1247	1360	718.9	0.5766	-0.03823
JCW-MW-15009	8	0	17	66	35	23	19.85	0.5671	0.6042
JCW-MW-15010	8	0	148	400	243.8	220.8	77.49	0.3179	0.9002
JCW-MW-15028	8	0	230	381.5	338.5	346.5	48.34	0.1428	-1.495

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UC

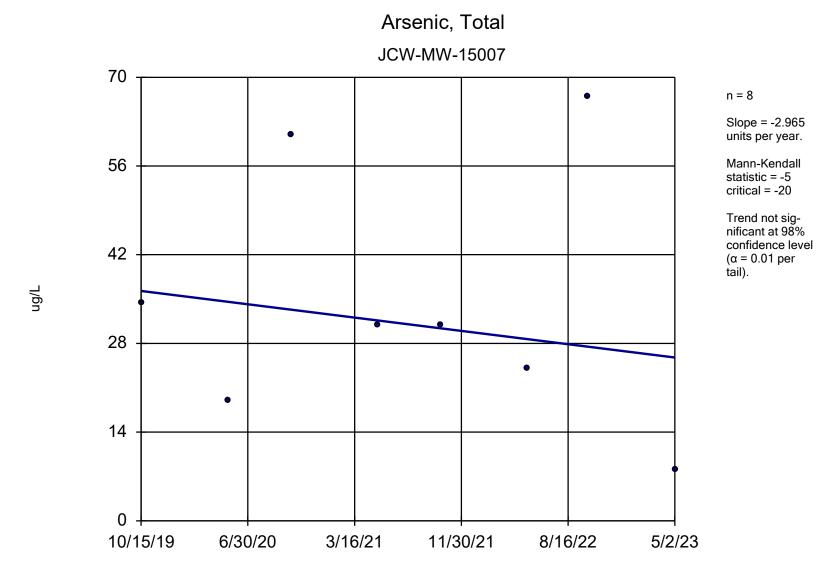
### **Summary Report**

Constituent: Selenium, Total Analysis Run 5/30/2023 11:38 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

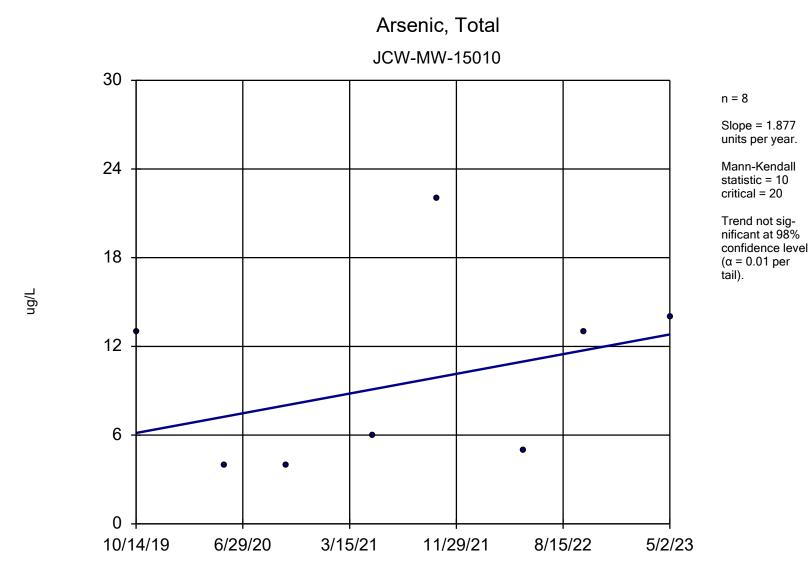
For observations made between 10/14/2019 and 5/2/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 25 Wells = 4 Minimum Value = 1 Maximum Value = 68 Mean Value = 3.297 Median Value = 1 Standard Deviation = 11.82 Coefficient of Variation = 3.586 Skewness = 5.367

Well	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	Skewness
JCW-MW-15007	8	5	1	68	9.938	1	23.48	2.363	2.259
JCW-MW-15009	8	4	1	2	1.25	1	0.4629	0.3703	1.155
JCW-MW-15010	8	8	1	1	1	1	0	0	NaN
JCW-MW-15028	8	8	1	1	1	1	0	0	NaN

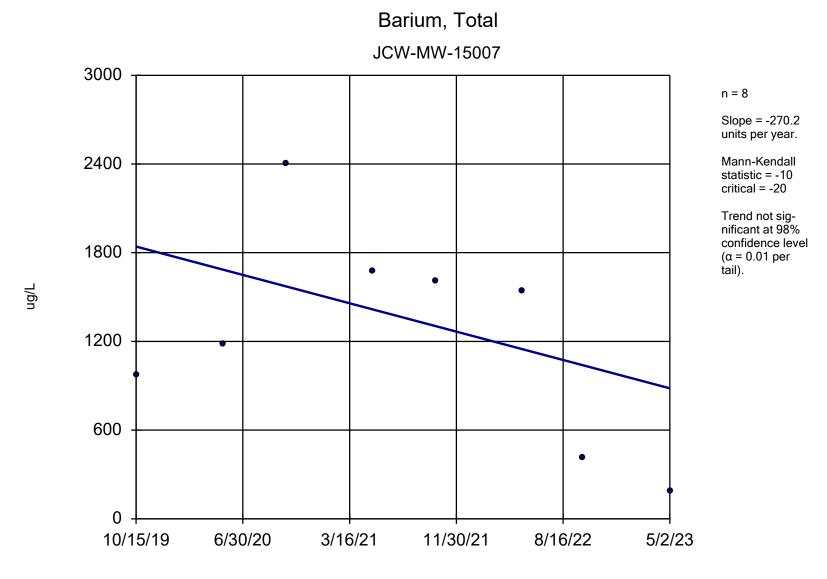


Sen's Slope Estimator Analysis Run 5/30/2023 11:39 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



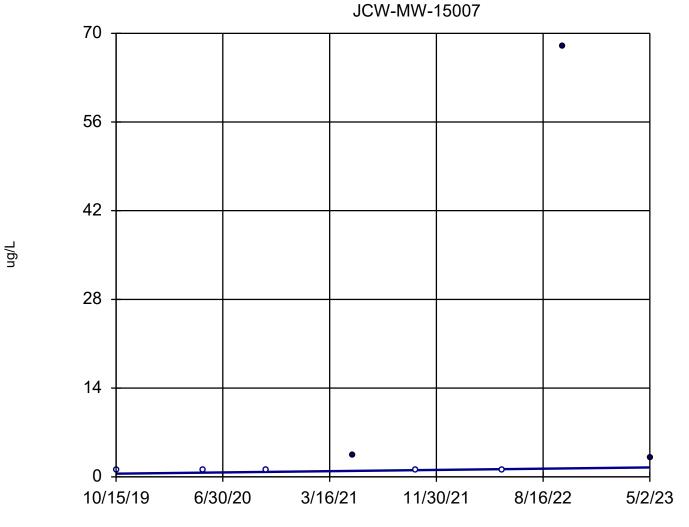
Sen's Slope Estimator Analysis Run 5/30/2023 11:39 AM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



Sen's Slope Estimator Analysis Run 5/30/2023 11:39 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

## Selenium, Total



n = 8

Slope = 0.2819 units per year.

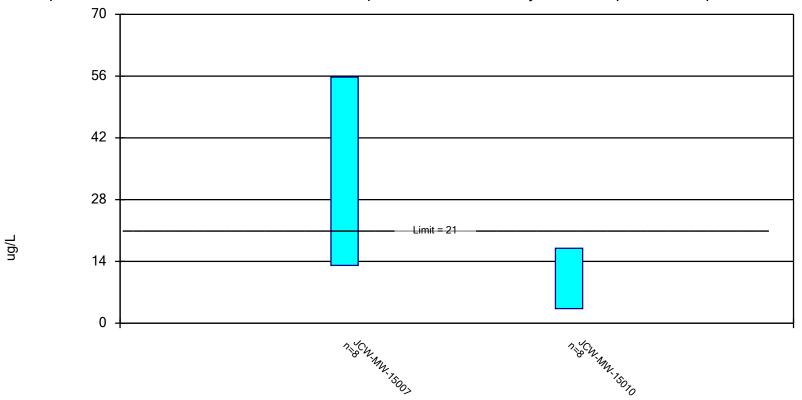
Mann-Kendall statistic = 10 critical = 20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 11:39 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

#### Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 5/30/2023 11:40 AM

## **Confidence Interval**

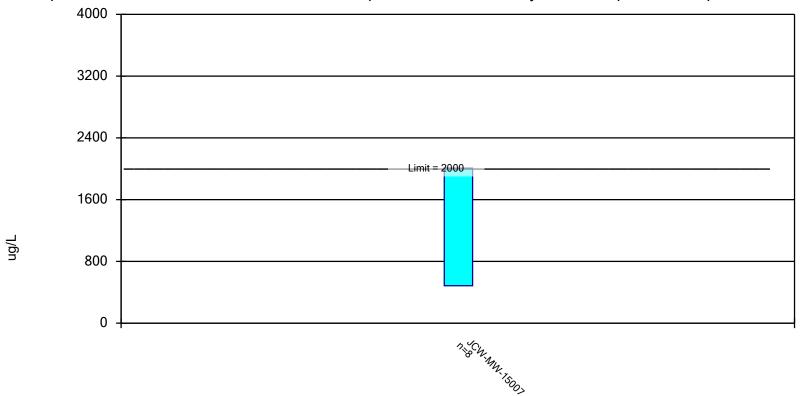
Constituent: Arsenic, Total (ug/L) Analysis Run 5/30/2023 11:41 AM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-15007	JCW-MW-15010
10/14/2019		13
10/15/2019	34.5 (D)	
5/14/2020	19	4
10/13/2020	61	4 (D)
5/11/2021		6
5/12/2021	31 (D)	
10/12/2021	31 (D)	
10/13/2021		22
5/10/2022	24	5 (D)
10/4/2022	67	13
5/2/2023	8 (D)	14
Mean	34.44	10.13
Std. Dev.	20.13	6.446
Upper Lim.	55.77	16.96
Lower Lim.	13.1	3.292

#### Parametric Confidence Interval

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



Constituent: Barium, Total Analysis Run 5/30/2023 11:41 AM

## **Confidence Interval**

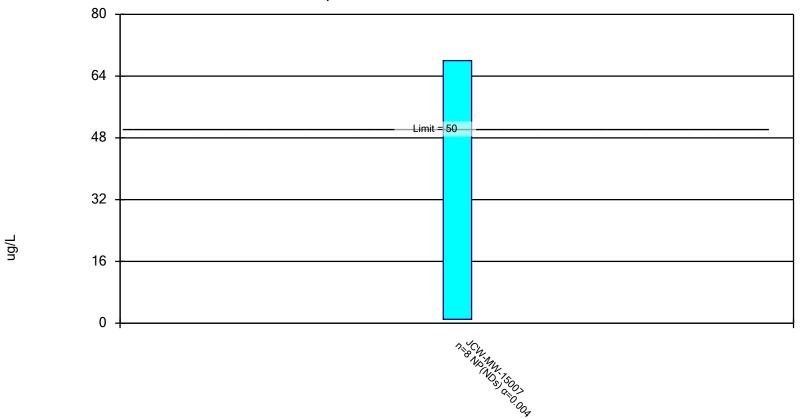
Constituent: Barium, Total (ug/L) Analysis Run 5/30/2023 11:41 AM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-15007
10/15/2019	970 (D)
5/14/2020	1180
10/13/2020	2400
5/12/2021	1675 (D)
10/12/2021	1605 (D)
5/10/2022	1540
10/4/2022	412
5/2/2023	192 (D)
Mean	1247
Std. Dev.	718.9
Upper Lim.	2009
Lower Lim.	484.7

### Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Selenium, Total Analysis Run 5/30/2023 11:41 AM

## **Confidence Interval**

Constituent: Selenium, Total (ug/L) Analysis Run 5/30/2023 11:41 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-15007
10/15/2019	<1 (D)
5/14/2020	<1
10/13/2020	<1
5/12/2021	3.5 (D)
10/12/2021	<1 (D)
5/10/2022	<1
10/4/2022	68
5/2/2023	3 (D)
Mean	9.938
Std. Dev.	23.48
Upper Lim.	68
Lower Lim.	1



## Appendix C Laboratory Analytical Reports



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q2

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 23-0404** 

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 05/01/2023 for the 2<sup>nd</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 05/03/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2023 DEK-JCW Background Wells

**Date Received:** 5/3/2023 **Chemistry Project:** 23-0404

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0404-01	MW-15002	Groundwater	05/01/2023 15:01	DEK JCW Background
23-0404-02	MW-15008	Groundwater	05/01/2023 12:40	DEK JCW Background
23-0404-03	MW-15016	Groundwater	05/01/2023 08:40	DEK JCW Background
23-0404-04	MW-15019	Groundwater	05/01/2023 13:43	DEK JCW Background
23-0404-05	DUP-Background	Groundwater	05/01/2023 00:00	DEK JCW Background
23-0404-06	FB- Background	Water	05/01/2023 12:40	DEK JCW Background



05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15002
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-01
 Collect Time:
 03:01 PM

Antimony ND ug/L 1.0 05/10/2023 AB23-0510-14 Arsenic ND ug/L 1.0 05/10/2023 AB23-0510-14 Barium 63 ug/L 5.0 05/10/2023 AB23-0510-14 Barium ND ug/L 1.0 05/10/2023 AB23-0510-14 Beryllium ND ug/L 20.0 05/10/2023 AB23-0510-14 Boron ND ug/L 20.0 05/10/2023 AB23-0510-14 Cadmium ND ug/L 1000.0 05/10/2023 AB23-0510-14 Calcium 48400 ug/L 1000.0 05/10/2023 AB23-0510-14 Chromium ND ug/L 1.0 05/10/2023 AB23-0510-14 Chromium ND ug/L 1.0 05/10/2023 AB23-0510-14 Copper 1 ug/L 1.0 05/10/2023 AB23-0510-14 Copper 1 ug/L 1.0 05/10/2023 AB23-0510-14 Lead ND ug/L 1.0 05/10/2023 AB23-0510-14 Magnesium ND ug/L 1.0 05/10/2023 AB23-0510-14 Magnesium S950 ug/L 100.0 05/10/2023 AB23-0510-14 Molybdenum ND ug/L 1.0 05/10/2023 AB23-0510-14 Nickel ND ug/L 10.0 05/10/2023 AB23-0510-14 Nickel ND ug/L 1.0 05/10/2023 AB23-0510-14 Selenium ND ug/L 2.0 05/10/2023 AB23-0510-14 Selenium ND ug/L 1.0 05/10/2023 AB23-0510-14 Selenium ND ug/L 1.0 05/10/2023 AB23-0510-14 Sodium 72000 ug/L 100.0 05/10/2023 AB23-0510-14 Sodium 72000 ug/L 1.0 05/10/2023 AB23-0510-14 Sodium ND ug/L 2.0 05/10/2023 AB23-0510-14 Sodium 72000 ug/L 1.0 05/10/2023 AB23-0510-14 Sodium 72000 ug/L 1.0 05/10/2023 AB23-0510-14 Sodium ND ug/L 2.0 05/10/2023 AB23-0510-14 Sodium 72000 ug/L 1.0 05/10/2023 AB23-0510-14 Sodium ND ug/L 2.0 05/10/2023 AB23-0510-14 Sodium ND	Metals by EPA 6020B: CCR Rul	le Appendix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	404-01-C01-A01	Analyst: EB
Arsenic ND ug/L 1.0 05/10/2023 AB23-0510-14 Barlum 63 ug/L 5.0 05/10/2023 AB23-0510-14 Beryllium ND ug/L 1.0 05/10/2023 AB23-0510-14 Beryllium ND ug/L 2.0.0 05/10/2023 AB23-0510-14 Beryllium ND ug/L 2.0.0 05/10/2023 AB23-0510-14 Cadmium ND ug/L 0.2 05/10/2023 AB23-0510-14 Cadmium ND ug/L 1.0 05/10/2023 AB23-0510-14 Corporation ND ug/L 1.0 05/10/2023 AB23-0510-14 Corporation ND ug/L 1.0 05/10/2023 AB23-0510-14 Copper 1 ug/L 1.0 05/10/2023 AB23-0510-14 Iron 729 ug/L 2.0 05/10/2023 AB23-0510-14 Iron 729 ug/L 1.0 05/10/2023 AB23-0510-14 Iron 729 ug/L 1.0 05/10/2023 AB23-0510-14 Iron ND ug/L 1.0 05/10/2023 AB23-0510-14 Magnesium ND ug/L 1.0 05/10/2023 AB23-0510-14 Magnesium 5950 ug/L 10.0 05/10/2023 AB23-0510-14 Molybdenum ND ug/L 5.0 05/10/2023 AB23-0510-14 Molybdenum ND ug/L 5.0 05/10/2023 AB23-0510-14 Nickel ND ug/L 1.0 05/10/2023 AB23-0510-14 Nickel ND ug/L 5.0 05/10/202	Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Barium         63         ug/L         5.0         05/10/2023         AB23-0510-14           Beryllium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Boron         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Cadmium         ND         ug/L         1.0         0.2         05/10/2023         AB23-0510-14           Calcium         48400         ug/L         1.0         0.5/10/2023         AB23-0510-14           Chromium         ND         ug/L         1.0         0.5/10/2023         AB23-0510-14           Cobalt         ND         ug/L         1.0         0.5/10/2023         AB23-0510-14           Copper         1         ug/L         1.0         0.5/10/2023         AB23-0510-14           Iron         729         ug/L         1.0         0.5/10/2023         AB23-0510-14           Lead         ND         ug/L         1.0         0.5/10/2023         AB23-0510-14           Magnesium         5950         ug/L         1.0         0.5/10/2023         AB23-0510-14           Magnesium         5950         ug/L         1.0         0.5/10/2023         AB23-0510-14           Nickel <td>Antimony</td> <td>ND</td> <td></td> <td>ug/L</td> <td>1.0</td> <td>05/10/2023</td> <td>AB23-0510-14</td>	Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Beryllium	Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron   ND	Barium	63		ug/L	5.0	05/10/2023	AB23-0510-14
Cadmium         ND         ug/L         0.2         05/10/2023         AB23-0510-14           Calcium         48400         ug/L         1000.0         05/10/2023         AB23-0510-14           Chromium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Cobalt         ND         ug/L         6.0         05/10/2023         AB23-0510-14           Copper         1         ug/L         1.0         05/10/2023         AB23-0510-14           Iron         729         ug/L         20.0         05/10/2023         AB23-0510-14           Lead         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Magnesium         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         1000.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         1.0         05/10/2023         AB23-0510-14           ND         ug/	Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Calcium         48400         ug/L         1000.0         05/10/2023         AB23-0510-14           Chromium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Cobalt         ND         ug/L         6.0         05/10/2023         AB23-0510-14           Copper         1         ug/L         1.0         05/10/2023         AB23-0510-14           Iron         729         ug/L         20.0         05/10/2023         AB23-0510-14           Lead         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Magnesium         ND         ug/L         100.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         100.0         05/10/2023         AB23-0510-14           Mickel         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Nickel         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Selenium         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Silver         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Vanadium         ND <td>Boron</td> <td>ND</td> <td></td> <td>ug/L</td> <td>20.0</td> <td>05/10/2023</td> <td>AB23-0510-14</td>	Boron	ND		ug/L	20.0	05/10/2023	AB23-0510-14
Chromium         ND         ug/L         1.0         05/10/2023         AB23-0510-14 Cobalt           Cobalt         ND         ug/L         6.0         05/10/2023         AB23-0510-14 Copper           Copper         1         ug/L         1.0         05/10/2023         AB23-0510-14 Copper           Iron         729         ug/L         20.0         05/10/2023         AB23-0510-14 Copper           Lead         ND         ug/L         1.0         05/10/2023         AB23-0510-14 Copper           Lithium         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Copper           Lithium         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Copper           Magnesium         5950         ug/L         10.0         05/10/2023         AB23-0510-14 Copper           Nickel         ND         ug/L         5.0         05/10/2023         AB23-0510-14 Copper           Nickel         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Copper           Nickel         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Copper           Selenium         ND         ug/L         10.0         05/10/2023         AB23-0510-14	Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Cobalt         ND         ug/L         6.0         05/10/2023         AB23-0510-14 Copper           Copper         1         ug/L         1.0         05/10/2023         AB23-0510-14 Dotted           Iron         729         ug/L         20.0         05/10/2023         AB23-0510-14 Dotted           Lead         ND         ug/L         1.0         05/10/2023         AB23-0510-14 Dotted           Lithium         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Dotted           Magnesium         5950         ug/L         1000.0         05/10/2023         AB23-0510-14 Dotted           Molybdenum         ND         ug/L         5.0         05/10/2023         AB23-0510-14 Dotted           Nickel         ND         ug/L         100.0         05/10/2023         AB23-0510-14 Dotted           Potassium         834         ug/L         100.0         05/10/2023         AB23-0510-14 Dotted           Selenium         ND         ug/L         1.0         05/10/2023         AB23-0510-14 Dotted           Sodium         72000         ug/L         100.0         05/10/2023         AB23-0510-14 Dotted           Vanadium         ND         ug/L         10.0         05/10/2023         <	Calcium	48400		ug/L	1000.0	05/10/2023	AB23-0510-14
Copper         1         ug/L Iron         1.0         05/10/2023         AB23-0510-14 AB23-0510-14 AB23-0510-14 AB23-0510-14 Lithium         1.0         05/10/2023 AB23-0510-14 AB23-0510-14 AB23-0510-14 AB23-0510-14 Molybdenum         AB23-0510-14 AB23-0510-14 Molybdenum         ND         ug/L U Molybdenum         1.0         05/10/2023 AB23-0510-14	Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron   729	Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Lead         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Lithium         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Magnesium         5950         ug/L         1000.0         05/10/2023         AB23-0510-14           Molybdenum         ND         ug/L         5.0         05/10/2023         AB23-0510-14           Nickel         ND         ug/L         100.0         05/10/2023         AB23-0510-14           Potassium         834         ug/L         100.0         05/10/2023         AB23-0510-14           Selenium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Silver         ND         ug/L         0.2         05/10/2023         AB23-0510-14           Sodium         72000         ug/L         100.0         05/10/2023         AB23-0510-14           Sodium         72000         ug/L         1000.0         05/10/2023         AB23-0510-14           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Variadium         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Mercury by EPA	Copper	1		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	Iron	729		ug/L	20.0	05/10/2023	AB23-0510-14
Magnesium         5950         ug/L         1000.0         05/10/2023         AB23-0510-14 Molybdenum           Molybdenum         ND         ug/L         5.0         05/10/2023         AB23-0510-14 Molybdenum           Nickel         ND         ug/L         2.0         05/10/2023         AB23-0510-14 Molybdenum           Potassium         834         ug/L         100.0         05/10/2023         AB23-0510-14 Molybdenum           Selenium         ND         ug/L         1.0         05/10/2023         AB23-0510-14 Molybdenum           Silver         ND         ug/L         0.2         05/10/2023         AB23-0510-14 Molybdenum           Sodium         72000         ug/L         1000.0         05/10/2023         AB23-0510-14 Molybdenum           Thallium         ND         ug/L         2.0         05/10/2023         AB23-0510-14 Molybdenum           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14 Molybdenum           Vanadium         ND         ug/L         10.0         05/10/2023         AB23-0510-14 Molybdenum           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0	Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Molybdenum         ND         ug/L         5.0         05/10/2023         AB23-0510-14           Nickel         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Potassium         834         ug/L         100.0         05/10/2023         AB23-0510-14           Selenium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Silver         ND         ug/L         0.2         05/10/2023         AB23-0510-14           Sodium         72000         ug/L         1000.0         05/10/2023         AB23-0510-14           Thallium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Zinc         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0404-01-C01-A02         Analysis CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         100.0         05/11/2023         AB23-0511-03           Fluoride </td <td>Lithium</td> <td>ND</td> <td></td> <td>ug/L</td> <td>10.0</td> <td>05/10/2023</td> <td>AB23-0510-14</td>	Lithium	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Nickel   Nickel   Nickel   Nickel   Nickel   Nickel   Nickel   Potassium   834   ug/L   100.0   05/10/2023   AB23-0510-14	Magnesium	5950		ug/L	1000.0	05/10/2023	AB23-0510-14
Potassium	Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Selenium         ND         ug/L         1.0         05/10/2023         AB23-0510-14           Silver         ND         ug/L         0.2         05/10/2023         AB23-0510-14           Sodium         72000         ug/L         1000.0         05/10/2023         AB23-0510-14           Thallium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Zinc         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0404-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         05/12/2023         AB23-0512-06           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03 </td <td>Nickel</td> <td>ND</td> <td></td> <td>ug/L</td> <td>2.0</td> <td>05/10/2023</td> <td>AB23-0510-14</td>	Nickel	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Silver         ND         ug/L         0.2         05/10/2023         AB23-0510-14           Sodium         72000         ug/L         1000.0         05/10/2023         AB23-0510-14           Thallium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14           Zinc         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Mercury by EPA 7470A, Total, Aqueous         ND         ug/L         10.0         05/10/2023         AB23-0510-14           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         05/12/2023         AB23-0512-06           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analysis: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/	Potassium	834		ug/L	100.0	05/10/2023	AB23-0510-14
Sodium   72000   ug/L   1000.0   05/10/2023   AB23-0510-14	Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Thallium         ND         ug/L         2.0         05/10/2023         AB23-0510-14 vanadium           Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14 vanadium           Zinc         ND         ug/L         10.0         05/10/2023         AB23-0510-14 vanadium           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0404-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analys	Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Vanadium         ND         ug/L         2.0         05/10/2023         AB23-0510-14 AB23-051	Sodium	72000		ug/L	1000.0	05/10/2023	AB23-0510-14
Zinc         ND         ug/L         10.0         05/10/2023         AB23-0510-12           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0404-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0404-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         05/12/2023         AB23-0512-06           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         05/12/2023         AB23-0512-06           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury         ND         ug/L         0.2         05/12/2023         AB23-0512-06           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Parameter(s)         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result Parameter(s)         Flag Units RL Analysis Date         Analysis Date         Tracking Analysis Date           Chloride         64500         ug/L 1000.0         05/11/2023         AB23-0511-03           Fluoride         ND ug/L 1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L 1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result Flag Units         RL Analysis Date         Tracking	Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	404-01-C01-A02	Analyst: CLE
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0404-01-C02-A01         Analyst: KDF           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Chloride         64500         ug/L         1000.0         05/11/2023         AB23-0511-03           Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C           Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	404-01-C02-A01	Analyst: KDR
Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride         ND         ug/L         1000.0         05/11/2023         AB23-0511-03           Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Chloride	64500		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate         14900         ug/L         1000.0         05/11/2023         AB23-0511-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0404-01-C03-A01         Analyst: LMC           Parameter(s)         Result         Flag Units         RL         Analysis Date         Tracking	Fluoride	ND		-			AB23-0511-03
Parameter(s) Result Flag Units RL Analysis Date Tracking	Sulfate	14900		-			AB23-0511-03
•	Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	0404-01-C03-A01	Analyst: LMC
Total Dissolved Solids 351 mg/L 10.0 05/04/2023 AB23-0504-07	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
	Total Dissolved Solids	351		mg/L	10.0	05/04/2023	AB23-0504-07



05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15008
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-02
 Collect Time:
 12:40 PM

motato by El 71 0020B. CON Italo Appo	Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp						
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14	
Barium	71		ug/L	5.0	05/10/2023	AB23-0510-14	
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Boron	107		ug/L	20.0	05/10/2023	AB23-0510-14	
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14	
Calcium	108000		ug/L	1000.0	05/10/2023	AB23-0510-14	
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14	
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Iron	17900		ug/L	20.0	05/10/2023	AB23-0510-14	
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Lithium	24		ug/L	10.0	05/10/2023	AB23-0510-14	
Magnesium	15400		ug/L	1000.0	05/10/2023	AB23-0510-14	
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14	
Nickel	2		ug/L	2.0	05/10/2023	AB23-0510-14	
Potassium	3180		ug/L	100.0	05/10/2023	AB23-0510-14	
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14	
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14	
Sodium	163000		ug/L	1000.0	05/10/2023	AB23-0510-14	
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14	
Vanadium	5		ug/L	2.0	05/10/2023	AB23-0510-14	
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14	
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot #: 23-0	404-02-C01-A02	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06	
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	404-02-C02-A01	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Chloride	259000		ug/L	1000.0	05/11/2023	AB23-0511-03	
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03	
Sulfate	10500	-		1000.0	05/11/2023	AB23-0511-03	
				Aliquot #: 23-0	404-02-C03-A01	Analyst: LMC	
Total Dissolved Solids by SM 2540C							
Total Dissolved Solids by SM 2540C Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	

05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15016
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-03
 Collect Time:
 08:40 AM

Metals by EPA 6020B: CCR Rule Apper				Aliquot #: 23-0	404-03-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	2		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	58		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	347		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	175000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	1970		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	64		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	23900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	6		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	10300		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	84800		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueous	<b>S</b>			Aliquot #: 23-0	404-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-03-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	253000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-03-C03-A01	Analyst: LMC
- ()	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Result	i iag	Ullits	111	Allalysis Date	Hacking

05/19/23



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Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15019
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-04
 Collect Time:
 01:43 PM

Metals by EPA 6020B: CCR Rule Appe	Aliquot #: 23-0	404-04-C01-A01	1 Analyst: EB			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	317		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	211		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	159000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21500		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	13		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	35900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1770		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	200000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	404-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	302000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	94200		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-04-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07
	23-	0404 Page	8 of 13			



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

Field Sample ID: **DUP-Background** 

A CENTURY OF EXCELLENCE

Lab Sample ID: 23-0404-05
Matrix: Groundwater

Collect Date: 05/01/2023 Collect Time: 12:00 AM

Report Date:

05/19/23

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	404-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	326		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	207		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	157000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21700		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	12		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	36400		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1800		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	203000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	404-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analys	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	304000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	93300		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-05-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07
	23-	-0404 Page 9	9 of 13			





**Report Date:** 05/19/23

Sample Site: **DEK JCW Background** 

Field Sample ID: **FB- Background**Lab Sample ID: 23-0404-06

Matrix: Water

Laboratory Project: 23-0404

Collect Date: 05/01/2023 Collect Time: 12:40 PM

Metals by EPA 6020B: CCI	R Rule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	404-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Barium	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND	ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Iron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	ND	ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, To	otal, Aqueous		Aliquot #: 23-0	404-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	05/16/2023	AB23-0516-03



05/19/23



Data Qualifiers Exception Summary

No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

#### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number:	23-6404			and the same of th		
Inspection Date: _ 5.00	1.23		Inspection	on By: LMO		
Sample Origin/Project Na	me: <u>07-20</u>	23 JC1	N-DEK	Backgrane	x Wens	
Shipment Delivered By: H	Enter the type of	f shipment c	arrier.	•		
Pony	FedEx	_ UI	PS	USPS	Airl	orne
Tracking Number:	391780	26 084	1.23 	pping Form Att	ached: Yes 🗶	No
Other/Hand Carry Tracking Number: Shipping Containers: Enter	3977 7 er the type and	ち 34 つ number of sl	II9 nipping conta	iners received.		
Cooler	Cardboard B	ox	Custo	om Case	Envelop	e/Mailer
Loose/Unpackaged	Containers		Other	8		
Condition of Shipment: E	nter the as-rece	ived conditi	on of the ship	ment container.		
Damaged Shipmen	t Observed: No	one	=	Dented	_ Lea	king
Other	· · · · · · · · · · · · · · · · · · ·				2 - 22-08	
Shipment Security: Enter	if any of the shi	ipping conta	iners were op	ened before rec	eipt.	
Shipping Containe	rs Received: O	pened		Sealed		
Enclosed Documents: Ente	er the type of do	ocuments en	closed with th	ne shinment		
					Othon	
CoC						
Temperature of Container	s: Measure the	temperature	of several sa	mple containers		
As-Received Temp	erature Range_	0.4-2.3	Samp	les Received on	Ice: Yes_X N	lo
M&TE # and Expir	ation 2772	3 5.25.	23			
Number and Type of Cont	ainers: Enter t	he total nun	ber of sample	e containers rec	eived.	
Container Type	Water	<u>Soil</u>		Other	<u>Broken</u>	Leaking
VOA (40mL or 60m	L)			-		
Quart/Liter (g/p)	<del></del>					
9-oz (amber glass j	ar)					
2-oz (amber glass)						
125 mL (plastic)	44	· contraction in the contraction				
24 mL vial (glass)					:	MATTER
غنان mL (plastic) ندمه ج. يو. ي Other	<u>\$</u>					-

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page \_ \ \_ of \_ \

SAMP	LING SITE / CU	STOMER:			PROJECT NUMBER:	SAP CC or WO	#:							A	NAL	YSIS	REOU	JESTE	ED		0	
Q2-20	23 JCW-DEK	Background Wo	ells		23-0404	23-0404 REQUESTER: Harold Register					ANALYSIS REQUESTED (Attach List if More Space is Needed)				1	QA REQUIREME	NT:					
SAMP	LING TEAM:				TURNAROUND TIME REQUIRED:	TURNAROUND TIME REQUIRED:											7	□ NPDES				
					□ 24 HR □ 48 HR □ 3 DAYS □ STANDARD 図 OTHER				_			_								1	⊠ TNI	
SENI	REPORT TO:	Caleb Batts			email:	phone:														1	□ ISO 17025	
C	COPY TO:	Harold Regist	ter		MATRIX CODES:  GW = Groundwater OX = Other			CO	NT	AINI	ERS										□ 10 CFR 50 APP.	В
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			P	RES	ERV	ATI	VE	tals							1	☐ INTERNAL INFO	Э
	LAB	SAMPLE COLL	ECTION	XIX	S = Soil / General Solid WP = Wipe O = Oil WT = General		AL#						Metals	su							□ OTHER	
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TOTAL#	None	HNO3	NaOH	HCI	MeOH	Total	Anions	TDS						REMARKS	
2	3-0404-01	5-1-27	1501	GW	MW-15002		3	2	1				x	x	x							
-	-02	5-1-23	1240	GW	MW-15008		3	2	1				х	x	x							
	-03	5-2-23	0840	GW	MW-15016		3	2	1				х	x	x							
	-04	5-1-27	1343	GW	MW-15019		3	2	1				x	x	х							
	-05	5-1-23	`	GW	DUP-Background		3	2	1				х	x	x							
•	-06	5-1-23	1240	W	FB- Background	3	1						х									
									6													
																-						
RELIN	QUISHED BY:		I	DATE/		ECEIVED BY:	-		!_				CO	MME	NTS							
	Al	Thy		2-	2-23/1600 %	d Ex																
RELIN	QVISHED BY:	/ /	I	DATE/		ECEIVED BY:							Rec	eived	on Io	e? 🗹	Yes [	□No	M&T	E#:_	21723	_
		Fed EX		05	5-03-25 10:20	Y.	- 10						Ten	npera	ture:	- 4.0	2.3°	°C	Cal. I	Due D	Date: 5-25-23	_
					<u>2</u>	3-0404 Page 13 of	13															



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: RCRA GROUNDWATER MONITORING – JCW BOTTOM ASH POND WELLS – 2023 Q2

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 23-0405** 

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock Bottom Ash Pond Wells area during the week of 05/01/2023 for the  $2^{nd}$  Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 05/04/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2023 JCW Bottom Ash Pond

**Date Received:** 5/4/2023 **Chemistry Project:** 23-0405

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0405-01	JCW-MW-15007	Groundwater	05/02/2023 08:33	JCW Bottom Ash Pond
23-0405-02	JCW-MW-15009	Groundwater	05/02/2023 10:57	JCW Bottom Ash Pond
23-0405-03	JCW-MW-15010	Groundwater	05/02/2023 12:12	JCW Bottom Ash Pond
23-0405-04	JCW-MW-15028	Groundwater	05/02/2023 09:43	JCW Bottom Ash Pond
23-0405-05	DUP-JCW-BAP	Groundwater	05/02/2023 00:00	JCW Bottom Ash Pond
23-0405-06	JCW-MW-15009 MS	Groundwater	05/02/2023 10:57	JCW Bottom Ash Pond
23-0405-07	JCW-MW-15009 MSD	Groundwater	05/02/2023 10:57	JCW Bottom Ash Pond
23-0405-08	EB-JCW-BAP	Water	05/02/2023 12:40	JCW Bottom Ash Pond
23-0405-09	FB-JCW-BAP	Water	05/02/2023 12:45	JCW Bottom Ash Pond



Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0405

Field Sample ID: JCW-MW-15007 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-01 Collect Time: 08:33 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV Tot	al Metals	s Ехр	Aliquot #: 23-0	405-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	8		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	189		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	212		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	207000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	1460		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	55		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	19500		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	6		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	6680		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	3		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	1140000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	17		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	405-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F, S	SO4, Aqւ	ieous	Aliquot #: 23-0	405-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1810000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	175000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	405-01-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3630	J	mg/L	10.0	05/05/2023	AB23-0505-05
		0405 Page (				



## **Analytical Report**

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0405 Field Sample ID: JCW-MW-15007 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-01 Collect Time: 08:33 AM

Alkalinity by SM 2320B			10000.0 05/10/2023 AB23-0510-02 10000.0 05/10/2023 AB23-0510-02		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	347000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	347000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02

05/19/23



Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0405

 Field Sample ID:
 JCW-MW-15009
 Collect Date:
 05/02/2023

 Lab Sample ID:
 23-0405-02
 Collect Time:
 10:57 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV Tot	al Metals	s Exp	Aliquot #: 23-0	405-02-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	19		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	1		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	170		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	526000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	1		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	13900		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	79		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	29800		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	13		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	11200		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	2		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	20900		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	405-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F, S	604, Aqı	ieous	Aliquot #: 23-0	405-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	36200		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	1490000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	405-02-C03-A01	Analyst: LMC
	Danieli			DI .	Aughoria Data	Tue elsine
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



## **Analytical Report**

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0405 Field Sample ID: JCW-MW-15009 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-02 Collect Time: 10:57 AM

Alkalinity by SM 2320B			Units         RL         Analysis Date         Tracking           ug/L         10000.0         05/10/2023         AB23-0510-02           ug/L         10000.0         05/10/2023         AB23-0510-02	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	105000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	105000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02



Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0405

Field Sample ID: JCW-MW-15010 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-03 Collect Time: 12:12 PM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai wetais	s Exp	Aliquot #: 23-0	405-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	14		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	285		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	1100		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	199000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	417		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	78		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	28900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	4		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	10700		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	39100		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	405-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	405-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	25000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	273000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Discolused Calida by CM 2540C				Aliquot #: 23-0	405-03-C03-A01	Analyst: LMO
Total Dissolved Solids by SM 2540C						
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking



## **Analytical Report**

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0405 Field Sample ID: JCW-MW-15010 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-03 Collect Time: 12:12 PM

Alkalinity by SM 2320B  Parameter(s) Result			Aliquot #: 23-0	405-03-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	441000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	441000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02



05/19/23



Sample Site:JCW Bottom Ash PondLaboratory Project:23-0405Field Sample ID:JCW-MW-15028Collect Date:05/02/2023Lab Sample ID:23-0405-04Collect Time:09:43 AM

				7 miquet ni =0 0	405-04-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	381		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	508		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	198000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	585		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	56		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	35000		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	4		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	10900		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	679000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	8		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	405-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqւ	ieous	Aliquot #: 23-0	405-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1110000		ug/L	1000.0	05/13/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	122000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	405-04-C03-A01	Analyst: LMC
	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Result	i iay	Ullits	IXE.	Allalysis Date	Hacking



## **Analytical Report**

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0405 Field Sample ID: JCW-MW-15028 Collect Date: 05/02/2023 Lab Sample ID: 23-0405-04 Collect Time: 09:43 AM

Alkalinity by SM 2320B			10000.0 05/10/2023 AB23-0510-02 10000.0 05/10/2023 AB23-0510-02		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	353000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	353000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02



05/19/23



Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0405

Field Sample ID: DUP-JCW-BAP Collect Date: 05/02/2023
Lab Sample ID: 23-0405-05 Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Apper				Aliquot #: 23-0	405-05-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	8		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	195		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	217		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	213000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	1610		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	56		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	20400		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	6		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	7120		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	3		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	1200000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	18		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	405-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F, S	604, Aqu	ieous	Aliquot #: 23-0	405-05-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1760000		ug/L	1000.0	05/13/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	177000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	405-05-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



## **Analytical Report**

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0405 Field Sample ID: **DUP-JCW-BAP** Collect Date: 05/02/2023 Lab Sample ID: 23-0405-05 Collect Time: 12:00 AM

Alkalinity by SM 2320B			Aliquot #: 23-0	405-05-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	355000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	355000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02



Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0405

Field Sample ID: JCW-MW-15009 MS Collect Date: 05/02/2023 Lab Sample ID: 23-0405-06 Collect Time: 10:57 AM

	ppendix III-IV To			Aliquot #: 23-0	405-06-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	118		%	1.0	05/10/2023	AB23-0510-14
Arsenic	104		%	1.0	05/10/2023	AB23-0510-14
Barium	115		%	5.0	05/10/2023	AB23-0510-14
Beryllium	90		%	1.0	05/10/2023	AB23-0510-14
Boron	101		%	20.0	05/10/2023	AB23-0510-14
Cadmium	114		%	0.2	05/10/2023	AB23-0510-14
Calcium	101		%	1000.0	05/10/2023	AB23-0510-14
Chromium	101		%	1.0	05/10/2023	AB23-0510-14
Cobalt	99		%	6.0	05/10/2023	AB23-0510-14
Copper	92		%	1.0	05/10/2023	AB23-0510-14
Iron	103		%	20.0	05/10/2023	AB23-0510-14
Lead	97		%	1.0	05/10/2023	AB23-0510-14
Lithium	94		%	10.0	05/10/2023	AB23-0510-14
Magnesium	107		%	1000.0	05/10/2023	AB23-0510-14
Molybdenum	119		%	5.0	05/10/2023	AB23-0510-14
Nickel	94		%	2.0	05/10/2023	AB23-0510-14
Potassium	106		%	100.0	05/10/2023	AB23-0510-14
Selenium	81		%	1.0	05/10/2023	AB23-0510-14
Silver	97.9		%	0.2	05/10/2023	AB23-0510-14
Sodium	109		%	1000.0	05/10/2023	AB23-0510-14
Thallium	97		%	2.0	05/10/2023	AB23-0510-14
Vanadium	105		%	2.0	05/10/2023	AB23-0510-14
Zinc	99		%	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqu	ieous			Aliquot #: 23-0	405-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	102		%	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Ar	nalyte List, Cl, F,	SO4, Aqu	eous	Aliquot #: 23-0	405-06-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	98		%	1000.0	05/11/2023	AB23-0511-03
Fluoride	93		%	1000.0	05/11/2023	AB23-0511-03
Sulfate	109		%	1000.0	05/11/2023	AB23-0511-03
Alkalinity by SM 2320B				Aliquot #: 23-0	405-06-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



## **Analytical Report**

**Report Date:** 05/19/23

Sample Site: JCW Bottom Ash Pond

Field Sample ID: JCW-MW-15009 MS

Lab Sample ID: 23-0405-06 Matrix: Groundwater Laboratory Project: 23-0405

Collect Date: 05/02/2023 Collect Time: 10:57 AM

Alkalinity by SM 2320B		<b>A</b>	Aliquot #: 23-0	405-06-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Bicarbonate	393000	ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND	ug/L	10000.0	05/10/2023	AB23-0510-02





05/19/23

Report Date:

Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0405

 Field Sample ID:
 JCW-MW-15009 MSD
 Collect Date:
 05/02/2023

 Lab Sample ID:
 23-0405-07
 Collect Time:
 10:57 AM

Metals by EPA 6020B: CCR Rule	e Appendix III-IV To	s Ехр	Aliquot #: 23-0	405-07-C01-A01	Analyst: EE			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Antimony	118		%	1.0	05/10/2023	AB23-0510-14		
Arsenic	103		%	1.0	05/10/2023	AB23-0510-14		
Barium	114		%	5.0	05/10/2023	AB23-0510-14		
Beryllium	88		%	1.0	05/10/2023	AB23-0510-14		
Boron	98		%	20.0	05/10/2023	AB23-0510-14		
Cadmium	112		%	0.2	05/10/2023	AB23-0510-14		
Calcium	113		%	1000.0	05/10/2023	AB23-0510-14		
Chromium	102		%	1.0	05/10/2023	AB23-0510-14		
Cobalt	98		%	6.0	05/10/2023	AB23-0510-14		
Copper	90		%	1.0	05/10/2023	AB23-0510-14		
Iron	119		%	20.0	05/10/2023	AB23-0510-14		
Lead	97		%	1.0	05/10/2023	AB23-0510-14		
Lithium	93		%	10.0	05/10/2023	AB23-0510-14		
Magnesium	108		%	1000.0	05/10/2023	AB23-0510-14		
Molybdenum	120		%	5.0	05/10/2023	AB23-0510-14		
Nickel	94		%	2.0	05/10/2023	AB23-0510-14		
Potassium	108		%	100.0	05/10/2023	AB23-0510-14		
Selenium	94		%	1.0	05/10/2023	AB23-0510-14		
Silver	98.8		%	0.2	05/10/2023	AB23-0510-14		
Sodium	111		%	1000.0	05/10/2023	AB23-0510-14		
Thallium	98		%	2.0	05/10/2023	AB23-0510-14		
Vanadium	105		%	2.0	05/10/2023	AB23-0510-14		
Zinc	98		%	10.0	05/10/2023	AB23-0510-14		
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	405-07-C01-A02	2 Analyst: CL		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Mercury	106		%	0.2	05/12/2023	AB23-0512-06		
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	405-07-C02-A01	Analyst: KDF		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Chloride	99		%	1000.0	05/11/2023	AB23-0511-03		
Fluoride	92		%	1000.0	05/11/2023	AB23-0511-03		
Sulfate	107		%	1000.0	05/11/2023	AB23-0511-03		
Alkalinity by SM 2320B				Aliquot #: 23-0	405-07-C03-A01	Analyst: DLS		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Alkalinity Total	97.3		%	10000.0	05/10/2023	AB23-0510-02		
	23-(	0405 Page 1	7 of 23					



#### **Analytical Report**

**Report Date:** 05/19/23

Sample Site: JCW Bottom Ash Pond

Field Sample ID: JCW-MW-15009 MSD

Lab Sample ID: 23-0405-07 Matrix: Groundwater Laboratory Project: 23-0405

Collect Date: 05/02/2023 Collect Time: 10:57 AM

Alkalinity by SM 2320B Aliquot #: 23-0405-07-C03-A01 **Analyst: DLS** Units Parameter(s) Result Flag RL**Analysis Date Tracking** Alkalinity Bicarbonate 396000 ug/L 10000.0 05/10/2023 AB23-0510-02 **Alkalinity Carbonate** ND ug/L 10000.0 05/10/2023 AB23-0510-02



05/19/23

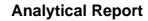


Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0405

Field Sample ID: EB-JCW-BAP Collect Date: 05/02/2023
Lab Sample ID: 23-0405-08 Collect Time: 12:40 PM

Matrix: Water

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals		tal Metals	Ехр	Aliquot #: 23-0	405-08-C01-A01	1 Analyst: EB																																											
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking																																											
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Barium	ND		ug/L	5.0	05/10/2023	AB23-0510-14																																											
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Boron	ND		ug/L	20.0	05/10/2023	AB23-0510-14																																											
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14																																											
Calcium	ND		ug/L	1000.0	05/10/2023	AB23-0510-14																																											
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14																																											
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Iron	22		ug/L	20.0	05/10/2023	AB23-0510-14																																											
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Lithium	ND		ug/L	10.0	05/10/2023	AB23-0510-14																																											
Magnesium	ND		ug/L	1000.0	05/10/2023	AB23-0510-14																																											
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14																																											
Nickel	ND		ug/L	2.0	05/10/2023	AB23-0510-14																																											
Potassium	ND		ug/L	100.0	05/10/2023	AB23-0510-14																																											
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14																																											
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14																																											
Sodium	ND	ug/L 1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	L 1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14																																											
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14																																											
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14																																											
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	405-08-C01-A02	Analyst: CLE																																											
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking																																											
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06																																											



05/19/23



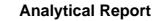
Count on Us®

Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0405

Field Sample ID: FB-JCW-BAP Collect Date: 05/02/2023
Lab Sample ID: 23-0405-09 Collect Time: 12:45 PM

Matrix: Water

Metals by EPA 6020B: CCR	Rule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	)405-09-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Barium	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND	ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Iron	20	ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	ND	ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Tota	al, Aqueous		Aliquot #: 23-0	405-09-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	05/12/2023	AB23-0512-06



05/19/23



Data Qualifiers

Exception Summary

No exceptions occurred.

CONSUMERS ENERGY

Inspection Date: 5.04.23

Sample Origin/Project Name: <u>Q2-2023</u>

#### Chemistry Department

General Standard Operating Procedure

1 CW

Inspection By: \_ UM6

Bottom Ash Pond

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

TITLE: SAMPLE L	OG-IN – SHIPMENT INSPECTIO	ON FORM
Project Log-In Number:	23 - 0405	

Shipme	ent Delivered By: Ente	er the type of ship	oment carrier	·.		
	Pony	FedEx	UPS _	USPS	Airborn	e
	Other/Hand Carry (wh	nom)				
				Shipping Form Attached		No
Shippin	ng Containers: Enter t	he type and num	per of shippi	ng containers received.		
	Cooler X	Cardboard Box _		Custom Case	Envelope/Ma	ailer
	Loose/Unpackaged Co	ontainers		Other		
Conditi				the shipment container.		
	Damaged Shipment O	bserved: None_	<u> </u>	Dented	Leaking	
	Other					****
Shipme	nt Security: Enter if a	ny of the shippin	g containers	were opened before receipt.		
	Shipping Containers F	Received: Opene	d	Sealed		
Enclose	d Documents: Enter t	he type of docum	ents enclose	ed with the shipment.		
	CoC_ <u>X</u> Wo	rk Request		Air Data Sheet	Other	
Temper	rature of Containers: 1	Measure the temp	perature of se	everal sample containers.		
	As-Received Tempera	ture Range 1.7	-5.9	Samples Received on Ice:	Yes No_	
	M&TE # and Expiration	on 15 027	123			
Number	r and Type of Contain	ers: Enter the to	otal number o	of sample containers received	i.	
	Container Type	Water S	<u>Soil</u>	Other	Broken	Leaking
	VOA (40mL or 60mL)	14		414444		
	Quart/Liter (g/p)					
	9-oz (amber glass jar)				The later of the same of the s	
	2-oz (amber glass)					
	125 mL (plastic)	16				
	24 mL vial (glass)					-
	رده <del>50</del> 0 mL (plastic)					Manager
	Other				No. and the second second	

# **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page \_\_\_\_\_ of \_\_\_\_\_

SAMPLING SITE / CUSTOMER:				PROJECT NUMBER:	SAP CC or WC	SAP CC or WO#:			ANALYSIS REQUESTED																	
Q2-20	23 JCW Botton	n Ash Pond			23-0405	REQUESTER:	Haro	ld R	egis	ter			,	(Attac	ch Lis	t if M	ore Spa	ice is N	leeded)	(	QA REQU	IREME	NT:			
SAMPI	LING TEAM:				TURNAROUND TIME REQUIRED:																□ NPDES					
					□ 24 HR □ 48 HR □ 3 DAYS □ STA	NDARD ⊠ OTH	HER_					_									⊠ TNI					
SEND	REPORT TO:	Caleb Batts			email:	phone:														1	□ ISO 1702	5				
COPY TO: Harold Register TRC		MATRIX CODES:  GW = Groundwater  WW = Wastewater  OX = Other  SL = Sludge		CONTAINERS													□ 10 CFR :	0 APP. I	В							
		W = Water / Aqueous Liquid A = Air		21-	PRESERVATIVE				VE	Metals			λ.					□ INTERN	AL INFO	С						
	LAB	SAMPLE COLI	LECTION	RIX	S = Soil / General Solid WP = Wipe O = Oil WT = General	al Waste	TOTAL #		٥ -	H 4		E .	I Me	Anions				suc	Alkalinity					OTHER		
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TO	None	HNC	NaO	HCI	MeOH	Total	Ani	TDS	Alk					REM	ARKS				
2:	3-0405-01	5/2/03	0833	GW	JCW-MW-15007		5	4	1				x	х	x	x										
	-02	(( ))	1057	GW	JCW-MW-15009		5	4	1				x	x	x	x						7)				
	-03	(( ))	90	GW	JCW-MW-15010		5	4	1				x	x	x	x										
	-04	( N	0943	GW	JCW-MW-15028		5	4	1				x	x	x	x										
	-05	(1 1)	_	GW	DUP-JCW-BAP		5	4	1				x	x	x	x										
	-06	(1 ))	1057	GW	JCW-MW-15009 MS		4	3	1				x	x		x										
	-07	(/ / (	1057	GW	JCW-MW-15009 MSD		4	3	1				x	x		x	9									
	-08	1111	1240	W	EB-JCW-BAP		1		1				x													
	-09	1111	1245	W	FB-JCW-BAP		1		1				x								-					
																	19									
																	1									
RELING	QUISHED BY:		1	DATE/		ECEIVED BY:							CO	MME	NTS		÷.									
	)		<b>I</b> /41	57	690	,-						-21					1									
RELING	QUISHED BY:		I	DATE/		ECEIVED BY:						-	Rec	eived	on Io	ce? 🗓	Yes [	□No	М&Т	E#: <u>\</u>	50277	27	_			
٤		100											Ten	nperat	ture:	1.7-	5.9	°C	Cal. I	Due Da	ate: <b>5-25</b>	-23	-			

# **ANALYTICAL REPORT**

## PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Generated 7/5/2023 11:48:36 AM Revision 2

## **JOB DESCRIPTION**

Karn/Weadock CCR DEK JCW Background Wells

# **JOB NUMBER**

240-184759-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203

# **Eurofins Cleveland**

#### **Job Notes**

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

## **Authorization**

Generated 7/5/2023 11:48:36 AM

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(330)966-9790

nuse DHeckler

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## **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-184759-1

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

### **Qualifiers**

Rad
Qualifier

G	The Sample MDC is greater than the requested RL.
	B 81 1 0 0 1 1 1 0 0 0 0

J Result is less than the sample detection limit.

**Qualifier Description** 

### **Glossary**

Abbreviation	These commonly	used abbreviations ma	y or may not be	present in this report.
Appleviation	These commonly	useu abbieviations ma	y or may not be	present in tins 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
CFU Colony Forming Unit
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)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
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)

TNTC Too Numerous To Count

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### **Case Narrative**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

**Laboratory: Eurofins Cleveland** 

**Narrative** 

Job Narrative 240-184759-1

#### Comments

A revised report was provided on July 5, 2023. The sample ID was corrected: DUP-BACKGROUND. The sampling date was corrected: MW-15016.

### Receipt

The samples were received on 5/5/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.3° C.

### **RAD**

Method 903.0: Radium-226 batch 611074: 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.

Method 904.0: Radium-228 batch 611088: The detection goal was not met for the following sample. Sample was prepped at a reduced volume due to the presence of matrix interferences: MW-15008 (240-184759-2). Analytical results are reported with the detection limit achieved.

Method 904.0: Radium-228 batch 611088: The detection goal was not met for the following sample. The samples and batch QC were prepped at full volume. Matrix interferences are suspected because the method blank achieved the detection goal demonstrating acceptable sample preparation and instrument performance: MW-15016 (240-184759-3). Analytical results are reported with the detection limit achieved

Method 904.0: Radium-228 batch 611088: 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.

Method PrecSep\_0: Radium-228 Prep Batch 160-611088: The following samples were prepared at a reduced aliquot due to Matrix: MW-15008 (240-184759-2), MW-15019 (240-184759-4) and DUP-BACKGROUND (240-184759-5). A laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep\_0: Radium-228 Prep Batch 160-611088: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Radium-226 Prep Batch 160-611074: The following samples were prepared at a reduced aliquot due to Matrix: MW-15008 (240-184759-2), MW-15019 (240-184759-4) and DUP-BACKGROUND (240-184759-5). A laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep STD: Radium-226 Prep Batch 160-611074: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). 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.

Job ID: 240-184759-1

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## **Method Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
PrecSep 0	Preparation, Precipitate Separation	None	EET SL

### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

## Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Job ID: 240-184759-1

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## **Sample Summary**

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-184759-1	MW-15002	Water	05/01/23 15:01	05/05/23 08:00
240-184759-2	MW-15008	Water	05/01/23 12:40	05/05/23 08:00
240-184759-3	MW-15016	Water	05/02/23 08:40	05/05/23 08:00
240-184759-4	MW-15019	Water	05/01/23 13:43	05/05/23 08:00
240-184759-5	DUP-BACKGROUND	Water	05/01/23 00:00	05/05/23 08:00
240-184759-6	FR-BACKGROUND	Water	05/01/23 12:40	05/05/23 08:00

Job ID: 240-184759-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-1

Matrice Matrice Mater

Matrix: Water

Job ID: 240-184759-1

C	lient	S	amp	le	ID	):	M	W	-1	5002	
_									_		

Date Collected: 05/01/23 15:01 Date Received: 05/05/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.115	U	0.115	0.115	1.00	0.183	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.0		30 - 110					05/11/23 12:08	06/08/23 06:47	1

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0854	U	0.301	0.301	1.00	0.547	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.0		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	87.4		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.200	U	0.322	0.322	5.00	0.547	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-2

**Matrix: Water** 

Job ID: 240-184759-1

Client Sample ID: MW-15008
Date Collected: 05/01/23 12:40
Date Received: 05/05/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.102	U	0.147	0.147	1.00	0.249	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.4		30 - 110					05/11/23 12:08	06/08/23 06:47	1

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.286	UG	0.658	0.658	1.00	1.16	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.4		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	61.5		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.388	U	0.674	0.674	5.00	1.16	pCi/L		06/08/23 14:39	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-3

**Matrix: Water** 

Job ID: 240-184759-1

<b>Client Sample</b>	ID:	MW-15016
Date Collected: 0	5/02	/23 08:40

Date Received: 05/05/23 08:00

Method: EPA 903.0	0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0671	U	0.0783	0.0785	1.00	0.127	pCi/L	05/11/23 12:08	06/08/23 06:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.2		30 - 110					05/11/23 12:08	06/08/23 06:49	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.201	UG	0.523	0.523	1.00	1.01	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.2		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	59.3		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
A L. d.	D	0	Uncert.	Uncert.	ъ.		1194	D	A	D'' E
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.134	U	0.529	0.529	5.00	1.01	pCi/L		06/08/23 14:39	1

Client: TRC Environmental Corporation.

**Client Sample ID: MW-15019** 

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-4

**Matrix: Water** 

Job ID: 240-184759-1

Date Collected: 05/01/23 13:43 Date Received: 05/05/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.134	0.137	1.00	0.137	pCi/L	05/11/23 12:08	06/08/23 08:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.1		30 - 110					05/11/23 12:08	06/08/23 08:21	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.483	U	0.529	0.530	1.00	0.859	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.1		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	65.7		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.792	U	0.546	0.547	5.00	0.859	pCi/L		06/08/23 14:39	1

7/5/2023 (Rev. 2)

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-5

Client Sample ID: DUP-BACKGROUND
Date Collected: 05/01/23 00:00
Date Received: 05/05/23 08:00

ab Sample النا: 240-184759-5 Matrix: Water

Job ID: 240-184759-1

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
		·	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.393		0.140	0.144	1.00	0.123	pCi/L	05/11/23 12:08	06/08/23 08:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:08	06/08/23 08:22	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.588	U	0.553	0.556	1.00	0.883	pCi/L	05/11/23 12:51	06/01/23 12:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:51	06/01/23 12:41	1
Y Carrier	71.1		30 - 110					05/11/23 12:51	06/01/23 12:41	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.981		0.570	0.574	5.00	0.883	pCi/L		06/08/23 14:39	1

Δ

5

7

10

11 10

13

Client: TRC Environmental Corporation.

Radium-228

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

0.242 U

Lab Sample ID: 240-184759-6

05/11/23 12:51 06/01/23 12:41

Client Sample ID: FB-BACKGROUND

Date Collected: 05/01/23 12:40

Date Received: 05/05/23 08:00

Matrix: Water

Job ID: 240-184759-1

Method: EPA 903.0	- Radium	-226 (GFF	PC)						
			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed
Radium-226	-0.0163	U	0.0448	0.0449	1.00	0.109	pCi/L	05/11/23 12:08	06/08/23 08:22

 Carrier
 %Yield Ba Carrier
 Qualifier State
 Limits State
 Prepared Dil Factor
 Analyzed O5/11/23 12:08 06/08/23 08:22 11

Method: EPA 904.0 - Radium-228 (GFPC)

Count Total

Uncert. Uncert.

Analyte Result Qualifier (2\sigma+/-) (2\sigma+/-) RL MDC Unit Prepared Analyzed

0.352

0.351

 Carrier
 %Yield Ba Carrier
 Limits
 Prepared 05/11/23 12:51
 Analyzed 06/01/23 12:41
 Dil Fac 05/11/23 12:51

 Y Carrier
 81.2
 30 - 110
 05/11/23 12:51
 06/01/23 12:41
 1

1.00

0.593 pCi/L

Method: TAL-STL Ra226\_Ra228 - Combined Radium-226 and Radium-228

Count Total
Uncert. Uncert.

**Analyte** Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac Combined Radium 226 0.226 U 0.354 0.355 5.00 0.593 pCi/L 06/08/23 14:39 + 228

3

5

7

Dil Fac

Dil Fac

9

10

12

16

## **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

Method: 903.0 - Radium-226 (GFPC)

**Matrix: Water Prep Type: Total/NA** 

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-184759-1	MW-15002	80.0	
240-184759-2	MW-15008	76.4	
240-184759-3	MW-15016	85.2	
240-184759-4	MW-15019	86.1	
240-184759-5	DUP-BACKGROUND	95.4	
240-184759-6	FB-BACKGROUND	85.4	
LCS 160-611074/2-A	Lab Control Sample	96.1	
LCSD 160-611074/3-A	Lab Control Sample Dup	81.0	
MB 160-611074/1-A	Method Blank	93.4	
Tracer/Carrier Legenc	Í		
Ba = Ba Carrier			<del></del>

Method: 904.0 - Radium-228 (GFPC)

**Matrix: Water** Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-184759-1	MW-15002	80.0	87.4	
240-184759-2	MW-15008	76.4	61.5	
240-184759-3	MW-15016	85.2	59.3	
240-184759-4	MW-15019	86.1	65.7	
240-184759-5	DUP-BACKGROUND	95.4	71.1	
240-184759-6	FB-BACKGROUND	85.4	81.2	
LCS 160-611088/2-A	Lab Control Sample	96.1	78.7	
LCSD 160-611088/3-A	Lab Control Sample Dup	81.0	62.1	
MB 160-611088/1-A	Method Blank	93.4	79.2	

Ba = Ba Carrier

Y = Y Carrier

Job ID: 240-184759-1

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK JCW Background Wells

## Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-611074/1-A

Count

**Matrix: Water** 

**Matrix: Water** 

Analysis Batch: 615046

Analysis Batch: 615046

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 611074

MB MB Uncert. Uncert. **MDC** Unit Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL Prepared Analyzed Dil Fac Radium-226 0.1185 0.0822 0.0829 1.00 0.113 pCi/L 05/11/23 12:08 06/08/23 06:45

Total

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 93.4 30 - 110 05/11/23 12:08 06/08/23 06:45

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 611074

Total LCS LCS %Rec **Spike** Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL %Rec Limits MDC Unit Radium-226 11.3 9.514 1.02 1.00 0.110 pCi/L 84 75 - 113

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 96.1 30 - 110

Lab Sample ID: LCSD 160-611074/3-A

Lab Sample ID: LCS 160-611074/2-A

**Matrix: Water** 

**Analysis Batch: 615046** 

**Client Sample ID: Lab Control Sample Dup** 

Prep Type: Total/NA

Prep Batch: 611074

Prep Batch: 611088

Total LCSD LCSD %Rec **RER** Spike Uncert. %Rec Added  $(2\sigma + / -)$ RL **MDC** Unit Limits Analyte Result Qual RER Limit Radium-226 11.3 1.12 1.00 0.131 pCi/L 92 75 - 113 0.42 10.42

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 81.0 30 - 110

### Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-611088/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 614160** 

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed Radium-228 Ū 0.333 1.00 0.512 pCi/L 05/11/23 12:51 06/01/23 12:31 0.4069 0.335

MB MB Carrier %Yield Qualifier Limits Dil Fac Prepared Analyzed Ba Carrier 93.4 30 - 110 05/11/23 12:51 06/01/23 12:31 30 - 110 Y Carrier 79.2 05/11/23 12:51 06/01/23 12:31

## **QC Sample Results**

Client: TRC Environmental Corporation.

Lab Sample ID: LCS 160-611088/2-A

**Matrix: Water** 

**Analysis Batch: 614160** 

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Method: 904.0 - Radium-228 (GFPC) (Continued)

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

Prep Batch: 611088

Job ID: 240-184759-1

				iotai					
	Spike	LCS	LCS	Uncert.				%Rec	
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits	
Radium-228	8.15	9.437		1.30	1.00	0.530 pCi/L	116	75 - 125	

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 96.1 30 - 110 Y Carrier 78.7 30 - 110

Lab Sample ID: LCSD 160-611088/3-A **Client Sample ID: Lab Control Sample Dup** 

Prep Type: Total/NA **Matrix: Water Analysis Batch: 614159** Prep Batch: 611088

				iotai							
	Spike	LCSD	LCSD	Uncert.				%Rec		RER	
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits	RER	Limit	
Radium-228	8.15	8.686		1.67	1.00	1.09 pCi/L	107	75 - 125	0.25	1	

	LCSD	LCSD	
Carrier	%Yield	Qualifier	Limits
Ba Carrier	81.0		30 - 110
Y Carrier	62.1		30 - 110

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

### Rac

## Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184759-1	MW-15002	Total/NA	Water	PrecSep STD	
240-184759-2	MW-15008	Total/NA	Water	PrecSep STD	
240-184759-3	MW-15016	Total/NA	Water	PrecSep STD	
240-184759-4	MW-15019	Total/NA	Water	PrecSep STD	
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep STD	
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep STD	
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

## Prep Batch: 611088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184759-1	MW-15002	Total/NA	Water	PrecSep_0	
240-184759-2	MW-15008	Total/NA	Water	PrecSep_0	
240-184759-3	MW-15016	Total/NA	Water	PrecSep_0	
240-184759-4	MW-15019	Total/NA	Water	PrecSep_0	
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep_0	
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep_0	
MB 160-611088/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-611088/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-611088/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep 0	

## **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: MW-15002

Date Collected: 05/01/23 15:01 Date Received: 05/05/23 08:00 Lab Sample ID: 240-184759-1

**Matrix: Water** 

Job ID: 240-184759-1

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:47
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: MW-15008

Date Collected: 05/01/23 12:40 Date Received: 05/05/23 08:00

Lab Sample ID: 240-184759-2

**Matrix: Water** 

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD		- <u> </u>	611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:47
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: MW-15016

Date Collected: 05/02/23 08:40

Date Received: 05/05/23 08:00

Lab Sample ID: 240-184759-3

Lab Sample ID: 240-184759-4

**Matrix: Water** 

**Matrix: Water** 

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 06:49
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Client Sample ID: MW-15019** 

Date Collected: 05/01/23 13:43

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:21
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

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### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-5

**Matrix: Water** 

Job ID: 240-184759-1

**Client Sample ID: DUP-BACKGROUND** Date Collected: 05/01/23 00:00

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:41
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: FB-BACKGROUND Lab Sample ID: 240-184759-6

Date Collected: 05/01/23 12:40 **Matrix: Water** 

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:41
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Laboratory References:** 

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

## **Laboratory: Eurofins 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
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-11-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-23
MI - RadChem Recognition	State	9005	06-30-23
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-23
New Jersey	NELAP	MO002	06-30-23
New Mexico	State	MO00054	06-30-23
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-23
Texas	NELAP	T104704193	07-31-23
US Fish & Wildlife	US Federal Programs	058448	07-31-23
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

Job ID: 240-184759-1

 $<sup>^{\</sup>star} \ Accreditation/Certification \ renewal \ pending \ - \ accreditation/certification \ considered \ valid.$ 

	Sampler			II ab PM				Carrier Tracking No(s)		COC No.	
Client Information				Brool	Brooks, Kris M					240-107203-33282.1	
Client Contact Jacob Krenz	Phone			E-Mail Kris E	3rooks@	E-Mail Kris. Brooks@et.eurofinsus.com	us.com	State of Ongin:		Page 1 of 1	
Company: TRC Environmental Corporation.			DISMA				Analysis	Analysis Requested		Job #:	
Address 1540 Eisenhower Place	Due Date Requested:	ted:								≥	Hexane
City. Ann Arbor	TAT Requested (days):	days):			15						ne NaO2
State, Zip. MI, 48108-7080	Compliance Project:	A Yes	Δ No		N. C.				311	D - Nitric Acid O - Na2SO3 E - NaHSO4 R - Na2S2O	2045 2503 25203
Phone. 734-971-7080(Tel) 734-971-9022(Fax)	PO# TBD				(0						S - H2SO4 T - TSP Dodecahydrate
Email: JKrenz@trccompanies.com	** OM									1 - Ice V - MCAA J - DI Water W - pH 4-5	etone SAA
Project Name Karn/Weadock CCR Background Well	Project #: 24024154				10 80						Y - Trizma Z - other (specify)
Site	\$SOW#				A) as					Other:	
Sample Identification	Sample Date	Sample Time	Sample Type (C≈comp,	Matrix (w-water, B-sold, O-westeld).	Field Filtered S Perform MS/M 903.0, Re226Re	onsbinsts - 0.406	240-1847		Tetal Number	Special Instructions/Note:	ions/Note:
		X	CO	on Code:	\$	٥	59 (		X		V
MW-15002	5-1-23	1051	ڻ	Water	√ X	×	Chair				
MW-15008	5-1-23	1240	9	Water	×	×	n of C				
MW-15016	5-2-23	0420	5	Water	N N	×	usto				
MW-15019	5-1-33	1343	5	Water	NNX	*	dy				
DUP-Background	5-1-23		S	Water	X X X	×					
EQ-Backgroud				Water		1			la l		
FB-Buckground	5-1-33	つかで	S	Water	N	×					
						$\parallel$					
Possible Hazard Identification					Samp	le Disposa	I ( A fee may I	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	s are retaine	ed longer than 1 mont	(h)
ested: 1, II, III, IV, Other (specify)			Sacionalical		Specie	al Instructions/QC	Special Instructions/QC Requirements	Disposal by Lab	Archive For		Months
Empty Kit Relinquished by:		Date:			Time:			Method of Shipment	ant:		
Relinquished by	Date String 33	LIHI/		Company	8	Received by	ae	Date	1/23	14/7 Company	any KY
Reinquished by:	Date/Time S/4/23	3/1/18		Company EA14		AG DO	\	Designation Designation	553	13 SOD CONTRACTOR	Jar
	Dater ime:			Company	ž	ceived by:	0	V Date/Time	ime	Сотралу	any
Custody Seals Intact: Custody Seal No.: △ Yes △ No		Ĺ			ŏ	oler Tempera	Cooler Temperature(s) °C and Other Remarks:	er Remarks			
										Ver. (	Ver. 06/08/2021

**Environment Testing** 

💸 eurofins

Chain of Custody Record 190

Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772

**Eurofins Cleveland** 180 S. Van Buren Avenue

194769
Eurofins - Canton Sample Receipt Form/Narrative Login # : 107 13
Barberton Facility
Client Site Name Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # E Foam Bex Client Cooler Box Other
Packing material used. Bushle Wrap Foam Plastic Bag None Other  COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt
IR GUN # 22 (CF +0.0 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity  -Were the seals on the outside of the cooler(s) signed & dated?  -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  -Were tamper/custody seals intact and uncompromised?  3. Shippers' packing slip attached to the cooler(s)?  4. Did custody papers accompany the sample(s)?  5. Were the custody papers relinquished & signed in the appropriate place?  6. Was/were the person(s) who collected the samples clearly identified on the COC?  7. Did all bottles arrive in good condition (Unbroken)?  8. Could all bottle labels (ID/Date/Time) be reconciled with the COC?  9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y/N)?  10. Were correct bottle(s) used for the test(s) indicated?  11. Sufficient quantity received to perform indicated analyses?  12. Are these work share samples and all listed on the COC?  13. Were all preserved sample(s) at the correct pH upon receipt?  14. Were VOAs on the COC?  15. Were air bubbles >6 mm in any VOA vials?  16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  Ves No  Ves No  Ves No  Ves No  No  No  No  No  No  No  No  No  No
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No.
17. Was a LL Hg or Me Hg trip blank present? Yes No
Contacted PM Date by via Verbal Voice Mail Other
Concerning
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES
19. 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)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s) were further preserved in the laboratory.  Time preserved: Preservative(s) added/Lot number(s):
VOA Sample Preservation - Date/Time VOAs Frozen:

5/5/2023

FB-BACKGROUND

FB-BACKGROUND

240-184759-A-6

240-184759-B-6

## **Login Container Summary Report**

240-184759

Temperature readings: \_ Container **Preservative** Client Sample ID Lab ID **Container Type** Temp Added (mls) Lot # pН MW-15002 Plastic 1 liter - Nitric Acid 240-184759-A-1 <2 MW-15002 Plastic 1 liter - Nitric Acid 240-184759-B-1 <2 MW-15008 240-184759-A-2 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid MW-15008 240-184759-B-2 <2 MW-15016 240-184759-A-3 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid MW-15016 240-184759-B-3 <2 Plastic 1 liter - Nitric Acid MW-15019 240-184759-A-4 <2 MW-15019 240-184759-B-4 Plastic 1 liter - Nitric Acid <2 **DUP-BACKGROUD** 240-184759-A-5 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid **DUP-BACKGROUD** 240-184759-B-5 <2

Plastic 1 liter - Nitric Acid

Plastic 1 liter - Nitric Acid

<2

<2

Phone: 330-497-9396 Fax: 330-497-0772 180 S. Van Buren Avenue Barberton, OH 44203

Chain of Custody Record

🔅 eurofins

**Environment Testing** 

 TSP Dodecahydrate Z - other (specify) N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 V - MCAA W - pH 4-5 Y - Trizma U - Acetone Preservation Codes G - Amchlor H - Ascorbic Acid COC No: 240-167649.1 240-184759-1 Page: Page 1 of 1 C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH I · Ice J · DI Water K · EDTA L · EDA A - HCL B - NaOH Total Number of containers arrier Tracking No(s) State of Origin: Michigan **Analysis Requested** Accreditations Required (See note) E-Mail: Kris.Brooks@et.eurofinsus.com 9226Ra228\_GFPC Lab PM: Brooks, Kris M Sep\_STD Standard Target List Due Date Requested: 6/6/2023 TAT Requested (days): Project #: 24024154 SSOW#: Phone: # 0V Client Information (Sub Contract Lab) Karn/Weadock CCR Groundwater Monitoring Phone: 314-298-8566(Tel) 314-298-8757(Fax) Company: TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, Shipping/Receiving State, Zip: MO, 63045 Client Contact Earth City

Note: Since Jahoratory acrossite those one extrined to		
The control and a second of the control of the cont	s Environment lesting North Central, LLC places the ownership of method, analyte & accreding listed above for analysis/testis/matrix being analyzed, the samples must be shipped baing North Central, LLC attention immediately. If all requested accreditations are current to	abortation our subcontract laboratory or change, Eurorins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment Testing North Central, LLC aboratory or other instructions will be provided. Any changes to accreditation in the State of Origin isled above for analysis/fests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC aboratory or other instructions will be provided. Any changes to accreditation in the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately.
Possible Hazard Identification		Common results with LLC.
Unconfirmed	dupo	Sample Disposal ( A ree may be assessed if samples are retained longer than 1 month)
		Return To Client Disposal By Lab Archive Eco
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2 Specia	Requirements:
Crasto Vit Deliana de La La La		
7 Little Veillidaishea by:	Date:	

Company

Company Company Method of Shipment: Cooler Temperature(s) °C and Other Remarks: 13 Received by: Received by: eceived by Company Date/Time: taclex Custody Seal No.: Custody Seals Infact: elinquished by:

MW-15002 (240-184759-1) MW-15008 (240-184759-2) MW-15016 (240-184759-3) MW-15019 (240-184759-4)

TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at 5.0 pc/vL. TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.

5.0 pCi/L 5.0 pCi/L

× × × × ×

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×

Water Water Water Water Water Water

Eastern 12:40

15:01

5/1/23 5/1/23 5/1/23 5/1/23 5/1/23 5/1/23

Eastern 08:40

Eastern 13:43 Eastern Eastern

DUP-BACKGROUD (240-184759-5) -B-BACKGROUND (240-184759-6)

Eastern 12:40

S=grab) A-Air)
Preservation Code:

(W=water, S=solid, O=waste/oil, BT=Tissue,

Type (C=comp, G=grab) Sample

Sample

Sample Date

Sample Identification - Client ID (Lab ID)

0.

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TVA protocol - Ra-226+228 action limit a

0

Special Instructions/Note:

# Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-184759-1

List Source: Eurofins St. Louis
List Number: 2
List Creation: 05/08/23 01:28 PM

Creator: Sharkey-Gonzalez, Briana L

QuestionAnswerCommentRadioactivity wasn't checked or is = background as measured by a survey meter.</td TrueThe cooler's custody seal, if present, is intact.TrueSample custody seals, if present, are intact.TrueThe cooler or samples do not appear to have been compromised or tampered with.TrueSamples were received on ice.N/ACooler Temperature is acceptable.TrueCooler Temperature is recorded.TrueCOC is present.TrueCOC is filled out in ink and legible.TrueCOC is filled out with all pertinent information.TrueIs the Field Sampler's name present on COC?True
meter. The cooler's custody seal, if present, is intact.  Sample custody seals, if present, are intact.  True The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Sample custody seals, if present, are intact.  True The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  N/A  Cooler Temperature is acceptable.  True Cooler Temperature is recorded.  True COC is present.  COC is filled out in ink and legible.  True COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  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.  Is the Field Sampler's name present on COC?  True
tampered with.  Samples were received on ice.  Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?
Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Is the Field Sampler's name present on COC?
·
There are no discrepancies between the containers received and the COC. True
Samples are received within Holding Time (excluding tests with immediate True HTs)
Sample containers have legible labels.
Containers are not broken or leaking.
Sample collection date/times are provided.
Appropriate sample containers are used.
Sample bottles are completely filled.
Sample Preservation Verified.
There is sufficient vol. for all requested analyses, incl. any requested  MS/MSDs  True
Containers requiring zero headspace have no headspace or bubble is True <6mm (1/4").
Multiphasic samples are not present.
Consultate de matematica en littina en comunacitina
Samples do not require splitting or compositing.  True

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# **ANALYTICAL REPORT**

## PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Generated 6/8/2023 4:48:19 PM

# **JOB DESCRIPTION**

Karn/Weadock CCR JCW Bottomn Ash Pond

# **JOB NUMBER**

240-184760-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



# **Eurofins Cleveland**

## **Job Notes**

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

# Authorization

Generated 6/8/2023 4:48:19 PM

Authorized for release by Kris Brooks, Project Manager II Kris.Brooks@et.eurofinsus.com (330)966-9790

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## **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-184760-1

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

### **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.
--------------	---

Eisted under the "D" column to designate that the result is reported on a dry weight basis

%R Percent Recovery
CFL Contains Free Liquid
CFU Colony Forming Unit
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)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent
POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
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)

TNTC Too Numerous To Count

**Eurofins Cleveland** 

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### **Case Narrative**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Job ID: 240-184760-1

**Laboratory: Eurofins Cleveland** 

Narrative

Job Narrative 240-184760-1

### Receipt

The samples were received on 5/5/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.4°C

### **Gas Flow Proportional Counter**

Method 903.0: Radium-226 Prep Batch 160-611074Insufficient sample volume was available to perform a sample duplicate for the following samples: JCW-MW-15007 (240-184760-1), JCW-MW-15009 (240-184760-2), JCW-MW-15010 (240-184760-3), JCW-MW-15028 (240-184760-4), DUP-JCW BAP (240-184760-5) and EB-JCW-BAP (240-184760-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 903.0: Radium-226 batch 611074Any 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.JCW-MW-15007 (240-184760-1), JCW-MW-15009 (240-184760-2), JCW-MW-15010 (240-184760-3), JCW-MW-15028 (240-184760-4), DUP-JCW BAP (240-184760-5), EB-JCW-BAP (240-184760-6), (LCS 160-611074/2-A), (LCSD 160-611074/3-A) and (MB 160-611074/1-A)

Method 904.0: Radium-228 Prep Batch 160-611088Insufficient sample volume was available to perform a sample duplicate for the following samples: JCW-MW-15007 (240-184760-1), JCW-MW-15009 (240-184760-2), JCW-MW-15010 (240-184760-3), JCW-MW-15028 (240-184760-4), DUP-JCW BAP (240-184760-5) and EB-JCW-BAP (240-184760-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 904.0: Radium-228 batch 611088Any 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.JCW-MW-15007 (240-184760-1), JCW-MW-15009 (240-184760-2), JCW-MW-15010 (240-184760-3), JCW-MW-15028 (240-184760-4), DUP-JCW BAP (240-184760-5), EB-JCW-BAP (240-184760-6), (LCS 160-611088/2-A), (LCSD 160-611088/3-A) and (MB 160-611088/1-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### Rad

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Job ID: 240-184760-1

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## **Method Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL

### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

### Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

**Eurofins Cleveland** 

Job ID: 240-184760-1

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# **Sample Summary**

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-184760-1	JCW-MW-15007	Water	05/02/23 08:33	
240-184760-2	JCW-MW-15007	Water	05/02/23 10:57	05/05/23 08:00
240-184760-3	JCW-MW-15010	Water	05/02/23 12:12	
240-184760-4	JCW-MW-15028	Water	05/02/23 09:43	05/05/23 08:00
240-184760-5	DUP-JCW BAP	Water	05/02/23 00:00	05/05/23 08:00
240-184760-6	EB-JCW-BAP	Water	05/02/23 12:40	05/05/23 08:00

Job ID: 240-184760-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15007

Date Collected: 05/02/23 08:33 Date Received: 05/05/23 08:00 Lab Sample ID: 240-184760-1

**Matrix: Water** 

Job ID: 240-184760-1

Method: EPA 903	.0 - Radium	-226 (GFP	C)							
		·	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.216		0.115	0.117	1.00	0.154	pCi/L	05/11/23 12:08	06/08/23 08:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		30 - 110					05/11/23 12:08	06/08/23 08:22	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.203	U	0.338	0.338	1.00	0.579	pCi/L	05/11/23 12:51	06/01/23 12:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		30 - 110					05/11/23 12:51	06/01/23 12:42	1
Y Carrier	78.4		30 - 110					05/11/23 12:51	06/01/23 12:42	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.419	U	0.357	0.358	5.00	0.579	pCi/L		06/08/23 14:39	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15009

Date Collected: 05/02/23 10:57 Date Received: 05/05/23 08:00 Lab Sample ID: 240-184760-2

**Matrix: Water** 

Job ID: 240-184760-1

Method: EPA 903.0	) - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0164	U	0.0698	0.0699	1.00	0.134	pCi/L	05/11/23 12:08	06/08/23 08:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.2		30 - 110					05/11/23 12:08	06/08/23 08:22	1

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.636	U	0.593	0.596	1.00	0.944	pCi/L	05/11/23 12:51	06/01/23 12:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.2		30 - 110					05/11/23 12:51	06/01/23 12:42	1
Y Carrier	53.7		30 - 110					05/11/23 12:51	06/01/23 12:42	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.652	U	0.597	0.600	5.00	0.944	pCi/L		06/08/23 14:39	1

6/8/2023

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15010

Lab Sample ID: 240-184760-3 Date Collected: 05/02/23 12:12 **Matrix: Water** 

Date Received: 05/05/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.304		0.113	0.116	1.00	0.109	pCi/L	05/11/23 12:08	06/08/23 08:23	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.0		30 - 110					05/11/23 12:08	06/08/23 08:23	1

	4.0 - Radium	(0	<b>~</b> /							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.309	U	0.439	0.440	1.00	0.740	pCi/L	05/11/23 12:51	06/01/23 12:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.0		30 - 110					05/11/23 12:51	06/01/23 12:42	1
Y Carrier	61.5		30 - 110					05/11/23 12:51	06/01/23 12:42	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.613	U	0.453	0.455	5.00	0.740	pCi/L		06/08/23 14:39	1

Job ID: 240-184760-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15028

Lab Sample ID: 240-184760-4 Date Collected: 05/02/23 09:43 **Matrix: Water** 

Date Received: 05/05/23 08:00

Method: EPA 903	.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.448		0.132	0.138	1.00	0.118	pCi/L	05/11/23 12:08	06/08/23 08:24	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:08	06/08/23 08:24	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.968		0.626	0.632	1.00	0.916	pCi/L	05/11/23 12:51	06/01/23 12:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:51	06/01/23 12:42	1
Y Carrier	44.4		30 - 110					05/11/23 12:51	06/01/23 12:42	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.42		0.640	0.647	5.00	0.916	pCi/L		06/08/23 14:39	1

Job ID: 240-184760-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

**Client Sample ID: DUP-JCW BAP** 

Date Collected: 05/02/23 00:00 Date Received: 05/05/23 08:00 Lab Sample ID: 240-184760-5

Matrix: Water

Job ID: 240-184760-1

Method: EPA 903.0 - Radium-226	(GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0457	U	0.0812	0.0813	1.00	0.142	pCi/L	05/11/23 12:08	06/08/23 08:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		30 - 110					05/11/23 12:08	06/08/23 08:25	1

## Method: EPA 904.0 - Radium-228 (GFPC)

Method: EPA 904.0	- Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.264	U	0.316	0.317	1.00	0.520	pCi/L	05/11/23 12:51	06/01/23 12:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		30 - 110					05/11/23 12:51	06/01/23 12:42	1
Y Carrier	81.7		30 - 110					05/11/23 12:51	06/01/23 12:42	1

## Method: TAL-STL Ra226\_Ra228 - Combined Radium-226 and Radium-228

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.310	U	0.326	0.327	5.00	0.520	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

**Client Sample ID: EB-JCW-BAP** 

Lab Sample ID: 240-184760-6 Date Collected: 05/02/23 12:40 **Matrix: Water** 

Date Received: 05/05/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0245	U	0.0658	0.0658	1.00	0.121	pCi/L	05/11/23 12:08	06/08/23 08:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.4		30 - 110					05/11/23 12:08	06/08/23 08:25	1

Method: EPA 90	14.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0446	U	0.257	0.257	1.00	0.502	pCi/L	05/11/23 12:51	06/01/23 12:43	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.4		30 - 110					05/11/23 12:51	06/01/23 12:43	1
Y Carrier	83.7		30 - 110					05/11/23 12:51	06/01/23 12:43	1

Method: TAL-STL R	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	m-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.0200	U	0.265	0.265	5.00	0.502	pCi/L		06/08/23 14:39	1

Job ID: 240-184760-1

## **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Method: 903.0 - Radium-226 (GFPC)

**Matrix: Water Prep Type: Total/NA** 

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-184760-1	JCW-MW-15007	88.1	
240-184760-2	JCW-MW-15009	82.2	
240-184760-3	JCW-MW-15010	90.0	
240-184760-4	JCW-MW-15028	95.4	
240-184760-5	DUP-JCW BAP	90.3	
240-184760-6	EB-JCW-BAP	94.4	
LCS 160-611074/2-A	Lab Control Sample	96.1	
LCSD 160-611074/3-A	Lab Control Sample Dup	81.0	
MB 160-611074/1-A	Method Blank	93.4	
Tracer/Carrier Legend	l		

Method: 904.0 - Radium-228 (GFPC)

**Matrix: Water** Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-184760-1	JCW-MW-15007	88.1	78.4	
240-184760-2	JCW-MW-15009	82.2	53.7	
240-184760-3	JCW-MW-15010	90.0	61.5	
240-184760-4	JCW-MW-15028	95.4	44.4	
240-184760-5	DUP-JCW BAP	90.3	81.7	
240-184760-6	EB-JCW-BAP	94.4	83.7	
LCS 160-611088/2-A	Lab Control Sample	96.1	78.7	
LCSD 160-611088/3-A	Lab Control Sample Dup	81.0	62.1	
MB 160-611088/1-A	Method Blank	93.4	79.2	

Ba = Ba Carrier

Y = Y Carrier

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Job ID: 240-184760-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-611074/1-A

**Matrix: Water** 

Analysis Batch: 615046

Client Sample ID: Method Blank

Prep Type: Total/NA

Job ID: 240-184760-1

Prep Batch: 611074

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Analyzed Dil Fac Radium-226 0.1185 0.0822 0.0829 1.00 0.113 pCi/L 05/11/23 12:08 06/08/23 06:45

Total

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 93.4 30 - 110 05/11/23 12:08 06/08/23 06:45

1.02

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 611074

Lab Sample ID: LCS 160-611074/2-A **Matrix: Water** 

Analysis Batch: 615046

Total **Spike** 

Added

11.3

LCS LCS Uncert. Result Qual  $(2\sigma + / -)$ 

9.514

Count

Count

**MDC** Unit 0.110 pCi/L

RL

1.00

%Rec %Rec Limits 84 75 - 113

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 96.1 30 - 110

Lab Sample ID: LCSD 160-611074/3-A

**Matrix: Water** 

Analyte

Radium-226

**Analysis Batch: 615046** 

**Client Sample ID: Lab Control Sample Dup** 

Prep Type: Total/NA

Prep Batch: 611074

Total LCSD LCSD Spike Uncert.

%Rec Added Result Qual  $(2\sigma + / -)$ RL **MDC** Unit Limits Analyte RER Limit Radium-226 11.3 1.12 1.00 0.131 pCi/L 92 75 - 113 0.42 10.42

LCSD LCSD

Carrier %Yield Qualifier Limits Ba Carrier 81.0 30 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-611088/1-A

**Matrix: Water** 

**Analysis Batch: 614160** 

Client Sample ID: Method Blank

%Rec

Prep Type: Total/NA Prep Batch: 611088

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed Radium-228 Ū 0.333 1.00 0.512 pCi/L 05/11/23 12:51 06/01/23 12:31 0.4069 0.335

Total

MB MB

Carrier %Yield Qualifier Limits Prepared Dil Fac Analyzed Ba Carrier 93.4 30 - 110 05/11/23 12:51 06/01/23 12:31 30 - 110 Y Carrier 79.2 05/11/23 12:51 06/01/23 12:31

**RER** 

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## **QC Sample Results**

Client: TRC Environmental Corporation. Job ID: 240-184760-1

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-611088/2-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

**Analysis Batch: 614160** 

**Prep Type: Total/NA** Prep Batch: 611088

				Total					
	Spike	LCS	LCS	Uncert.				%Rec	
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits	
Radium-228	8.15	9.437		1.30	1.00	0.530 pCi/L	116	75 - 125	

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 96.1 30 - 110 Y Carrier 78.7 30 - 110

Lab Sample ID: LCSD 160-611088/3-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

**Prep Type: Total/NA Analysis Batch: 614159** Prep Batch: 611088

				iotai						
	Spike	LCSD	LCSD	Uncert.				%Rec		RER
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits	RER	Limit
Radium-228	8.15	8.686		1.67	1.00	1.09 pCi/L	107	75 - 125	0.25	1

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 30 - 110 81.0 30 - 110 Y Carrier 62.1

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Job ID: 240-184760-1

#### Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184760-1	JCW-MW-15007	Total/NA	Water	PrecSep STD	
240-184760-2	JCW-MW-15009	Total/NA	Water	PrecSep STD	
240-184760-3	JCW-MW-15010	Total/NA	Water	PrecSep STD	
240-184760-4	JCW-MW-15028	Total/NA	Water	PrecSep STD	
240-184760-5	DUP-JCW BAP	Total/NA	Water	PrecSep STD	
240-184760-6	EB-JCW-BAP	Total/NA	Water	PrecSep STD	
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

#### Prep Batch: 611088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184760-1	JCW-MW-15007	Total/NA	Water	PrecSep_0	
240-184760-2	JCW-MW-15009	Total/NA	Water	PrecSep_0	
240-184760-3	JCW-MW-15010	Total/NA	Water	PrecSep_0	
240-184760-4	JCW-MW-15028	Total/NA	Water	PrecSep_0	
240-184760-5	DUP-JCW BAP	Total/NA	Water	PrecSep_0	
240-184760-6	EB-JCW-BAP	Total/NA	Water	PrecSep_0	
MB 160-611088/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-611088/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-611088/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

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#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15007

Date Collected: 05/02/23 08:33 Date Received: 05/05/23 08:00

Lab Sample ID: 240-184760-1

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

Lab Sample ID: 240-184760-4

Job ID: 240-184760-1

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:42
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: JCW-MW-15009 Lab Sample ID: 240-184760-2

Date Collected: 05/02/23 10:57 Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:42
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Lab Sample ID: 240-184760-3 Client Sample ID: JCW-MW-15010

Date Collected: 05/02/23 12:12 Date Received: 05/05/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:23
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:42
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: JCW-MW-15028

Date Collected: 05/02/23 09:43 Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:24
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:42
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Eurofins Cleveland** 

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6/8/2023

#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

**Client Sample ID: DUP-JCW BAP** 

Lab Sample ID: 240-184760-5 Date Collected: 05/02/23 00:00 **Matrix: Water** 

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 08:25
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:42
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Client Sample ID: EB-JCW-BAP** Lab Sample ID: 240-184760-6

Date Collected: 05/02/23 12:40 **Matrix: Water** 

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD	<del></del> -		611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 08:25
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:43
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Laboratory References:** 

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

### **Laboratory: Eurofins St. Louis**

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	<b>Expiration Date</b>
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-23
MI - RadChem Recognition	State	9005	06-30-23
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-23
New Jersey	NELAP	MO002	06-30-23
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-23
Texas	NELAP	T104704193	07-31-23
US Fish & Wildlife	US Federal Programs	058448	07-31-23
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

Job ID: 240-184760-1

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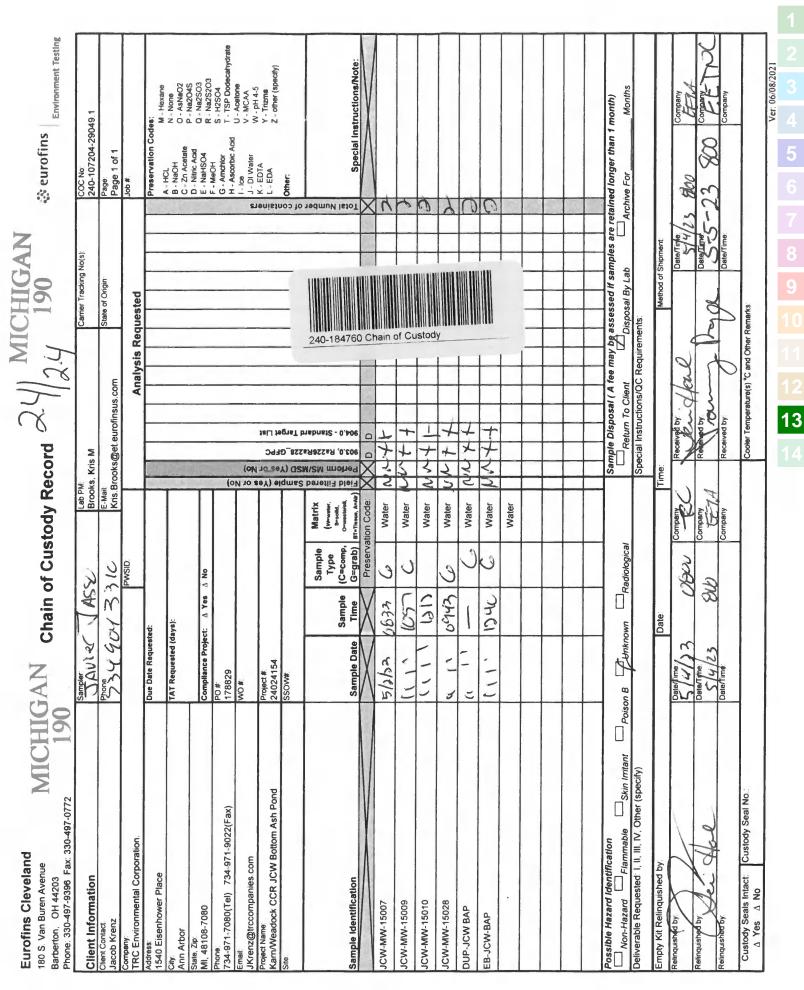
12

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 $<sup>^{\</sup>star} \ \text{Accreditation/Certification renewal pending - accreditation/certification considered valid}.$ 

Eurofins Cleveland



1017/
Eurofins - Canton Sample Receipt Form/Narrative  Login #: \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Client TR Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # Client Cooler Box Other 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 # 2 (CF +0 0 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity  -Were the seals on the outside of the cooler(s) signed & dated?  -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  -Were tamper/custody seals intact and uncompromised?  3. Shippers' packing slip attached to the cooler(s)?  4. Did custody papers accompany the sample(s)?  5. Were the custody papers relinquished & signed in the appropriate place?  6. Was/were the person(s) who collected the samples clearly identified on the COC?  7. Did all bottle labels (ID/Date/Time) be reconciled with the COC?  9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y/N)?  10. Were correct bottle(s) used for the test(s) indicated?  11. Sufficient quantity received to perform indicated analyses?  12. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  13. Were all preserved sample(s) at the correct pH upon receipt?  14. Were VOAs on the COC?  15. Were air bubbles >6 mm in any VOA vials?  16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  17. Was a LL Hg or Me Hg trip blank present?  18. Were air bubbles >6 mm in any VOA vials?  19. Larger than this.  10. Was a LL Hg or Me Hg trip blank present?  10. Were air bubbles >6 mm in any VOA vials?  11. Larger than this.  12. Larger than this.  13. Were air bubbles >6 mm in any VOA vials?  14. Was a LL Hg or Me Hg trip blank present?  15. Were air bubbles >6 mm in any VOA vials?  16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  17. Was a LL Hg or Me Hg trip blank present?
Contacted PM Date by via Verbal Voice Mail Other
Concerning
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES
19. 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)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s) were further preserved in the laboratory.  Time preserved: Preservative(s) added/Lot number(s):
VOA Sample Preservation - Date/Time VOAs Frozen:

# **Login Container Summary Report**

240-184760

Temperature readings: **Preservative** Container Client Sample ID Lab ID Container Type pН Temp Added (mls) Lot # JCW-MW-15007 240-184760-A-1 Plastic 1 liter - Nitric Acid <2 JCW-MW-15007 240-184760-B-1 Plastic 1 liter - Nitric Acid <2 JCW-MW-15009 240-184760-A-2 Plastic 1 liter - Nitric Acid <2 JCW-MW-15009 240-184760-B-2 Plastic 1 liter - Nitric Acid <2 JCW-MW-15010 240-184760-A-3 Plastic 1 liter - Nitric Acid <2 JCW-MW-15010 240-184760-B-3 Plastic 1 liter - Nitric Acid <2 JCW-MW-15028 240-184760-A-4 Plastic 1 liter - Nitric Acid <2 JCW-MW-15028 240-184760-B-4 Plastic 1 liter - Nitric Acid <2 **DUP-JCW BAP** 240-184760-A-5 Plastic 1 liter - Nitric Acid <2 **DUP-JCW BAP** 240-184760-B-5 Plastic 1 liter - Nitric Acid <2 **EB-JCW-BAP** 240-184760-A-6 Plastic 1 liter - Nitric Acid <2 EB-JCW-BAP 240-184760-B-6 Plastic 1 liter - Nitric Acid <2

# **Eurofins Cleveland**

180 S. Van Buren Avenue Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772

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List Number: 2 List Creation: 05/08/23 01:28 PM

Creator: Sharkey-Gonzalez, Briana L

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# **July 2023 Assessment Monitoring Data Summary and Statistical Evaluation**

JC Weadock, Bottom Ash Pond CCR Unit

**Essexville**, Michigan

January 2024

Hydrogeologist/Project Manager

**Prepared For:** 

Consumers Energy Company

**Prepared By:** 

**TRC** 

1540 Eisenhower Place Ann Arbor, Michigan 48108

Wheley

Andrew Whaley

Project Geologist



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#### 1.0 Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90 – 257.98) apply to the JC Weadock Bottom Ash Pond CCR Unit (Weadock Bottom Ash Pond).

Consumers Energy has performed assessment monitoring in accordance with §257.95 of the CCR Rule for the Weadock Bottom Ash Pond in Essexville, Michigan (Figure 1) while continuing to evaluate corrective measures for the Weadock Bottom Ash Pond per §257.96 and §257.97. A public meeting was conducted on June 12, 2023, at least 30 days prior to the final remedy selection, as required under §257.96(e) to discuss the results of the corrective measures assessment. On July 21, 2023, Consumers Energy posted the JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit 40 CFR 257.97(a) Selection of Remedy Letter Report (Remedy Selection Report) (Consumers Energy 2023a) to the operating record and publicfacing CCR website. The Remedy Selection Report identified Source Removal with Post Remedy Monitoring as the final remedy for the former bottom ash pond to address the potential for residual beryllium and lithium; therefore, this July 2023 assessment groundwater monitoring report documents the final assessment monitoring data evaluation for the Weadock Bottom Ash Pond. Groundwater data collected post-CCR removal demonstrates that the remedy is complete per the criteria set forth in §257.98(c) and the remedy is protective of human health and the environment as presented in the Completion of Remedy Letter Report (Consumers Energy, 2023b) and the Weadock Bottom Ash Pond CCR unit was certified closed (Consumers Energy, 2023c). Therefore, as of September 2023, the Weadock Bottom Ash Pond was deemed a closed CCR unit under 40 CFR §257. Accordingly, the CCR unit is not subject to post-closure care requirements or any other requirements under 40 CFR §257 of the CCR Rule. Therefore, ongoing assessment and post-remedy (i.e., corrective action) monitoring was concluded at the Weadock Bottom Ash Pond in 2023 and no further monitoring activities for the Weadock Bottom Ash Pond are planned at this time.

This monitoring report has been prepared to provide the summary of the July 2023 assessment groundwater monitoring results, data quality review, and statistical data evaluation for the Weadock Bottom Ash Pond groundwater monitoring system.

#### 1.1 Program Summary

Groundwater monitoring for the Weadock Bottom Ash Pond commenced after the installation of the monitoring well network in December 2015 to establish background conditions. Detection monitoring was initiated on October 17, 2017 in conformance with the self-implementing schedule in the CCR Rule.

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



- Boron at JCW-MW-15010;
- Calcium at JCW-MW-15009;
- Field pH at JCW-MW-15009 (low), JCW-MW-15010 (high), JCW-MW-15028 (high); and
- Sulfate at JCW-MW-15009.

On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. On January 14, 2019, Consumers Energy provided notification that beryllium and lithium were present at statistically significant levels above the Groundwater Protection Standards (GWPSs) in one of the downgradient monitoring wells (JCW-MW-15009) at the Weadock Bottom Ash Pond. The notification of the GWPS exceedance was followed up with a Response Action Plan Submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on March 15, 2019 laying out the preliminary understanding of water quality and actions that were underway to mitigate or eliminate unacceptable risk associated with the identified release from the CCR unit. The Assessment of Corrective Measures (ACM) (TRC, 2019b) was initiated on April 14, 2019 and submitted on September 11, 2019 in accordance with the schedule in §257.96 and the requirements of the Response Action Plan.

The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1). Although site-specific constituents of concern (COCs) (i.e., arsenic [Weadock Landfill], beryllium and lithium [Weadock Bottom Ash Pond]) have been identified in groundwater monitoring locations at concentrations exceeding their respective GWPS, COCs are 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 the Weadock Bottom Ash Pond.

Evaluation of groundwater under the CCR Rule for the July 2023 assessment monitoring event includes the following constituents that are collected unfiltered in the field:

**CCR Rule Monitoring Constituents** 

Appendix III	Apper	ndix IV
Boron	Antimony	Mercury
Calcium	Arsenic	Molybdenum
Chloride	Barium	Selenium
Fluoride	Beryllium	Thallium
рН	Cadmium	
Sulfate	Chromium	
Total Dissolved Solids (TDS)	Cobalt	
	Fluoride	
	Lead	



To inform remedy selection, Consumers Energy has also evaluated Michigan state-specific constituents as follows:

#### Additional Monitoring Constituents (Michigan Part 115/PA 640)

Detection Monitoring	Assessment Monitoring
Iron	Copper
	Nickel
	Silver
	Vanadium
	Zinc

#### 1.2 Site Overview

The Weadock Bottom Ash Pond is located within the JC Weadock Power Plant site, which is located south of the DE Karn Power Plant site, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). The Weadock Bottom Ash Pond is located immediately west of the JC Weadock Solid Waste Disposal Area (*i.e.* Weadock Landfill) and outside of the soil-bentonite slurry wall (Figure 2). The Weadock Landfill is being monitored in accordance with the EGLE-approved *Landfill Hydrogeological Monitoring Plan*, JC Weadock Solid Waste Disposal Area (February 2021). In addition to the Weadock Bottom Ash Pond and Weadock Landfill, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 and continued to operate through April 15, 2016.

The Weadock Bottom Ash Pond was formerly the primary settling/detention structure for the National Pollutant Discharge Elimination System (NPDES) Treatment System prior to discharge and characterized as an existing CCR surface impoundment. Consumers Energy ceased hydraulic loading to the Weadock Bottom Ash Pond in April 2018 and has allowed the area to dewater by gravity. The active dewatering and excavation work was completed between February and July 2020. The excavation extended to six inches below known CCR elevations established from previous investigations. Excavated CCR has been placed in the neighboring Weadock Landfill that is constructed with of a fully encapsulation soil-bentonite slurry wall keyed into a competently confining clay unit. The Weadock Bottom Ash Pond has been restored by backfilling and grading the surface with clean fill in accordance with the plan to promote stormwater drainage, minimize ponding of surface water, and to reduce the potential of

<sup>&</sup>lt;sup>1</sup> 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.



infiltration and migration of residual arsenic and any future COCs. Consumers Energy submitted for review and approval, *J.C. Weadock Generating Facility Bottom Ash Pond CCR Removal Documentation Report* (Weadock Bottom Ash Pond Closure Report) on August 26, 2020 to satisfy requirements for completing the removal of solid waste which rendered the need for a solid waste operating license unnecessary. EGLE approved the removal documentation report satisfying state requirements to close on December 1, 2020. Groundwater conditions post-CCR removal continue to be monitored.

#### 1.3 Geology/Hydrogeology

The majority of Weadock Bottom Ash Pond area is comprised of surficial CCR and sand fill. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling.

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 ft bgs. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well graded sand present at depths ranging from 10 to 20 ft-bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.

The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft-bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft-bgs.

The Weadock Bottom Ash Pond and Weadock Landfill are bounded by several surface water features (Figure 1): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. The shallow groundwater flow direction in the vicinity of the Weadock Bottom Ash Pond is to the north toward the discharge channel and to the east toward the Saginaw River. Historical groundwater



flow beneath the Weadock Landfill was directed north to the discharge channel due to the bentonite/soil slurry wall. Originally, the slurry wall enclosed the historical fly ash disposal area with the exception of a small segment along the perimeter dike that is designed to vent along the discharge channel immediately upgradient from the NPDES external outfall to prevent water from building up within the facility. In July 2018, this vent was closed and the slurry wall reduced porewater flux around the entire perimeter of the landfill. Following the closure of the vent, the static water level elevations inside of the slurry wall are generally significantly different (>1 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairs.

In previous investigations, bedrock groundwater was generally encountered around 578 ft (NAVD88), which is several feet lower than the shallow groundwater. Groundwater flow direction was generally to the northeast under a very shallow gradient. Given the different groundwater flow regime in the bedrock than the shallow saturated unit, bedrock wells near the surface water bodies are several feet below the surface water elevation. Based on the fact that the shallow sand and the bedrock are separated by over 50 ft of clay, the bedrock unit does not appear to be hydraulically connected to the shallow sand.



# 2.0 Groundwater Monitoring

#### 2.1 Monitoring Well Network

In accordance with 40 CFR 257.91, Consumers Energy established a groundwater monitoring system for the Weadock Bottom Ash Pond, which consists of eight monitoring wells (four background monitoring wells and four downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

Groundwater around the Weadock Bottom Ash Pond was characterized as radial based on the eight initial background sampling events prior to commencing detection monitoring; therefore, the four downgradient wells (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028) were installed in the accessible areas along the perimeter of the Weadock Bottom Ash Pond. Following the cessation of hydraulic loading, groundwater near the Weadock Bottom Ash Pond continues to flow to the north toward the discharge channel and to the west near the Saginaw River; therefore, the compliance wells continue to accurately represent the quality of groundwater passing the waste boundary that ensures detection of groundwater contamination such that all potential contaminant pathways are monitored.

Four monitoring wells located south of the Weadock Bottom Ash Pond provide data on background groundwater quality that has not been impacted by a CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019). Analysis for the establishment of these wells as background is detailed in the *Groundwater Statistical Evaluation Plan* (Stats Plan) for the Weadock Bottom Ash Pond, dated October 17, 2017.

#### 2.2 July 2023 Assessment Monitoring

Per §257.95, all wells in the CCR unit monitoring program must be sampled at least semiannually. TRC conducted the second semiannual assessment monitoring event of 2023 for Appendix III and IV constituents at Bottom Ash Pond CCR Unit in accordance with the *JC Weadock Monitoring Program Sample Analysis Plan* (TRC, 2018) (SAP). The semiannual assessment monitoring event was performed on July 24 through July 26, 2023. The Bottom Ash Pond downgradient monitoring well network (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028), and background monitoring wells (MW-15002, MW-15008, MW-15016, and MW-15019) were sampled during the semiannual assessment monitoring event. The locations of the monitoring wells are depicted on Figure 2.

The July 2023 sampling event consisted of collecting static water level measurements from the Weadock Bottom Ash Pond groundwater monitoring system. Static water level measurements were also collected at other site wells to support preparation of a groundwater contour map. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2.



Appendix III, IV, and additional Michigan Part 115 constituents were analyzed by Consumers Energy Laboratory Services in Jackson, Michigan in accordance with the SAP. The analytical results for the background monitoring wells are summarized in Table 3. The analytical results for the Weadock Bottom Ash Pond downgradient monitoring wells are summarized in Table 4. Analytical results from the July 2023 monitoring event are included in the attached laboratory reports (Appendix C).

#### 2.2.1 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the July 2023 assessment monitoring event are provided in Table 1. These data were used to construct the groundwater contour map (Figure 3). Groundwater elevations at the Weadock site are generally within the range of 579 to 594 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at a similar or slightly higher elevation relative to the surrounding surface water features measured by the NOAA gauging station data.

Figure 3 shows that groundwater near the Weadock Bottom Ash Pond continues to flow to the north toward the discharge channel and to the west near the Saginaw River. The average hydraulic gradient throughout the bottom ash pond area during the July 2023 event is estimated at 0.0041 ft/ft. The gradient was calculated using the monitoring well pairs JCW-MW-15028/JCW-MW-15009, JCW-MW-15007/JCW-MW-15010, and MW-15016/MW-15002. Using the mean hydraulic conductivity of 16 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated seepage velocity observed in July 2023 is 0.22 ft/day or 80 ft/year. The general flow direction is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient monitoring wells are appropriately positioned to detect the presence of Appendix III/IV constituents that could potentially migrate from the Weadock Bottom Ash Pond.

#### 2.2.2 Data Quality

Data was evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. 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 Appendix A.



## 3.0 Assessment Monitoring Statistical Evaluation

Assessment monitoring is continuing at the Weadock Bottom Ash Pond 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 July 2023 groundwater data in accordance with the assessment monitoring program.

#### 3.1 Establishing Groundwater Protection Standards

The 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. In accordance with §257.95(h) and the Stats Plan, GWPSs were established for the Appendix IV constituents following the preliminary assessment monitoring event as documented in the Groundwater Protection Standards technical memorandum (Appendix C of the 2018 Annual Groundwater Monitoring Report (TRC, 2019a). The GWPS is established as the higher value 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 constituents without an established MCL.

#### 3.2 Data Comparison to Groundwater Protection Standards

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 *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 monitoring well data exceeds the GWPS for any Appendix IV constituent. As documented in the January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, beryllium and lithium were present at statistically significant levels above the federal GWPS in one downgradient monitoring well within the Weadock Bottom Ash Pond groundwater monitoring system.

Confidence intervals were established per the statistical methods detailed in the *Statistical Evaluation of July 2023 Assessment Monitoring Sampling Event* technical memorandum provided in Appendix B. For each Appendix IV constituent, the concentrations were first compared directly to the respective GWPSs. Constituent-well combinations that included a direct exceedance of the GWPSs were retained for further statistical analysis using confidence limits.

Previously, beryllium and lithium at JCW-MW-15009 were present at a statistically significant levels; however, the lower confidence limit for all Appendix IV constituents are below their respective GWPSs since May 2019. Overall, the assessment monitoring statistical evaluations have confirmed that beryllium, and lithium are the only Appendix IV constituents that have been present at statistically significant levels above the GWPS. The statistical evaluation of this semiannual assessment monitoring event data indicate that no appendix IV constituents are



currently present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Weadock Bottom Ash Pond:

Constituent GWPS #Downgradient Wells Observed

No constituents are present at statistically significant levels exceeding the GWPS

Source removal of CCR has been completed, as reported in the *Weadock Bottom Ash Pond Removal Documentation Report* (Golder, August 2020) and approved by the EGLE on December 18, 2020. Beryllium and lithium concentrations have been below the GWPS at JCW-MW-15009 for the past nine semi-annual sampling events. A summary of the confidence intervals for July 2023 is provided in Table 5.



#### 4.0 Conclusions

Assessment monitoring was performed at the Weadock Bottom Ash Pond CCR unit through July 2023 while continuing to evaluate corrective measures for the Weadock Bottom Ash Pond per §257.96 and §257.97. A summary of the July 2023 assessment monitoring event is presented in this report. Overall, the statistical assessments have confirmed that there are no Appendix IV constituents present at statistically significant levels above the GWPS. Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Weadock Bottom Ash Pond under the *J.C. Weadock Generating Facility Bottom Ash Pond Closure Plan* (Golder, January 2018) and the CCR Rule's closure by removal provisions in §257.102(c).

Consumers has formally selected the Source Removal with Post Remedy Monitoring remedy for the Weadock Bottom Ash Pond per §257.97(a) to meet the standards set forth in §257.97(b) (Consumers Energy, July 2023). Groundwater data collected post-CCR removal demonstrates that the remedy is complete per the criteria set forth in §257.98(c) and the remedy is protective of human health and the environment as presented in the Completion of Remedy Letter Report (Consumers Energy, 2023b) and the Weadock Bottom Ash Pond CCR unit was certified closed (Consumers Energy, 2023c). Therefore, as of September 2023, the Weadock Bottom Ash Pond was deemed a closed CCR unit under 40 CFR §257. Accordingly, the CCR unit is not subject to post-closure care requirements or any other requirements under 40 CFR §257 of the CCR Rule. Therefore, ongoing assessment and post-remedy (i.e., corrective action) monitoring was concluded at the Weadock Bottom Ash Pond in 2023 and no further monitoring activities for the Weadock Bottom Ash Pond are planned at this time.



#### 5.0 References

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



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



# **Tables**

Table 1

# Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	тос		Scree	n In	terval	July 24, 2023		
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Ele	vati (ft)	ion	Depth to Water	Groundwater Elevation	
<b>.</b>	147 11					(ft BTOC)	(ft)	
Background Monitori		0.554	500.0	1.	570 O	7.45	500 50	
MW-15002	587.71	Sand	580.9	to	570.9	7.15	580.56	
MW-15008	585.36	Sand with clay	578.7	to	568.7	4.63	580.73	
MW-15016	586.49	Sand	581.2	to	578.2	4.62	581.87	
MW-15019	586.17	Sand and Sand/Clay	579.5	to	569.5	5.56	580.61	
MW-58		Sand with clay				5.58	580.86	
Bottom Ash Pond: Do			500.7	1.	570.0	0.70	500.00	
JCW-MW-15007	587.40	Sand	582.7	to	579.2	3.78	583.62	
JCW-MW-15009	589.64	Sand	581.9	to	576.9	8.65	580.99	
JCW-MW-15010	597.76	Sand	579.7	to	578.2	17.03	580.73	
JCW-MW-15028	589.64	Sand	567.7	to	564.7	7.60	582.04	
		Is (outside slurry wall)	578.3	1. 1	570.0	40.00	500.05	
JCW-MW-18001				to	573.3	16.68	580.05	
JCW-MW-18004	593.04	Sand and Sandy Clay		to	578.9	12.05	580.99	
JCW-MW-18005	590.89		580.0	to	575.0	8.43	582.46	
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8	to	577.8	13.13	587.59	
MW-50	593.36	Sand	577.8	to	574.8	13.38	579.98	
MW-51	594.29	Sand and Clay	577.8	to	574.8	14.23	580.06	
MW-52	594.90	Sand	579.3	to	576.3	14.87	580.03	
MW-53	593.68	Sand and Clay	579.1	to	576.1	13.68	580.00	
MW-53R	594.25	Sand and Clay	580.4	to	575.4	14.20	580.05	
MW-54R	593.89	Clay and Sand	581.3	to	576.3	13.60	580.29	
MW-55	593.82	Sand	581.5	to	578.5	13.85	579.97	
OW-57R OUT	591.00	Sandy Clay	577.0	to	572.0	9.68	581.32	
Landfill: Static Water		<u> </u>	1		1		•	
JCW-OW-18001	595.84	Fly Ash and Sand	581.1	to	576.1	6.80	589.04	
JCW-OW-18002	593.63	Sand	578.9	to	573.9	10.60	583.03	
JCW-OW-18003	593.99	Sand and Clay	580.5	to	575.5	8.50	585.49	
JCW-OW-18004	594.19	Sandy Clay	584.6	to	579.6	7.30	586.89	
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9	to	577.9	7.90	592.71	
MW-20	592.73	NR	~581.1	to	~578.1	6.44	586.29	
OW-51	593.62	Clay and Sand	578.9	to	575.9	9.34	584.28	
OW-53	593.64	Clay and Sand	579.0	to	576.0	7.78	585.86	
OW-54	594.10	Clay and Sand	580.0	to	577.0	7.88	586.22	
OW-55	594.67	Clay (or Sand and Clay)	580.9	to	577.9	6.76	587.91	
OW-56R	592.01	Ash and Sand	577.5	to	572.5	6.05	585.96	
OW-57R IN	590.86	Sandy Clay	575.7	to	570.7	5.95	584.91	
OW-61	602.15	Ash and Sand	588.0	to	585.0	8.35	593.80	
Landfill: Leachate He	adwells							
LH-103R	612.70	Fly Ash	30.2	to	33.2	22.80	589.90	
LH-104	596.56	Fly Ash	8.0	to	11.0	9.00	587.56	

#### Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

Table 2

# Summary of Field Parameters JC Weadock Bottom Ash Pond - RCRA CCR Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature	Turbidity (NTU)
Background	•		, ,	, ,	,	, ,	,
MW-15002	7/26/2023	0.80	-56.8	6.6	5,356	15.5	5.4
MW-15008	7/24/2023	0.90	-55.5	6.5	1,340	14.9	0.6
MW-15016	7/26/2023	0.90	-83.9	6.8	1,559	19.3	6.0
MW-15019	7/24/2023	0.90	-61.4	6.6	1,636	14.7	4.9
Weadock Bottom Ash Pond							
JCW-MW-15007	7/26/2023	0.23	-86.0	7.1	8,250	17.2	10.0
JCW-MW-15009	7/26/2023	0.37	-40.0	6.4	2,766	16.8	10.0
JCW-MW-15010	7/26/2023	0.21	-211.5	7.3	1,941	16.2	7.0
JCW-MW-15028	7/26/2023	0.30	-79.8	7.8	4,766	13.7	10.0

#### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celsius.

NTU - Nephelometric Turbidity Unit.

#### Table 3

# Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	10/4/2023	10/2/2023	10/4/2023	10/2/2023
				MI Non-			Doole		
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		Васко	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	205	157	533	275
Calcium	mg/L	NC	NC	NC	500EE	245	126	244	162
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	3,170	387	239	368
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250E	500EE	< 1	89	149	101
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	5,430	1,160	1,340	1,400
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	6.7	6.5	6.9	6.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	2	2	28	1
Barium	ug/L	2,000	2,000	2,000	1,200	968	94	154	373
Beryllium	ug/L	4	4.0	4.0	33	< 1	<1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	2	2	< 1	<1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	27	20	54	14
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	1.18	0.352	0.182	0.543
Radium-228	pCi/L	NC	NC	NC	NC	3.3	1.67	< 0.7	1.23
Radium-226/228	pCi/L	5	NC	NC	NC	4.48	2.02	< 0.7	1.77
Selenium	ug/L	50	50	50	5.0	< 1	<1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300E	300E	500,000EE	30,400	22,500	22,500	21,800
Copper	ug/L	1,000**	1,000E	1,000E	20	2	< 1	< 1	< 1
Nickel	ug/L	NC	100	100	120	5	3	8	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	11	5	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000E	260	< 10	< 10	< 10	< 10

#### Notes:

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

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

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, updated October 12, 2023.
- $^{\star\star} \text{Secondary Maximum Contaminant Level (SMCL)}, \text{EPA Secondary Drinking Water Regulations (SDWR) April, 2012}.$
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is

to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

**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) DE Karn Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	DEK-MW-15002	DEK-MW-15005	DEK-MW-15006	DEK-MW-18001
					Sample Date:	10/4/2023	10/5/2023	10/5/2023	10/4/2023
				MI Non-					
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^				
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	1,280	957	1,050	987
Calcium	mg/L	NC	NC	NC	500EE	71.7	125	143	52.5
Chloride	mg/L	250**	250E	250 <sup>E</sup>	50	86.3	89.2	62.6	69.4
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	50.2	290	446	158
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	596	892	926	551
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 9.0	7.3	7.7	7.7	7.4
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	1	48	22	398
Barium	ug/L	2,000	2,000	2,000	1,200	110	267	150	155
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	<1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	25	27	18	19
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	7	7	9
Radium-226	pCi/L	NC	NC	NC	NC	0.272	0.512	0.452	0.148
Radium-228	pCi/L	NC	NC	NC	NC	1.13	1.11	< 0.666	< 0.581
Radium-226/228	pCi/L	5	NC	NC	NC	1.41	1.63	1.04	< 0.581
Selenium	ug/L	50	50	50	5.0	< 1	< 1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 115 <sup>(2)</sup>									
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	< 20	1,360	1,860	720
Copper	ug/L	1,000**	1,000E	1,000E	20	< 1	<1	< 1	< 1
Nickel	ug/L	NC	100	100	120	< 2	5	3	< 2
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000E	260	< 10	< 10	< 10	< 10

#### Notes:

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

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

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, updated October 12, 2023.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

 $\ensuremath{\mathsf{RED}}$  value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

Table 5

#### Summary of Assessment Monitoring Statistical Evaluation – July 2023 JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

Constituent	Units	GWPS	JCW-M\	N-15007	JCW-MW-15010		
Constituent	Offics	GWF3	LCL	UCL	LCL	UCL	
Arsenic	ug/L	21	11	55	3.3	17	
Barium	ug/L	2,000	320	2,000			
Selenium	ug/L	50	0.50	68			

#### Notes:

Only compliance well/constituent pairs with one or more concentrations exceeding the GWPS within

the 8 most recent semiannual sampling events are included on this table.

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.

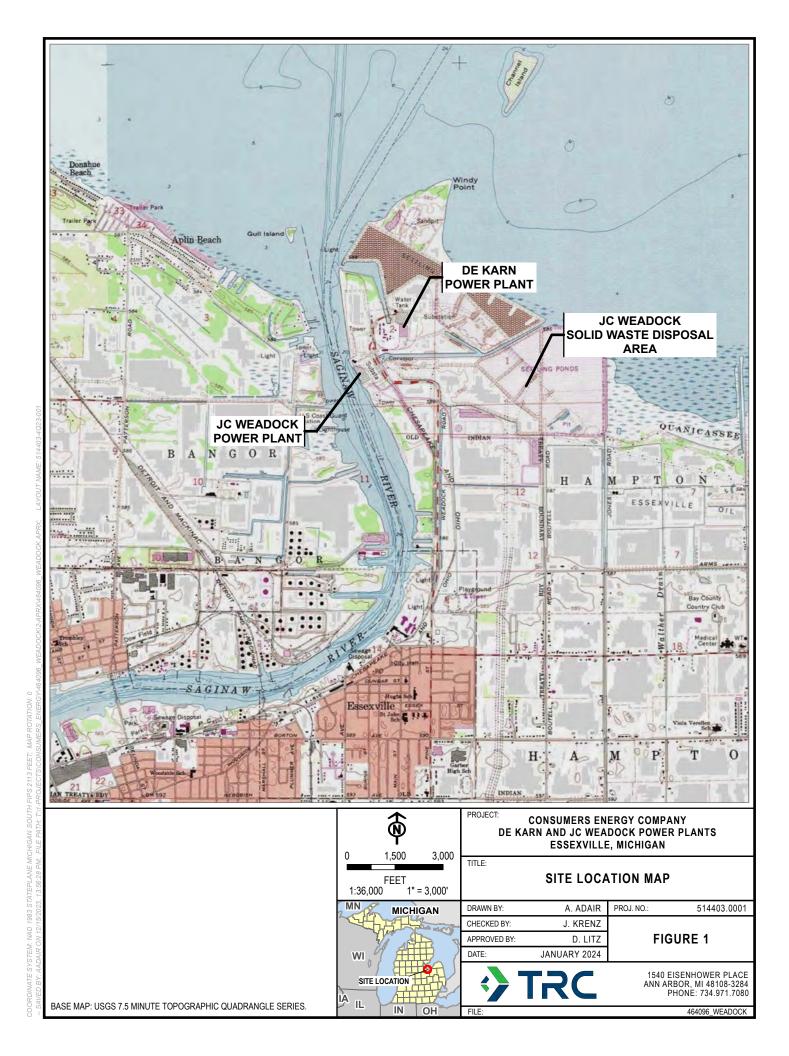
LCL - Lower Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

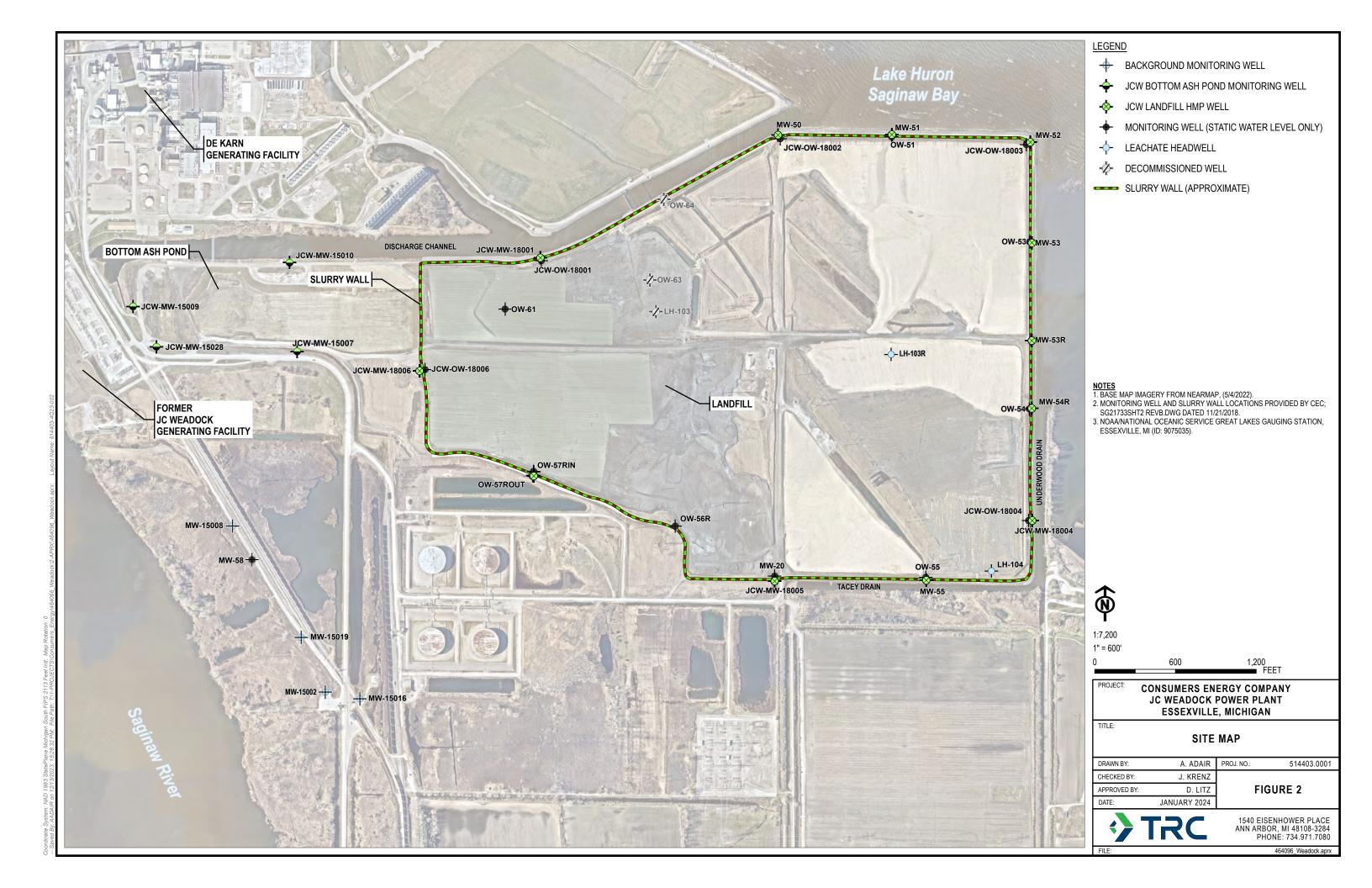
-- - Not Applicable; constituent concentrations for the 8 most recent semiannual sampling events were below the GWPS.

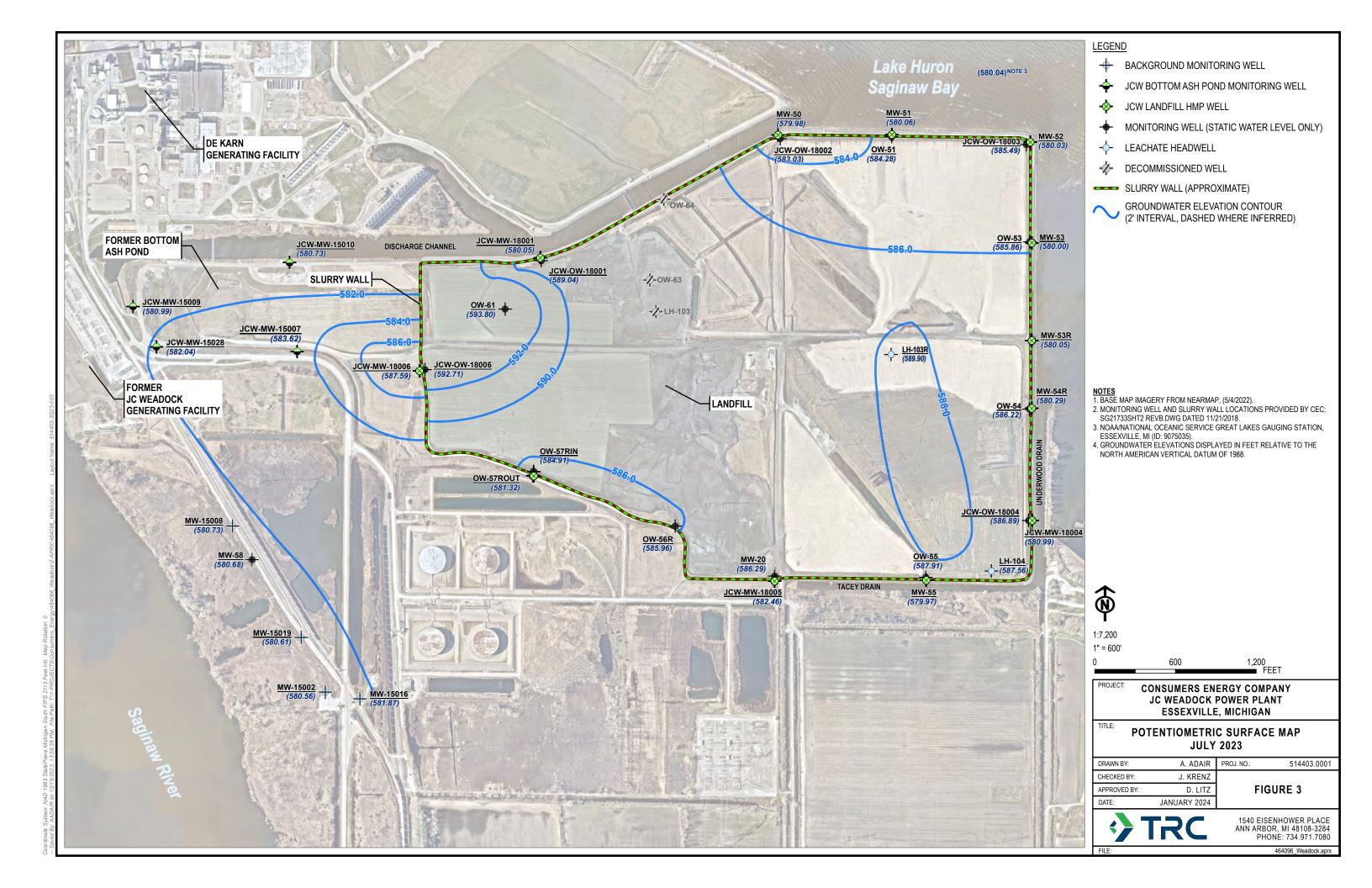
Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.



# **Figures**









# **Appendix A Data Quality Reviews**

# Laboratory Data Quality Review Groundwater Monitoring Event July 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0721.

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

■ MW-15002

■ MW-15008

■ MW-15016

MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses:
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

### **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium 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**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- The field duplicate pair samples were DUP-Background and MW-15008; all criteria between the parent and duplicate samples were within the QC limits with the following exception:
  - The results for chromium were <5x the RL and the absolute difference was equal to the RL. Therefore, the positive results for chromium in all groundwater samples in this data set should be considered estimated, as summarized in the attached table, Attachment A
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

### Attachment A

Summary of Data Non-Conformances for Groundwater Analytical Data JCW/DEK Background Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15002	7/26/2023		
MW-15008	7/24/2023		
MW-15016	7/26/2023	Chromium	Field duplicate variability (absolute difference equal to reporting limit); potential uncertainty exists for the listed results.
MW-15019	7/24/2023		
DUP-Background	7/24/2023		

# Laboratory Data Quality Review Groundwater Monitoring Event July 2023 JC Weadock Bottom Ash Pond

Groundwater samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, alkalinity, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0722.

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

- JCW-MW-15007
- JCW-MW-15009
- JCW-MW-15010

■ JCW-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method				
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0				
Total Dissolved Solids (TDS)	SM 2540C				
Total Metals	SW-846 6020B/7470A				
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B				

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

### **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 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**

- One equipment blank (EB-JCW-BAP) and one field blank (FB-JCW-BAP) were collected.
   Total metals were not detected in these blanks.
- MS and MSD analyses were performed on sample JCW-MW-15009 for total metals, anions, and total alkalinity. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory for all parameters and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-JCW-BAP and JCW-MW-15007; all criteria between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.



# Appendix B Statistical Evaluation of July 2023 Assessment Monitoring Sampling Event



**Date:** January 30, 2024

**To:** J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

**Project No.:** 514403.0001.0000 Phase 002, Task 002

Subject: Statistical Evaluation of July 2023 Assessment Monitoring Sampling Event

JC Weadock Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), beryllium and lithium were present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019. Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule<sup>1</sup> at the JC Weadock Power Plant Bottom Ash Pond.

An assessment monitoring event was conducted on July 26, 2023. 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<sup>™</sup> output files are included as an attachment.

The statistical evaluation of the assessment monitoring event data indicates that no constituents are present at statistically significant levels that exceed the GWPSs in downgradient monitoring wells at the Weadock Bottom Ash Pond.

### Constituent GWPS #Downgradient Wells Observed

No constituents are present at statistically significant levels above the GWPSs.

Both beryllium and lithium at downgradient well JCW-MW-15009 were previously present at statistically significant levels; however, beryllium and lithium concentrations have been below their respective GWPS for eight semiannual events.

<sup>&</sup>lt;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).

### **Assessment Monitoring Statistical Evaluation**

The four downgradient wells (JCW-MW-15007, JCW-MW-15009, JCW-MW-15010, and JCW-MW-15028) are located in accessible areas along the downgradient perimeter of the Weadock Bottom Ash Pond. Following the assessment monitoring sampling event, compliance well data for the Weadock Bottom Ash Pond 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 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 is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample standard deviation, and a selected confidence level (i.e., 99 percent), an upper and lower confidence limit is calculated. The true mean concentration, with 99 percent confidence, will fall between the 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 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 1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight sampling events (May 2020 through July 2023) were retained for further analysis. Arsenic at JCW-MW-15007 and JCW-MW-15010, barium at JCW-MW-15007, and selenium at JCW-MW-15007 had individual results exceeding their respective GWPSs within this time period.

Groundwater data were evaluated utilizing Sanitas<sup>™</sup> statistical software. Sanitas<sup>™</sup> is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas<sup>™</sup> statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals, as appropriate, were calculated for each of the CCR Appendix IV

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<sup>&</sup>lt;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.

constituents using a per test<sup>3</sup> 99 percent confidence level, i.e., a significance level ( $\alpha$ ) of 0.01. The following narrative describes the methods employed and the results obtained. The Sanitas<sup>TM</sup> 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.

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. Initially, the assessment monitoring results were observed visually for potential trends. No outliers or visual trends were identified.

The Sanitas<sup>TM</sup> 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 pertest 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<sup>™</sup> software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes about data transformations, as appropriate. The data sets for arsenic at JCW-MW-15007 and JCW-MW-15010, and barium at JCW-MW-15007 were found to be normally distributed. A Non-parametric confidence interval was used for selenium at JCW-MW-15007 due to a high percentage of non-detects in the dataset. The confidence interval test compares the lower confidence limit to the GWPS.

The statistical evaluation of the Appendix IV parameters shows no constituents present at statistically significant levels that exceed the GWPSs. The results of the assessment monitoring statistical evaluation are consistent with the previous assessment monitoring data statistical evaluation.

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<sup>&</sup>lt;sup>3</sup> Confidence level is assessed for each individual comparison (i.e. per well and per constituent)

## **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Attachment 1 Sanitas™ Output Files

# **Table**

# Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

				Sa	ample Location:	1				JCW-M	W-15007				
					Sample Date:	5/14/2020	10/13/2020	5/12/2021	5/12/2021	10/12/2021	10/12/2021	5/10/2022	10/4/2022	5/2/2023	7/26/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS				•		•				
Appendix III									Field Dup		Field Dup				
Boron	ug/L	NC	NA	619	NA	335	329	233	240	503	532	255	570	212	321
Calcium	mg/L	NC	NA	302	NA	217	413	280	294	265	267	275	493	207	284
Chloride	mg/L	250*	NA	2,440	NA	2,870	5,810	3,780	3,830	2,820	2,790	3,470	2,880	1,810	2,150
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	1,160	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	57.2	4.47	29.0	29.8	82.1	82.5	28.4	773	175	305
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	5,080	11,200	7,200	7,280	5,070	4,920	7,000	6,910	3,630	2,220
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.6	7.3	7.1		7.0		7.2	6.9	7.0	7.1
Appendix IV															
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	19	61	31	31	17	45	24	67	8	20
Barium	ug/L	2,000	NA	1,300	2,000	1,180	2,400	1,680	1,670	1,620	1,590	1,540	412	189	300
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1	1	< 1	< 1	1	1	3	2	< 1	1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	< 1,000	1,160	< 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	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	103	94	70	69	144	151	81	147	55	87
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	8	8	7	7	5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.728	1.71	1.32	1.01	1.35	1.02	1.09	< 0.184	0.216	
Radium-228	pCi/L	NC	NA	NA	NA	0.698	1.67	1.27	1.43	1.63	1.66	1.21	< 0.585	< 0.579	
Radium-226/228	pCi/L	5	NA	3.32	5	1.43	3.38	2.59	2.45	2.98	2.68	2.30	< 0.585	< 0.579	
Selenium	ug/L	50	NA	2	50	< 1	<1	4	3	< 1	< 1	< 1	68	3	<1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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.

Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences.
 and/or concentrations of other constituents present.

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### Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

				Sa	ample Location:				JCW-M\	N-15009			
					Sample Date:	5/14/2020	10/13/2020	5/12/2021	10/13/2021	5/10/2022	10/4/2022	5/2/2023	7/26/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS								
Appendix III													
Boron	ug/L	NC	NA	619	NA	141	263	255	289	202	239	170	236
Calcium	mg/L	NC	NA	302	NA	314	560	574	615	526	566	526	555
Chloride	mg/L	250*	NA	2,440	NA	3.19	5.96	14.8	28.7	34.5	32.6	36.2	21.7
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
Sulfate	mg/L	250*	NA	407	NA	611	1,060	1,450	1,410	1,310	1,460	1,490	1,370
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	1,370	1,910	2,230	2,400	2,270	2,380	2,260	1,230
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.2	6.6	5.6	6.0	5.9	6.3	5.8	6.4
Appendix IV													
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	< 1	1	< 1	3	< 1	< 1	< 1	2
Barium	ug/L	2,000	NA	1,300	2,000	58	51	23	23	17	23	19	23
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	1	< 1	1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	2	< 1	< 1	< 1	1	1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	18	53	89	112	80	92	79	96
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	10	9	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	< 0.125	< 0.352	0.333	0.388	< 0.601	0.174	< 0.134	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.491	< 0.495	0.720	0.922	1.11	0.753	< 0.944	
Radium-226/228	pCi/L	5	NA	3.32	5	< 0.491	< 0.495	1.05	1.31	1.45	0.927	< 0.944	
Selenium	ug/L	50	NA	2	50	1	< 1	< 1	< 1	< 1	1	2	2
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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) Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences and/or concentrations of other constituents present.

# Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

				Sa	ample Location:					JCW-M	W-15010				
					Sample Date:	5/14/2020	10/13/2020	10/13/2020	5/11/2021	10/13/2021	5/10/2022	5/10/2022	10/4/2022	5/2/2023	7/26/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS										
Appendix III								Field Dup				Field Dup			
Boron	ug/L	NC	NA	619	NA	2,070	2,000	2,030	1,080	1,190	1,200	1,200	1,080	1,100	1,400
Calcium	mg/L	NC	NA	302	NA	286	218	204	128	142	165	165	170	199	287
Chloride	mg/L	250*	NA	2,440	NA	90.4	105	106	67.8	50.7	41.7	41.9	30.5	25	34.9
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
Sulfate	mg/L	250*	NA	407	NA	553	254	255	74.7	77.0	167	167	207	273	502
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	1,500	982	997	607	667	838	806	836	936	686
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	7.7	7.1		7.2	7.1	7.1		7.1	7.1	7.3
Appendix IV															
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	4	4	4	6	22	5	5	13	14	13
Barium	ug/L	2,000	NA	1,300	2,000	400	220	221	148	221	219	220	276	285	404
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1	< 1	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	116	96	97	70	92	74	73	71	78	104
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.409	< 0.442	< 0.445	< 0.410	0.389	< 0.488	< 0.415	0.318	0.304	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.467	< 0.493	< 0.566	0.700	0.858	0.932	1.37	0.652	< 0.740	
Radium-226/228	pCi/L	5	NA	3.32	5	0.781	< 0.493	< 0.566	0.898	1.25	0.952	1.50	0.970	< 0.740	
Selenium	ug/L	50	NA	2	50	< 1	<1	< 1	< 1	< 1	< 1	< 1	< 1	<1	1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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.

 Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences and/or concentrations of other constituents present.

Page 3 of 4 January 2024

# Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

					1.1.					011/ 1511/ 450				
				Sa	ample Location:		I		,	CW-MW-150		I		I
		Ι	Г	<u> </u>	Sample Date:	5/14/2020	5/14/2020	10/13/2020	5/12/2021	10/12/2021	5/10/2022	10/4/2022	5/2/2023	7/26/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS									
Appendix III							Field Dup							
Boron	ug/L	NC	NA	619	NA	570	562	644	563	620	633	547	508	636
Calcium	mg/L	NC	NA	302	NA	205	204	221	235	205	199	192	198	193
Chloride	mg/L	250*	NA	2,440	NA	823	806	811	921	974	1,070	1,350	1,110	1,150
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
Sulfate	mg/L	250*	NA	407	NA	128	122	99.8	102	97	93.7	106	122	141
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	2,210	2,240	2,070	2,130	2,360	2,500	2,460	2,520	1,260
pH, Field	SU	6.5 - 8.5*	NA	6.5-7.3	NA	8.1		7.9	7.7	7.8	7.7	7.7	7.6	7.8
Appendix IV														
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	< 1	1	< 1	3	11	< 1	9	< 1	< 1
Barium	ug/L	2,000	NA	1,300	2,000	324	331	332	342	363	351	385	381	381
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1	< 1	< 1	< 1	< 1	2	1	< 1	1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
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
Lead	ug/L	NC	15	1	15	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	60	60	53	51	66	54	52	56	60
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.515	< 0.136	0.697	0.621	0.819	0.49	0.646	0.448	
Radium-228	pCi/L	NC	NA	NA	NA	0.733	< 0.399	< 0.468	0.997	1.19	0.944	1.23	0.968	
Radium-226/228	pCi/L	5	NA	3.32	5	1.25	< 0.399	1.15	1.62	2.00	1.43	1.87	1.42	
Selenium	ug/L	50	NA	2	50	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

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.

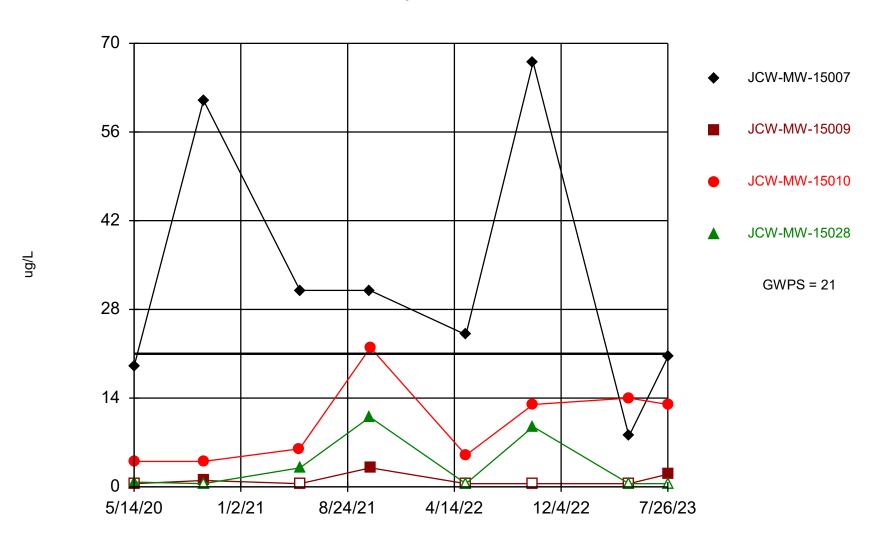
Bold value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against

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) Laboratory reporting limit exceeds GWPS due to sample dilutions performed as a result of sample matrix interferences. and/or concentrations of other constituents present.

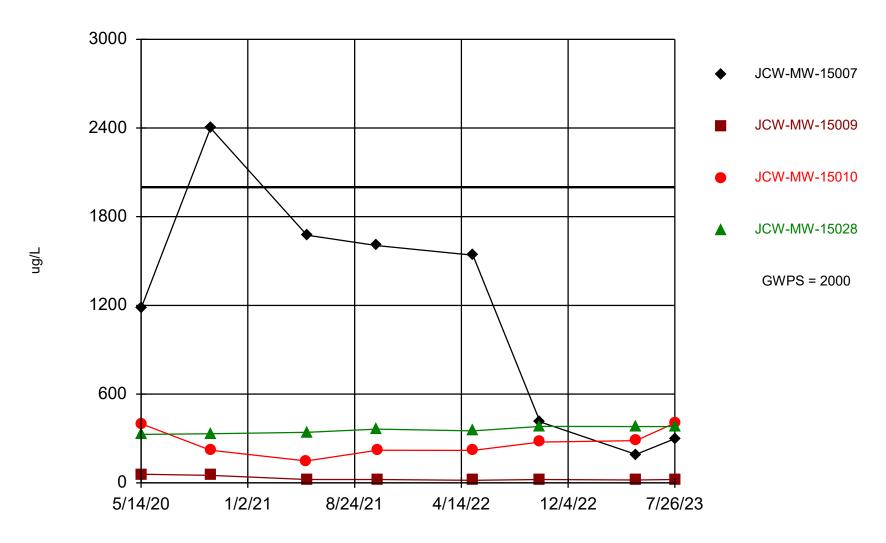
# Attachment 1 Sanitas™ Output Files

# Arsenic Comparison to GWPS



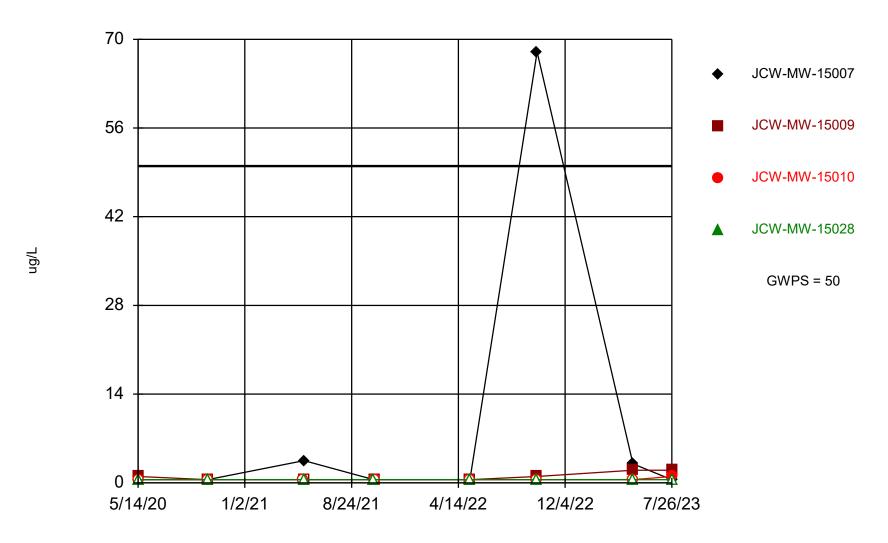
Time Series Analysis Run 9/21/2023 1:38 PM

# Barium Comparison to GWPS



Time Series Analysis Run 9/21/2023 1:39 PM

# Selenium Comparison to GWPS



Time Series Analysis Run 9/21/2023 1:40 PM

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG

# **Summary Report**

Constituent: Arsenic, Total Analysis Run 9/21/2023 1:42 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 5/14/2020 and 7/26/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 9 Wells = 4 Minimum Value = 0.5 Maximum Value = 67 Mean Value = 11.79 Median Value = 4.5 Standard Deviation = 16.51 Coefficient of Variation = 1.401 Skewness = 2.083

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-15007	8	0	8	67	32.69	27.5	20.72	0.6339	0.7383
JCW-MW-15009	8	5	0.5	3	1.063	0.5	0.9425	0.8871	1.314
JCW-MW-15010	8	0	4	22	10.13	9.5	6.446	0.6367	0.6362
JCW-MW-15028	8	4	0.5	11	3.281	0.625	4.403	1.342	1.07

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG

# **Summary Report**

Constituent: Barium, Total Analysis Run 9/21/2023 1:42 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 5/14/2020 and 7/26/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 0 Wells = 4 Minimum Value = 17 Maximum Value = 2400 Mean Value = 455.4 Median Value = 312.8 Standard Deviation = 574.9 Coefficient of Variation = 1.263 Skewness = 2.003

Well	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-15007	8	0	192	2400	1163	1360	791.5	0.6807	0.05667
JCW-MW-15009	8	0	17	58	29.63	23	15.63	0.5276	1.13
JCW-MW-15010	8	0	148	404	271.8	248.5	90.54	0.3332	0.4367
JCW-MW-15028	8	0	327.5	381.5	357.4	357	22.5	0.06296	-0.08455

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG

# **Summary Report**

Constituent: Selenium, Total Analysis Run 9/21/2023 1:42 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 5/14/2020 and 7/26/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 24 Wells = 4 Minimum Value = 0.5 Maximum Value = 68 Mean Value = 2.922 Median Value = 0.5 Standard Deviation = 11.9 Coefficient of Variation = 4.072 Skewness = 5.355

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-15007	8	5	0.5	68	9.625	0.5	23.62	2.454	2.255
JCW-MW-15009	8	4	0.5	2	1	0.75	0.6547	0.6547	0.8165
JCW-MW-15010	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
JCW-MW-15028	8	8	0.5	0.5	0.5	0.5	0	0	NaN

ng/L

0

5/14/20

1/2/21

8/24/21

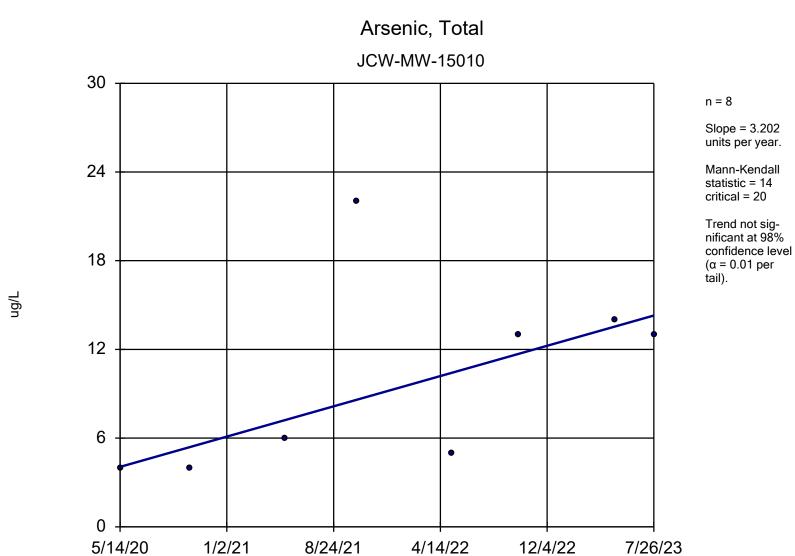
# Arsenic, Total JCW-MW-15007 70 n = 8 Slope = -4.234units per year. 56 Mann-Kendall statistic = -5 critical = -20 Trend not sig-nificant at 98% confidence level 42 $(\alpha = 0.01 \text{ per})$ tail). 28 14

Sen's Slope Estimator Analysis Run 9/21/2023 1:44 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

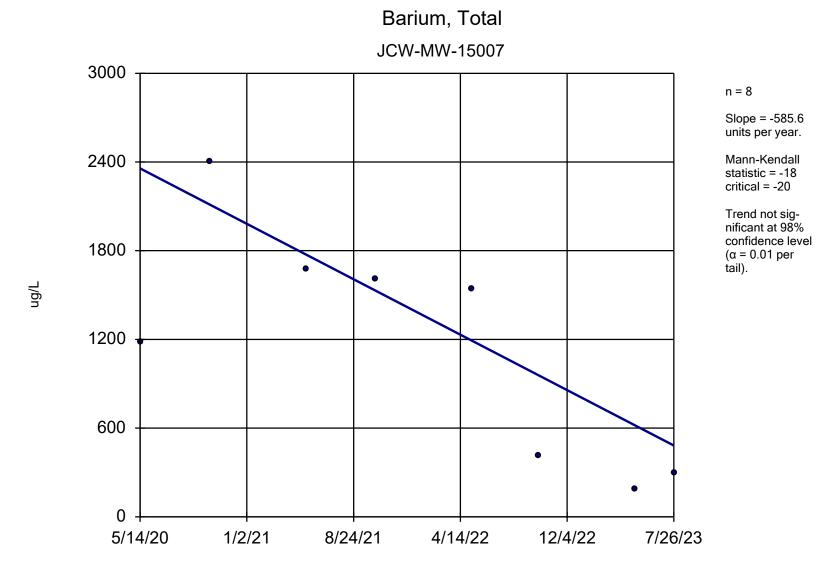
4/14/22

12/4/22

7/26/23

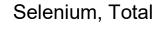


Sen's Slope Estimator Analysis Run 9/21/2023 1:44 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

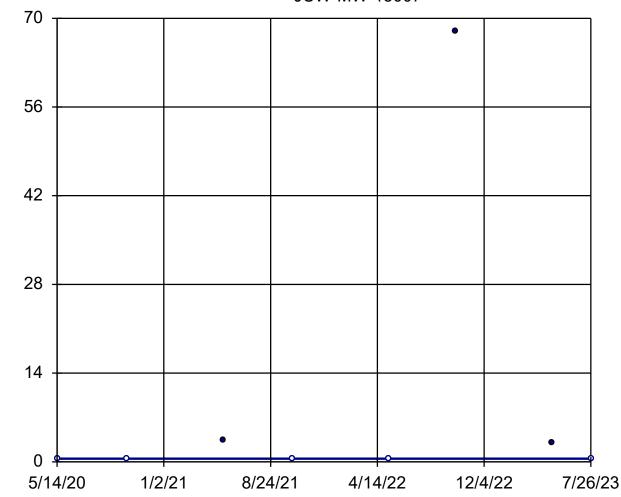


Sen's Slope Estimator Analysis Run 9/21/2023 1:44 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

ng/L



JCW-MW-15007



n = 8

Slope = 0 units per year.

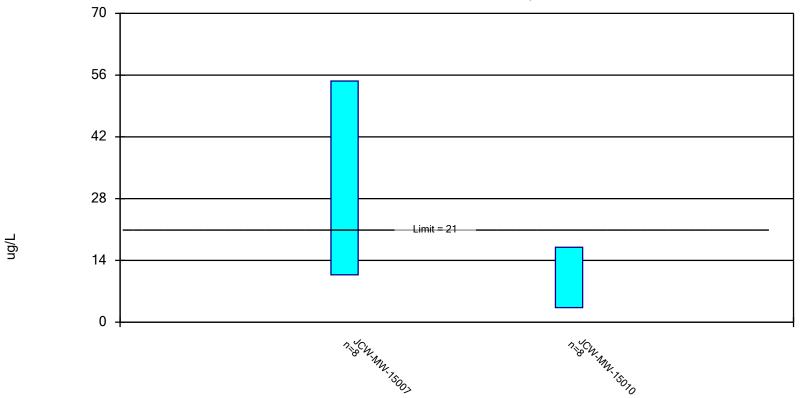
Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

Sen's Slope Estimator Analysis Run 9/21/2023 1:44 PM

## Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 9/21/2023 1:45 PM

# **Confidence Interval**

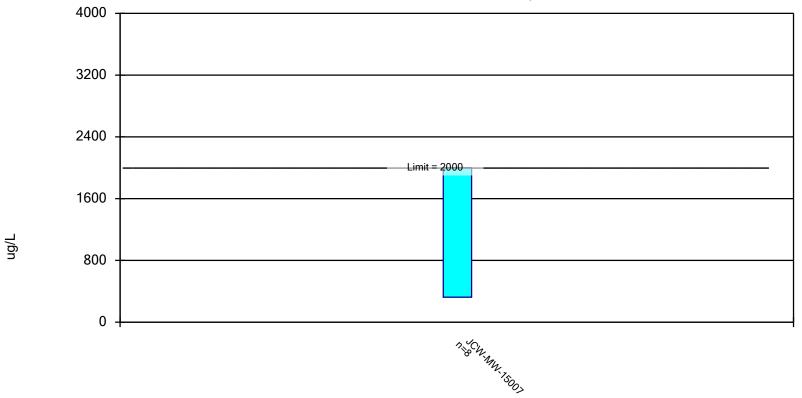
Constituent: Arsenic, Total (ug/L) Analysis Run 9/21/2023 1:46 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	JCW-MW-15007	JCW-MW-15010
5/14/2020	19	4
10/13/2020	61	4 (D)
5/11/2021		6
5/12/2021	31 (D)	
10/12/2021	31 (D)	
10/13/2021		22
5/10/2022	24	5 (D)
10/4/2022	67	13
5/2/2023	8 (D)	14
7/26/2023	20.5 (D)	13
Mean	32.69	10.13
Std. Dev.	20.72	6.446
Upper Lim.	54.65	16.96
Lower Lim.	10.72	3.292

### Parametric Confidence Interval

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



Constituent: Barium, Total Analysis Run 9/21/2023 1:46 PM

# **Confidence Interval**

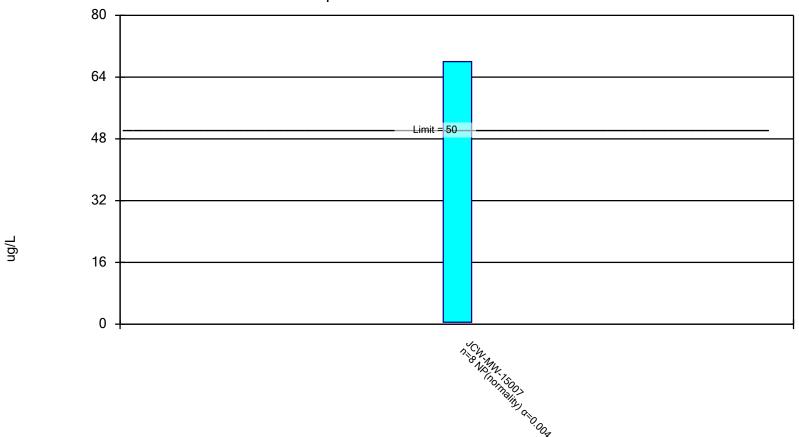
Constituent: Barium, Total (ug/L) Analysis Run 9/21/2023 1:46 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

JCW-MW-15007
1180
2400
1675 (D)
1605 (D)
1540
412
192 (D)
298 (D)
1163
791.5
2002
323.8

## Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Selenium, Total Analysis Run 9/21/2023 1:46 PM

# **Confidence Interval**

Constituent: Selenium, Total (ug/L) Analysis Run 9/21/2023 1:46 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	JCW-MW-15007
5/14/2020	<1
10/13/2020	<1
5/12/2021	3.5 (D)
10/12/2021	<1 (D)
5/10/2022	<1
10/4/2022	68
5/2/2023	3 (D)
7/26/2023	<1 (D)
Mean	9.625
Std. Dev.	23.62
Upper Lim.	68
Lower Lim.	0.5



# **Appendix C Laboratory Analytical Reports**



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 12, 2023

Subject: RCRA GROUNDWATER MONITORING – JCW BOTTOM ASH POND WELLS – 2023 Q3

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0722

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock Bottom Ash Pond Wells area during the week of 07/24/2023 for the 3<sup>rd</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/27/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

### III. Results/Quality Control

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

### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2023 JCW Bottom Ash Pond

Date Received: 7/27/2023 Chemistry Project: 23-0722

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0722-01	JCW-MW-15007	Groundwater	07/26/2023 06:50	JCW Bottom Ash Pond
23-0722-02	JCW-MW-15009	Groundwater	07/26/2023 08:35	JCW Bottom Ash Pond
23-0722-03	JCW-MW-15010	Groundwater	07/26/2023 09:23	JCW Bottom Ash Pond
23-0722-04	JCW-MW-15028	Groundwater	07/26/2023 07:43	JCW Bottom Ash Pond
23-0722-05	DUP-JCW-BAP	Groundwater	07/26/2023 00:00	JCW Bottom Ash Pond
23-0722-06	JCW-MW-15009 MS	Groundwater	07/26/2023 08:35	JCW Bottom Ash Pond
23-0722-07	JCW-MW-15009 MSD	Groundwater	07/26/2023 08:35	JCW Bottom Ash Pond
23-0722-08	EB-JCW-BAP	Water	07/26/2023 09:35	JCW Bottom Ash Pond
23-0722-09	FB-JCW-BAP	Water	07/26/2023 09:30	JCW Bottom Ash Pond



Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: JCW-MW-15007 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-01 Collect Time: 06:50 AM

Metals by EPA 6020B: CCR Rule Apper		- Inotal		Aliquot #: 23-0	722-01-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	20		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	300		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	321		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	284000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	2		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	5000		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	87		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	28800		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	7		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	10800		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	1290000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	11		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	722-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F, S	SO4, Aqu	ieous	Aliquot #: 23-0	722-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	2150000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	305000		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	722-01-C03-A01	Analyst: SL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



**Analytical Report** 

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: JCW-MW-15007 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-01 Collect Time: 06:50 AM

Alkalinity by SM 2320B	Aliquot #: 23-0	Analyst: DLS			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	388000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	388000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01



Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0722

Field Sample ID: JCW-MW-15009 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-02 Collect Time: 08:35 AM

				Allquot #. 25-0	722-02-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	2		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	23		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	236		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	555000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	2		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	13900		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	96		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	24700		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	16		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	11800		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	2		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	13500		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	722-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	722-02-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	21700		ug/L	1000.0	07/31/2023	AB23-0731-0 <sup>2</sup>
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	1370000		ug/L	1000.0	07/31/2023	AB23-0731-0
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	722-02-C03-A01	Analyst: SL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
						AB23-0728-09



## **Analytical Report**

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: JCW-MW-15009 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-02 Collect Time: 08:35 AM

Alkalinity by SM 2320B	Aliquot #: 23-0	722-02-C04-A01	Analyst: DLS		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	264000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	264000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01

08/12/23



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Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0722

Field Sample ID: JCW-MW-15010 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-03 Collect Time: 09:23 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	722-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	13		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	404		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	1400		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	287000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	1		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	69		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	104		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	44000		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	6		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	12500		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	55100		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot #: 23-0	722-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	722-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	34900		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	502000		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	722-03-C03-A01	Analyst: SLF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	686	J	mg/L	10.0	07/28/2023	AB23-0728-09
		.0722 Page				



## **Analytical Report**

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: JCW-MW-15010 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-03 Collect Time: 09:23 AM

Alkalinity by SM 2320B	Aliquot #: 23-0	722-03-C04-A01	Analyst: DLS		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	485000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	485000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01

08/12/23



Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0722

 Field Sample ID:
 JCW-MW-15028
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0722-04
 Collect Time:
 07:43 AM

				Allquot #. 20 0	722-04-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	381		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	636		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	193000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	1		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	369		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	60		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	34600		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	5		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	10800		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	679000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	10		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	722-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-0 <sup>-</sup>
Anions by EPA 300.0 CCR Rule Analy	/te List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	722-04-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1150000		ug/L	1000.0	07/31/2023	AB23-0731-0
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-0
Sulfate	141000		ug/L	1000.0	07/31/2023	AB23-0731-0
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	722-04-C03-A01	Analyst: SLI
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
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## **Analytical Report**

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: JCW-MW-15028 Collect Date: 07/26/2023 Lab Sample ID: 23-0722-04 Collect Time: 07:43 AM

Alkalinity by SM 2320B	Aliquot #: 23-0	722-04-C04-A01	Analyst: DLS		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	391000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	391000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01



08/12/23



Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0722

 Field Sample ID:
 DUP-JCW-BAP
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0722-05
 Collect Time:
 12:00 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	otal Metals	з Ехр	Aliquot #: 23-0	722-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	21		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	296		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	328		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	281000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	2		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	5000		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	90		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	28600		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	8		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	10600		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	1270000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	12		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	722-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	722-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	2320000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	291000		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	722-05-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2280		mg/L	10.0	07/28/2023	AB23-0728-09
	22	0722 Bags 1	2 of 21			



## **Analytical Report**

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** 

Laboratory Project: 23-0722 Field Sample ID: **DUP-JCW-BAP** Collect Date: 07/26/2023 Lab Sample ID: 23-0722-05 Collect Time: 12:00 AM

Alkalinity by SM 2320B	Aliquot #: 23-0	Analyst: DLS			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	390000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	390000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01



Sample Site: **JCW Bottom Ash Pond** 

Field Sample ID: JCW-MW-15009 MS

Lab Sample ID: 23-0722-06 Matrix: Groundwater Laboratory Project: 23-0722 Collect Date: 07/26/2023

> Collect Time: 08:35 AM

Report Date:

08/12/23

Metals by EPA 6020B: CCR Rule	Aliquot #: 23-0	Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	107		%	1.0	08/03/2023	AB23-0803-02
Arsenic	108		%	1.0	08/03/2023	AB23-0803-02
Barium	109		%	5.0	08/03/2023	AB23-0803-02
Beryllium	94		%	1.0	08/03/2023	AB23-0803-02
Boron	97		%	20.0	08/03/2023	AB23-0803-02
Cadmium	99.8		%	0.2	08/03/2023	AB23-0803-02
Calcium	121		%	1000.0	08/03/2023	AB23-0803-02
Chromium	104		%	1.0	08/03/2023	AB23-0803-02
Cobalt	103		%	6.0	08/03/2023	AB23-0803-02
Copper	92		%	1.0	08/03/2023	AB23-0803-02
Iron	120		%	20.0	08/03/2023	AB23-0803-02
Lead	89		%	1.0	08/03/2023	AB23-0803-02
Lithium	100		%	10.0	08/03/2023	AB23-0803-02
Magnesium	106		%	1000.0	08/03/2023	AB23-0803-02
Molybdenum	112		%	5.0	08/03/2023	AB23-0803-02
Nickel	98		%	2.0	08/03/2023	AB23-0803-02
Potassium	109		%	100.0	08/03/2023	AB23-0803-02
Selenium	90		%	1.0	08/03/2023	AB23-0803-02
Silver	92.0		%	0.2	08/03/2023	AB23-0803-02
Sodium	109		%	1000.0	08/03/2023	AB23-0803-02
Thallium	92		%	2.0	08/03/2023	AB23-0803-02
Vanadium	106		%	2.0	08/03/2023	AB23-0803-02
Zinc	102		%	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, A	queous			Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	106		%	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	722-06-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	97		%	1000.0	07/31/2023	AB23-0731-01
Fluoride	93		%	1000.0	07/31/2023	AB23-0731-01
Sulfate	108			1000.0	07/31/2023	AB23-0731-01
Alkalinity by SM 2320B				Aliquot #: 23-0	722-06-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	94.3		%	10000.0	08/03/2023	AB23-0803-01
	23⊣	0722 Page 1	5 of 21			



Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond** Laboratory Project: 23-0722

Field Sample ID: JCW-MW-15009 MSD Collect Date: 07/26/2023 Lab Sample ID: 23-0722-07 Collect Time: 08:35 AM

Metals by EPA 6020B: CCR Rule	e Appendix III-IV To	Aliquot #: 23-0	Analyst: EB			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	107		%	1.0	08/03/2023	AB23-0803-02
Arsenic	111		%	1.0	08/03/2023	AB23-0803-02
Barium	106		%	5.0	08/03/2023	AB23-0803-02
Beryllium	96	6 %		1.0	08/03/2023	AB23-0803-02
Boron	95		%	20.0	08/03/2023	AB23-0803-02
Cadmium	99.3		%	0.2	08/03/2023	AB23-0803-02
Calcium	103		%	1000.0	08/03/2023	AB23-0803-02
Chromium	101		%	1.0	08/03/2023	AB23-0803-02
Cobalt	102		%	6.0	08/03/2023	AB23-0803-02
Copper	91		%	1.0	08/03/2023	AB23-0803-02
Iron	105		%	20.0	08/03/2023	AB23-0803-02
Lead	91		%	1.0	08/03/2023	AB23-0803-02
Lithium	98		%	10.0	08/03/2023	AB23-0803-02
Magnesium	103		%	1000.0	08/03/2023	AB23-0803-02
Molybdenum	114		%	5.0	08/03/2023	AB23-0803-02
Nickel	97		%	2.0	08/03/2023	AB23-0803-02
Potassium	102		%	100.0	08/03/2023	AB23-0803-02
Selenium	89		%	1.0	08/03/2023	AB23-0803-02
Silver	91.3		%	0.2	08/03/2023	AB23-0803-02
Sodium	105		%	1000.0	08/03/2023	AB23-0803-02
Thallium	91		%	2.0	08/03/2023	AB23-0803-02
Vanadium	108		%	2.0	08/03/2023	AB23-0803-02
Zinc	95		%	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	722-07-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	105		%	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	722-07-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	98		%	1000.0	07/31/2023	AB23-0731-01
Fluoride	90		%	1000.0	07/31/2023	AB23-0731-01
Sulfate	110		%	1000.0	07/31/2023	AB23-0731-01
Alkalinity by SM 2320B				Aliquot #: 23-0	722-07-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	94.3		%	10000.0	08/03/2023	AB23-0803-01
	23-1	0722 Page 1	6 of 21			





**Report Date:** 08/12/23

Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0722

Field Sample ID: EB-JCW-BAP Collect Date: 07/26/2023
Lab Sample ID: 23-0722-08 Collect Time: 09:35 AM

Matrix: Water

Metals by EPA 6020B: CCR R	Aliquot #: 23-0	Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Barium	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Boron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND	ι	ug/L	6.0	08/03/2023	AB23-0803-02
Copper	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Iron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	ND	ι	ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	722-08-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	ι	ug/L	0.2	08/08/2023	AB23-0808-01



08/12/23



Count on US®

Sample Site: JCW Bottom Ash Pond Laboratory Project: 23-0722

Field Sample ID: FB-JCW-BAP Collect Date: 07/26/2023
Lab Sample ID: 23-0722-09 Collect Time: 09:30 AM

Matrix: Water

Metals by EPA 6020B: CCR R	Aliquot #: 23-0	Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	ND		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	ND		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	ND		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	ND		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	ND		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	ND		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	722-09-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01



## **Analytical Report**

**Report Date:** 08/12/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

## Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

## TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Ins	pection Date: 7-27-2	3		Inspection By	: This	R		
San	nple Origin/Project Name:	03-2023						
Shi	pment Delivered By: Ente	r the type of ships	ment carri	er.				
		edEx			USPS		Airboi	rne
	Other/Hand Carry (wh		0.0		00.0_		10,000	
	Tracking Number:			Shipping	Form At	tached: Yes		No
Shi	pping Containers: Enter th	ne type and number	er of ship	oing containers	received.			
	Cooler						welone/	Mailer
	Loose/Unpackaged Co							
Con								
Col	ndition of Shipment: Enter						1 50	
	Damaged Shipment Of Other			Dente	ed	9	Leakii	ng
Shi	pment Security: Enter if a	ny of the shipping	containe	rs were opened	before red	ceipt.		
	Shipping Containers R	eceived: Opened		Seale	d			
	Simpling Containers I	eccirca, espenda		Ocuio	-	_		
			A . 177	40.00 00 07				
En	closed Documents: Enter the							
En	CoCt Wor					Othe	r	
		rk Request		Air Data Sh	eet		r	
	CoCt Wor	rk Request	erature of	Air Data Sh	eetcontainer	s.		
	CoC Wornperature of Containers: N  As-Received Tempera	rk Request	erature of	Air Data Sh several sample Samples R	eetcontainer	s.		
Ter	CoC Wondersture of Containers: No As-Received Tempera M&TE # and Expiration	rk Request	erature of	Air Data Sh several sample Samples Ro	container	s. n Ice: Yes_		
Ter	CoC Woonperature of Containers: Mas-Received Tempera M&TE # and Expiration  mber and Type of Contain	Measure the temperature Range 1.4- on 015492 : ers: Enter the total	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word properature of Containers: No As-Received Tempera M&TE # and Expiration where and Type of Container Type	Measure the temperature Range 1.4- on 015492 ers: Enter the tot  Water S	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word present with the containers: Note that the containers of the containers of the container of t	Measure the temperature Range 1.4- on 015492 : ers: Enter the total	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word properature of Containers: Mas-Received Tempera M&TE # and Expiration where and Type of Container Type VOA (40mLor 60mL) Quart/Liter (g/p)	Measure the temperature Range 1.4- on 015492 ers: Enter the tot  Water S	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word present the containers: Note that the containers: Note that the container and Type of Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)	Measure the temperature Range 1.4- on 015492 ers: Enter the tot  Water S	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word present the containers: Note that the containers of the containers of the container and the container that the c	Measure the temper ture Range 1.4- on 015492 : ers: Enter the tot  Water 14	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word present the containers: Mas-Received Tempera M&TE # and Expiration where and Type of Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)	Measure the temperature Range 1.4- on 015492 ers: Enter the tot  Water S	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	
Ter	CoC Word present the containers: Note that the containers of the containers of the container and the container that the c	Measure the temper ture Range 1.4- on 015492 : ers: Enter the tot  Water 14	erature of	Air Data She several sample Samples Re	container eceived of	s. n Ice: Yes	_ No	

## **CHAIN OF CUSTODY**



# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

Page 1 of 1

SAMPLING SITE / CUSTOMER:			PROJECT NUMBER:	SAP CC or W	VO#:						ANALYSIS REQUESTED								OA DEOLUBEMENT.		
Q3-20	23 JCW Botto	m Ash Pond			23-0722	REQUESTER	R: Haro	: Harold Register					(Attach List if More Space is Needed)								QA REQUIREMENT:
SAMP	LING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER													□ NPDES  ☑ TNI			
SENI	REPORT TO:	Caleb Batts			email:	phone:						1		l						□ 1SO 17025	
(	COPY TO:	Harold Regis	ster		MATRIX CODES: GW = Groundwater OX = Other		CONTAINERS												☐ 10 CFR 50 APP. B		
TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE				IVE	Metals			y			☐ INTERNAL INFO				
	LAB	SAMPLE COL	SAMPLE COLLECTION		S = Soil / General Solid WP = Wipe O = Oil WT = Gene		TOTAL#		33	7 H		Ψ.	al Me	Anions	0.0	Alkalinity					□ OTHER
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TO	Non		None HNO <sub>3</sub> H <sub>2</sub> SO <sub>4</sub> NaOH HCI MeOH		MeOH	Total	Ani	TDS	Alk					REMARKS
2	3-0722-01	7/26/33	ريو يان	GW	JCW-MW-15007		5	4	1				x	x	x	x					
	-02	un	083.	GW	JCW-MW-15009		5	4	1				x	x	x	x					
	-03	11 11	0933	GW	JCW-MW-15010		5	4	1				x	x	x	x					
	-04	1 11	0743	GW	JCW-MW-15028		5	4	1				x	x	x	x					
	-05	11 11	_	GW	DUP-JCW-BAP		5	4	1				x	x	x	х					
	-06	110	0835	GW	JCW-MW-15009 MS		4	3	1				x	x		x					
	-07	WM	0831	GW	JCW-MW-15009 MSD		4	3	1				x	x		x					
	-08	(1)	0935	W	EB-JCW-BAP		1		1				x								
1776	-09	NI	0970	W	FB-JCW-BAP		1		1				x								
								H													
(	OUISHED BY:		76	27/	93 0930	ECEIVED BY:									ENTS		,				0.17/00
RELIN	QUISHED BY:		1	DATE/		ECEIVED BY: 23-0722 Page 21	l of 21											8 °C	o N	M&TE	#:_015402 ue Date;_5-23-24



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 11, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q3

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 23-0721** 

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 07/24/2023 for the 3<sup>rd</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/27/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2023 DEK-JCW Background Wells

**Date Received:** 7/27/2023 **Chemistry Project:** 23-0721

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0721-01	MW-15002	Groundwater	07/26/2023 08:52	DEK JCW Background
23-0721-02	MW-15008	Groundwater	07/24/2023 13:23	DEK JCW Background
23-0721-03	MW-15016	Groundwater	07/26/2023 09:33	DEK JCW Background
23-0721-04	MW-15019	Groundwater	07/24/2023 14:05	DEK JCW Background
23-0721-05	DUP-Background	Groundwater	07/24/2023 00:00	DEK JCW Background
23-0721-06	FB- Background	Water	07/26/2023 09:33	DEK JCW Background





Report Date: 08/11/23

Sample Site: **DEK JCW Background** Laboratory Project: 23-0721

Field Sample ID: MW-15002 Collect Date: 07/26/2023 Lab Sample ID: 23-0721-01 Collect Time: 08:52 AM

	_			Analyst: CLE		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Appe	endix III-IV Tot	tal Metals	s Ехр	Aliquot #: 23-0	721-01-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	651		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	146		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	221000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	2		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	2		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	13500		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	1		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	23		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	31400		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	7		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	4200		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	1130000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	10		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	18		ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule Analy	te List. Cl. F. S	SO4. Aau	ieous	Aliguot #: 23-0	721-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1940000	3	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01 AB23-0731-01
Sulfate	2160		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Calida by CM 25400				Allmust #- 00.0	704 04 000 404	Amalian C. O. K
Total Dissolved Solids by SM 2540C Parameter(s)	Result	Flor	Units	Aliquot #: 23-0	721-01-C03-A01	Analyst: SLK Tracking
` ,		Flag			Analysis Date	_
Total Dissolved Solids	2100		mg/L	10.0	07/28/2023	AB23-0728-09



08/11/23



A CENTURY OF EXCELLENCE

Sample Site: **DEK JCW Background** Laboratory Project: **23-0721** 

 Field Sample ID:
 MW-15008
 Collect Date:
 07/24/2023

 Lab Sample ID:
 23-0721-02
 Collect Time:
 01:23 PM

Mercury by EPA 7470A, Total,	Aqueous		Aliquot #: 23-0	Aliquot #: 23-0721-02-C01-A01				
Parameter(s)	Result	Flag Un	ts RL	Analysis Date	Tracking			
Mercury	ND	ug/L	0.2	08/01/2023	AB23-0801-01			
Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	Aliquot #: 23-0721-02-C01-A02				
Parameter(s)	Result	Flag Un	•	Analysis Date	Analyst: EB Tracking			
Antimony	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Arsenic	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Barium	85	ug/L	5.0	08/03/2023	AB23-0803-02			
Beryllium	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Boron	149	ug/L	20.0	08/03/2023	AB23-0803-02			
Cadmium	ND	ug/L	0.2	08/03/2023	AB23-0803-02			
Calcium	123000	ug/L	1000.0	08/03/2023	AB23-0803-02			
Chromium	2	ug/L	1.0	08/03/2023	AB23-0803-02			
Cobalt	ND	ug/L	6.0	08/03/2023	AB23-0803-02			
Copper	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Iron	20800	ug/L	20.0	08/03/2023	AB23-0803-02			
Lead	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Lithium	23	ug/L	10.0	08/03/2023	AB23-0803-02			
Magnesium	19500	ug/L	1000.0	08/03/2023	AB23-0803-02			
Molybdenum	ND	ug/L	5.0	08/03/2023	AB23-0803-02			
Nickel	2	ug/L	2.0	08/03/2023	AB23-0803-02			
Potassium	3390	ug/L	100.0	08/03/2023	AB23-0803-02			
Selenium	ND	ug/L	1.0	08/03/2023	AB23-0803-02			
Silver	ND	ug/L	0.2	08/03/2023	AB23-0803-02			
Sodium	208000	ug/L	1000.0	08/03/2023	AB23-0803-02			
Thallium	ND	ug/L	2.0	08/03/2023	AB23-0803-02			
Vanadium	6	ug/L	2.0	08/03/2023	AB23-0803-02			
Zinc	ND	ug/L	10.0	08/03/2023	AB23-0803-02			
Anions by EPA 300.0 CCR Rule	e Analyte List, Cl, F,	SO4, Aqueous	6 Aliquot #: 23-0	0721-02-C02-A01	Analyst: KDR			
Parameter(s)	Result	Flag Uni		Analysis Date	Tracking			
Chloride	333000	ug/L	1000.0	07/31/2023	AB23-0731-01			
Fluoride	ND	ug/L	1000.0	07/31/2023	AB23-0731-01			
Sulfate	19000	ug/L ug/L	1000.0	07/31/2023	AB23-0731-01 AB23-0731-01			
Total Discolved Solids by SM (	0540C		Allaurat #1 00 f	724 02 022 404	Analysts CL V			
Total Dissolved Solids by SM 2		Floo Uni	-	0721-02-C03-A01	Analyst: SLK			
Parameter(s)	Result	Flag Uni		Analysis Date	Tracking			
Total Dissolved Solids	526	mg/L	. 10.0	07/28/2023	AB23-0728-09			
	22	0721 Daga 6 of 12						



08/11/23



A CENTURY OF EXCELLENCE

Sample Site:DEK JCW BackgroundLaboratory Project:23-0721Field Sample ID:MW-15016Collect Date:07/26/2023Lab Sample ID:23-0721-03Collect Time:09:33 AM

Mercury by EPA 7470A, Total, Aq	ueous		Aliquot #: 23-0	721-03-C01-A01	Analyst: CLE		
Parameter(s)	Result	Flag Un	its RL	Analysis Date	Tracking		
Mercury	ND	ug/L	0.2	08/01/2023	AB23-0801-01		
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals Exp	) Aliquot #: 23-0	0721-03-C01-A02	Analyst: EB		
Parameter(s)	Result	Flag Un	•	Analysis Date	Tracking		
Antimony	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Arsenic	19	ug/L	1.0	08/03/2023	AB23-0803-02		
Barium	104	ug/L	5.0	08/03/2023	AB23-0803-02		
Beryllium	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Boron	572	ug/L	20.0	08/03/2023	AB23-0803-02		
Cadmium	ND	ug/L	0.2	08/03/2023	AB23-0803-02		
Calcium	240000	ug/L	. 1000.0	08/03/2023	AB23-0803-02		
Chromium	1	ug/L	1.0	08/03/2023	AB23-0803-02		
Cobalt	ND	ug/L	6.0	08/03/2023	AB23-0803-02		
Copper	1	ug/L	1.0	08/03/2023	AB23-0803-02		
Iron	15100	ug/L	20.0	08/03/2023	AB23-0803-02		
Lead	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Lithium	73	ug/L	10.0	08/03/2023	AB23-0803-02		
Magnesium	36400	ug/L	1000.0	08/03/2023	AB23-0803-02		
Molybdenum	ND	ug/L	5.0	08/03/2023	AB23-0803-02		
Nickel	10	ug/L	2.0	08/03/2023	AB23-0803-02		
Potassium	12000	ug/L	100.0	08/03/2023	AB23-0803-02		
Selenium	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Silver	ND	ug/L	0.2	08/03/2023	AB23-0803-02		
Sodium	96600	ug/L	. 1000.0	08/03/2023	AB23-0803-02		
Thallium	ND	ug/L	2.0	08/03/2023	AB23-0803-02		
Vanadium	ND	ug/L	2.0	08/03/2023	AB23-0803-02		
Zinc	ND	ug/L	. 10.0	08/03/2023	AB23-0803-02		
Anions by EPA 300.0 CCR Rule A	nalyte List, CI, F,	SO4, Aqueous	S Aliquot #: 23-0	0721-03-C02-A01	Analyst: KDR		
Parameter(s)	Result	Flag Un		Analysis Date	Tracking		
Chloride	191000	ug/L	1000.0	07/31/2023	AB23-0731-01		
Fluoride	ND	ug/L		07/31/2023	AB23-0731-01		
Sulfate	138000	ug/L		07/31/2023	AB23-0731-01		
Total Dissolved Solids by SM 254	.0C		Alignot #- 23-4	0721-03-C03-A01	Analyst: SLK		
Parameter(s)	Result	Flag Un		Analysis Date	Tracking		
Total Dissolved Solids	660	mg/l		07/28/2023	AB23-0728-09		
. 3.4. 2.00004 001140		0721 Dags 7 of 13		0.,20,2020	, 1520 0120 00		



08/11/23



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Sample Site: **DEK JCW Background** Laboratory Project:

23-0721 Field Sample ID: MW-15019 Collect Date: 07/24/2023 Lab Sample ID: 23-0721-04 Collect Time: 02:05 PM

Mercury by EPA 7470A, Total, Aqueou	ıs		Aliquot #: 23-0	Analyst: CLE		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	721-04-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	362		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	275		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	174000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	1		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	23500		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	15		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	39700		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	4		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	2300		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	218000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule Analys	te List. Cl. F.	SO4. Aqı	ieous	Aliguot #: 23-0	721-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	339000	J	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	105000		ug/L	1000.0	07/31/2023	AB23-0731-01 AB23-0731-01
Total Discolused Oal! In his OM 05/00						
Total Dissolved Solids by SM 2540C	D "		11.24		721-04-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	671		mg/L	10.0	07/28/2023	AB23-0728-09
	22	0721 Dogo	0 of 12			





Sample Site: DEK JCW Background Laboratory Project: 23-0721

Field Sample ID: **DUP-Background** 

Lab Sample ID: 23-0721-05 Matrix: Groundwater Collect Date: 07/24/2023
Collect Time: 12:00 AM

Report Date:

08/11/23

Mercury by EPA 7470A, Total, Aqueous Aliquot #: 23-0721-05-C01-A01 **Analyst: CLE** Units Parameter(s) Result Flag RL **Analysis Date Tracking** ND 08/01/2023 ug/L 0.2 AB23-0801-01 Mercury

Metals by EPA 6020B: CCR Ru	ıle Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	721-05-C01-A02	-A02 Analyst: EB		
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking		
Antimony	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Arsenic	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Barium	84	ug/L	5.0	08/03/2023	AB23-0803-02		
Beryllium	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Boron	151	ug/L	20.0	08/03/2023	AB23-0803-02		
Cadmium	ND	ug/L	0.2	08/03/2023	AB23-0803-02		
Calcium	123000	ug/L	1000.0	08/03/2023	AB23-0803-02		
Chromium	1	ug/L	1.0	08/03/2023	AB23-0803-02		
Cobalt	ND	ug/L	6.0	08/03/2023	AB23-0803-02		
Copper	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Iron	20500	ug/L	20.0	08/03/2023	AB23-0803-02		
Lead	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Lithium	23	ug/L	10.0	08/03/2023	AB23-0803-02		
Magnesium	18800	ug/L	1000.0	08/03/2023	AB23-0803-02		
Molybdenum	ND	ug/L	5.0	08/03/2023	AB23-0803-02		
Nickel	3	ug/L	2.0	08/03/2023	AB23-0803-02		
Potassium	3490	ug/L	100.0	08/03/2023	AB23-0803-02		
Selenium	ND	ug/L	1.0	08/03/2023	AB23-0803-02		
Silver	ND	ug/L	0.2	08/03/2023	AB23-0803-02		
Sodium	202000	ug/L	1000.0	08/03/2023	AB23-0803-02		
Thallium	ND	ug/L	2.0	08/03/2023	AB23-0803-02		
Vanadium	6	ug/L	2.0	08/03/2023	AB23-0803-02		
Zinc	ND	ug/L	10.0	08/03/2023	AB23-0803-02		

Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot #: 23-0721-05-C02-A01 Analyst: KDR Parameter(s) Result Flag Units RL**Analysis Date Tracking** Chloride 336000 ug/L 07/31/2023 AB23-0731-01 1000.0 Fluoride ND ug/L 1000.0 07/31/2023 AB23-0731-01 Sulfate 18800 ug/L 07/31/2023 AB23-0731-01 1000.0

**Total Dissolved Solids by SM 2540C** Aliquot #: 23-0721-05-C03-A01 Analyst: SLK Parameter(s) Result Units RL Flag **Analysis Date Tracking Total Dissolved Solids** 559 07/28/2023 AB23-0728-09 mg/L 10.0



08/11/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0721** 

Field Sample ID: FB- Background Collect Date: 07/26/2023
Lab Sample ID: 23-0721-06 Collect Time: 09:33 AM

Matrix: Water

Mercury by EPA 7470A, Total, Aque	ous		Aliquot #: 23-0721-06-C01-A01 Anal					
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Mercury	ND	ι	ug/L	0.2	08/01/2023	AB23-0801-01		
Metals by EPA 6020B: CCR Rule Ap	pendix III-IV To	tal Metals	Ехр	Aliquot #: 23-0	721-06-C01-A02	Analyst: EB		
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking		
Antimony	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Arsenic	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Barium	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02		
Beryllium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Boron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02		
Cadmium	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02		
Calcium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02		
Chromium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Cobalt	ND	ι	ug/L	6.0	08/03/2023	AB23-0803-02		
Copper	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Iron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02		
Lead	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Lithium	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02		
Magnesium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02		
Molybdenum	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02		
Nickel	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02		
Potassium	ND	ι	ug/L	100.0	08/03/2023	AB23-0803-02		
Selenium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02		
Silver	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02		
Sodium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02		
Thallium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02		
Vanadium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02		
Zinc	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02		





**Report Date:** 08/11/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

## Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

## TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inspection Date: 07.2	772		Townsels De AC		
Sample Origin/Project Name:	03.70	3 JCW.	- DEK Backgrou	nud	
Shipment Delivered By: Enter	the type of	shipment carr	ier.		
Pony F Other/Hand Carry (who	edEx_ om)_TRC	UPS	USPS_	Airbo	orne
Tracking Number:			Shipping Form Att	ached: Yes	No
Shipping Containers: Enter th	ne type and n	umber of ship	pping containers received.		
Cooler (1)	Cardboard Bo	x	Custom Case	Envelope	/Mailer
Loose/Unpackaged Co			Other		
Condition of Shipment: Enter			of the shipment container		
			Dented		ing
Other					
	rk Request_		Air Data Sheet		
Temperature of Containers: N		and the second			
As-Received Tempera	ture Range_	2.8-3-6	Samples Received or	ı Ice: Yes 🔏 N	0
M&TE # and Expiration	5-77	3.741			
Number and Type of Contain	ers: Enter th	ne total numb	er of sample containers rec	ceived.	
Container Type	Water	Soil	Other	Broken	Leaking
Container Type VOA (40mL or 60mL)	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p)	Water	<u>Soil</u>	Other	Broken	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar)	<u>Water</u>	<u>Soil</u>	Other	Broken ———	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic)	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic) 24 mL vial (glass)	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic)	Water  II	Soil	Other	Broken	Leaking

PH FSP 0-3 13 1410-511 124 - 205522 PAP' 2-15-25

76. 28 Zhot needed

## **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page 1 of 1

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

SAMPLING SITE / CUSTOMER:				PROJECT NUMBER:	SAP CC or V	SAP CC or WO#:						ANALYSIS REQUESTED							
Q3-2	023 JCW-DEK	Background W	ells		23-0721 REQUESTER: Harold Register							t if Mor	QA REQUIREMENT:						
SAMI	PLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER												□ NPDES  ⊠ TNI		
SEN	O REPORT TO:	Caleb Batts			email:	phone:													□ ISO 17025
	COPY TO:	Harold Regis	ter		MATRIX CODES:  GW = Groundwater OX = O	ther	CONTAINERS											☐ 10 CFR 50 APP. B	
		TRC WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air		TRC WW = Wastewater SL = Sludge PRESERVA:  W = Water / Aqueous Liquid A = Air				/AT	IVE	als						☐ INTERNAL INFO			
	LAB			C C 110 10 11 11 11 11 11 11 11 11 11 11 11		Vipe General Waste	'AL#			7 7		н.	Il Metals	suc		1			□ OTHER
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / L	OCATION	TOTAL	None	HNO	H <sub>2</sub> SO <sub>4</sub>		MeO	Total	Anions	TDS		À.		REMARKS
	23-0721-01	7-26-27	0852	GW	MW-15002		3	2	1				x	x	x				
-	-02	7-24-23	1323	GW	MW-15008		3	2	1				x	x	x				
	-03	7-26-23	0933	GW	MW-15016		3	2	ì				x	x	x				
	-04	7-24-27	1405	GW	MW-15019		3	2	1		П		х	x	x				
	-05	7-24-27	_	GW	DUP-Background		3	2	1	Ť		T	x.	x	x	П			
	-06	7-26-23	0933	W	FB- Background		1				П		x			7	1		
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RELIN	QUISHED BY:			DATE/	rimē:	RECEIVE BY: 23-0721 Page 13	3 of 13									e? ⊌Y .8-3			#: 015402 ne Date: 5-23-24



## First Quarter 2023 Hydrogeological **Monitoring Report**

JC Weadock Solid Waste Disposal Area

**Essexville**, Michigan

April 2023

Project Manager/Hydrogeologist

## **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

#### **Prepared By:**

**TRC** 1540 Eisenhower Place Ann Arbor, Michigan 48108

Kristin Lowery, E.I.T.

Project Engineer



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#### **FIGURES**

Figure 1 Site Location Map

Figure 2 Site Map

Figure 3 Potentiometric Surface Map – March 2023

#### **APPENDICES**

Appendix A Static Water Level Evaluation

Appendix B Data Quality Review

Appendix C Detection Monitoring Statistical Trend Tests

Appendix D Assessment Monitoring and GSI Statistical Evaluation

Appendix E Laboratory Analytical Report

Appendix F Field Records

Appendix G Alternate Source Demonstration Supporting Information



#### 1.0 Introduction

Consumers Energy implemented a comprehensive compliance monitoring plan documented in the *Revised Hydrogeological Monitoring Plan* (Natural Resource Technology, 2010) for the JC Weadock Solid Waste Disposal Area required by Special License Condition 20.b in Solid Waste Disposal Area Operating License No. 9233 issued on October 15, 2009. Since that time, 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) imposing groundwater monitoring and corrective action requirements that apply to the landfill (Weadock Landfill). Michigan amended Part 115 of the Natural Resources and Environmental Protection Act (NREPA) PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management) to provide a basis for establishing a groundwater monitoring system and initiating detection and assessment monitoring to conform requirements for any licensed coal ash impoundment or landfill after December 28, 2018 with Part 115 amendments and the CCR Rule.

On January 15, 2021, Consumers Energy submitted the *Landfill Hydrogeological Monitoring Plan, JC Weadock Power Plant, Essexville, Michigan* (Weadock Landfill HMP), which includes components for Detection Monitoring and Assessment Monitoring, as well as Groundwater Surface Water Interface (GSI) Compliance Monitoring, to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115 and the CCR Rule. The Weadock Landfill HMP (TRC, February 2021) was revised per EGLE comments, submitted, and approved by EGLE on February 19, 2021 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021.

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

This First Quarter 2023 JC Weadock Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash landfill. 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 (MDEQ) – Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 Format for Solid Waste Disposal Facility Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the approved Weadock Landfill HMP that was approved by the EGLE on February 19, 2021. The Weadock Landfill HMP is compliant with Public Act No. 640 of 2018 (PA 640) to amend the NREPA, also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

#### 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the first quarter 2023 at the JC Weadock Solid Waste Disposal Area located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). This JC Weadock Disposal Area is currently authorized under a permit (Groundwater Discharge Authorization GWE-0005) issued pursuant to Part 31 to



discharge to the unusable aquifer directly underlying the solid waste that vents almost immediately to the Saginaw River and Saginaw Bay.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule. Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report JC Weadock Power Plant Bottom Ash Pond CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JCW-MW-15011, JCW-MW-15012, JCW-MW-15023; and
- Field pH at JCW-MW-15023 (high).

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 notice to the Department on January 14, 2019 that arsenic was detected at statistically significant levels above the federal groundwater protection standards (GWPS) established pursuant to §257.95(h) in one monitoring well at the JC Weadock Landfill (JCW-MW-15023), which was located downgradient of a 1,600 linear foot vent within the slurry wall enclosing the historical fly ash disposal area. The vent was designed to direct groundwater flow beneath the landfill to the discharge channel immediately upgradient from the National Pollutant Discharge Elimination System (NPDES) external outfall to prevent water from building up within the facility. In July 2018, this vent was closed (Golder, 2018) and the engineering improvement was approved the by the Department (MDEQ, 2018). As a part of the vent closure, monitoring wells JCW-MW-15011, JCW-MW-15012, and JCW-MW-15023 were decommissioned by overdrilling, removing the well material, and sealing the borehole in order to allow for the slurry wall construction as discussed in the 2018 Annual Groundwater Monitoring Report for the JC Weadock Landfill CCR Unit (TRC, 2019a). Consumers Energy installed an additional nine monitoring wells in August 2018 to supplement the preexisting Michigan Part 115 compliance groundwater well network and provide appropriate coverage for the collection of groundwater levels and water quality data along the perimeter of the Weadock Landfill, as discussed in the Weadock Landfill HMP. Closing the vent and completely encircling the Weadock Landfill with a soil-bentonite slurry wall has demonstrated reduced groundwater flux around the entire perimeter of the landfill.

In March 2019, Consumers Energy submitted a Response Action Plan (Consumers, 2019), which identified interim response activities taken or to be taken to control possible sources of contamination. Consumers Energy further evaluated arsenic in groundwater at the Weadock Landfill as part of the nature and extent analysis and outlined potential remedies in the Assessment of Corrective Measures (TRC, 2019b), which was initiated on April 14, 2019 and completed on September 11, 2019, and focused on materials management with an emphasis on improving source control through the closure plan.

Compliance monitoring is being implemented under the Weadock Landfill HMP dated February 2021 and approved by the EGLE on February 19, 2021. Groundwater data collected in accordance with the Weadock Landfill HMP are used to:



- Assess background groundwater quality for the purposes of establishing and updating GWPS (HMP Section 7.1 Background Determination)
- Perform detection monitoring to assess whether a new release has occurred during operation of the landfill (i.e. statistically significant increase (SSI) over background) (HMP Section 7.2 Detection Monitoring)
- Perform assessment monitoring to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. statistically significant level over the GWPS) (HMP Section 7.3 Assessment Monitoring)
- Assess compliance with the GSI pathway (HMP Section 7.4)

Consumers Energy also continues 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. Assessment monitoring data collected in accordance with the CCR Rule is used to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (*i.e.* statistically significant level over the Appendix IV GWPS).

#### 1.3 Site Overview

The JC Weadock Solid Waste Disposal Area is located within the former JC Weadock Power Plant (Site), located south of the DE Karn Power Plant, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). In addition to the disposal area, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 continued to operate through April 15, 2016.

#### 1.4 Geology/Hydrogeology

The majority of Weadock Landfill area is comprised of surficial CCR and sand fill, as described in the Weadock Landfill HMP. USGS topographic maps and aerial photographs dating back to 1950, in addition to field descriptions of subsurface soil at the Site, indicate that the Site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10-30 feet below ground surface (ft bgs) overlying a clay till which is observed at depth ranging from 25-75 ft bgs. A sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well-graded sand present at depths ranging from 10 to 20 ft bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the landfill perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.



The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the Site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs.

The Weadock Landfill is bounded by several surface water features (Figures 1 and 2): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in this water bearing zone is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay.



### 2.0 Leachate Monitoring

The leachate monitoring program consists of an annual laboratory leachate sampling program (Q1) and an annual field leachate sampling program (Q4) per the Weadock Landfill HMP. This program was instituted to maintain the facility under the applicable portions of Part 115, Rule 311 – Leaching tests to evaluate potential for groundwater contamination at unlined industrial waste landfills. Specifically, Subrule (3) states that waste that is disposed of in an industrial waste landfill shall be retested to evaluate potential for groundwater contamination annually or on a more frequent schedule as specified by the solid waste control agency. The Weadock Landfill HMP includes laboratory leachate testing, which consists of four dry-handled Coal Combustion Residual (CCR) samples collected under normal plant operating conditions during the active life of the landfill. Laboratory leachate data for the four dry-handled CCR samples are shown in Table 6. The 2023 laboratory leachate data are generally consistent with data collected in previous years.

Additional support for evaluating the potential for groundwater contamination at the unlined industrial waste landfill includes the field leachate monitoring program conducted during the fourth quarter of each year. This program consists of an annual sampling collection from two (2) leachate headwells; LH-103R and LH-104. This program was implemented to determine constituents in the leachate as measured under actual conditions in the field and to assess which constituents have the potential to exceed applicable criteria at the compliance well locations.



### 3.0 Groundwater Monitoring

#### 3.1 Monitoring Well Network

The groundwater monitoring system presented in the HMP has been established in accordance with R 299.4906 and the CCR Rule §257.91 and consists of 16 monitoring wells (four background monitoring wells and 12 downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well network has been designed to provide appropriate coverage for water level and water quality data collection along the perimeter of the landfill. The monitoring well locations are shown on Figure 2. Monitoring well specifications and purpose (i.e. static water level monitoring, groundwater quality monitoring, or GSI monitoring) are included in Table 1.

The Weadock Landfill HMP groundwater monitoring system consists of the following:

- **Background Groundwater Quality:** Four monitoring wells located southwest of the Weadock Landfill provide data on background groundwater quality that has not been affected by the CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019) and are used to establish groundwater protection standards (GWPSs) for the landfill:
  - MW-15002 MW-15008 MW-15016 MW-15019
- **Downgradient Groundwater Quality:** The twelve downgradient monitoring wells, located on the outside of the perimeter slurry wall include:

JCW-MW-18001 - JCW-MW-18004 - JCW-MW-18005 - JCW-MW-18006

- MW-50 - MW-51 - MW-52 - MW-53

MW-53R
 MW-54R
 MW-55
 OW-57R Out

■ Groundwater-Surface Water Interface (GSI) Monitoring: Monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the monitoring program to meet the requirements of Part 31. Locations and alignments were established in the Phase II Groundwater Discharge Evaluation, Figure: Appendix K (Natural Resource Technology, 2005) as a baseline for monitoring future results. These monitoring wells are screened across the water table of the uppermost aquifer and will serve as GSI monitoring wells to determine compliance with generic GSI criteria or site-specific mixing zone-based criteria as appropriate. The eight GSI compliance monitoring wells include:

- MW-50 - MW-51 - MW-52 - MW-53

MW-53RMW-54RMW-55JCW-MW-18004

■ **Static Water Level Measurement Only:** Eleven (11) monitoring wells, located on the inside of the perimeter slurry wall, at paired locations with several of the downgradient monitoring wells include:

JCW-OW-18001 - JCW-OW-18002 - JCW-MW-18003 - JCW-MW-18004

- JCW-MW-18005 - JCW-MW-18006 - MW-20 - OW-51

– OW-53 – OW-54 – OW-55 – OW-56R

- OW-57R IN - OW-61 - OW-63



#### 3.2 March 2023 Monitoring Event

In accordance with the Weadock Landfill HMP, TRC conducted the first quarter 2023 monitoring event for the Weadock Landfill by collecting water levels on March 6, 2023, and collecting groundwater samples on March 7 through 9, 2023. Samples that were collected during this event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan for analysis of total metals and inorganic parameters. Quarterly monitoring constituents include:

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents						
Boron	Antimony	Lithium					
Calcium	Arsenic	Mercury					
Chloride	Barium	Molybdenum					
Fluoride	Beryllium	Nickel					
Iron	Cadmium	Selenium					
рН	Chromium, total	Silver					
Sulfate	Cobalt	Thallium					
Total Dissolved Solids (TDS)	Copper	Vanadium					
	Fluoride	Zinc					
	Lead						

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity. Analytical results from the monitoring event are included in the attached laboratory reports (Appendix E).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the Weadock Landfill HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix F).

Groundwater samples were collected using a peristaltic pump. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Groundwater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of two field blanks, one equipment blank, three field duplicates (MW-15002, JCW-MW-18006, and MW-50), and one field matrix spike/matrix spike duplicate samples collected at JCW-MW-18001.



#### 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The laboratory data were found to be complete and usable for the purposes of the Weadock Landfill HMP. The data quality reviews for the JC Weadock Disposal Area network wells are summarized in Appendix B.

#### 3.3 Groundwater Flow Rate and Direction

Potentiometric monitoring initiated in the unusable aquifer beneath the facility includes static water level data collected for development of water table contours and evaluation of the potential for discharge from the facility. The monitoring under this section will be conducted quarterly until closure, as approved by the Director, and semiannually during the 30-year post-closure period. Monitoring will continue until the end of post closure (30 years) or as otherwise approved by the Director.

The measurements for top of casing (TOC) and quarterly recorded depth to water (DTW) with corresponding calculated static water level (SWL) is tabulated and presented in Table 1. A potentiometric surface map is provided as Figure 3.

Groundwater elevations measured at the Site in March 2023 are generally within the range of 579 to 594 feet above mean sea level (ft NAVD88). Groundwater elevations in monitoring wells located adjacent to Saginaw Bay and adjoining surface water bodies are typically encountered at a similar or slightly higher elevation relative to surrounding surface water features measured by the NOAA gauging station. A time-series plot included in Appendix A compares the groundwater elevation of MW-50, MW-51, MW-52, MW-53, MW-54R, JCW-MW-18004, and MW-55 to the nearby NOAA staff gauge. Water levels in wells adjacent to surface water bodies (e.g. Saginaw Bay, Tacey Drain) closely mirror the surface water elevation. Such conditions would result in a minimal gradient to potentially a reverse gradient (i.e., toward the landfill) between the well and the drain which would result in minimal to zero mass flux to the drain (Appendix A: Table A1).

The groundwater monitoring system is structured such that there are eleven (11) monitoring well pairs used to evaluate the hydraulic gradient and potential for water flux across the slurry wall. Static water level observations from the paired wells are shown on time series charts in Appendix A. The static water level elevations inside of the Weadock Landfill perimeter slurry wall are generally significantly different (>3 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairings inside and outside of the constructed slurry wall. As such, the water level elevations indicate that the slurry wall is performing as designed. The general flow direction observed within the confinement of the slurry wall is similar to that identified in previous monitoring rounds. Due to the potential for radial flow, the downgradient wells are appropriately positioned to detect the presence of detection or assessment parameters that could potentially migrate from the Weadock Landfill.



As shown on Figure 3 and in Appendix A, the static water level outside of the slurry wall is lower than the static water level inside of the wall; therefore, the potential groundwater flux across the slurry wall was calculated and included in Table A2 of Appendix A.

#### 3.4 Groundwater Analytical Data and Relevant Screening Criteria

Groundwater analytical data are evaluated in accordance with the Weadock Landfill HMP to determine the effectiveness of landfill structural and operational enhancement measures on the quality and quantity of groundwater flow beneath the footprint of the facility (Section 3.4.1 Detection Monitoring and Section 3.4.2 Assessment Monitoring). Additionally, analytical results for these wells are being evaluated in support of GSI compliance. GSI criteria only apply to the designated compliance point as specified in Section 3.4.3 below; however, analytical results and data trends in groundwater collected from the perimeter dike wells are evaluated to identify potential GSI compliance issues. Data are evaluated by using a combination of screening against relevant criteria, as well as utilizing statistical analyses.

Analytical results from the first quarter 2023 monitoring event are included in the attached laboratory report (Appendix E). Groundwater analytical data from the first quarter 2023 monitoring event are summarized in Table 3 (background monitoring wells) and Table 4 (Weadock Landfill Monitoring Wells), as well as the associated Part 201 generic GSI and site-specific mixing-zone GSI criteria. Field data are summarized in Table 2.

Mixing-zone criteria for arsenic, boron, and selenium are provided for the Karn-Weadock complex in the mixing zone determination, dated December 23, 2015 (MDEQ, 2015). As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. All data are screened against GSI criteria; however, compliance with GSI criteria is determined at select monitoring locations as noted in Section 3.4.3 below.

The mixing zone determination included both final acute values (FAV) and final chronic values (FCV). If a concentration of a constituent at a groundwater well exceeds the acute criteria, and the exceedances are upgradient of the GSI compliance monitoring wells, Consumers Energy must demonstrate that data from all of the compliance monitoring wells are, and will be, in compliance with acute mixing zone-based GSI criteria for those parameters. Averaging of groundwater data is not allowed for comparison to generic GSI or acute mixing zone-based GSI criteria. Acute mixing zoned-based or generic GSI criteria may not be exceeded in any individual GSI compliance monitoring well. If a concentration of a constituent at a well exceeds the chronic criterion, compliance can be demonstrated on a mass-flux basis. The facility can choose to demonstrate compliance by evaluating the total chronic loading based upon the contribution from each compliance well with respect to the total flux observed in the mixing zone.

Table 7 provides a summary of the statistically significant increases or exceedances over the most recent four quarters in accordance with the EGLE-prescribed format; only well/constituent pairs that exceed the relevant GSI criteria (within the last four quarters) are included.



#### 3.4.1 Detection Monitoring

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. The potentiometric analysis, as discussed in Section 3.3, demonstrates that the slurry wall is performing as designed.

In addition to the comparison of analytical data to relevant screening criteria (Table 4), statistical trend analyses are used to evaluate groundwater quality each quarter. Consumers Energy manages and evaluates its groundwater data using Sanitas™ Statistical Software. Consumers Energy conducts intrawell trend analyses to examine data for a given well over time to determine if changes in water quality are occurring that may be associated with the landfill and to identify potential GSI compliance issues. Specifically, the Mann-Kendall test for trend was performed at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant.

Appendix C includes a table summarizing the results of the trend tests as well as the Sanitas<sup>™</sup> output summary statistics and graphs. Data are stable or declining for the majority of the well/constituent pairs, with the following exceptions:

- The previously observed increasing trend for boron at MW-54R continued in Q1 2023.
- The previously confirmed increasing trend for calcium at JCW-MW-18001 continued to be observed in Q1 2023.
- The previously confirmed increasing trend for chloride at MW-53R in Q4 2022 did not continue to increase in Q1 2023. The previously confirmed increasing trend for chloride at MW-54R continued to be observed in Q1 2023.
- The new increasing trend for iron at MW-52 that was initially observed in Q4 2022 was not confirmed in Q1 2023.
- The previously confirmed increasing trend for sulfate at JCW-MW-18001 continued to be observed in Q1 2023.
- The previously confirmed increasing trend for TDS at JCW-MW-18001 continued to be observed in Q1 2023.

Although increasing trends for detection monitoring constituents were observed, individual constituent trends provide a *potential indication* that there may be a release coming from the monitored unit. When these indicator trends are evaluated with other co-monitored conditions and parameters at the Weadock Landfill, the increasing trends for detection monitoring constituents do not appear to be a result of a new release from operation of the landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Several of these newly observed trends, such as those observed for calcium, chloride, sulfate, and TDS, are likely a result of localized geochemical changes influenced by changes in lake levels rather than a change in flux from the landfill and will continue to be evaluated. The increasing trends of calcium, sulfate, and TDS in JCW-MW-18001 and chloride in MW-54R are attributed to localized changes in geochemistry proximal to each well, rather than a change in flux from the landfill, as discussed further in Section 3.5.



Consumers is further evaluating possible causes of the increasing boron concentrations at several porewater compliance monitoring wells. Previous studies (NRT, 2005) documented boron at significantly elevated concentrations at the Karn-Weadock Power Generating Complex. Boron was also identified at SSI background levels in the 2017 *Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit* (TRC, 2018) and was one of the detection monitoring constituents that triggered the initiation of the assessment monitoring program. Statistical significance above the GWPS established for boron has been noted for these monitoring wells per the Part 115 groundwater monitoring program requirements, as discussed in Section 3.4.2.2. Continued monitoring and assessment for potential future actions is warranted at this time; however, observed concentrations of boron in each of the monitoring wells are less than the relevant Part 115 compliance standard - the GSI pathway standard (Section 3.4.3).

#### 3.4.2 Assessment Monitoring Data Evaluation

Assessment monitoring is continuing at the Weadock Landfill in accordance with the Weadock Landfill HMP and §257.95. The assessment monitoring data were statistically evaluated in accordance with the procedures in the Weadock Landfill HMP. The statistical evaluation details are provided in Appendix D. A summary of the confidence interval evaluation is provided in Table 5.

#### 3.4.2.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess constituent concentrations present in groundwater as a result of CCR unit operations by statistically comparing concentrations in the downgradient wells to each of the respective GWPSs for each detection and assessment monitoring constituent. The calculation of the GWPSs in accordance with the Weadock Landfill HMP is documented in the *Groundwater Protection Standards* technical memorandum included as Appendix H of the *First Quarter 2021 Hydrogeological Monitoring Report* (TRC, April 2021). The Federal CCR Rule requires establishment of GWPSs for assessment monitoring (Appendix IV) constituents only. Part 115 requires establishment of GWPSs for both detection and assessment monitoring constituents.

#### 3.4.2.2 Data Comparison to Groundwater Protection Standards

Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*, *Unified Guidance* (Unified Guidance) (USEPA, 2009) and the Weadock Landfill HMP, 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.



**Detection Monitoring Constituents (Part 115):** The first quarter 2023 statistical evaluation indicates that boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT and calcium at JCW-MW-18001 were present at statistically significant levels above the GWPS. Boron was one of the Appendix III SSIs that originally triggered assessment monitoring. Boron concentrations have been consistently above the GWPS but less than the chronic-based mixing zone-based GSI criterion of 44,000 ug/L within the Weadock Landfill monitoring well network since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Consumers is asserting an ASD for the increases in calcium at JCW-MW-18001, as detailed in Section 3.5.1.

The GWPSs for boron and calcium were established based on background concentrations observed in wells unaffected by the Weadock Landfill or Weadock Bottom Ash Pond. Detection monitoring (i.e., Appendix III) constituents do not have associated health-based criteria and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. Concentrations of boron below relevant GSI criteria, as discussed in Section 3.4.3. There are no health-based or GSI criteria specific to calcium.

Assessment Monitoring Constituents (Part 115 and Federal CCR): Based on the first quarter 2023 statistical evaluation, there are no assessment monitoring constituents present at statistically significant levels above the GWPSs within the Weadock Landfill groundwater monitoring system. Although concentrations of arsenic and molybdenum at MW-55 observed during individual sampling events are above the GWPS, the elevated concentrations of those constituents are not a result of a release from the Weadock Landfill, as detailed in Section 3.5. The head differential of 10.01 feet between OW-55 inside the slurry wall and MW-55 outside of the slurry wall also suggests that the integrity of the slurry wall is maintained and groundwater flow from the landfill to the south is impeded by the low permeability of the slurry wall. Groundwater conditions at MW-55 will continue to be monitored.

### 3.4.3 GSI Compliance Monitoring

The GSI monitoring program consists of the eight monitoring points located along the surface water features:

MW-50	■ MW-51	■ MW-52	■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

First quarter 2023 data from the GSI monitoring points are tabulated in Table 4. Consistent with the Weadock Landfill HMP, confidence limits were established for the following GSI monitoring program constituents:



■ Boron ■ Iron

■ pH ■ Sulfate

■ Lithium ■ Molybdenum

■ Selenium ■ Vanadium

The confidence interval calculations are provided in Appendix D. The confidence interval test compares the lower confidence limit to the GSI. Overall, data continue to demonstrate compliance with the applicable GSI criteria.

**Boron:** The assessment monitoring statistical evaluation found that boron was present at statistically significant levels above the GWPS at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT. Boron is a detection monitoring (i.e. Appendix III) constituent and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. All observations of boron are less than the recommended mixing-zone based GSI value specified in Table 3 of the *Implementation of a Mixing Zone Request, Consumers Energy DE Karn/JC Weadock Complex* (MDEQ, 2015) (Appendix D: Table 2).

Arsenic and Molybdenum at MW-55: Concentrations of arsenic and molybdenum at MW-55 have at times exceeded the GSI criteria on a direct comparison to the fixed limit basis (Appendix D: Table 2). The March 2023 sampling event results show that both arsenic and molybdenum concentrations are below applicable GSI criteria. The statistical evaluation presented in Appendix D shows that the lower confidence limits of the arsenic and molybdenum data over the past 8 events do not exceed the GSI criteria. Additionally, water levels in MW-55 closely mirror the surface water elevation measured at the NOAA gauging station, which indicates there is a minimal outward gradient to a potentially, modest reverse gradient (i.e., toward the landfill) between the monitoring well and the drain, resulting in a minimal to zero mass flux to the drain (Appendix A).

#### 3.5 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed in the 2022 Semiannual Groundwater Monitoring Report and Fourth Quarter 2022 Hydrogeological Monitoring Report (TRC, January 2023):

- Calcium, sulfate and TDS in monitoring well JCW-MW-18001;
- Arsenic and molybdenum in monitoring well MW-55; and
- Chloride in monitoring well MW-54R.



#### 3.5.1 Monitoring Well JCW-MW-18001: Calcium, Sulfate, and TDS

Although confirmed increasing trends were observed at JCW-MW-18001 for calcium, sulfate, and TDS (through Q1 2023), these trends are not indicative of a new release from the landfill. Calcium and sulfate are two of several constituents that contribute to the overall TDS concentration and increasing calcium and sulfate concentrations would result in an increase in TDS as well. Increases of calcium, sulfate, and TDS concentrations at JCW-MW-18001 are attributed to changes occurring outside of the slurry wall as a result of changing water levels, rather than a change in flux from the landfill; therefore, Consumers Energy is presenting an Alternate Source Demonstration (ASD) for these constituents. The following lines of evidence as well as additional time series charts included in Appendix G support this ASD:

- The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill (Appendix A).
- Concentration data also support that the slurry wall is effective in reducing the flux of groundwater from the landfill, based on the following observations (Appendix G1):
  - JCW-MW-18001 was installed after the 1,600 linear foot gap in the landfill perimeter slurry wall was closed, as discussed in Section 1.2. Prior to the slurry wall expansion in July 2018, monitoring well JCW-MW-15023 was located within the gap of the slurry wall and was sampled between December 2015 and May 2018 as a part of the original Federal CCR program monitoring well network. The groundwater quality data collected from JCW-MW-15023 shows that groundwater in contact with CCR managed within the landfill was high in arsenic, and low in sulfate, calcium, and TDS (Appendix G1).
  - To accommodate the July 2018 slurry wall expansion, JCW-MW-15023 was decommissioned. Once slurry wall construction was completed, JCW-MW-18001 was installed within 10-ft of the location of the former JCW-MW-15023 well, on the discharge channel side of the slurry wall. Additionally, an observation well, JCW-OW-18001, was installed on the landfill side of the slurry wall to monitor water levels to assess the effectiveness of the hydraulic control. Both JCW-MW-18001 (outside) and JCW-OW-18001 (inside) have been sampled recently to assess concentration trends.
    - Concentrations of arsenic are much higher inside of the slurry wall, within the landfill, while arsenic concentration remain low on the outside of the landfill.
    - Concentrations of sulfate, calcium, and TDS are much lower on the inside of the slurry wall and are higher outside of the slurry wall.
- These combined lines of evidence support that increasing concentrations of calcium, sulfate, and TDS are not a result of a change in flux from the landfill and instead are a result of changing groundwater conditions on the outside of the slurry wall.

#### 3.5.2 Monitoring Well MW-55: Arsenic and Molybdenum

Additionally, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for arsenic and molybdenum at MW-55 indicating elevated levels of constituents at that location are not related to materials management of the Weadock Landfill (2021 Annual Groundwater Monitoring and Corrective Action Report, TRC, January 2022). The basis for this ASD is summarized below and updated time series plots in support of this ASD are included in Appendix G (Figure G2).



Data collected from the 2018 investigation as well as data collected during routine sampling events for Part 115 and Federal CCR groundwater compliance show the following:

- **Distinct Chemistry from Leachate** The leachate chemistry from a monitoring well screened at the base of the ash fill (LH-104) is distinctly different from the groundwater chemistry near MW-55 and the temporary monitoring wells installed by TRC in the investigation area, as illustrated Appendix G of the 2019 Annual Groundwater Monitoring and Corrective Action Report (TRC, January 2020). Additionally, concentrations of arsenic and molybdenum are generally much lower, and concentrations of boron are much higher within the landfill (LH-104) than outside of the landfill at MW-55 (Figure G2).
- Conservative Tracer Boron is a metalloid known to be present in coal ash and can be used as a conservative tracer in groundwater. Concentrations of boron in Leachate Headwell LH-104 (10,800 ug/L in October 2022) are significantly higher than concentrations observed at any of the other locations sampled as a part of this monitoring program. Additionally, recently observed boron concentrations at MW-55 are similar to or lower than historical concentrations, which further supports that the water quality at MW-55 is not directly affected by groundwater migrating from the landfill.
- Reducing Conditions and Groundwater Head Levels Water levels observed at MW-55, as shown in Appendices A and G, increased over 4-ft between 2010 and 2020. The oxidation-reduction potential (ORP) at MW-55 has generally decreased (i.e., is more reducing) since 2010. The lowering of ORP over time as a result of increased water levels has changed the geochemical conditions in the vicinity of MW-55 and has resulted in increased solubility of arsenic and molybdenum. Since 2021, water levels have been generally decreasing, resulting in a slight increase in ORP (i.e., is less reducing) and decreases in concentrations of both arsenic and molybdenum, which further illustrates the relationship between groundwater elevations, redox state, and concentration of arsenic and molybdenum in groundwater.

#### 3.5.3 Chloride at MW-54R

An observation of an increasing trend of chloride at MW-54R without other corroborating lines of evidence is not indicative of a release from the Landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Changes in chloride at MW-54R are likely a result of localized geochemical changes influenced by changes in lake levels. Additionally, chloride was identified as naturally elevated in the Phase II Discharge Evaluation (NRT, September 2005) and was eliminated as a constituent of concern when the mixing zone was first authorized based on the data supporting that conclusion. The box and whiskers plot in Appendix G further illustrates that the chloride concentrations observed at MW-54R are within the range of concentrations observed regionally within other wells in the compliance well network and well below the chloride concentration observed at leachate headwell LH-103R in October 2022.



#### 4.0 Conclusions and Recommendations

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. Evaluation of the first quarter 2023 data demonstrate that the slurry wall is functioning as designed.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule, as discussed in the 2022 Annual Groundwater Monitoring and Corrective Action Report, due to observed groundwater concentrations that are indicative of impact from past landfill operations. Evaluation of the first quarter 2023 data in accordance with the Weadock Landfill HMP demonstrate that boron and calcium are present at concentrations above the GWPSs. Boron and calcium are detection monitoring (i.e., Appendix III) constituents that do not have associated health-based criteria and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. Concentrations of boron are below relevant GSI criteria, as discussed in Section 3.4.3. There is no GSI criteria specific to calcium.

The statistical evaluation in first quarter 2023 found that no constituents were present at statistically significant levels above applicable GSI criteria.

Therefore, Consumers Energy will continue with the detection and assessment monitoring as required by the CCR rule as well as the monitoring program relative to the implementation of the site-specific mixing zone authorization at the Weadock Landfill unit in conformance with the JC Weadock Landfill HMP. The second quarter monitoring event for is scheduled for May 2023.



#### 5.0 References

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Table 1

# Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	тос	October 1 Heritari	Screen	Inter	val	March	6, 2023
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	_	ration (ft)	•	Depth to Water	Groundwater Elevation
						(ft BTOC)	(ft)
Background Monitoring	ng Wells		•				•
MW-15002	587.71	Sand	580.9	to 5	70.9	6.11	581.60
MW-15008	585.36	Sand with clay	578.7	to 50	8.7	4.35	581.01
MW-15016	586.49	Sand	581.2	to 5	78.2	3.14	583.35
MW-15019	586.17	Sand and Sand/Clay	579.5	to 50	69.5	6.12	580.05
Bottom Ash Pond: Do	wngradient Monit	oring Wells					
JCW-MW-15007	587.40	Sand	582.7	to 5	79.2	3.18	584.22
JCW-MW-15009	589.64	Sand	581.9	to 5	76.9	8.73	580.91
JCW-MW-15010	597.76	Sand	579.7	to 5	78.2	17.68	580.08
JCW-MW-15028	589.64	Sand	567.7	to 50	64.7	6.22	583.42
Landfill: Downgradier	t Monitoring Well	s (outside slurry wall)					
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3	to 5	73.3	17.35	579.38
JCW-MW-18004	593.04	Sandy Clay	583.9	to 5	78.9	12.24	580.80
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0	to 5	75.0	6.33	584.56
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8	to 5	77.8	12.96	587.76
MW-50	593.36	Sand	577.8	to 5	74.8	13.96	579.40
MW-51	594.29	Sand and Clay	577.8	to 5	74.8	14.72	579.57
MW-52	594.90	Sand	579.3	to 5	76.3	15.38	579.52
MW-53	593.68	Sand and Clay	579.1	to 5	76.1	14.02	579.66
MW-53R	594.25	Sand and Clay	580.4	to 5	75.4	14.86	579.39
MW-54R	593.89	Clay and Sand	581.3	to 5	76.3	14.00	579.89
MW-55	593.82	Sand	581.5	to 5	78.5	14.16	579.66
OW-57ROUT	591.00	Sandy Clay	577.0	to 5	72.0	8.50	582.50
Landfill: Static Water	Level Only (inside	slurry wall)					
JCW-OW-18001	595.84	Fly Ash and Sand	581.1	to 5	76.1	6.44	589.40
JCW-OW-18002	593.63	Sand	578.9	to 5	73.9	8.64	584.99
JCW-OW-18003	593.99	Sand and Clay	580.5	to 5	75.5	7.60	586.39
JCW-OW-18004	594.19	Sandy Clay	584.6	to 5	79.6	6.82	587.37
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9	to 5	77.9	6.58	594.03
MW-20	592.73	NR	~581.1	to ~5	78.1	5.22	587.51
OW-51	593.62	Clay and Sand	578.9	to 5	75.9	9.50	584.12
OW-53	593.64	Clay and Sand	579.0	to 5	76.0	6.64	587.00
OW-54	594.10	Clay and Sand	580.0	to 5	77.0	6.42	587.68
OW-55	594.67	Clay (or Sand and Clay)	580.9	to 5	77.9	5.00	589.67
OW-56R	592.01	Ash and Sand	577.5	to 5	72.5	4.38	587.63
OW-57R IN	590.86	Sandy Clay	575.7	to 5	70.7	4.56	586.30
OW-61	602.15	Ash and Sand	588.0	to 5	35.0	8.26	593.89
Landfill: Leachate Hea	adwells		-				-
LH-103R	612.70	Fly Ash	30.2	to 3	3.2	23.58	589.12
LH-104	596.56	Fly Ash	8.0	to 1	1.0	7.55	589.01

#### Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

Table 2

## Summary of Field Parameters JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Background							
MW-15002	3/7/2023	3.80	69.5	7.3	1,036	6.1	6.0
MW-15008	3/7/2023	0.19	-98.5	6.8	1,320	7.1	10.0
MW-15016	3/7/2023	0.52	59.0	7.1	970	3.7	6.0
MW-15019	3/7/2023	0.30	-89.0	6.7	2,064	6.6	4.9
Weadock Landfill							
JCW-MW-18001	3/8/2023	0.39	-55.5	6.68	3,343	11.0	4.5
JCW-MW-18004	3/9/2023	9.40	200.9	6.76	1,494	4.5	4.5
JCW-MW-18005	3/9/2023	1.10	19.9	6.64	1,487	6.0	10.0
JCW-MW-18006	3/9/2023	0.95	-26.3	6.89	1,228	8.1	4.3
MW-50	3/8/2023	0.95	-36.0	7.27	1,338	9.2	9.1
MW-51	3/9/2023	0.70	145.0	7.23	1,700	6.8	4.9
MW-52	3/9/2023	0.50	39.0	6.77	1,767	6.4	7.0
MW-53	3/9/2023	0.58	-25.8	7.32	746	6.4	3.9
MW-53R	3/9/2023	0.48	30.0	6.71	1,433	6.4	9.5
MW-54R	3/9/2023	2.90	122.5	6.80	1,192	5.2	6.8
MW-55	3/9/2023	0.42	-71.0	6.75	1,405	6.8	9.7
OW-57ROUT	3/9/2023	4.00	124.8	6.91	1,195	6.9	4.5

#### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

# Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – Hydrogeological Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	3/7/2023	3/7/2023	3/7/2023	3/7/2023
				MI Non-			Doole		•
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		Васко	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	< 20	102	261	224
Calcium	mg/L	NC	NC	NC	500EE	81.3	96.6	108	143
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	2,500	219	71.4	325
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	18.3	18.7	210	91.1
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	574	743	673	1,200
pH, Field	SU	6.5 - 8.5**	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 9.0	7.3	6.8	7.1	6.7
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	< 1	3	< 1	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	69	65	37	326
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	1	1	< 1	1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	< 10	28	55	12
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC				
Radium-228	pCi/L	NC	NC	NC	NC				
Radium-226/228	pCi/L	5	NC	NC	NC				
Selenium	ug/L	50	50	50	5.0	< 1	< 1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	626	18,900	421	21,700
Copper	ug/L	1,000**	1,000E	1,000E	20	1	< 1	2	< 1
Nickel	ug/L	NC	100	100	120	3	3	5	5
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	3	5	< 2	2
Zinc	ug/L	5,000**	2,400	5,000E	260	< 10	< 10	< 10	< 10

#### Notes:

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

 $p\mbox{Ci/L}$  - picocuries per liter;  $\mbox{SU}$  - standard units;  $p\mbox{H}$  is a field parameter.

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 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- $(1)\ 40\ CFR\ Part\ 257\ Appendix\ III\ Detection\ Monitoring\ Constituents\ and\ Appendix\ IV\ Assessment\ Monitoring\ Constituents.$
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

**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.

# Summary of Groundwater Sampling Results (Analytical) JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

							Sample Location:	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
							Sample Date:	3/8/2023	3/9/2023	3/9/2023	3/9/2023	3/8/2023	3/9/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient	Downgradient/ GSI	Downgradient	Downgradient	Downgradient/ GSI	Downgradient/ GSI
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,440	180	930	1,730	2,020	1,320
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	486	221	262	121	152	169
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	54.2	12.7	25.4	79.9	35.9	98.4
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	1,640	533	435	32.5	341	360
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	3,030	1,250	1,250	715	939	1,180
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.68	6.76	6.64	6.89	7.27	7.23
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	< 1	4	5	2	10
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	47	24	115	232	89	178
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	<1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	91	39	36	21	65	46
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	6	< 5	< 5	< 5
Selenium	ug/L	50	50	50	5.0	55	120	2	11	3	2	1	2
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>												
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	NC	NC	830	46	1,720	2,930	604	514
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	NC	NC	2	1	1	< 1	< 1	< 1
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	5.000**	2.400	5.000€	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

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 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- $^{\text{E}}$  Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

**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.

# Summary of Groundwater Sampling Results (Analytical) JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

							Sample Location:	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
							Sample Date:	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,040	2,150	2,330	5,660	1,110	1,860
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	228	82.5	195	168	162	116
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	36.3	24.8	27.2	49.6	24.2	59.0
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500 <sup>EE</sup>	NC	NC	581	93.6	101	62.0	94.6	79.7
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	1,430	489	960	770	898	790
pH, Field	SU	6.5 - 8.5**	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.77	7.32	6.71	6.80	6.75	6.91
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	< 1	17	1	68	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	102	202	179	126	287	75
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	4
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	27	33	59	71	27	26
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	7	< 5	15	50	6
Selenium	ug/L	50	50	50	5.0	55	120	1	1	1	1	3	2
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>												
Iron	ug/L	300**	300 <sup>E</sup>	300€	500,000EE	NC	NC	2,820	403	1,580	262	24,800	53
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000⋿	20	NC	NC	1	< 1	1	2	< 1	1
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	< 2	< 2	4	15
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000E	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

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 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- $^{\text{E}}$  Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

**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.

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### Summary of Confidence Interval Evaluation: March 2023 JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Assessment Mo	nitoring Stat	istical Evalua	tion																					
Constituent	Units	GWPS	MV	V-50	MV	<b>/-</b> 51	MW	V-52	MW	<i>I-</i> 53	MW	/-53R	MW	-54R	MW	<b>/-</b> 55	OW-57	R OUT	JCW-M	W-18001	JCW-M	N-18005	JCW-M	W-18006
Constituent	Offics	GWF3	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron <sup>(1)</sup>	ug/L	560	1,300	1,900	1,100	1,400	1,100	1,300	3,300	4,200	1,600	2,300	4,300	6,600	690	1,000	1,700	2,000	1,400	1,700	920	1,200	2,100	3,100
Calcium	mg/L	280	36	260	120	300													320	460				
Sulfate	mg/L	780	270	650															780	2,100				-
Arsenic	ug/L	21									11	23			(2)	(2)			0.5	38			14	32
Molybdenum	ug/L	73													(2)	(2)								
Iron	ug/L	28,000													16,000	36,000								-
Vanadium	ug/L	6																	1.0	12				

GSI Statistical Evaluation											
Constituent	Units	GSI	MW-55								
Constituent	Offics	GSI	LCL	UCL							
Arsenic	ug/L	100	58	190							
Molybdenum	ug/L	120	56	160							

#### Notes:

ug/L - micrograms per Liter

mg/L - milligrams per Liter

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

 ${\sf GWPS-Groundwater\ Protection\ Standard\ as\ established\ in\ TRC's\ Technical\ Memorandum\ dated\ April\ 23,\ 2021}$ 

GSI - Groundwater Surface Water Interface Criteria; GSI criteria is the generic Michigan Part 201 GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

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

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

1,300	Indicates a statistically significant exceedance of the GWPS (detection monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the GWPS (assessment monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1.300	Indicates a statistically significant exceedance of the applicable GSI criterion. An exceedance occurs when the LCL is greater than the criterion

- (1) Boron concentrations were confirmed as a statistically significant increase (SSI) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).
- (2) The concentrations of arsenic and molybdenum at MW-55 are not a result of a release from the unit, as detailed in the Alternate Source Demonstration (TRC, January 2022); therefore, confidence intervals were not calculated for comparison to GWPSs.

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April 2023

Table 6

# Synthetic Precipitation Leaching Procedure Results DE Karn & JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	B		DE Karr	n Ash Silo San	nples - March	21, 2023
Parameter	Reporting Limit	Units	Fly Ash	Fly Ash	Fly Ash	Fly Ash
			Grab 1	Grab 2	Grab 3	Grab 4
Antimony	1	ug/L	< 1	< 1	< 1	< 1
Arsenic	1	ug/L	< 1	< 1	< 1	< 1
Barium	5	ug/L	4,000	3,900	4,200	4,200
Beryllium	1	ug/L	< 1	< 1	< 1	< 1
Boron	20	ug/L	32	29	30	26
Cadmium	0.2	ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	ug/L	89	90	93	98
Cobalt	6	ug/L	< 6	< 6	< 6	< 6
Copper	2	ug/L	< 2	< 2	< 2	< 2
Iron	20	ug/L	22	26	30	22
Lead	1	ug/L	< 1	< 1	< 1	< 1
Lithium	10	ug/L	57	63	65	66
Mercury	0.2	ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	5	ug/L	58	59	59	60
Nickel	2	ug/L	7	7	7	6
Selenium	1	ug/L	22	25	24	23
Silver	0.2	ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Sodium	1,000	ug/L	20,000	19,500	19,700	19,800
Thallium	2	ug/L	< 2	< 2	< 2	< 2
Vanadium	2	ug/L	14	15	15	16
Zinc	10	ug/L	< 10	< 10	< 10	< 10
Alkalinity, Bicarbonate	10,000	ug/L	< 10,000	< 10,000	< 10,000	< 10,000
Sulfate	2,000	ug/L	54,000	46,000	38,000	36,000

#### Notes:

ug/L = micrograms per liter

# EGLE Exceedance Summary Table JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

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

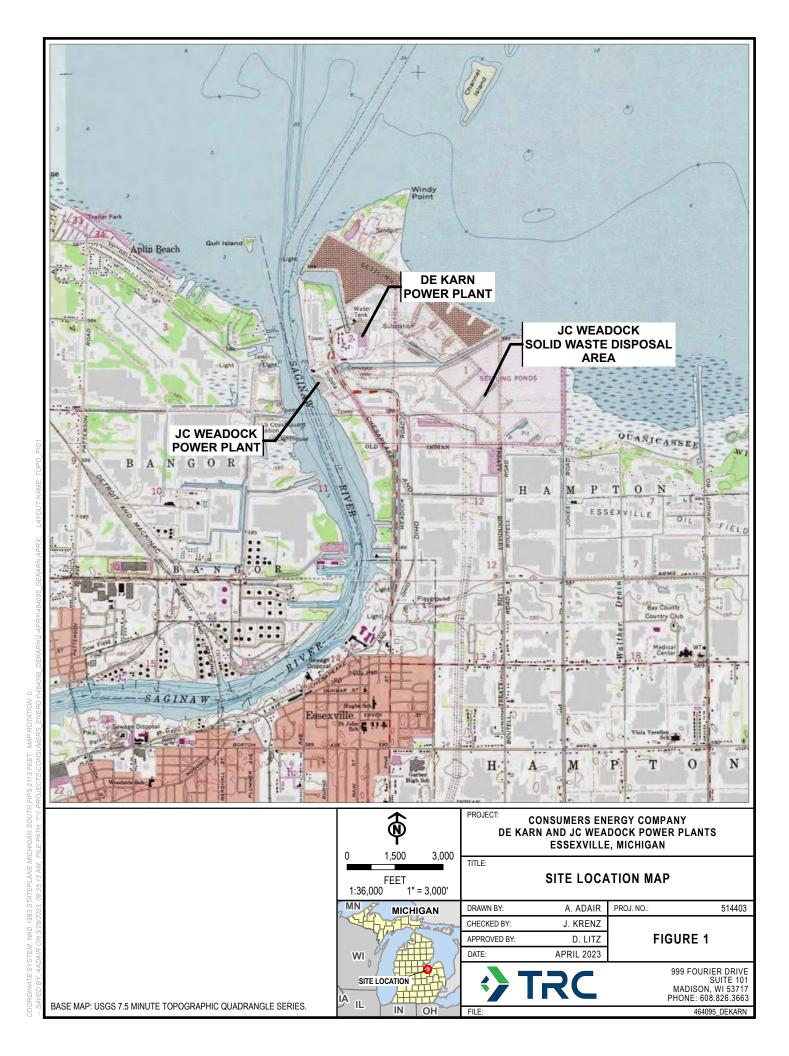
Data is in (X) ug/L or ( ) mg/L unless otherwise stated

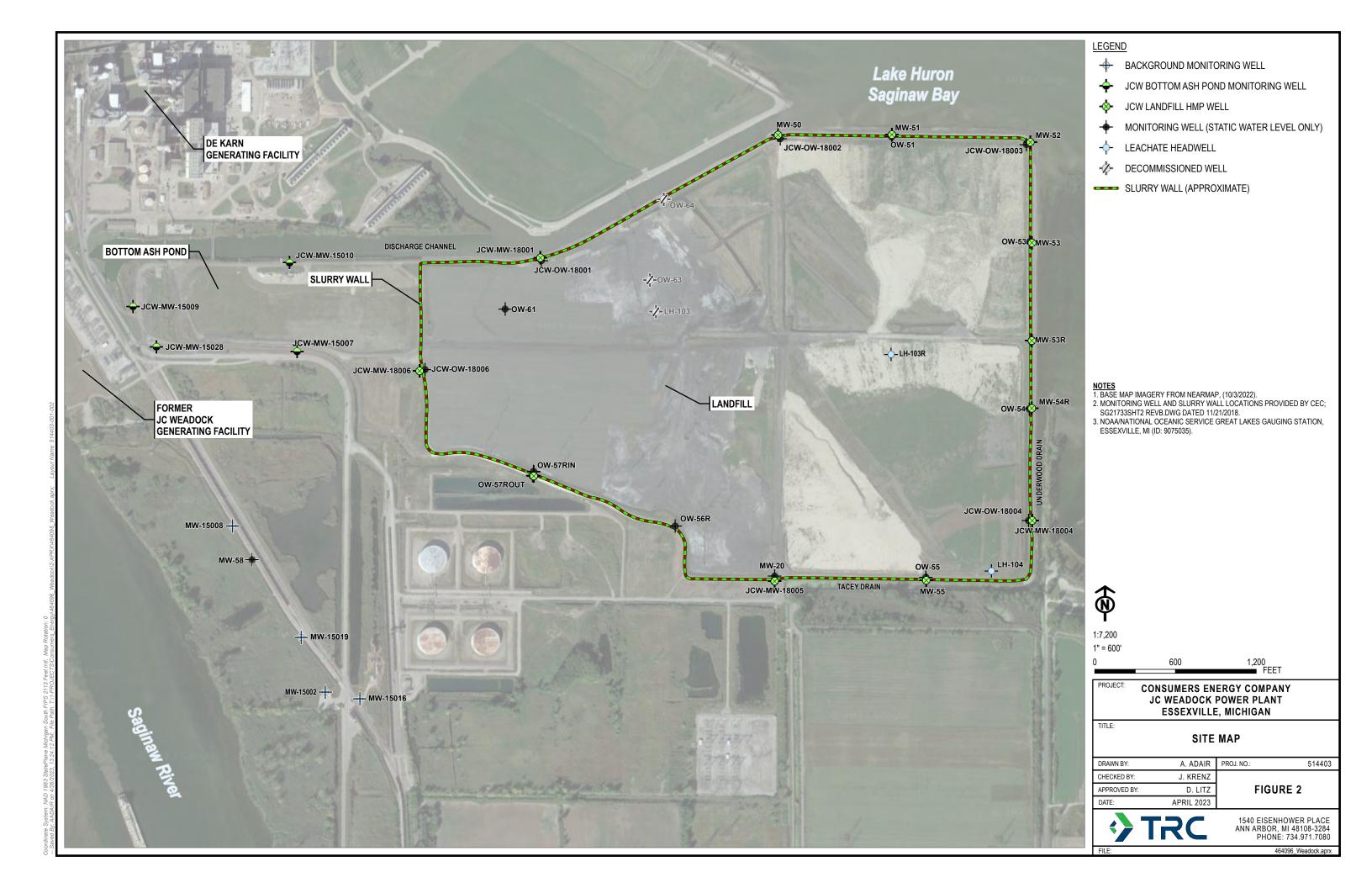
Facility: JC Weadock – WDS# 395457

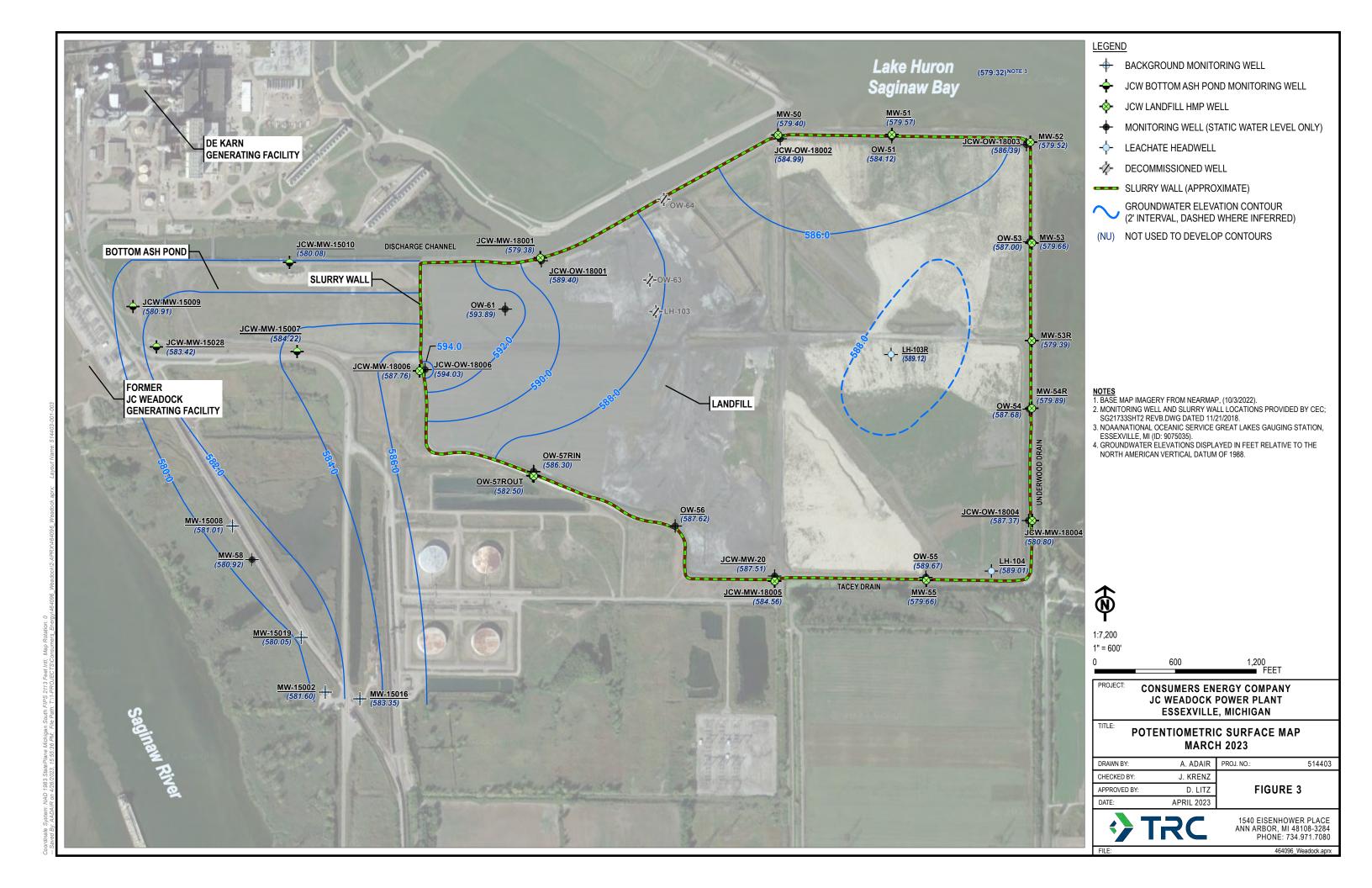
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	1 Qtr. 2023 ( <b>bold</b> >201)	4 Qtr. 2022 ( <b>bold</b> >201)	3 Qtr. 2022 ( <b>bold</b> >201)	2 Qtr. 2022 ( <b>bold</b> >201)				
	No Exceedances at Compliance Locations											



### **Figures**









# Appendix A Static Water Level Evaluation

#### Table A1

### Static Water Levels for Select Perimeter Dike Monitoring Wells and NOAA Staff Gauge First Quarter 2023 Quarterly Report

JC Weadock Solid Waste Disposal Area, Essexville, Michigan

Well Location	Date Measured	Groundwater Water Elevation (GWE) (ft)	Saginaw Bay Surface Water Elevation (SWE) (ft)	Elevation Difference (GWE-SWE) <sup>(1)</sup>		
MW-50	3/6/2023	579.40		0.08		
MW-51	3/6/2023	579.57		0.25		
MW-52	3/6/2023	579.52		0.20		
MW-53	3/6/2023	579.66	579.32	0.34		
MW-53R	3/6/2023	579.39	579.52	0.07		
MW-54R	3/6/2023	579.89		0.57		
MW-55	3/6/2023	579.66		0.34		
JCW-MW-18004	3/6/2023	580.80		1.48		
Average:		579.74				

#### Notes:

Elevation in feet above North American Vertical Datum 1988 (NAVD 88)

TOC: top of well casing

ft BTOC: feet below top of well casing

(1) Positive elevation difference indicates flow toward the surface water body.

#### Table A2

### Slurry Wall Gradient and Flux

#### First Quarter 2023 Quarterly Report

JC Weadock Solid Waste Disposal Area, Essexville, Michigan

Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Discharge Channel	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
JCW-OW-18001 <sup>(6)</sup>	589.40		22.37	4.48E-01	2.00	2.88	1,010		0.45	2,904	8.48E-02	0.63	232
JCW-MW-18001		579.38			3.75			2.30E-08	0.40	2,004	0.402 02	0.00	202
JCW-OW-18002	584.99		28.87	1.94E-01	4.00	4.25	970	2.002 00	0.19	4,123	5.20E-02	0.39	142
MW-50		579.40			4.50				0.10	4,123	J.20L 02	0.55	172
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-51 MW-51	584.12	579.57	14.38	3.16E-01	4.00 4.27	4.14	1,850		0.32	7,650	1.58E-01	1.18	431
JCW-OW-18003 MW-52	586.39	579.52	33.85	2.03E-01	3.50 3.73	3.62	740	2.30E-08	0.20	2,675	3.54E-02	0.26	97
OW-53	587.00		20.14	3.64E-01	1.25	1.53	730		0.36	1,121	2.66E-02	0.20	73
MW-53		579.66			1.82					1			
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Non-Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-54	587.68		21.23	3.67E-01	2.00	2.25	510		0.37	1,148	2.75E-02	0.21	75
MW-54R		579.89			2.50				0.57	1,140	2.73L-02	0.21	73
JCW-OW-18004	587.37		26.59	2.47E-01	8.00	4.45	820		0.25	3,649	5.88E-02	0.44	160
JCW-MW-18004		580.80			0.90			2.30E-08	0.23	3,043	3.00L-02	0.44	100
OW-55	589.67		23.95	4.18E-01	2.00	1.83	1,220	2.30L-00	0.42	2,233	6.08E-02	0.46	166
MW-55		579.66			1.66				0.42	2,233	0.00L-02	0.40	100
MW-20	587.51	-	40.93	7.21E-02	1.50	1.38	1,120		0.07	1,540	7.24E-03	0.05	20
JCW-MW-18005		584.56			1.25				0.07	1,540	7.24L-03	0.00	20

Calculated Groundwater Discharge from JC Weadock (gal per day) = 3.82

(cubic ft per day) = 0.51 (cubic ft per min) 3.5E-04

Calculated Groundwater Discharge from JC Weadock (gal per yr) = 1,395

(cubic ft per yr) = 187

Calculated Groundwater Discharge from JC Weadock (gal per year per linear foot of dike) = 0.16

(cubic feet per year per linear foot of dike)

#### Notes:

Water level data collected on March 6, 2023 are shown by yellow cells:

- 1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
- 2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above the top of the sand unit, or the measured saturated thickness of the sand unit if the SWL is below the top of the sand unit.
- 3. Hydraulic conductivity taken as harmonic mean of laboratory tests done on in-place slurry wall from NTH Certified Quality Assurance Report, Appendix E, April 24, 2009
- 4. Arithmetic average used to develop geometric properties of each section/zone (e.g. discharge channel, adjacent, and non-adjacent)
- 5. If Obs well SWL < MW SWL calculated flow will be zero.
- 6. Field recorded water level is anomalously low and is suspected to be a transcription error. The corrected value, based on water level trends and historical data, is used to calculate flux.

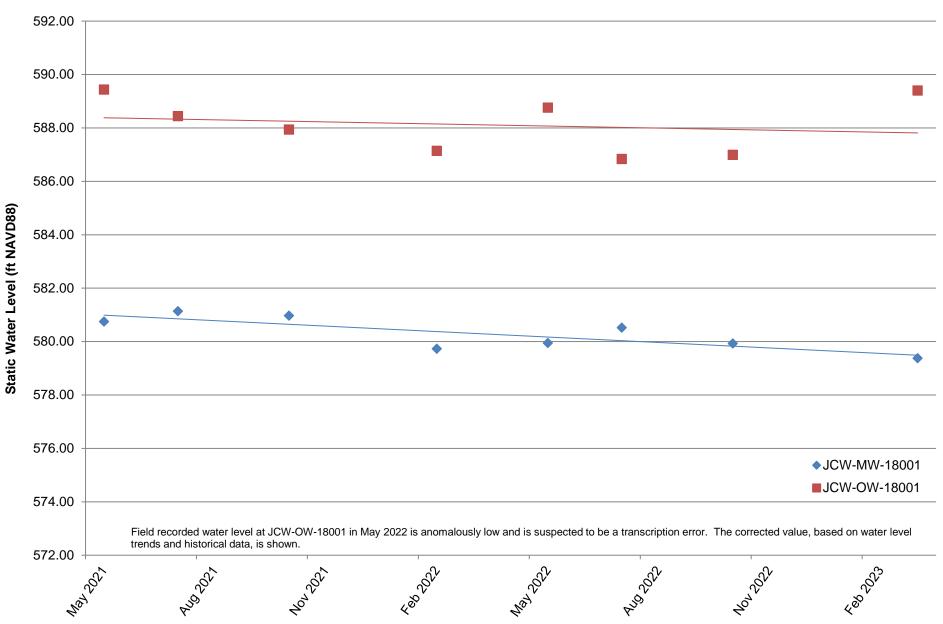
SWL = Static Water Level; Obs Well = Observation Well; MW= Monitoring Well; ft NAVD 88 = feet above North American Vertical Datum 1988

ft/ft = feet per foot; cm/sec = centimeters per second; ft<sup>2</sup> = square feet; ft<sup>3</sup>/day = cubic feet per day; Gal/day = gallons per day; Gal/yr = gallons per year

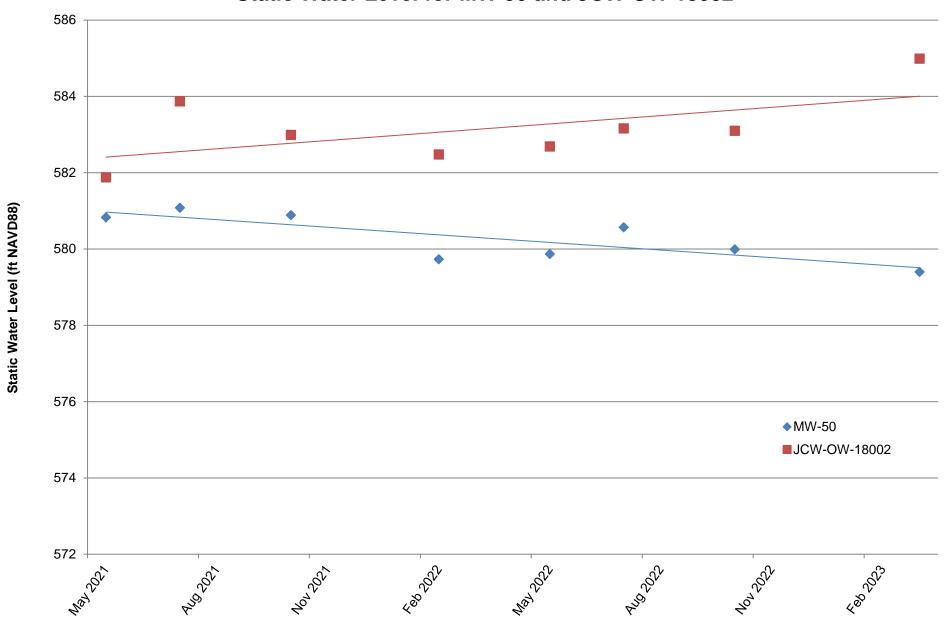
i = hydraulic gradient; K = hydraulic conductivity; x<sub>wells</sub> = distance between well pairs

2.08E-02

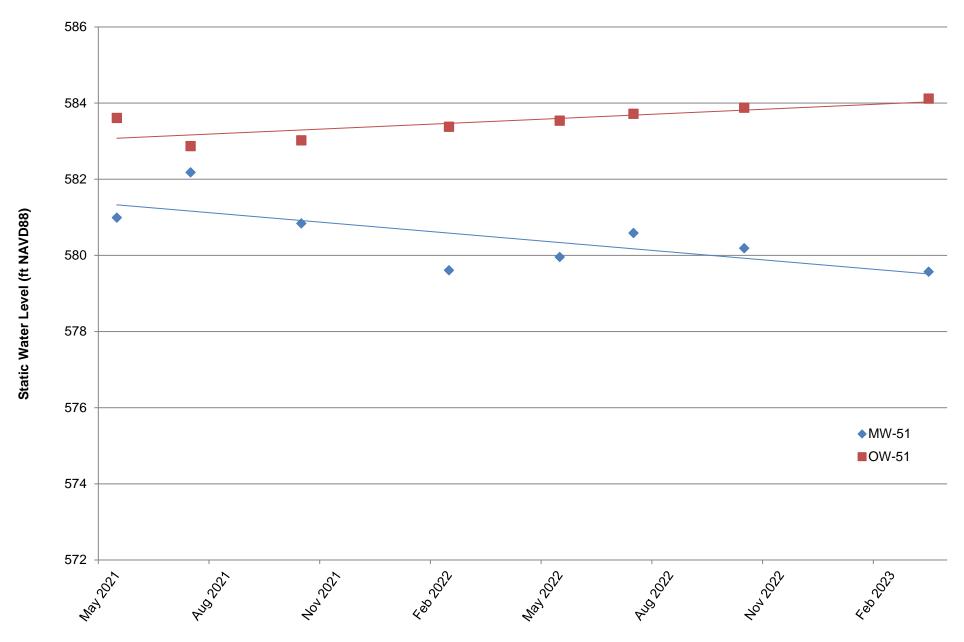
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



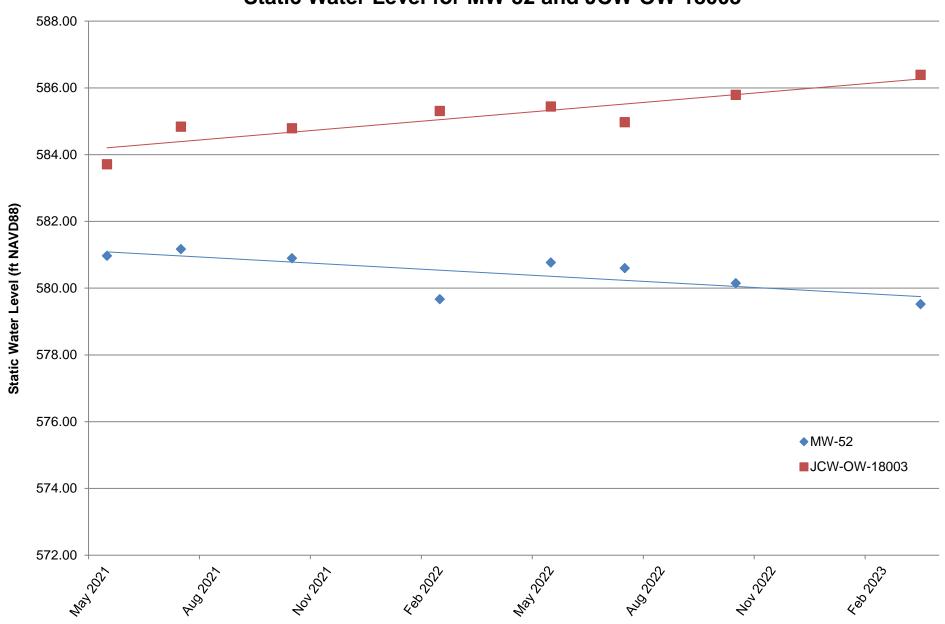
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



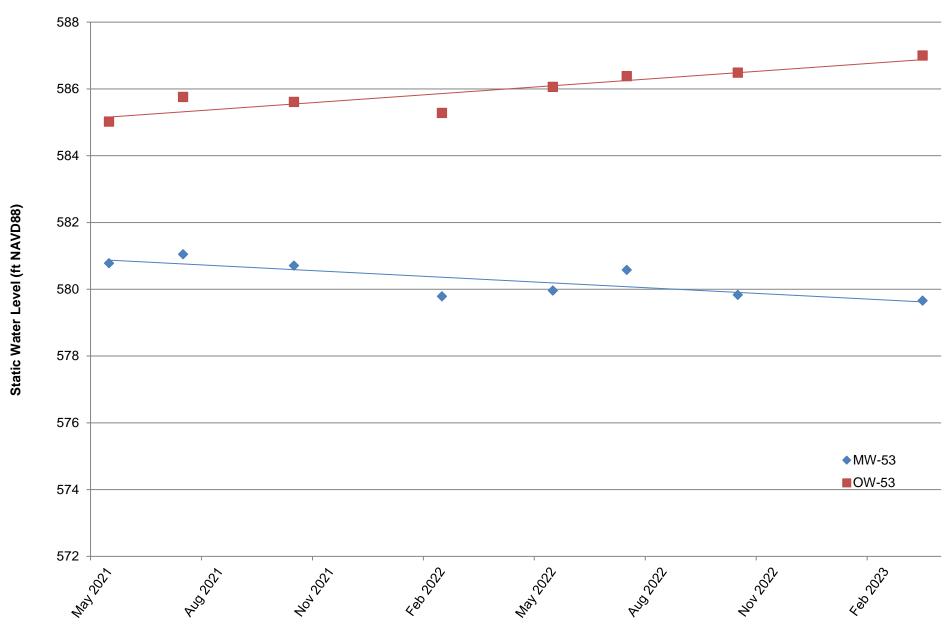
Appendix A
Static Water Level for MW-51 and OW-51



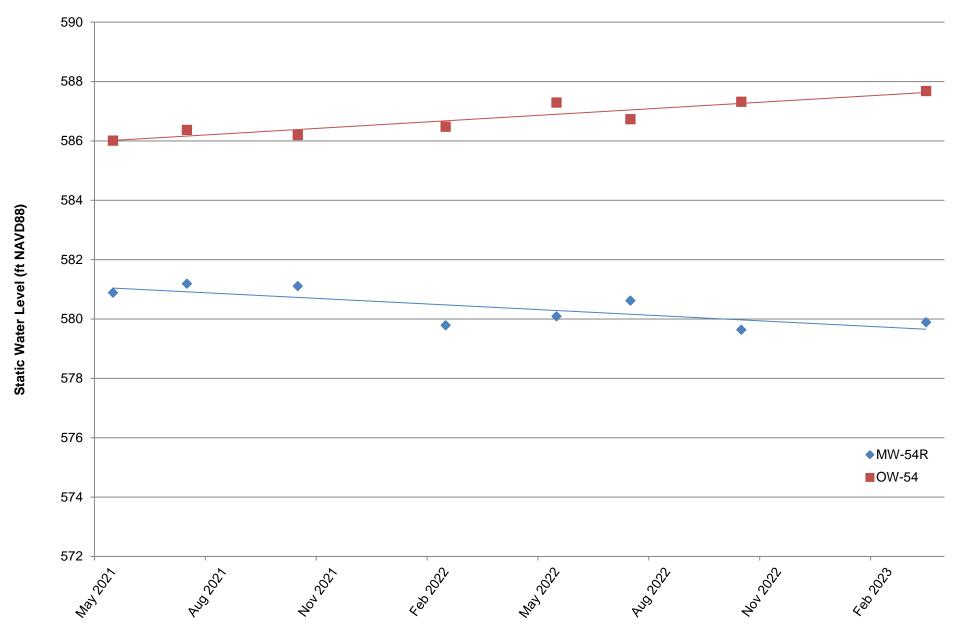
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



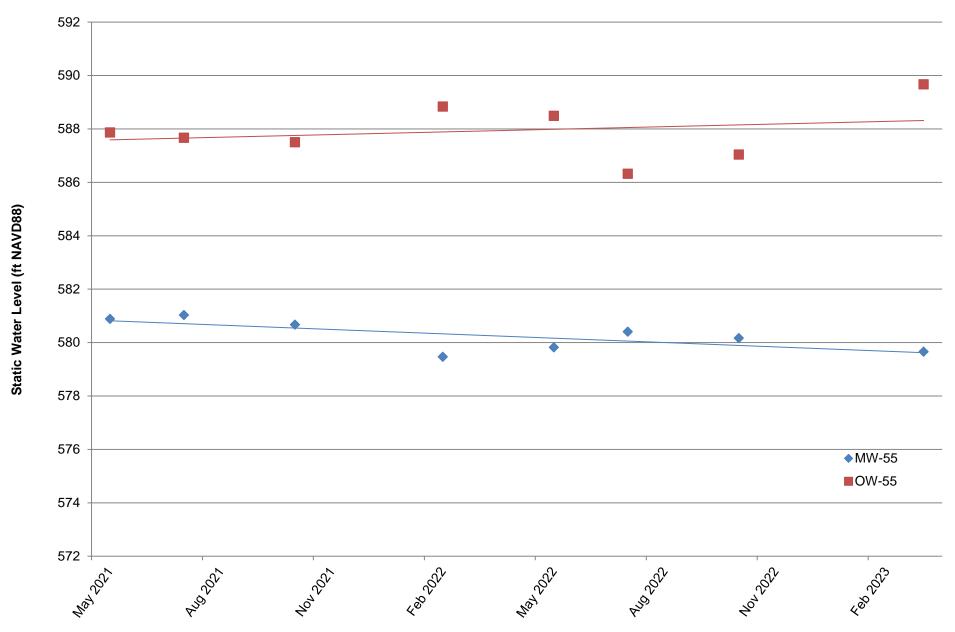
Appendix A
Static Water Level for MW-53 and OW-53



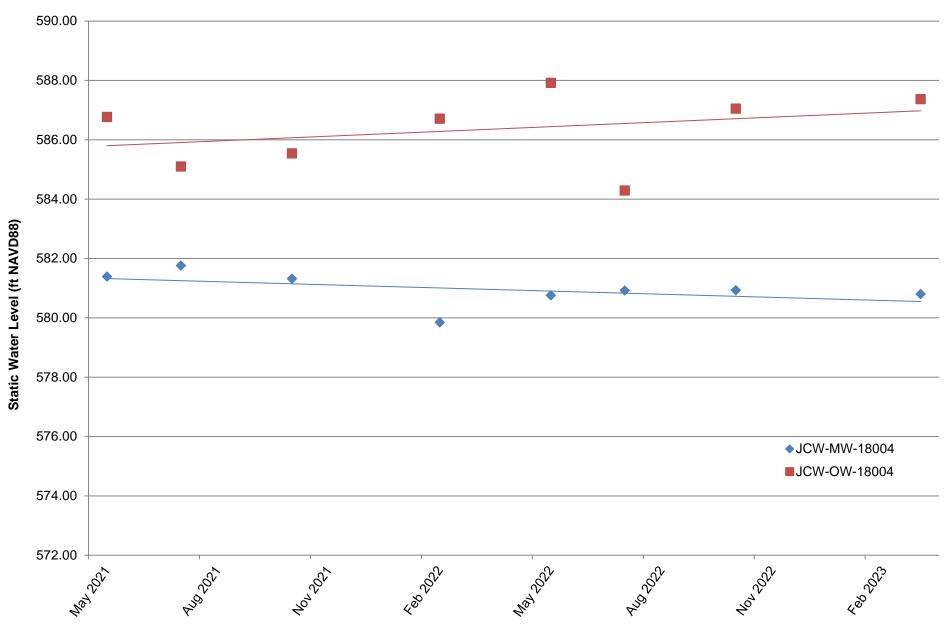
Appendix A
Static Water Level for MW-54R and OW-54



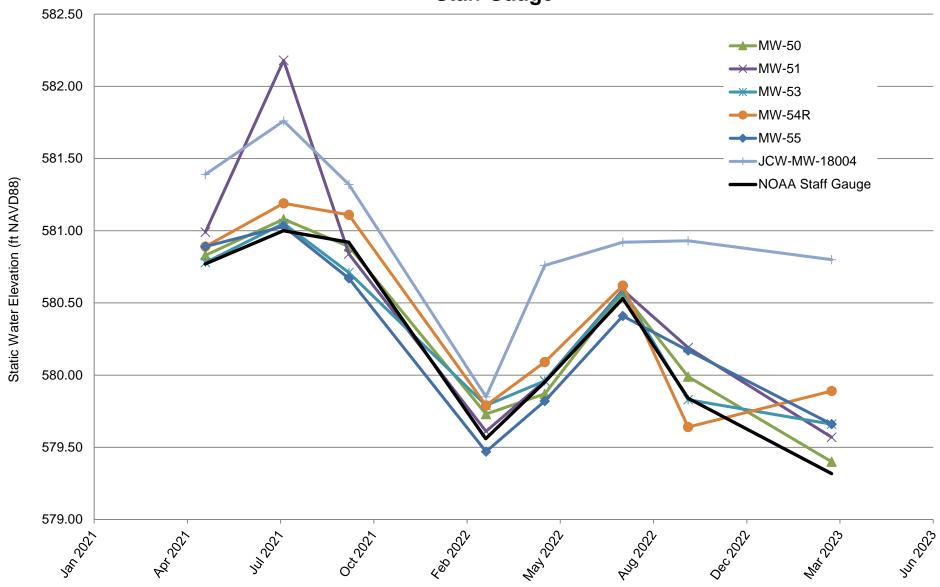
Appendix A
Static Water Level for MW-55 and OW-55



Appendix A
Static Water Level for JCW-MW-18004 and JCW-OW-18004



Appendix A
Static Water Elevations for Select Perimeter Dike Monitoring Wells and NOAA
Staff Gauge





# Appendix B Data Quality Review

# Laboratory Data Quality Review Groundwater Monitoring Event March 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the March 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0166.

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

■ MW-15002

■ MW-15008

MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method		
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0		
Total Dissolved Solids (TDS)	SM 2540C		
Total Metals	SW-846 6020B/7470A		

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 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:**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- The field duplicate pair samples were DUP-Background and MW-15002; all criteria between the parent and duplicate samples were within the QC limits with the following exception: the relative percent difference for chloride was > 30 (169%). Therefore, the positive results for chloride should be considered estimated in all groundwater samples in this data set, as summarized in the attached table. Attachment A.
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

#### Attachment A

### Summary of Data Non-Conformances for Groundwater Analytical Data JCW/DEK Background Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15002	3/7/2023		
MW-15008	3/7/2023		
MW-15016	3/7/2023	Chloride	Field duplicate variability (relative percent difference above criteria); potential uncertainty exists.
MW-15019	3/7/2023		
DUP-Background	3/7/2023		

# Laboratory Data Quality Review Groundwater Monitoring Event March 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the March 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0172R (04/12/23).

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

JCW-MW-18001

JCW-MW-18004

JCW-MW-18005

■ JCW-MW-18006

■ MW-50

MW-51

■ MW-52

■ MW-53

■ MW-53R

■ MW-54R

■ MW-55

■ MW-58

OW-57R OUT

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

Analyte Group	Method		
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0		
Total Dissolved Solids (TDS)	SM 2540C		
Total Metals	SW-846 6020B/7470A		
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B		

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the 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:**

- One field blank (FB-01) and one equipment blank (EB-01) sample were collected. Total metals and anions were not detected in these blank samples.
- MS and MSD analyses were performed on sample JCW-MW-18001 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-JCW-LF-02/JCW-MW-18006 and DUP-JCW-LF-01/MW-50; all criteria between the parent and duplicate samples were within the QC limits.

3

Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event March 2023 JCW Alternate Source Demonstration

A groundwater sample was collected by TRC for the March 2023 sampling event. The sample was analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0173.

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

#### JCW-OW-18001

The sample was analyzed for the following constituents:

Analyte Group	Method		
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0		
Total Dissolved Solids (TDS)	SM 2540C		
Total Metals	SW-846 6020B/7470A		
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B		

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, where 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 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the total metals, anions, alkalinity, and TDS, analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the detection 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:**

- No field blanks or equipment blanks were collected with this data set.
- A field duplicate pair was not submitted with this data set.
- Laboratory duplicate and MS/MSD analyses were not performed on the sample from this data set.



# **Appendix C Detection Monitoring Statistical Trend Tests**

#### Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility First Quarter 2023 Data from May 2021 to March 2023

Porewater Monitoring Points						
PARAMETER	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
Boron <sup>(1)</sup>	0	0	0	0	0	0
Calcium	↑ <sup>ASD</sup>	0	0	0	$\downarrow$	<b>↓</b>
Chloride	↓*	0	0	0	$\downarrow$	0
Fluoride	O*	O*	O*	O*	O*	O*
Iron	0	0	0	0	0	0
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0
Sulfate	↑ <sup>ASD</sup>	0	0	0	0	<u></u>
Total Dissolved Solids	↑ <sup>ASD</sup>	0	0	0	0	<b>\_*</b>

#### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

↑ = Upward trend, confirmed

↓ = Downward trend, continuous

↓\* = Downward trend, new

<sup>ASD</sup> = Alternate Source Demonstration (Fourth Quarter 2022 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, January 2023).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

#### Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility First Quarter 2023 Data from May 2021 to March 2023

Porewater Monitoring Points						
PARAMETER	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57R OUT
Boron <sup>(1)</sup>	0	0	0	1	0	0
Calcium	0	<b>↓</b>	0	0	0	0
Chloride	↓*	0	0	↑ <sup>ASD</sup>	0	0
Fluoride	O*	O*	O*	O*	O*	O*
Iron	0	0	0	0	0	0
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0
Sulfate	0	0	0	0	0	0
Total Dissolved Solids	0	<b>↓</b>	0	0	0	0

#### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

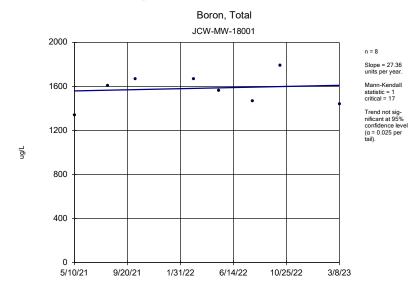
↑ = Upward trend, confirmed

↓ = Downward trend, continuous

↓\* = Downward trend, new

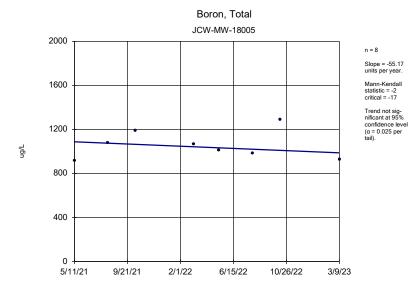
<sup>ASD</sup> = Alternate Source Demonstration (Fourth Quarter 2022 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, January 2023).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).



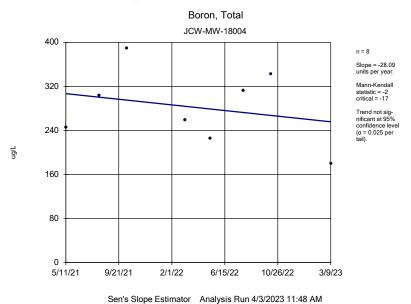
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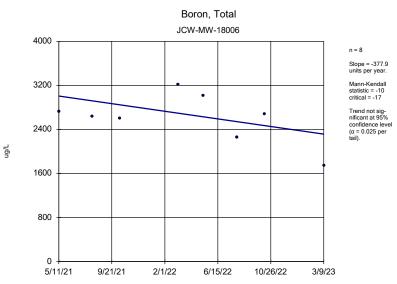


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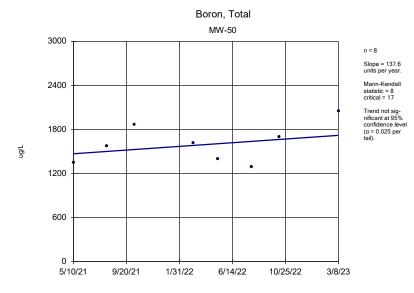


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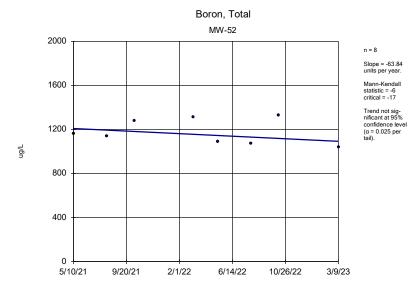
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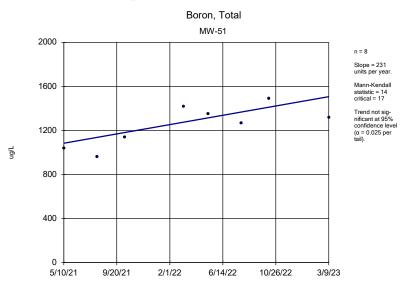
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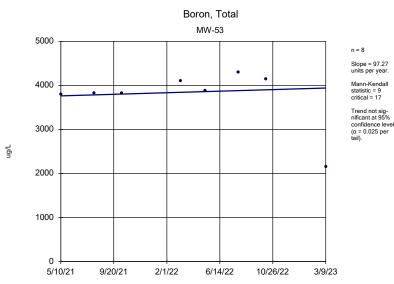
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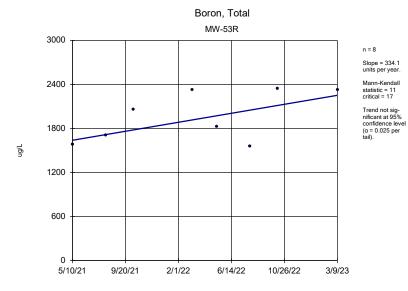
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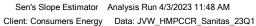
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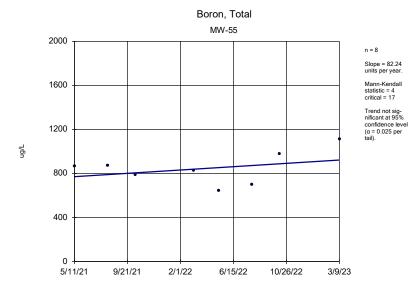


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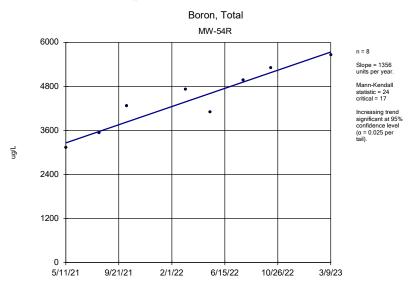






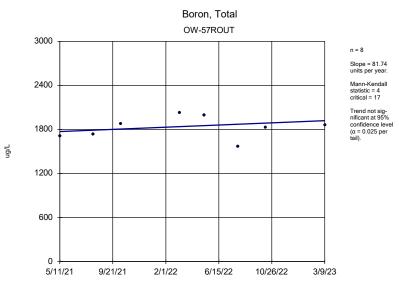
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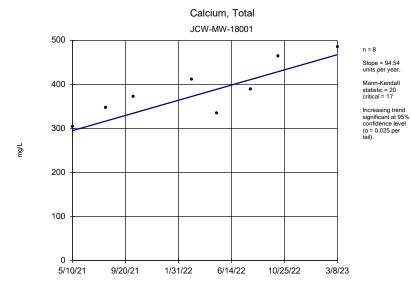
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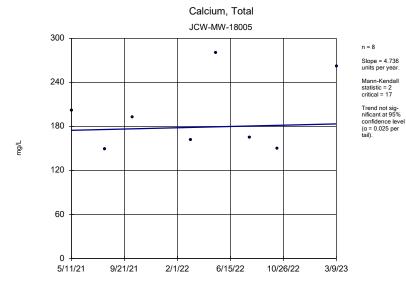
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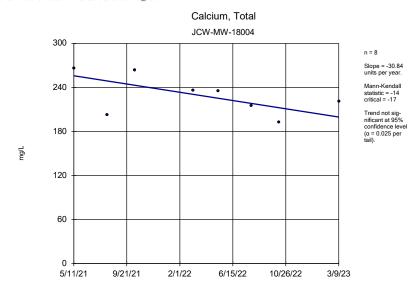
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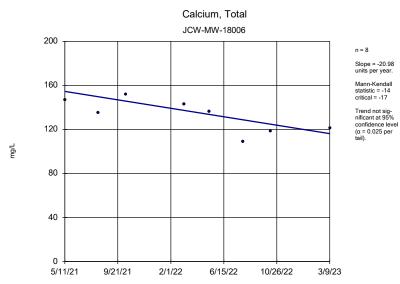


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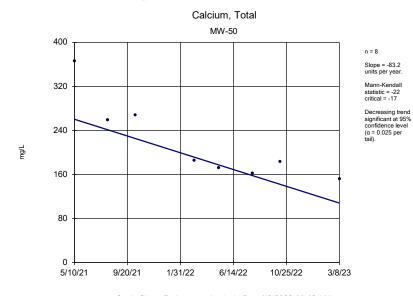


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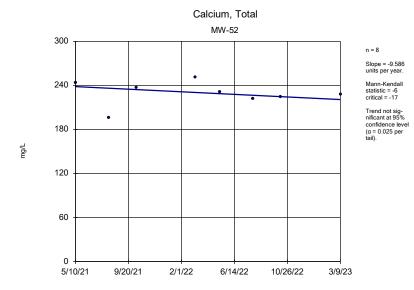
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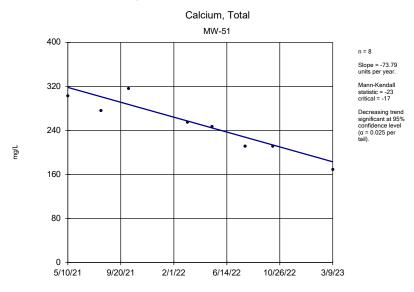
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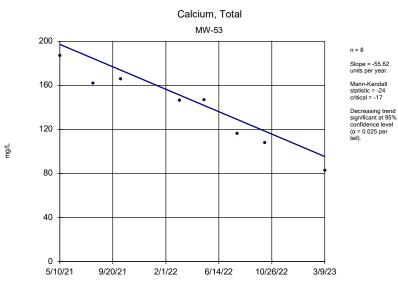


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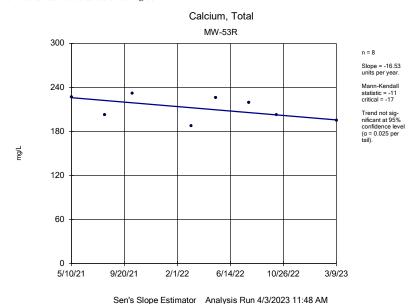


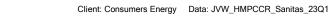
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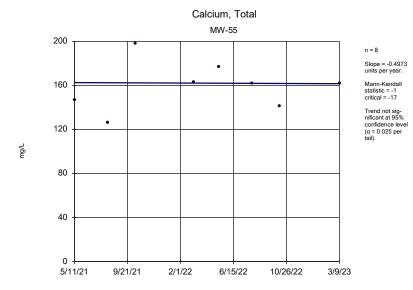


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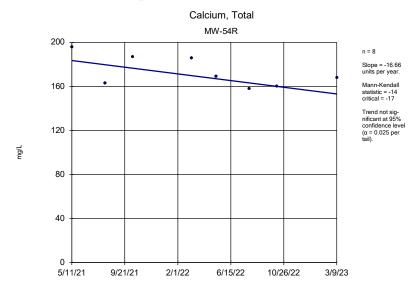






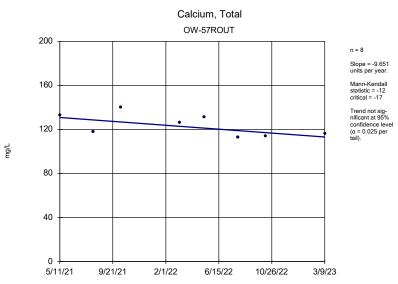
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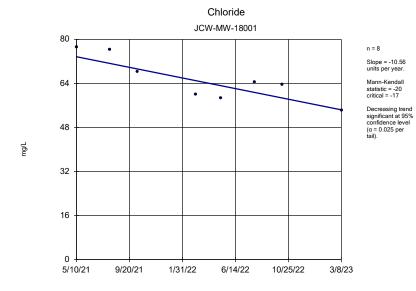
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# Chloride JCW-MW-18005 70 Slope = -10.97 Trend not significant at 95% confidence level (a = 0.025 per tail).

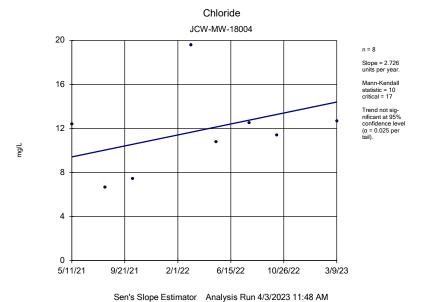
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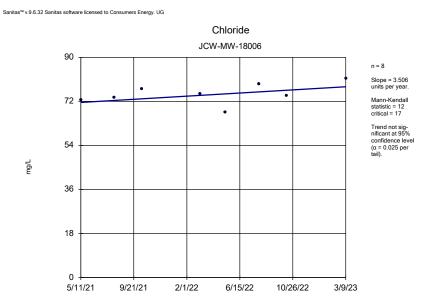
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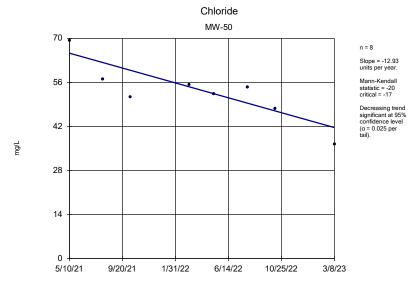
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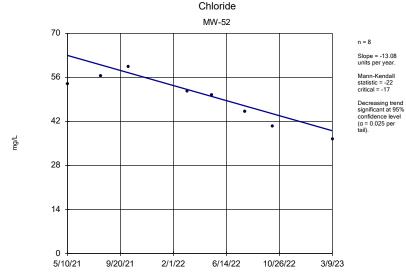


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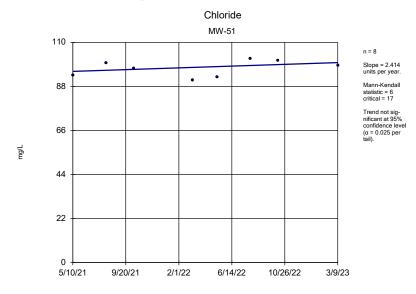


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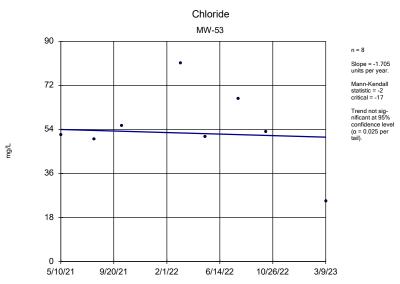


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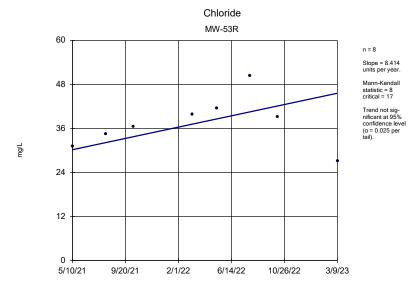


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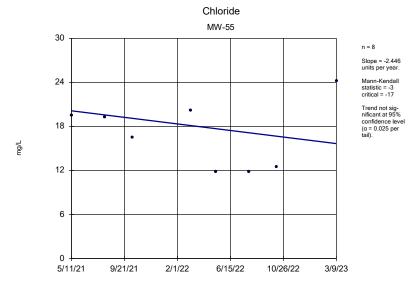
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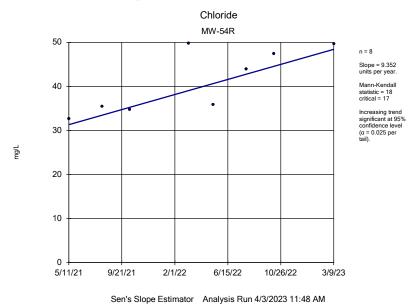
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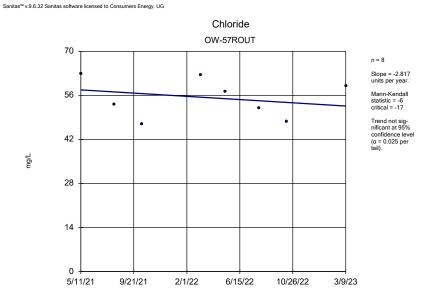
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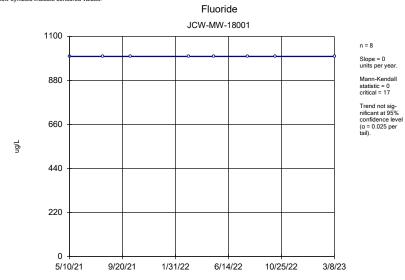




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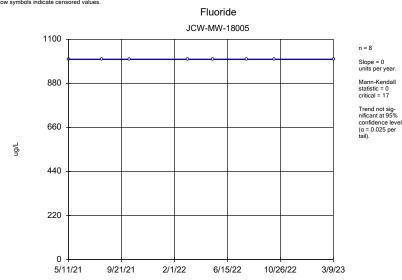
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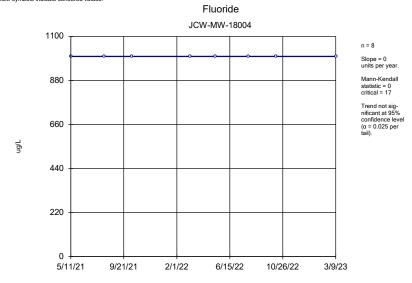
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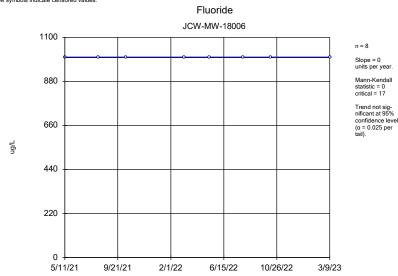
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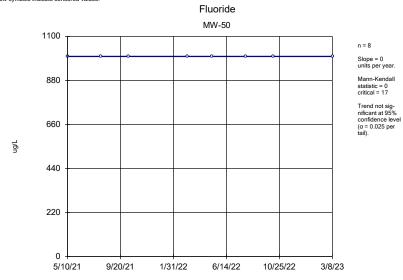
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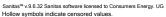
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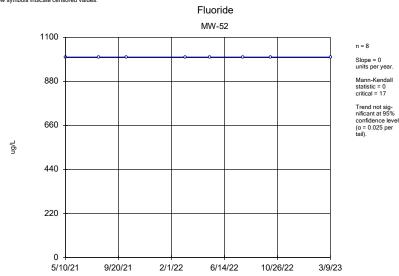
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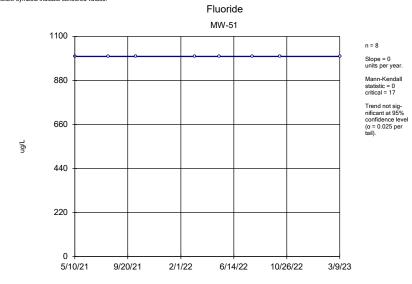




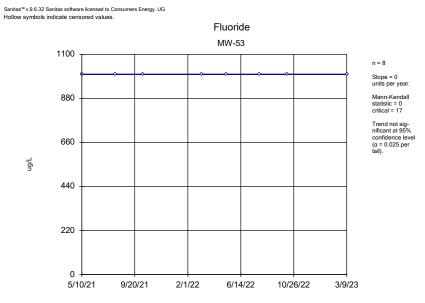
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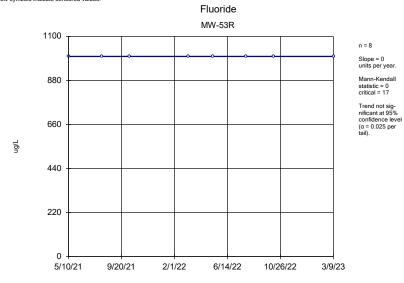
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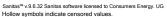
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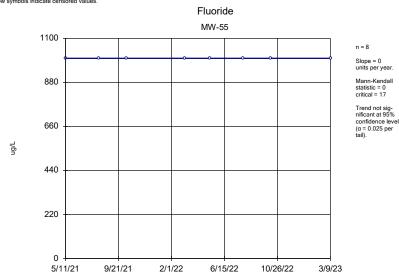
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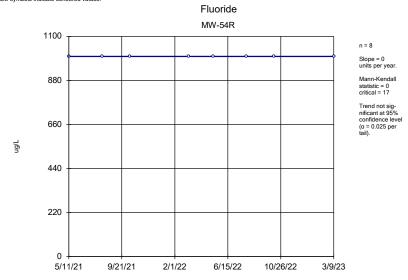




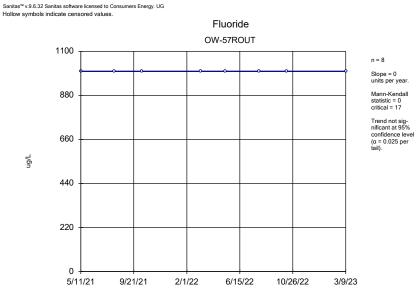
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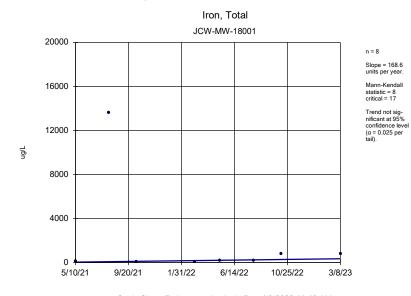


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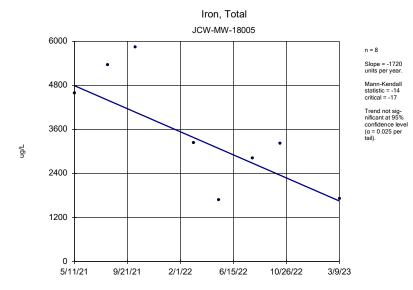


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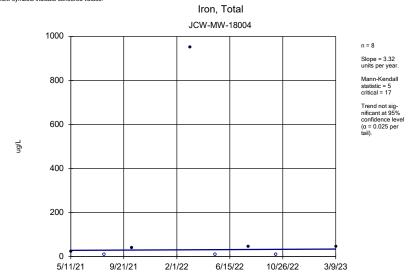


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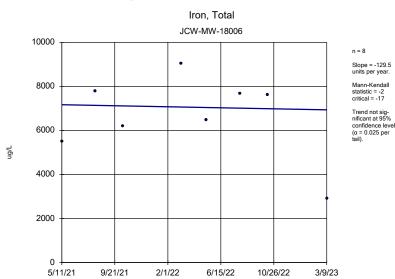


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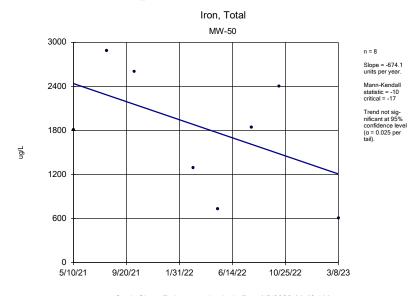


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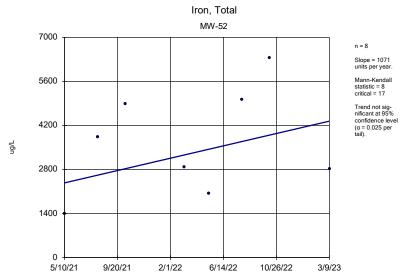
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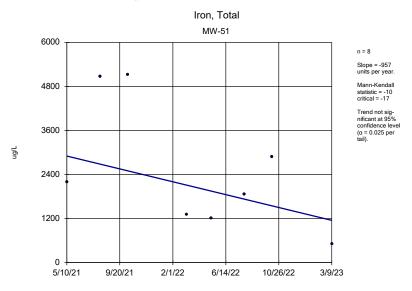
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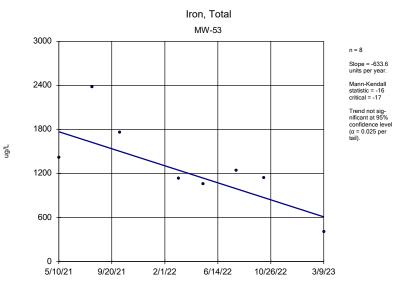
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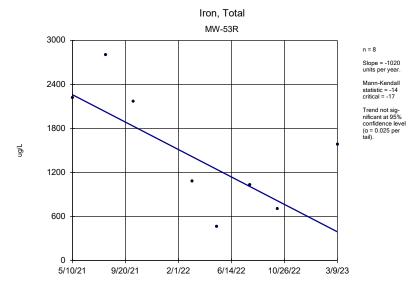
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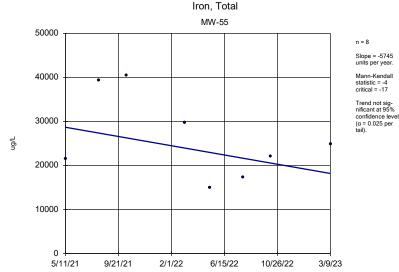


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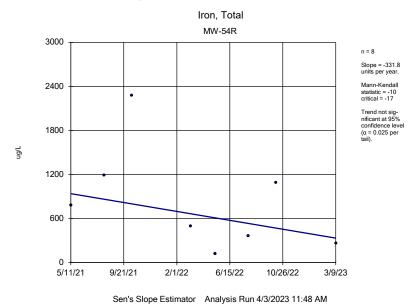


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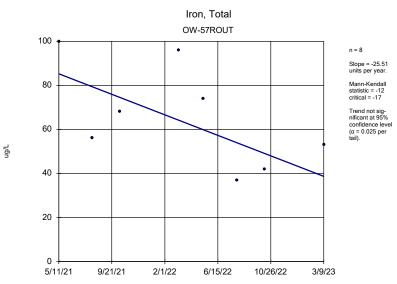


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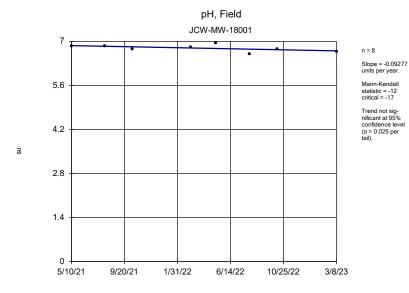


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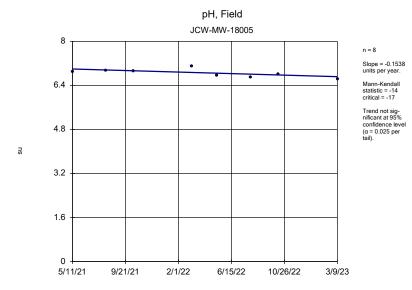
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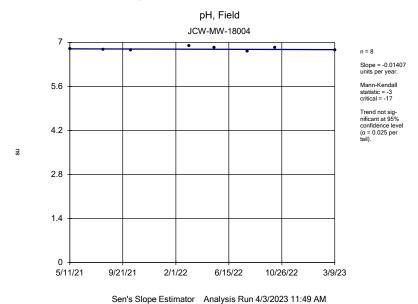
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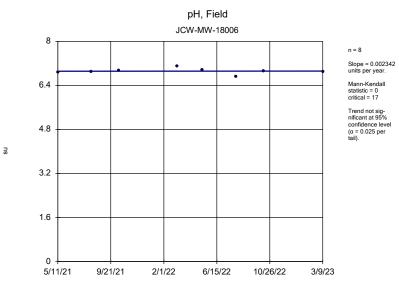


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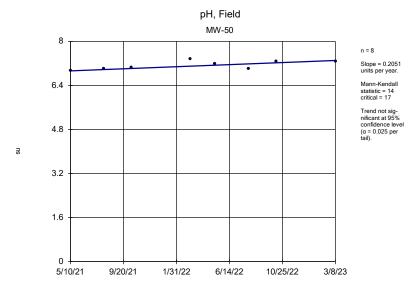


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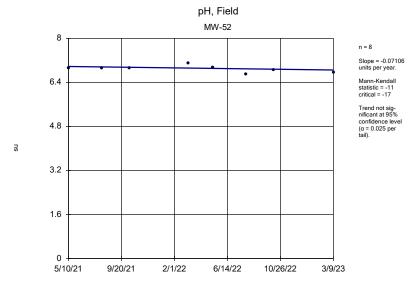
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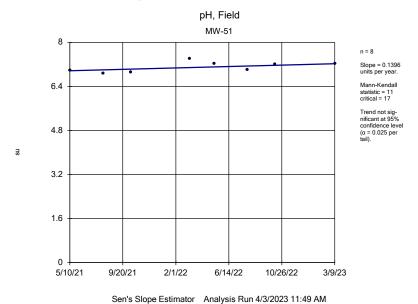
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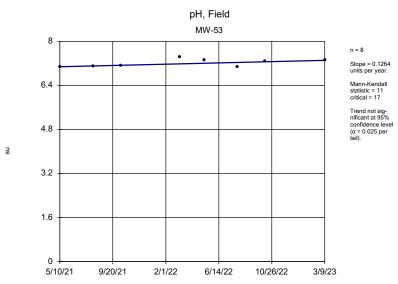


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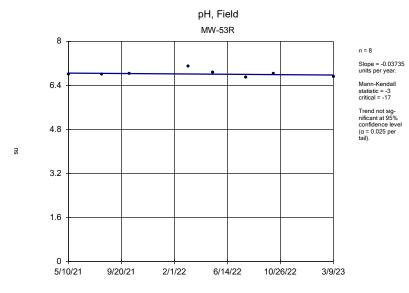


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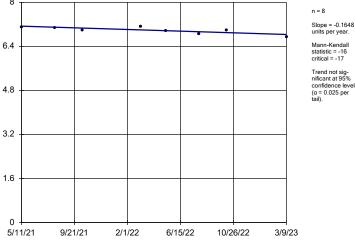
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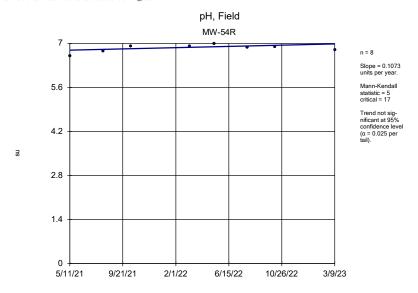


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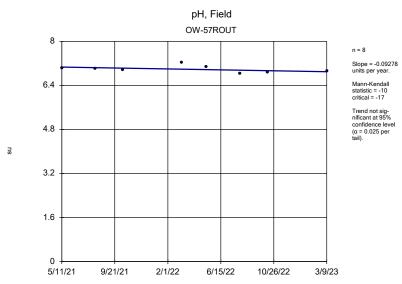
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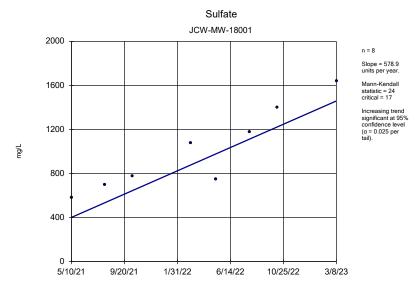
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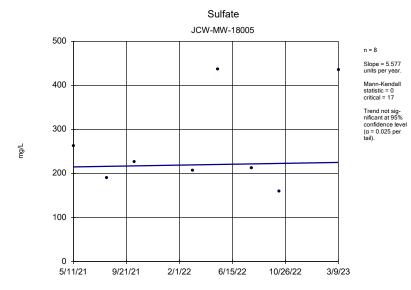
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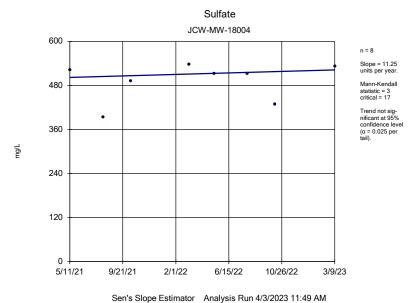
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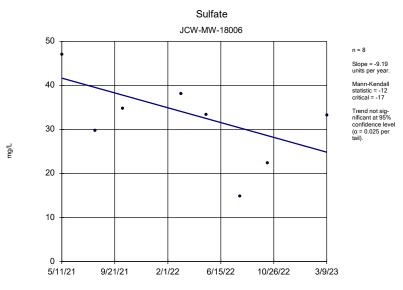
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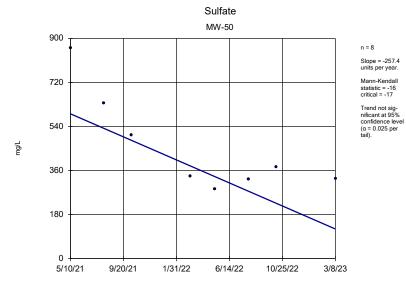
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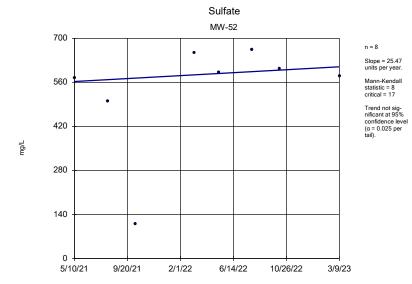
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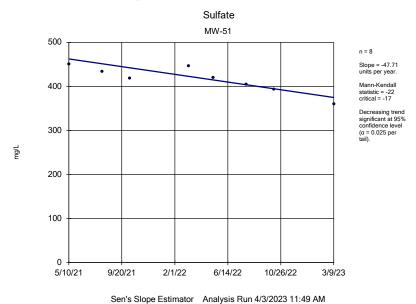
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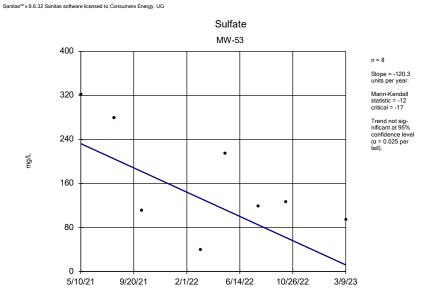


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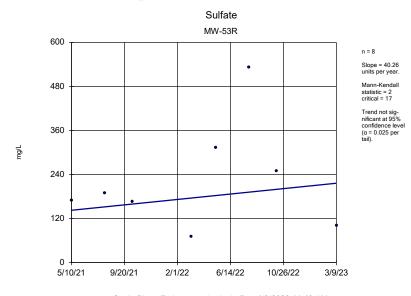


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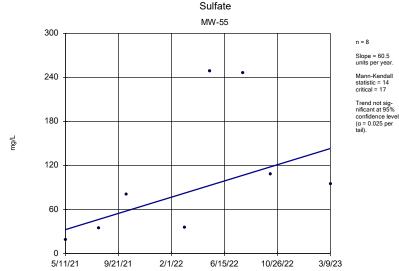
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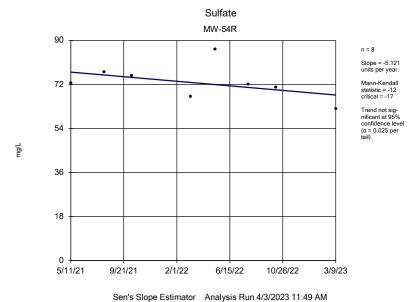
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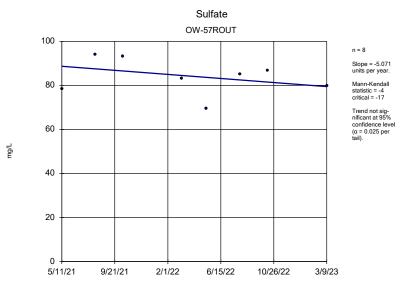
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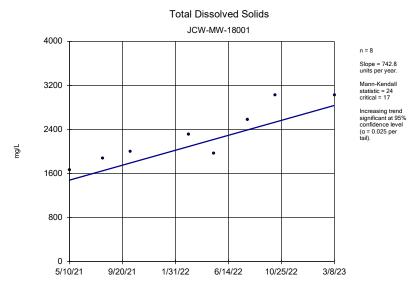
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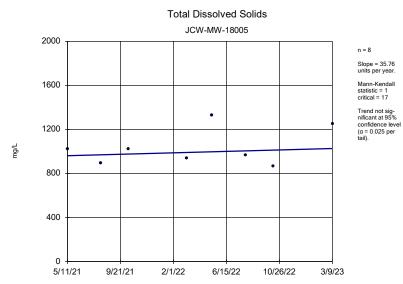
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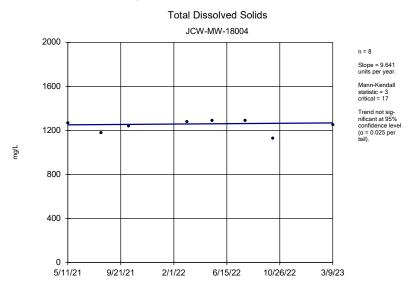
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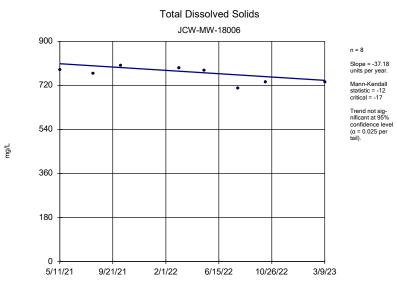
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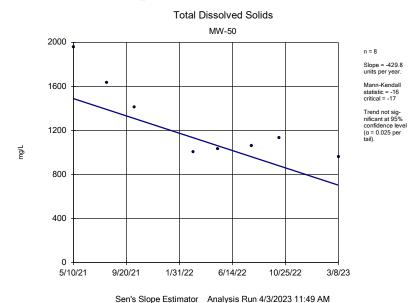
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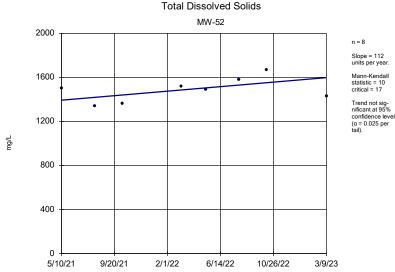
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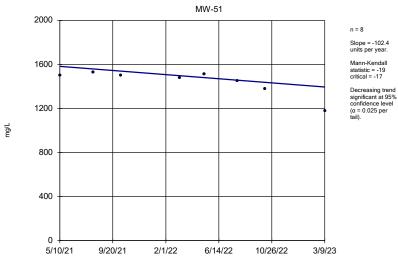


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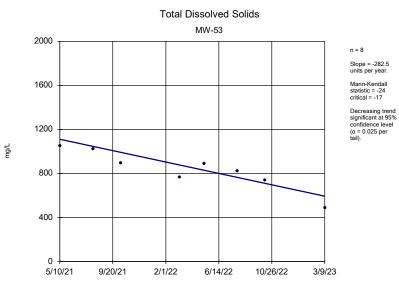
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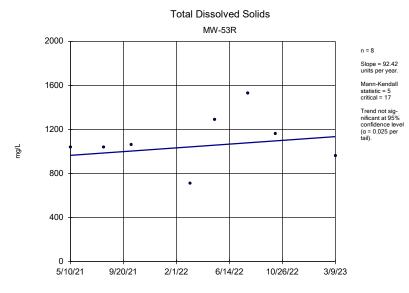
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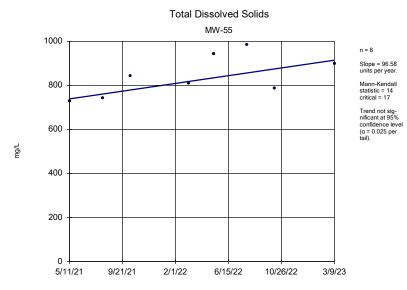
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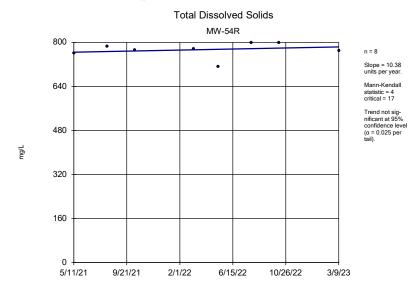
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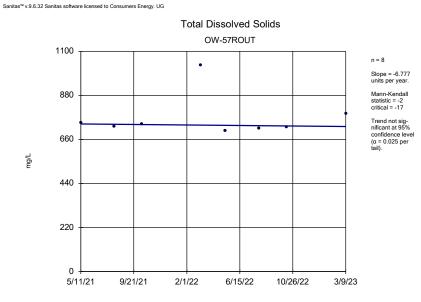
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# Appendix D Assessment Monitoring and GSI Statistical Evaluation

**Date:** April 27, 2023

**To:** J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

Project No.: 514403.0000 Phase 002, Task 002

Subject: Assessment Monitoring and GSI Statistical Evaluation of the March 2023 Sampling

**Event** 

JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), arsenic was present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019.

Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule¹ at the JC Weadock Power Plant Landfill and quarterly groundwater monitoring in accordance with the February 2021 Landfill Hydrogeological Monitoring Plan (HMP). The first quarter 2023 monitoring event was conducted on March 8 and 9, 2023. In accordance with §257.95 and the HMP, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix III and Appendix IV constituents, and additional Michigan Part 115 (as amended by PA 640) Section 11511a(3) and Section 11519b(2) constituents, are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h) and Part 115, as detailed in the April 23, 2021 Groundwater Protection Standards technical memorandum, which was also included in the First Quarter 2021 Hydrogeological Monitoring Report². In accordance with the HMP, groundwater monitoring data from the designated groundwater-surface water (GSI) monitoring wells must be also compared to the GSI criteria to determine whether or not the GSI monitoring constituents are detected at statistically significant levels above the GSI criteria.

The evaluation of the initial semiannual assessment monitoring event data (April and May 2018) indicated that arsenic was present at statistically significant levels above the GWPS at one of the three former downgradient wells. The three downgradient wells were located within a vent (e.g., opening) of the perimeter soil/bentonite slurry wall to assess the quality of groundwater passing the waste boundary. As discussed in detail below, in July 2018, the vent in the perimeter soil/bentonite slurry wall was closed and the slurry wall is now continuous along the entire perimeter of the Weadock Landfill.

<sup>&</sup>lt;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).

<sup>&</sup>lt;sup>2</sup> TRC. 2021. First Quarter 2021 Hydrogeological Monitoring Report – JC Weadock Solid Waste Disposal Area, Essexville, Michigan. Prepared for Consumers Energy Company. April.

As a result of the change in groundwater flow conditions, the groundwater monitoring system was revised, as documented in the HMP. The monitoring well network now consists of twelve (12) downgradient monitoring wells and eight (8) GSI monitoring wells.

The statistical evaluation of the first quarter 2023 assessment monitoring event data indicates that the following constituents are present at statistically significant levels above the GWPSs in downgradient monitoring wells at the Weadock Landfill:

Constituent	GWPS	#Downgradient Wells Exceeded
Boron	560 μg/L	11 of 12
Calcium	280 mg/L	1 of 12

Corrective action has been triggered as a result of data collected during the initial assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and execute the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria.

#### **Statistical Evaluation Procedures**

Following each quarterly sampling event, compliance well data for the Weadock Landfill are evaluated in accordance with the Assessment Monitoring Statistical Data Evaluation and GSI Data Evaluation procedures in the HMP. The assessment monitoring and GSI monitoring programs were developed to evaluate concentrations of constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs or GSI criteria). To evaluate whether or not a criterion exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given monitoring event compared to the applicable criterion 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 3, the preferred method for comparisons to a fixed standard is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample 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 the 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 criterion. If the confidence interval straddles the criterion (i.e. the lower confidence level is below the criterion, 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 criterion 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

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<sup>&</sup>lt;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.

assessment monitoring presented in §257.93(f) and (g). Statistical evaluation methodologies built into the CCR Rule and Part 115, 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 constituent, the concentrations for each well were first compared directly to the GWPS, as shown on Table 1, or the GSI criteria, as shown on Table 2. Parameter-well combinations that included a direct exceedance of the criteria within the most recent two years of sampling events (eight quarterly sampling events, May 2021 through March 2023) were retained for further analysis. Data collected under the previous HMP is used where available.

Groundwater data were evaluated utilizing Sanitas<sup>TM</sup> statistical software. Sanitas<sup>TM</sup> is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas<sup>TM</sup> 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 for each parameter with a direct exceedance using a per test<sup>4</sup> 99 percent confidence level, i.e., a significance level (α) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas<sup>TM</sup> 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.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the assessment and GSI monitoring programs. Initially, the results were observed visually for potential trends. No outliers were identified in the data set.

The Sanitas<sup>TM</sup> software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. The tests were run with a per-test significance of  $\alpha = 0.01$ . Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

<sup>&</sup>lt;sup>4</sup> Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

The Sanitas<sup>™</sup> software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes data transformations, as appropriate.

#### **Assessment Monitoring Statistical Evaluation**

The assessment monitoring statistical evaluation is performed on the downgradient monitoring wells in accordance with the HMP. The downgradient monitoring wells include:

■ JCW-MW-18001 ■ JCW-MW-18004 ■ JCW-MW-18005 ■ JCW-MW-18006

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ OW-57R Out

The concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Constituent-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events were retained for further analysis (Attachment 1). Direct comparison GWPS exceedances include the following constituent well combinations:

- Boron in MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, OW-57R OUT, JCW-MW-18001, JCW-MW-18005, and JCW-MW-18006;
- Calcium in MW-50, MW-51, JCW-MW-18001;
- Sulfate in MW-50 and JCW-MW-18001;
- Arsenic in MW-53R, MW-55, JCW-MW-18001, and JCW-MW-18006;
- Molybdenum in MW-55;
- Iron in MW-55; and,
- Vanadium in JCW-MW-18001.

The purpose of assessment monitoring is to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. GWPS). As detailed in the *Alternate Source Demonstration* (TRC, December 2019), the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit; therefore, comparison of these concentrations to the GWPS is not appropriate and assessment monitoring confidence intervals were not calculated.

The software outputs for the assessment monitoring data evaluation 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. Visual trends were apparent in multiple wells for arsenic, boron, calcium, and sulfate. These data sets were tested further in Sanitas™ utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test to test for significance of the trend at the 98% confidence level. The trend tests show that the trends for boron at MW-54R, calcium at MW-50 and MW-51, and sulfate at JCW-MW-18001 are statistically significant (Attachment 1). The trends are causing the confidence intervals to widen. Calculating a confidence interval around a trending data set incorporates not only variability present naturally in the underlying dataset, but also incorporates variability due to the trend itself. Based on the observed trends, confidence bands were selected as a more appropriate assessment for boron at MW-54R, calcium at MW-50 and MW-51, and sulfate at JCW-MW-18001. Confidence bands are selected by the Unified Guidance as the appropriate method for calculating confidence intervals on trending

data. A confidence band calculates upper and lower confidence limits at each point along the trend to reduce variability and create a narrower confidence interval.

The Sanitas<sup>™</sup> software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-55, and OW-57R OUT Calcium at JCW-MW-18001 Arsenic at JCW-MW-18006 and MW-53R Iron at MW-55
Normalized by power transformation	Boron at MW-53 (X^4) and MW-53R (X^1/2) Sulfate at MW-50 (X^1/3)
Non-Parametric (over 50% non-detect)	Arsenic at JCW-MW-18001 Vanadium at JCW-MW-18001
Not Applicable – confidence bands used	Boron at MW-54R Calcium at MW-50 and MW-51 Sulfate at JCW-MW-18001

The confidence bands and interval tests compare the lower confidence limit to the GWPS. Arsenic concentrations at JCW-MW-18006 were previously considered statistically significant; however, the lower confidence limit has been at or below the GWPS since the second quarter 2021. Calcium concentrations at MW-51 were previously considered statistically significant; however, calcium concentrations are generally decreasing and the lower confidence limit has been below the GWPS since the first quarter 2022. Concentrations trends will continue to be monitored. Statistically significant exceedances of the GWPS were noted for boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, and calcium at JCW-MW-18001. Boron concentrations have been consistently above the GWPS since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Corrective action has been triggered for the site as a result of data collected during the initial May 2018 assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

#### **GSI Statistical Evaluation**

Eight monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the GSI monitoring program to meet the requirements of Part 31:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

The concentrations from each well were first compared directly to the GSI criteria, as shown on Table 2. Constituent-well combinations that included a direct exceedance of the GSI criteria within the past eight monitoring events were retained for further analysis (Attachment 2). Direct comparison GSI criteria exceedances include the following constituent well combinations:

Arsenic in MW-55; and

Molybdenum in MW-55.

The purpose of the GSI statistical evaluation is to assess compliance with the GSI pathway. Although the *Alternate Source Demonstration* supports that the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit, these concentrations still affect compliance with the GSI pathway. Therefore, it is appropriate to calculate confidence limits for arsenic and molybdenum at MW-55 for comparison to the GSI criteria.

The software outputs for the assessment monitoring data evaluation are included in Attachment 2 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 2.

The Sanitas<sup>™</sup> 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 distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Arsenic at MW-55 Molybdenum at MW-55

The confidence interval tests compare the lower confidence limit to the GSI. The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria. Arsenic and molybdenum concentrations at MW-55 were previously considered statistically significant; however, the arsenic and molybdenum concentrations decreased in 2022 and 2023. The lower confidence limits for arsenic and molybdenum continued to be below the GWPS in first quarter 2023.

#### **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Table 2 Comparison of Groundwater Sampling Results to GSI

Attachment 1 Assessment Monitoring Sanitas™ Output Files

Attachment 2 GSI Evaluation Sanitas™ Output Files

### **Tables**

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

									o, iviicingan									
		Sample Location:								MW	/-50							1
		Sample Date:	5/10/2021	5/10/2021	8/2/2021	8/2/2021	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023
Constituent	Unit	GWPS																
Appendix III <sup>(1)</sup>				Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	1,380	1,320	1,520	1,630	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080
Calcium	mg/L	280	363	370	267	252	274	261	186	185	169	175	161	164	186	181	152	
Chloride	mg/L	2,300	68.9	69.9	57.0	57.2	51.0	51.7	54.9	55.6	53.3	51.6	54.2	54.9	47.7	47.6	35.9	36.7
Fluoride	ug/L	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
Sulfate	mg/L	780	856	867	638	634	496	512	346	330	285	286	324	325	376	376	341	315
Total Dissolved Solids	mg/L	4,700	1,950	1,970	1,630	1,640	1,440	1,380	999	1,010	1,020	1,050	1,080	1,040	1,120	1,150	939	984
pH, Field	SU	6.5 - 8.5	6.9		7.0		7.1		7.4		7.2		7.0		7.3		7.3	
Appendix IV <sup>(1)</sup>																		
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	1	2	2	3	3	2	2	1	1	2	2	3	3	2	2
Barium	ug/L	2,000	108	109	91	97	102	89	115	117	86	86	90	94	106	108	89	92
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	100	100	79	81	93	68	77	77	69	66	64	61	62	62	65	65
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5
Radium-226	pCi/L	NA	< 0.237	< 0.245			< 0.215	0.243			< 0.310	< 0.287			0.158	0.343		
Radium-228	pCi/L	NA	0.557	0.607			1.15	1.22			< 0.493	0.648			1.14	1.37		
Radium-226/228	pCi/L	5.0	0.650	0.671			1.21	1.46			0.518	0.904			1.30	1.72		
Selenium	ug/L	50	< 1	1	3	2	4	4	2	2	2	2	2	2	2	2	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameter	s <sup>(2)</sup>																	
Iron	ug/L	28,000	1,810	1,810	3,000	2,780	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601
Copper	ug/L	1,000	< 1	2	1	< 1	1	< 1	< 1	< 1	1	1	< 1	< 1	1	< 1	< 1	< 1
Nickel	ug/L	100	< 2	< 2	11	12	16	11	< 2	19	< 2	6	6	7	4	7	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					ie, Michigan					
		Sample Location:				MW	/-51		_	
		Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,040	960	1,140	1,420	1,350	1,270	1,490	1,320
Calcium	mg/L	280	303	276	316	255	247	211	211	169
Chloride	mg/L	2,300	93.6	99.8	97.1	91.1	92.8	102	101	98.4
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	450	434	418	446	420	404	394	360
Total Dissolved Solids	mg/L	4,700	1,500	1,530	1,500	1,480	1,510	1,450	1,380	1,180
pH, Field	SU	6.5 - 8.5	7.0	6.9	6.9	7.4	7.2	7.0	7.2	7.2
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	11	14	20	12	10	15	18	10
Barium	ug/L	2,000	148	148	197	198	150	169	188	178
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	57	47	64	58	56	53	50	46
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.268		0.451		< 0.423		< 0.397	
Radium-228	pCi/L	NA	0.626		2.01		< 0.494		2.19	
Radium-226/228	pCi/L	5.0	0.851		2.46		0.576		2.51	
Selenium	ug/L	50	< 1	1	3	3	2	2	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,200	5,080	5,130	1,310	1,210	1,860	2,880	514
Copper	ug/L	1,000	< 1	< 1	1	< 1	2	< 1	1	< 1
Nickel	ug/L	100	< 2	11	18	< 2	< 2	6	4	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

				LSSOAVII	ie, iviici iigari					
		Sample Location:				MW	<i>I-</i> 52			
		Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,160	1,140	1,280	1,310	1,090	1,070	1,330	1,040
Calcium	mg/L	280	244	196	237	251	231	222	224	228
Chloride	mg/L	2,300	53.9	56.5	59.4	51.6	50.5	45.1	40.4	36.3
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	574	501	110	654	591	663	603	581
Total Dissolved Solids	mg/L	4,700	1,500	1,340	1,360	1,520	1,490	1,580	1,670	1,430
pH, Field	SU	6.5 - 8.5	6.9	6.9	6.9	7.1	7.0	6.7	6.9	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	132	115	152	170	107	118	122	102
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	29	21	31	27	25	29	26	27
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.237		< 0.274		< 0.489		0.205	
Radium-228	pCi/L	NA	< 0.407		0.778		< 0.532		< 0.694	
Radium-226/228	pCi/L	5.0	< 0.407		1.03		0.875		0.805	
Selenium	ug/L	50	1	1	3	2	2	2	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	1,400	3,830	4,880	2,870	2,030	5,020	6,340	2,820
Copper	ug/L	1,000	< 1	< 1	1	1	2	2	2	1
Nickel	ug/L	100	< 2	9	14	< 2	< 2	5	3	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

		Sample Location:				MW	<b>/</b> -53			
		Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	3,790	3,820	3,820	4,100	3,880	4,300	4,140	2,150
Calcium	mg/L	280	187	162	166	146	147	116	108	82.5
Chloride	mg/L	2,300	51.8	49.9	55.5	81.1	50.9	66.5	53	24.8
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	322	279	111	39.5	215	119	126	93.6
Total Dissolved Solids	mg/L	4,700	1,050	1,020	896	768	886	820	740	489
pH, Field	SU	6.5 - 8.5	7.1	7.1	7.1	7.4	7.3	7.1	7.3	7.3
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	2	2	1	< 1	1	2	< 1
Barium	ug/L	2,000	214	200	212	401	356	313	285	202
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	46	38	53	48	41	42	38	33
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	7
Radium-226	pCi/L	NA	< 0.239		0.399		0.406		0.269	
Radium-228	pCi/L	NA	0.455		0.979		< 0.518		1.15	
Radium-226/228	pCi/L	5.0	0.684		1.38		0.824		1.42	
Selenium	ug/L	50	2	3	< 1	3	1	3	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters <sup>(</sup>	2)									
Iron	ug/L	28,000	1,420	2,380	1,760	1,130	1,060	1,240	1,140	403
Copper	ug/L	1,000	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Nickel	ug/L	100	< 2	6	10	< 2	< 2	4	2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

- -- not analyzed.
- GWPS Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.
- 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 and the HMP.
- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

				ESSEXVII	ie, iviici iigari					
		Sample Location:				MW	-53R			•
		Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,580	1,710	2,060	2,330	1,830	1,560	2,340	2,330
Calcium	mg/L	280	227	203	232	188	226	219	203	195
Chloride	mg/L	2,300	31.1	34.5	36.6	39.9	41.6	50.4	39.2	27.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	170	189	166	71.7	314	533	250	101
Total Dissolved Solids	mg/L	4,700	1,040	1,040	1,060	709	1,290	1,530	1,160	960
pH, Field	SU	6.5 - 8.5	6.8	6.8	6.8	7.1	6.9	6.7	6.8	6.7
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	18	23	25	10	8	17	20	17
Barium	ug/L	2,000	208	204	189	203	147	97	118	179
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	59	56	57	56	61	70	63	59
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.306		0.344	-	< 0.325		0.239	
Radium-228	pCi/L	NA	0.822		1.05		< 0.480		0.967	
Radium-226/228	pCi/L	5.0	1.13		1.40		< 0.480		1.21	
Selenium	ug/L	50	< 1	2	3	2	2	2	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,220	2,800	2,170	1,080	460	1,030	702	1,580
Copper	ug/L	1,000	1	1	< 1	2	2	2	1	1
Nickel	ug/L	100	< 2	10	2	< 2	< 2	5	3	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

T										
		Sample Location:				MW	-54R			
		Sample Date:	5/11/2021	8/3/2021	10/11/2021	3/9/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	3,140	3,530	4,270	4,720	4,110	4,970	5,310	5,660
Calcium	mg/L	280	196	163	187	186	169	158	160	168
Chloride	mg/L	2,300	32.7	35.5	34.7	49.8	35.8	43.9	47.4	49.6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	72.7	77.0	75.7	67.1	86.3	72.1	70.9	62
Total Dissolved Solids	mg/L	4,700	762	786	772	776	712	800	799	770
pH, Field	SU	6.5 - 8.5	6.6	6.8	6.9	6.9	7.0	6.9	6.9	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	2	4	1	< 1	2	2	1
Barium	ug/L	2,000	122	124	129	154	111	109	123	126
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	2	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	64	60	59	74	64	74	74	71
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	7	7	9	10	12	15
Radium-226	pCi/L	NA	< 0.255		< 0.231		< 0.347		0.208	
Radium-228	pCi/L	NA	0.782		0.759		< 0.552		1.31	
Radium-226/228	pCi/L	5.0	0.900		0.965		< 0.552		1.52	
Selenium	ug/L	50	< 1	1	2	2	2	1	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	782	1,190	2,280	496	121	367	1,090	262
Copper	ug/L	1,000	2	1	< 1	1	1	1	1	2
Nickel	ug/L	100	3	9	< 2	< 2	< 2	2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					L336XVIIIe, IVIICI IIg						
		Sample Location:					MW-55				
		Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>									Field Dup		
Boron	ug/L	560	866	873	788	826	642	709	687	976	1,110
Calcium	mg/L	280	147	126	198	163	177	159	165	141	162
Chloride	mg/L	2,300	19.5	19.3	16.5	20.2	11.8	11.8	11.8	12.5	24.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	18.5	34.3	80.7	35.4	249	248	245	108	94.6
Total Dissolved Solids	mg/L	4,700	729	743	844	808	942	930	1,040	786	898
pH, Field	SU	6.5 - 8.5	7.1	7.1	7.0	7.1	7.0	6.9		7.0	6.8
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	169	204	198	88	48	80	78	126	68
Barium	ug/L	2,000	323	347	330	299	222	232	231	223	287
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	24	25	34	28	24	29	28	30	27
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	131	157	206	89	78	80	78	91	50
Radium-226	pCi/L	NA	0.525		0.467		< 0.478			0.365	
Radium-228	pCi/L	NA	0.896		1.10		< 0.646			0.966	
Radium-226/228	pCi/L	5.0	1.42		1.56		0.696			1.33	
Selenium	ug/L	50	1	1	2	1	3	3	4	< 1	3
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	21,500	39,400	40,500	29,800	15,000	18,000	16,600	22,100	24,800
Copper	ug/L	1,000	< 1	< 1	< 1	< 1	1	< 1	1	1	< 1
Nickel	ug/L	100	< 2	6	8	4	3	6	6	4	4
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.
- -- not analyzed.
- GWPS Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.
- 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 and the HMP.
- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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		Sample Location:				OW-57	'R OUT			
		Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/9/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,710	1,730	1,880	2,030	1,990	1,570	1,830	1,860
Calcium	mg/L	280	133	118	140	126	131	113	114	116
Chloride	mg/L	2,300	62.9	53.1	46.9	62.5	57.3	52.0	47.6	59
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	78.3	93.9	93.1	83.1	69.4	85.0	86.8	79.7
Total Dissolved Solids	mg/L	4,700	743	725	737	1,030	702	714	722	790
pH, Field	SU	6.5 - 8.5	7.0	7.0	7.0	7.2	7.1	6.8	6.9	6.9
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	73	72	75	85	79	67	75	75
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	1	1	< 1	1	2	1	< 1	4
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	24	20	21	26	27	23	22	26
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	6	7	9	8	7	7	8	6
Radium-226	pCi/L	NA	< 0.286		< 0.227	-	< 0.440	-	0.199	
Radium-228	pCi/L	NA	0.606		1.12	-	< 0.539	-	< 0.711	
Radium-226/228	pCi/L	5.0	0.615		1.26	-	< 0.539	-	0.870	
Selenium	ug/L	50	< 1	< 1	2	1	3	1	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	100	56	68	96	74	37	42	53
Copper	ug/L	1,000	1	2	1	2	2	1	2	1
Nickel	ug/L	100	16	21	12	17	14	17	16	15
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

		0 11 11								
		Sample Location:		ı	1		W-18001		ı	
		Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/7/2022	5/9/2022	8/1/2022	10/10/2022	3/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,340	1,610	1,670	1,670	1,560	1,470	1,790	1,440
Calcium	mg/L	280	305	348	373	412	335	389	465	486
Chloride	mg/L	2,300	77.3	76.4	68.3	60.0	58.8	64.6	63.6	54.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	580	700	777	1,080	752	1,180	1,400	1,640
Total Dissolved Solids	mg/L	4,700	1,670	1,880	2,000	2,310	1,970	2,580	3,020	3,030
pH, Field	SU	6.5 - 8.5	6.9	6.9	6.8	6.8	7.0	6.6	6.8	6.7
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	38	1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	166	199	184	129	80	61	66	47
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	8	< 1	< 1	2	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	68	71	103	87	76	95	97	91
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	9	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.378		0.337		< 0.327		< 0.142	
Radium-228	pCi/L	NA	< 0.558		1.05		0.494		0.852	
Radium-226/228	pCi/L	5.0	< 0.558		1.39		0.586		0.893	
Selenium	ug/L	50	< 1	2	3	2	2	3	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	154	13,600	91	86	210	196	818	830
Copper	ug/L	1,000	3	6	2	2	3	2	3	2
Nickel	ug/L	100	2	16	20	6	8	14	15	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	2	12	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	12	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					. 3					
		Sample Location:				JCW-M	W-18004			
		Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	246	304	389	259	226	313	343	180
Calcium	mg/L	280	266	203	264	236	235	215	193	221
Chloride	mg/L	2,300	12.4	6.65	7.45	19.6	10.8	12.5	11.4	12.7
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	523	393	493	537	512	512	428	533
Total Dissolved Solids	mg/L	4,700	1,270	1,180	1,240	1,280	1,290	1,290	1,130	1,250
pH, Field	SU	6.5 - 8.5	6.8	6.8	6.8	6.9	6.8	6.7	6.8	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	27	36	41	32	26	31	37	24
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	36	47	63	34	42	51	46	39
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.271		0.182		< 0.417	1	< 0.135	
Radium-228	pCi/L	NA	< 0.425		0.796		0.790	-	< 0.742	
Radium-226/228	pCi/L	5.0	< 0.425		0.978		0.910		< 0.742	
Selenium	ug/L	50	1	4	3	2	2	1	1	11
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	24	< 20	39	952	< 20	45	< 20	46
Copper	ug/L	1,000	2	1	2	1	2	2	2	1
Nickel	ug/L	100	2	9	16	4	< 2	2	5	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					E33CXVIIIC, WIICHIG						
		Sample Location:					JCW-MW-1800	5			
		Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	3/7/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>							Field Dup				
Boron	ug/L	560	919	1,080	1,190	1,030	1,100	1,010	981	1,290	930
Calcium	mg/L	280	202	149	193	159	164	280	165	150	262
Chloride	mg/L	2,300	56.0	64.9	63.6	61.7	60.7	32.6	50.9	53.9	25.4
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	263	190	227	204	211	437	213	160	435
Total Dissolved Solids	mg/L	4,700	1,020	895	1,020	942	934	1,330	967	868	1,250
pH, Field	SU	6.5 - 8.5	6.9	7.0	6.9	7.1		6.8	6.7	6.8	6.6
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	9	9	9	5	5	5	4	5	4
Barium	ug/L	2,000	93	98	124	108	110	110	71	80	115
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	30	28	39	32	30	33	32	32	36
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	5	5	6	< 5	5	6
Radium-226	pCi/L	NA	< 0.224		< 0.262			< 0.414		0.193	
Radium-228	pCi/L	NA	0.524		0.984			< 0.521		< 0.800	
Radium-226/228	pCi/L	5.0	0.728		1.16			0.622		< 0.800	
Selenium	ug/L	50	1	2	4	3	3	2	< 1	2	3
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	4,590	5,350	5,840	3,300	3,170	1,680	2,810	3,220	1,720
Copper	ug/L	1,000	1	12	1	< 1	< 1	2	< 1	< 1	1
Nickel	ug/L	100	10	29	22	10	25	< 2	9	11	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.
- -- not analyzed.
- GWPS Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.
- 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 and the HMP.
- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards

JC Weadock Landfill – Hydrogeological Monitoring Program

Essexville, Michigan

						L33eAVIIIe, IVIICIIIG							
		Sample Location:					,	JCW-MW-1800	6				
		Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	5/9/2022	5/9/2022	8/2/2022	10/11/2022	10/11/2022	3/9/2023	3/9/2023
Constituent	Unit	GWPS											
Appendix III <sup>(1)</sup>								Field Dup			Field Dup		Field Dup
Boron	ug/L	560	2,720	2,640	2,600	3,220	2,990	3,030	2,260	2,720	2,650	1,730	1,760
Calcium	mg/L	280	147	135	152	143	136	136	109	118	119	121	121
Chloride	mg/L	2,300	72.6	73.6	77.0	75.0	67.3	67.7	79.0	74.2	74.7	79.9	82.8
Fluoride	ug/L	4,000	< 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	780	47.0	29.7	34.7	38.1	32.8	34.0	14.9	21.6	23.0	32.5	33.9
Total Dissolved Solids	mg/L	4,700	784	769	802	792	788	772	709	720	746	715	753
pH, Field	SU	6.5 - 8.5	6.9	6.9	7.0	7.1	7.0		6.7	6.9		6.9	
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	30	25	21	33	22	23	21	25	25	5	5
Barium	ug/L	2,000	472	492	351	665	514	509	452	480	499	232	238
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	53	46	47	63	56	57	52	52	52	21	23
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.418		0.268		< 0.416			0.516	0.259		
Radium-228	pCi/L	NA	< 0.483		0.872		< 0.518			< 0.609	0.869		
Radium-226/228	pCi/L	5.0	0.888		1.14		0.690			0.999	1.13		
Selenium	ug/L	50	1	2	4	2	< 1	1	< 1	1	1	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	2)												
Iron	ug/L	28,000	5,490	7,790	6,200	9,040	6,600	6,360	7,670	7,620	7,630	2,930	2,910
Copper	ug/L	1,000	2	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	3	6	10	6	< 2	< 2	5	5	6	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	3	4	2	4	3	3	3	3	4	< 2	2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

					Commis I continu								MW	1.50							
					Sample Location:				1	ı	1				ı	T		1			
					Sample Date:	5/10/2021	5/10/2021	8/2/2021	8/2/2021	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023
			Chronic-Based Mixing																		
Constituent	Unit	Generic GSI <sup>^</sup>	Zone GSI Criteria*	Zone GSI Criteria*	GSI**																
Appendix III <sup>(1)</sup>							Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	4,000	44,000	69,000	44,000	1,380	1,320	1,520	1,630	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	856	867	638	634	496	512	346	330	285	286	324	325	376	376	341	315
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9		7.0		7.1		7.4		7.2		7.0		7.3		7.3	
Appendix IV <sup>(1)</sup>																					
Arsenic	ug/L	10	100	680	100	1	1	2	2	3	3	2	2	1	1	2	2	3	3	2	2
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	100	100	79	81	93	68	77	77	69	66	64	61	62	62	65	65
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5
Selenium	ug/L	5.0	55	120	55	< 1	1	3	2	4	4	2	2	2	2	2	2	2	2	1	1
MI Part 115 Parame	ters <sup>(2)</sup>	•			•													•			
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,810	1,810	3,000	2,780	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

\*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\rm EE}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

					Sample Location:				MV	<i>I</i> -51			
					Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,040	960	1,140	1,420	1,350	1,270	1,490	1,320
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	450	434	418	446	420	404	394	360
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.0	6.9	6.9	7.4	7.2	7.0	7.2	7.2
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	11	14	20	12	10	15	18	10
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	57	47	64	58	56	53	50	46
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	< 1	1	3	3	2	2	1	2
MI Part 115 Parame	ters <sup>(2)</sup>	<u> </u>			_								_
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,200	5,080	5,130	1,310	1,210	1,860	2,880	514
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	<i>I</i> -52			<del></del>
					Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**	0/10/2021	0/2/2021	10/11/2021	O/O/EOEE	OFFICEL	OF ITZUZZ	10/10/2022	0/0/2020
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,160	1,140	1,280	1,310	1,090	1,070	1,330	1,040
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	574	501	110	654	591	663	603	581
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	6.9	6.9	7.1	7.0	6.7	6.9	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	29	21	31	27	25	29	26	27
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	1	1	3	2	2	2	2	1
MI Part 115 Paramet	ers <sup>(2)</sup>	<u> </u>											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,400	3,830	4,880	2,870	2,030	5,020	6,340	2,820
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	<i>I</i> -53			
					Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	3,790	3,820	3,820	4,100	3,880	4,300	4,140	2,150
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	322	279	111	39.5	215	119	126	93.6
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.1	7.1	7.4	7.3	7.1	7.3	7.3
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	2	2	1	< 1	1	2	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	46	38	53	48	41	42	38	33
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	7
Selenium	ug/L	5.0	55	120	55	2	3	< 1	3	1	3	1	1
MI Part 115 Paramet	ters <sup>(2)</sup>	<u> </u>									_		
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,420	2,380	1,760	1,130	1,060	1,240	1,140	403
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	-53R			
					Sample Date:	5/10/2021	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,580	1,710	2,060	2,330	1,830	1,560	2,340	2,330
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	170	189	166	71.7	314	533	250	101
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.8	6.8	7.1	6.9	6.7	6.8	6.7
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	18	23	25	10	8	17	20	17
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	59	56	57	56	61	70	63	59
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	< 1	2	3	2	2	2	2	1
MI Part 115 Paramet	ters <sup>(2)</sup>	<u> </u>									_		
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,220	2,800	2,170	1,080	460	1,030	702	1,580
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

TRC | Consumers Energy X:\WPAAM\PJT2\514403\0000\2023\Q1\Appx\Appx\D\T514403.0-Appx\D\T2\_23\Q1

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					Sample Location:				MW	-54R			<del></del>
					Sample Date:	5/11/2021	8/3/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**	0, 1 1, 2021	0,0,00					,	
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	3,140	3,530	4,270	4,720	4,110	4,970	5,310	5,660
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	72.7	77.0	75.7	67.1	86.3	72.1	70.9	62
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.6	6.8	6.9	6.9	7.0	6.9	6.9	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	1	2	4	1	< 1	2	2	1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	2	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	64	60	59	74	64	74	74	71
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	7	7	9	10	12	15
Selenium	ug/L	5.0	55	120	55	< 1	1	2	2	2	1	2	1
MI Part 115 Paramet	ters <sup>(2)</sup>	<u> </u>							_				
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	782	1,190	2,280	496	121	367	1,090	262
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:					MW-55				
					Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**									
Appendix III <sup>(1)</sup>												Field Dup		
Boron	ug/L	4,000	44,000	69,000	44,000	866	873	788	826	642	709	687	976	1,110
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	18.5	34.3	80.7	35.4	249	248	245	108	94.6
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.1	7.0	7.1	7.0	6.9		7.0	6.8
Appendix IV <sup>(1)</sup>														
Arsenic	ug/L	10	100	680	100	169	204	198	88	48	80	78	126	68
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	24	25	34	28	24	29	28	30	27
Molybdenum	ug/L	120	NC	NC	120	131	157	206	89	78	80	78	91	50
Selenium	ug/L	5.0	55	120	55	1	1	2	1	3	3	4	< 1	3
MI Part 115 Parame	ters <sup>(2)</sup>													
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	21,500	39,400	40,500	29,800	15,000	18,000	16,600	22,100	24,800
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- <sup>F</sup> Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				JCW-M	W-18004			
					Sample Date:	5/11/2021	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	246	304	389	259	226	313	343	180
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	523	393	493	537	512	512	428	533
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.8	6.8	6.9	6.8	6.7	6.8	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	36	47	63	34	42	51	46	39
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	1	4	3	2	2	1	1	11
MI Part 115 Paramet	ers <sup>(2)</sup>	•				·			•		•		
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	24	< 20	39	952	< 20	45	< 20	46
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

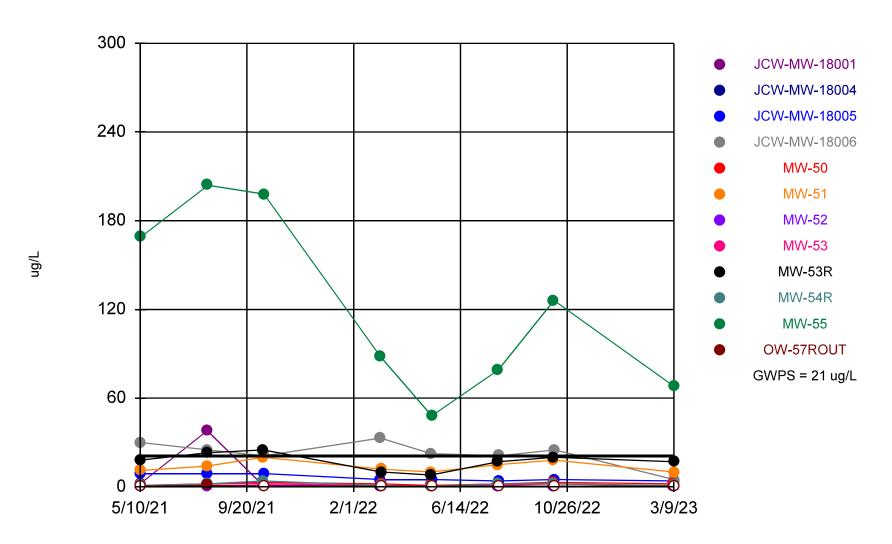
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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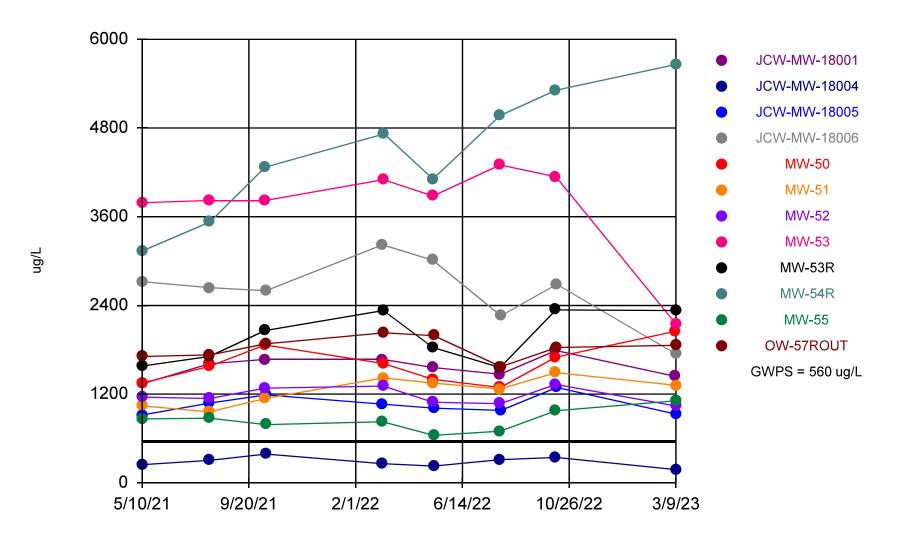
### Attachment 1 Assessment Monitoring Sanitas™ Output Files

## Arsenic Comparison to GWPS



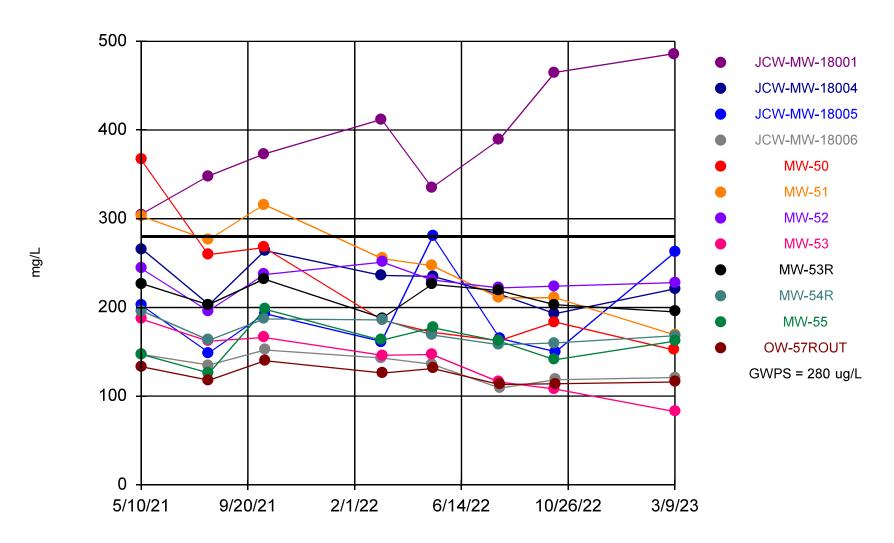
Time Series Analysis Run 4/3/2023 1:20 PM

## Boron Comparison to GWPS



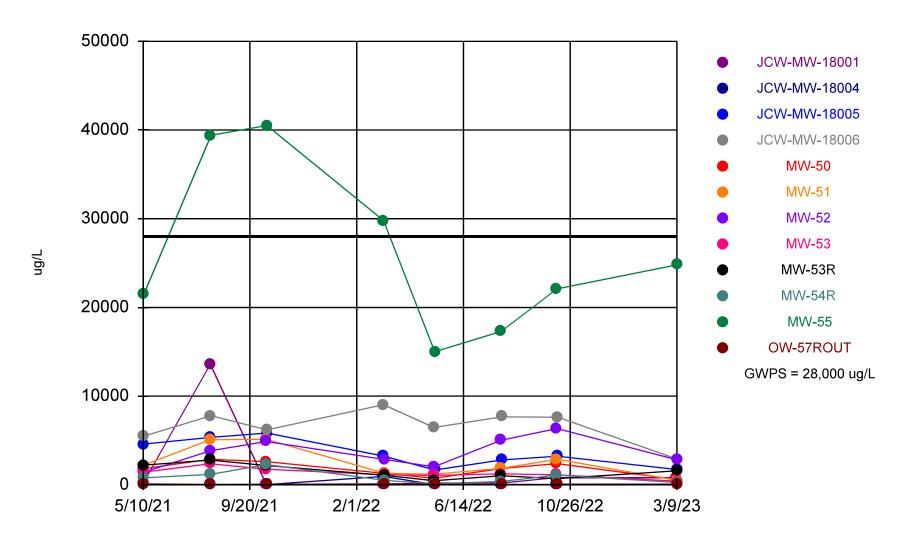
Time Series Analysis Run 4/3/2023 1:21 PM

## Calcium Comparison to GWPS



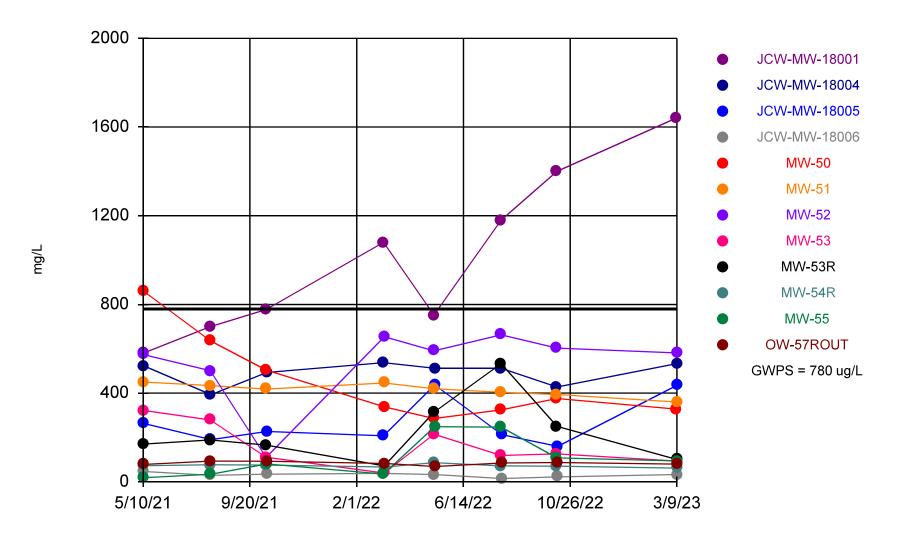
Time Series Analysis Run 4/3/2023 1:22 PM

## Iron Comparison to GWPS



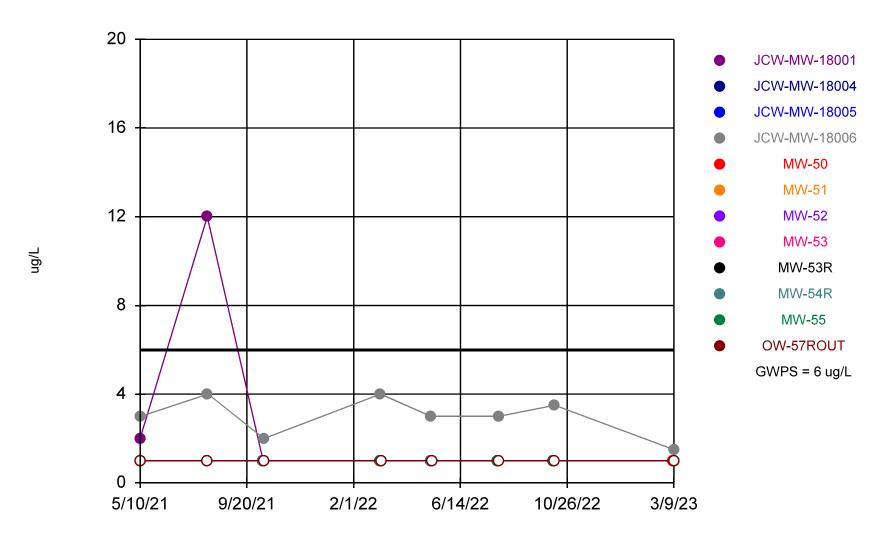
Time Series Analysis Run 4/3/2023 1:23 PM

## Sulfate Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:23 PM

## Vanadium Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:24 PM

Constituent: Arsenic, Total Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 31 Wells = 12 Minimum Value = 0.5 Maximum Value = 204 Mean Value = 16.21 Median Value = 2 Standard Deviation = 37.24 Coefficient of Variation = 2.297 Skewness = 3.715

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	5	0.5	38	5.438	0.5	13.17	2.422	2.261
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
JCW-MW-18005	8	0	4	9	6.25	5	2.315	0.3703	0.4157
JCW-MW-18006	8	0	5	33	22.81	23.75	8.358	0.3664	-1.102
MW-50	8	0	1	3	2	2	0.7559	0.378	0
MW-51	8	0	10	20	13.75	13	3.732	0.2714	0.5619
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.188	1	0.7039	0.5928	0.2719
MW-53R	8	0	8	25	17.25	17.5	5.849	0.3391	-0.3783
MW-54R	8	1	0.5	4	1.688	1.5	1.1	0.6518	1.126
MW-55	8	0	48	204	122.5	107	61.09	0.4987	0.2503
OW-57ROUT	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268

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#### **Summary Report**

Constituent: Boron, Total Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 180 Maximum Value = 5660 Mean Value = 1867 Median Value = 1565 Standard Deviation = 1217 Coefficient of Variation = 0.6517 Skewness = 1.19

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	1340	1790	1569	1585	146.3	0.09328	-0.1019
JCW-MW-18004	8	0	180	389	282.5	281.5	67.59	0.2393	0.07362
JCW-MW-18005	8	0	919	1290	1058	1038	128.6	0.1215	0.6758
JCW-MW-18006	8	0	1745	3220	2610	2663	450.6	0.1727	-0.6631
MW-50	8	0	1290	2050	1606	1595	262.4	0.1634	0.4157
MW-51	8	0	960	1490	1249	1295	186	0.1489	-0.3321
MW-52	8	0	1040	1330	1178	1150	114.1	0.09691	0.2446
MW-53	8	0	2150	4300	3750	3850	672.5	0.1793	-1.921
MW-53R	8	0	1560	2340	1968	1945	340.5	0.1731	0.008592
MW-54R	8	0	3140	5660	4464	4495	866.5	0.1941	-0.1692
MW-55	8	0	642	1110	847.4	846	148.8	0.1756	0.3732
OW-57ROUT	8	0	1570	2030	1825	1845	151.6	0.08305	-0.2475

Constituent: Calcium, Total Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 82.5 Maximum Value = 486 Mean Value = 204.2 Median Value = 187.5 Standard Deviation = 77.94 Coefficient of Variation = 0.3817 Skewness = 1.381

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	305	486	389.1	381	62.82	0.1614	0.3267
JCW-MW-18004	8	0	193	266	229.1	228	26.49	0.1156	0.2035
JCW-MW-18005	8	0	149	280	195.3	179	50.61	0.2591	0.7603
JCW-MW-18006	8	0	109	152	132.7	135.5	15.12	0.1139	-0.2858
MW-50	8	0	152	366.5	218.6	184.5	73.7	0.3371	1.055
MW-51	8	0	169	316	248.5	251	49.94	0.201	-0.144
MW-52	8	0	196	251	229.1	229.5	16.65	0.07267	-0.7473
MW-53	8	0	82.5	187	139.3	146.5	34.55	0.248	-0.3216
MW-53R	8	0	188	232	211.6	211	16.46	0.07777	-0.1233
MW-54R	8	0	158	196	173.4	168.5	14.28	0.08238	0.4582
MW-55	8	0	126	198	159.5	162	22.15	0.1389	0.2336
OW-57ROUT	8	0	113	140	123.9	122	10.08	0.08135	0.3557

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#### **Summary Report**

Constituent: Iron, Total Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 3 Wells = 12 Minimum Value = 10 Maximum Value = 40500 Mean Value = 4192 Median Value = 1630 Standard Deviation = 7570 Coefficient of Variation = 1.806 Skewness = 3.171

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	86	13600	1998	203	4698	2.351	2.248
JCW-MW-18004	8	3	10	952	142	31.5	327.7	2.307	2.258
JCW-MW-18005	8	0	1680	5840	3556	3228	1566	0.4404	0.2201
JCW-MW-18006	8	0	2920	9040	6652	7053	1871	0.2812	-0.8533
MW-50	8	0	602.5	2890	1771	1825	847.7	0.4787	-0.1513
MW-51	8	0	514	5130	2523	2030	1742	0.6904	0.6358
MW-52	8	0	1400	6340	3649	3350	1675	0.4591	0.2368
MW-53	8	0	403	2380	1317	1190	574.5	0.4364	0.4016
MW-53R	8	0	460	2800	1505	1330	826.3	0.5489	0.2667
MW-54R	8	0	121	2280	823.5	639	702.3	0.8529	1.104
MW-55	8	0	15000	40500	26300	23450	9540	0.3627	0.4915
OW-57ROUT	8	0	37	100	65.75	62	23.33	0.3548	0.3401

Constituent: Sulfate Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 14.9 Maximum Value = 1640 Mean Value = 321.9 Median Value = 247.8 Standard Deviation = 304.4 Coefficient of Variation = 0.9456 Skewness = 1.733

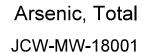
<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	580	1640	1014	928.5	375	0.37	0.4771
JCW-MW-18004	8	0	393	537	491.4	512	52.59	0.107	-1.04
JCW-MW-18005	8	0	160	437	266.6	220	108.6	0.4074	0.9118
JCW-MW-18006	8	0	14.9	47	31.66	33.3	9.738	0.3076	-0.269
MW-50	8	0	285.5	861.5	456.7	357	200.8	0.4397	1.142
MW-51	8	0	360	450	415.8	419	29.67	0.07137	-0.6498
MW-52	8	0	110	663	534.6	586	178.8	0.3344	-1.928
MW-53	8	0	39.5	322	163.1	122.5	98.21	0.602	0.5157
MW-53R	8	0	71.7	533	224.3	179.5	146.4	0.6527	1.183
MW-54R	8	0	62	86.3	72.98	72.4	7.184	0.09845	0.3777
MW-55	8	0	18.5	249	108.4	87.65	91.57	0.845	0.7699
OW-57ROUT	8	0	69.4	93.9	83.66	84.05	8.051	0.09623	-0.3427

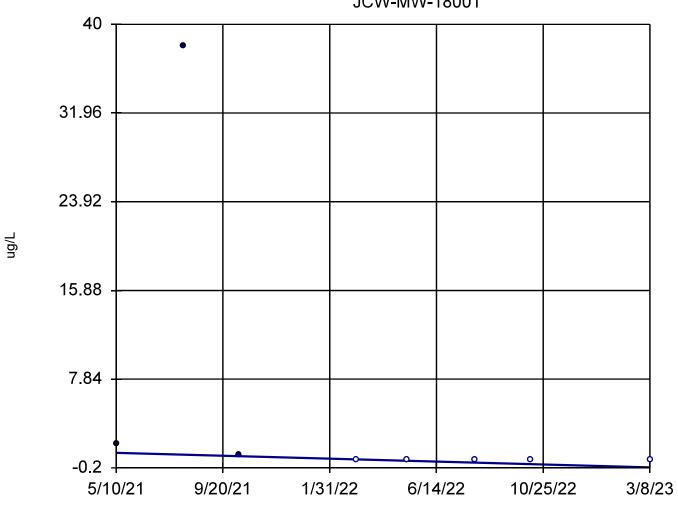
Constituent: Vanadium, Total Analysis Run 4/3/2023 1:26 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 86 Wells = 12 Minimum Value = 1 Maximum Value = 12 Mean Value = 1.292 Median Value = 1 Standard Deviation = 1.262 Coefficient of Variation = 0.9771 Skewness = 6.8

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	6	1	12	2.5	1	3.854	1.542	2.232
JCW-MW-18004	8	8	1	1	1	1	0	0	NaN
JCW-MW-18005	8	8	1	1	1	1	0	0	NaN
JCW-MW-18006	8	0	1.5	4	3	3	0.8864	0.2955	-0.4934
MW-50	8	8	1	1	1	1	0	0	NaN
MW-51	8	8	1	1	1	1	0	0	NaN
MW-52	8	8	1	1	1	1	0	0	NaN
MW-53	8	8	1	1	1	1	0	0	NaN
MW-53R	8	8	1	1	1	1	0	0	NaN
MW-54R	8	8	1	1	1	1	0	0	NaN
MW-55	8	8	1	1	1	1	0	0	NaN
OW-57ROUT	8	8	1	1	1	1	0	0	NaN





n = 8

Slope = -0.7208 units per year.

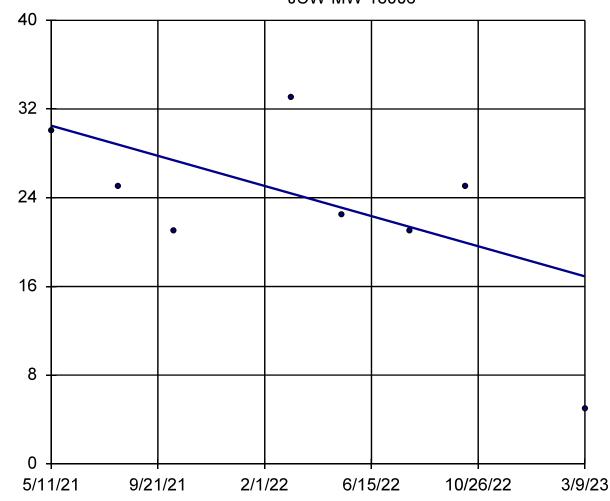
Mann-Kendall statistic = -16 critical = -20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

ng/L

# Arsenic, Total JCW-MW-18006



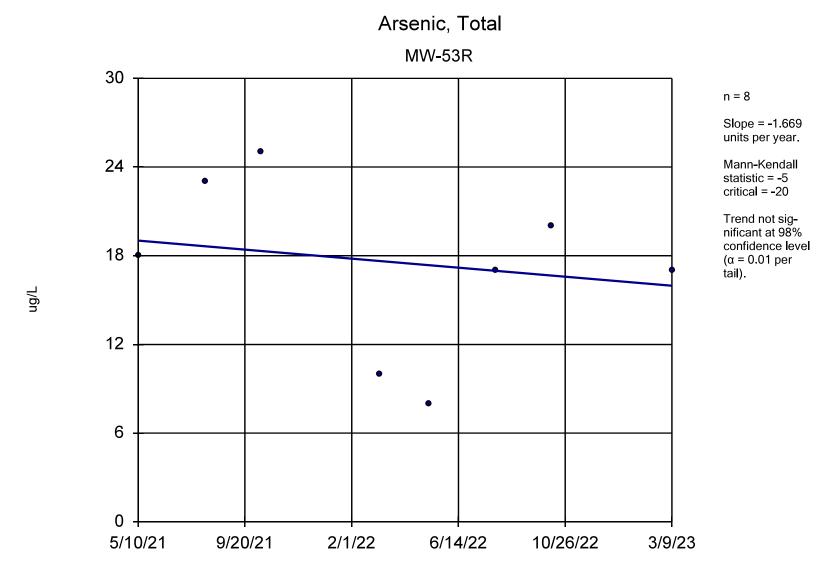
n = 8

Slope = -7.437 units per year.

Mann-Kendall statistic = -12 critical = -20

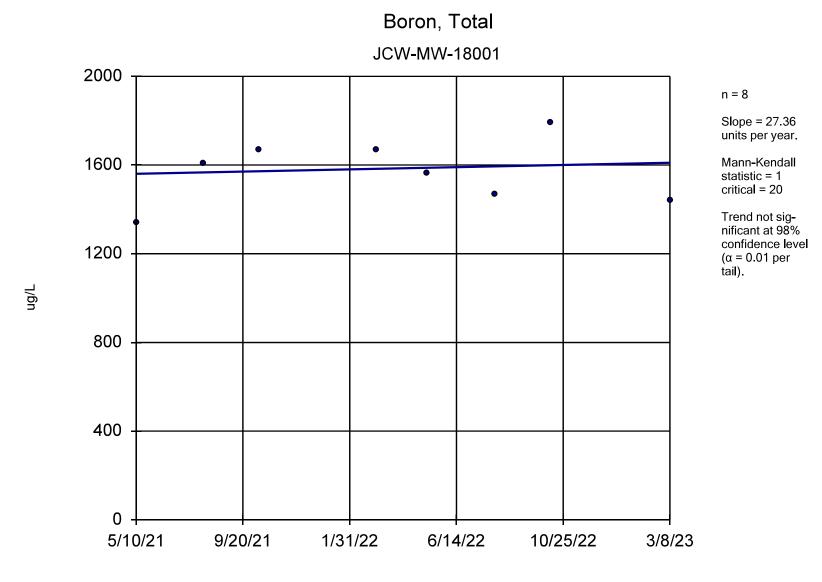
Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM



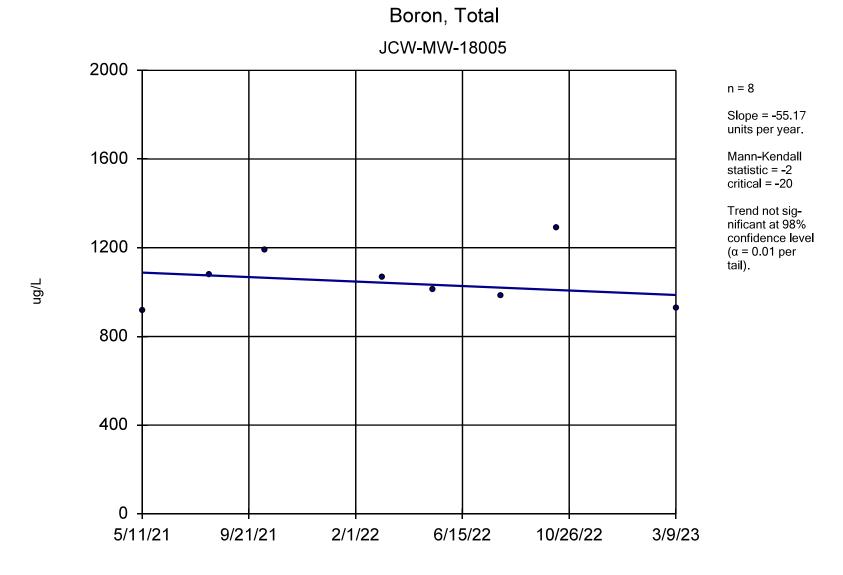
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



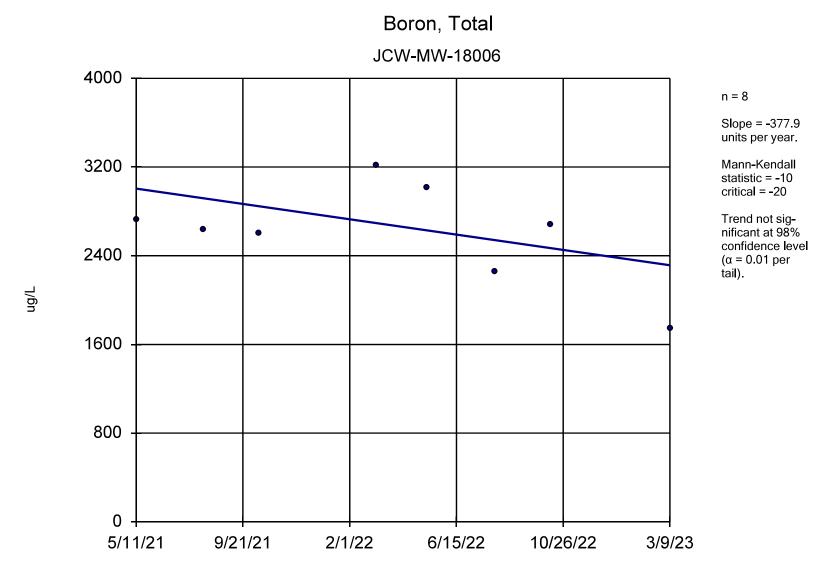
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



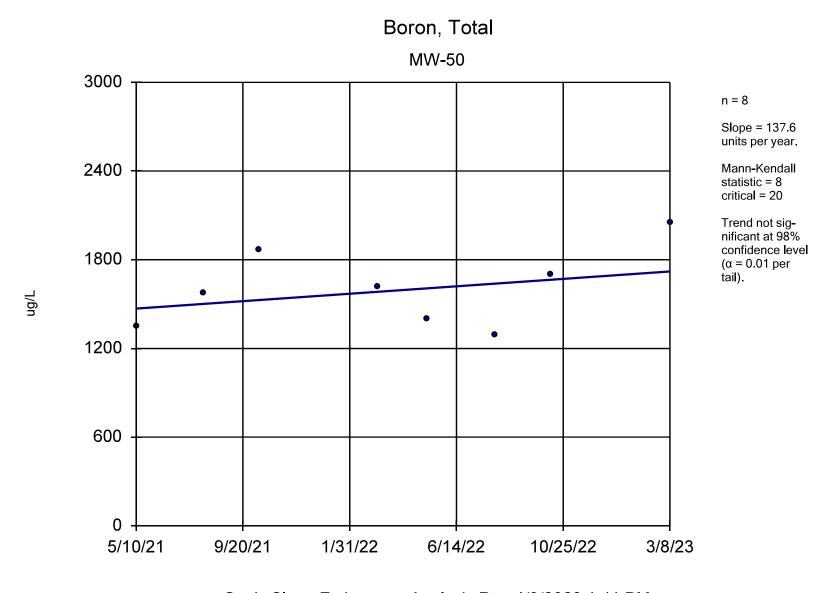
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



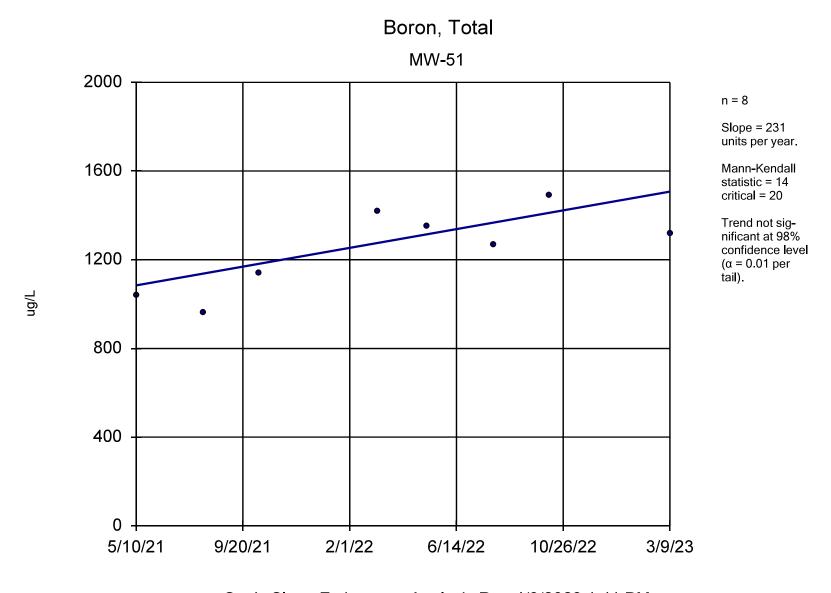
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



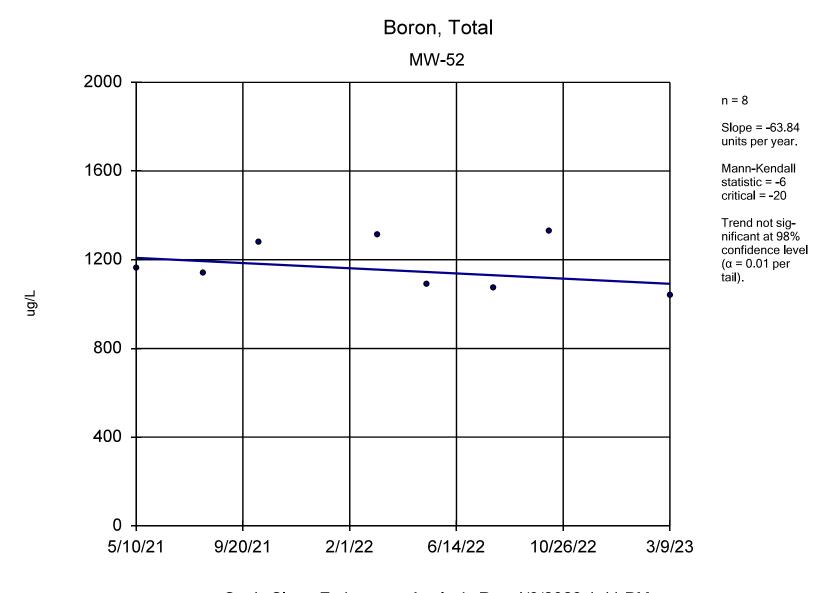
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



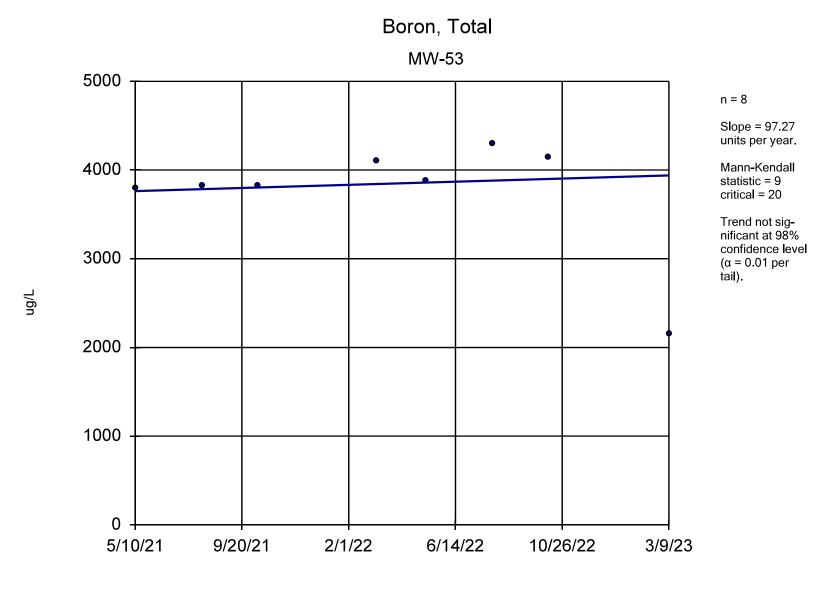
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



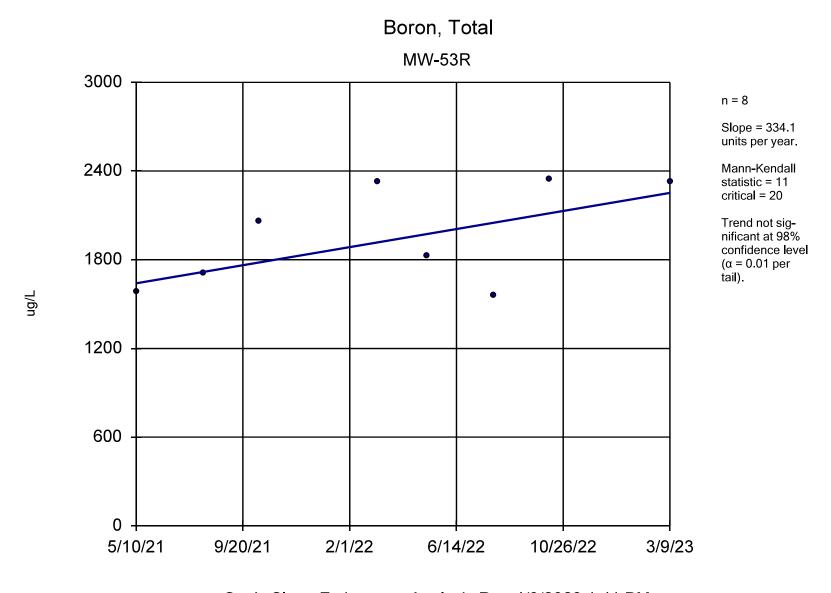
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



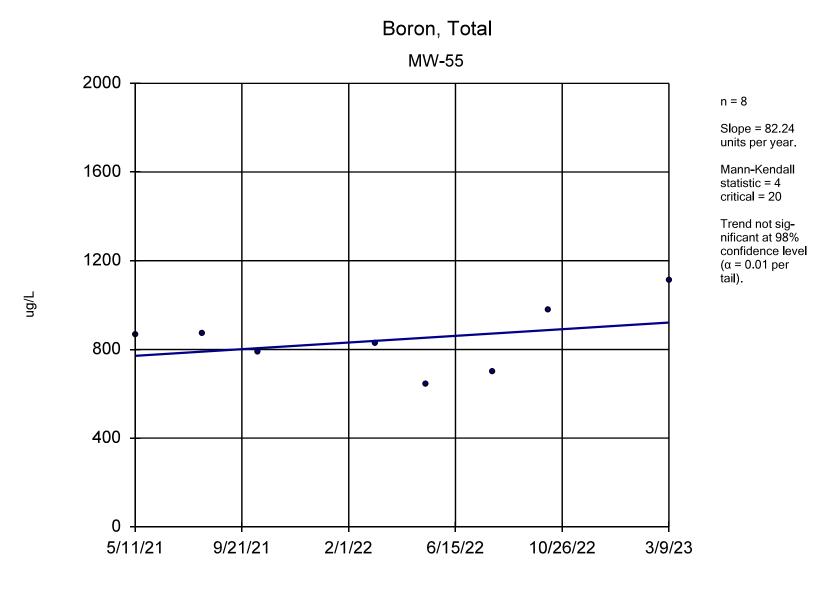
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



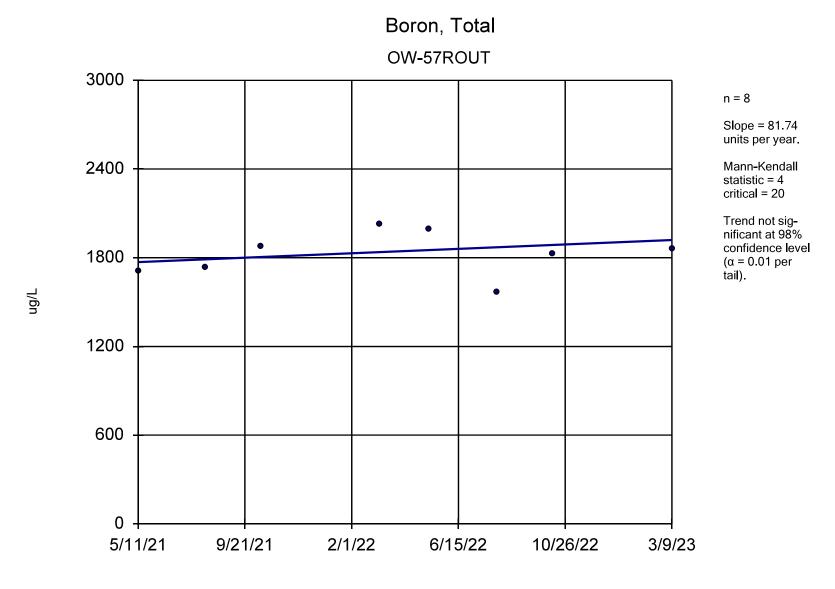
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



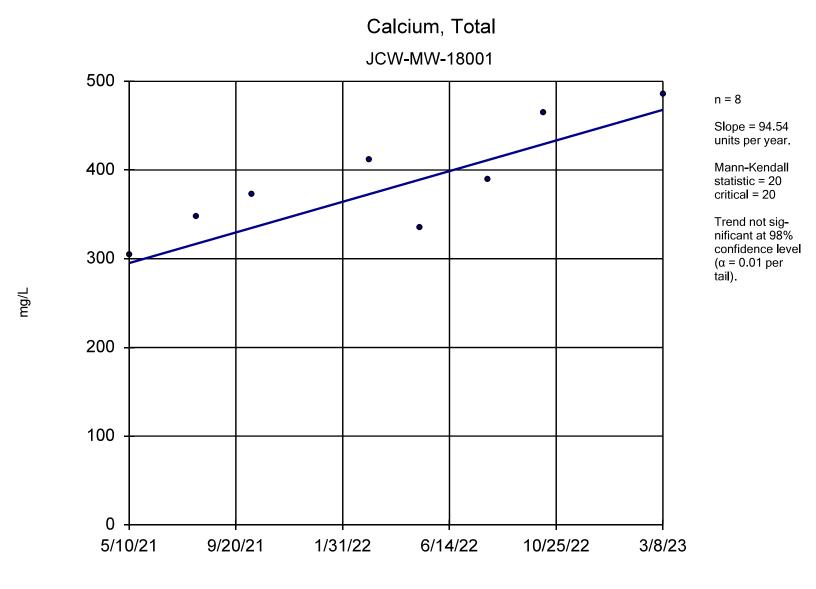
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



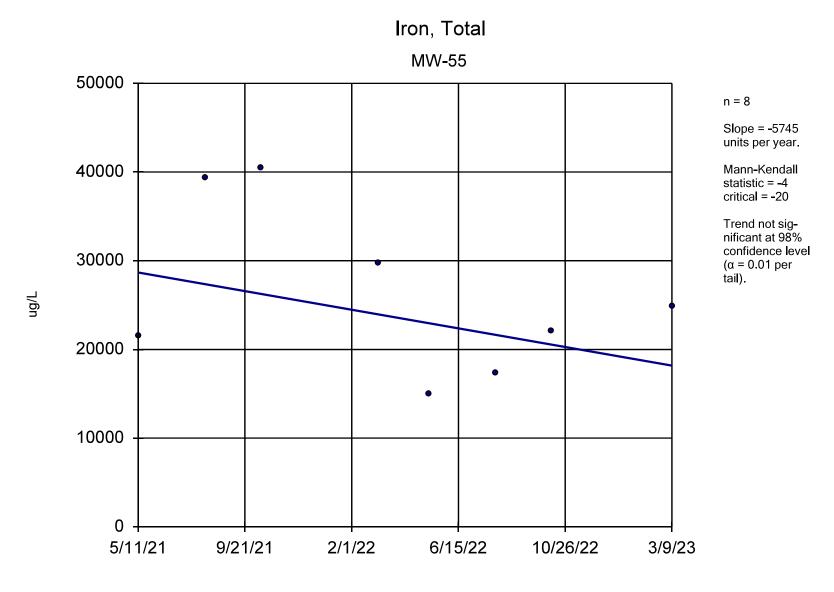
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



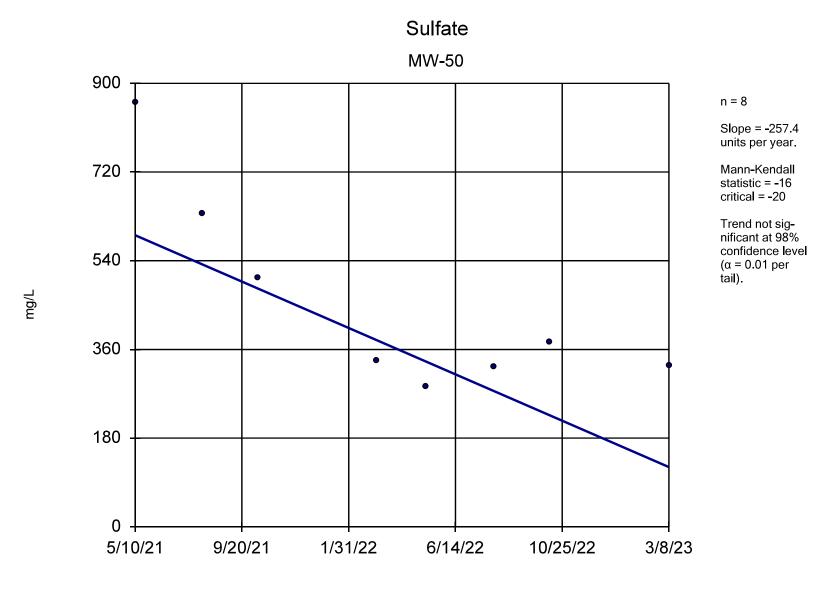
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

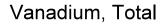
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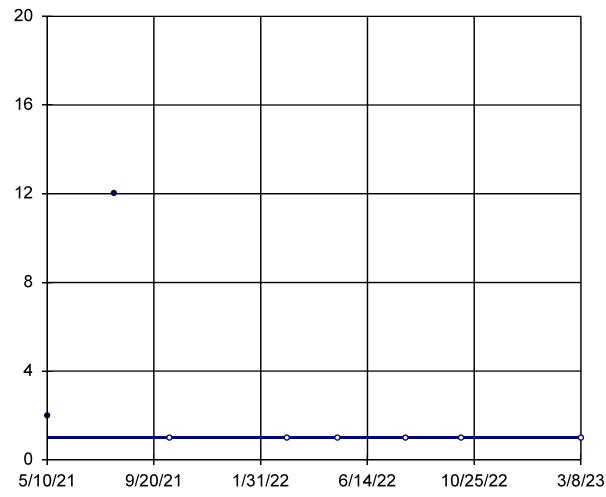
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

ng/L



JCW-MW-18001



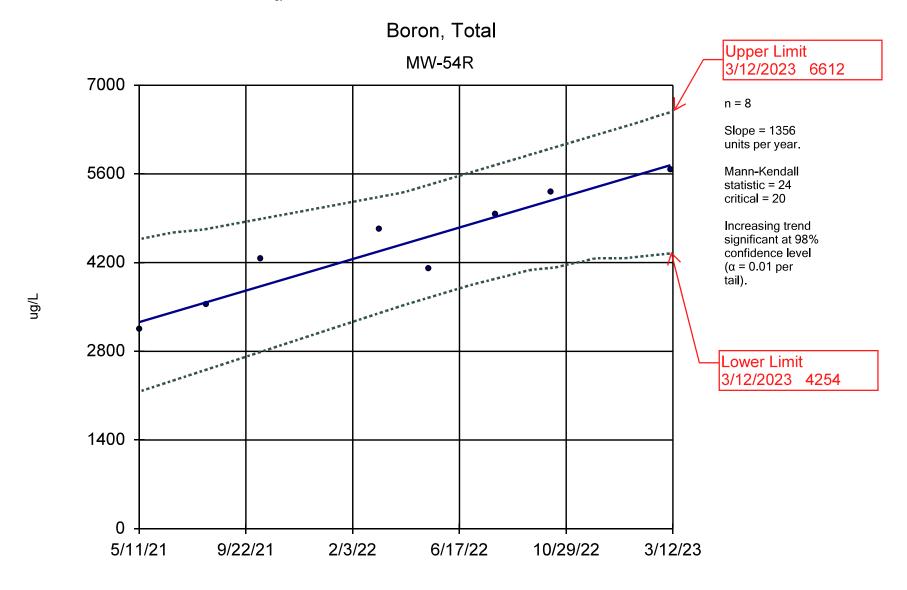
n = 8

Slope = 0 units per year.

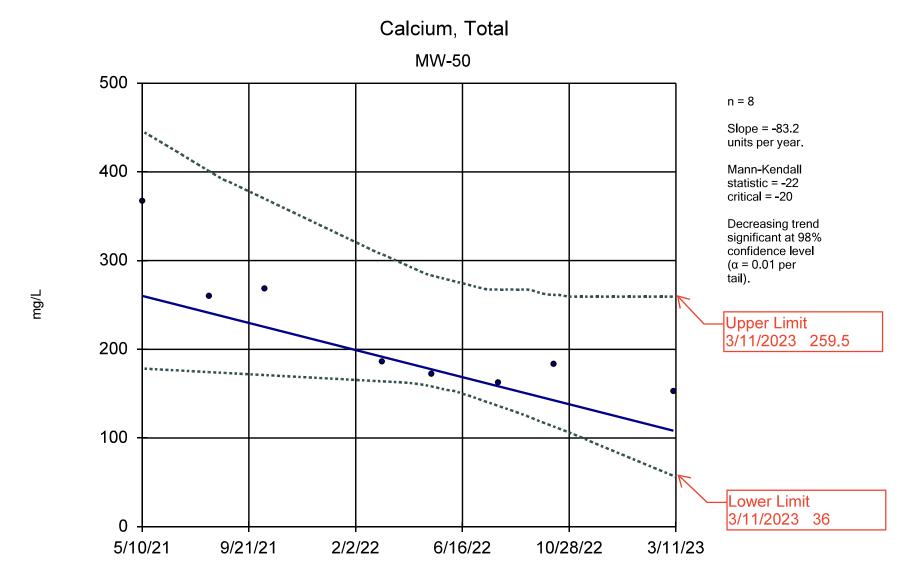
Mann-Kendall statistic = -11 critical = -20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

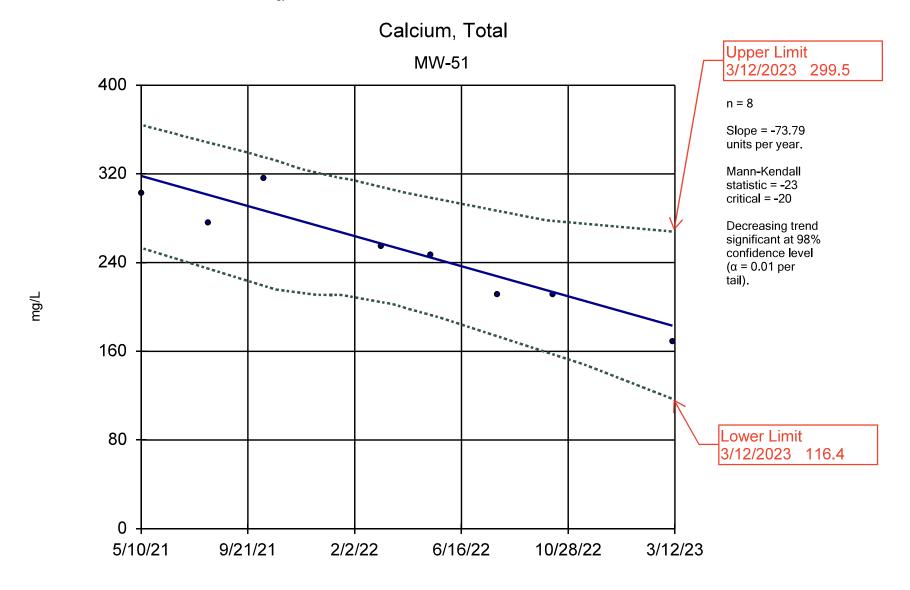
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM



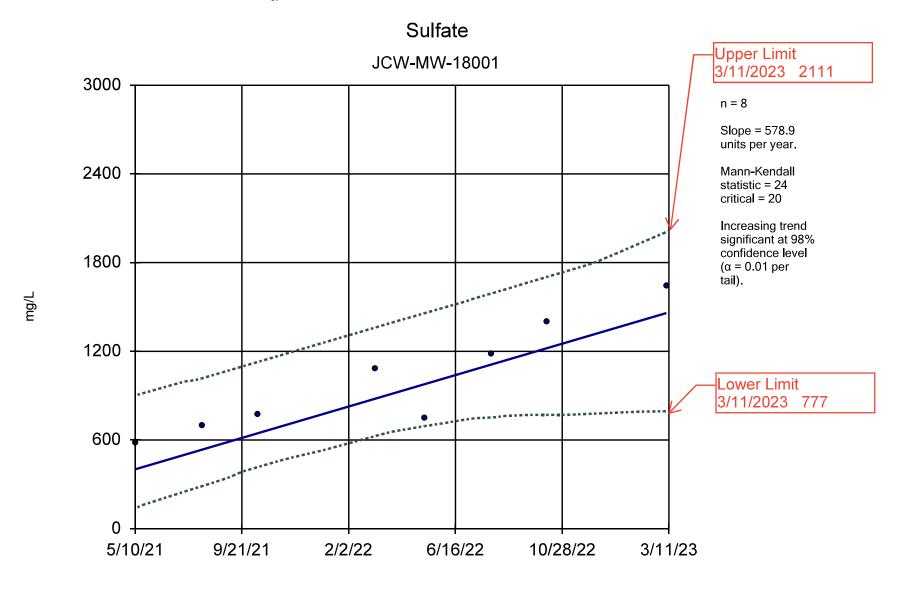
Sen's Slope and 98% Confidence Band Analysis Run 4/3/2023 1:43 PM Client: Consumers Energy Data: JVW HMPCCR Sanitas 23Q1



Sen's Slope and 98% Confidence Band Analysis Run 4/3/2023 1:43 PM Client: Consumers Energy Data: JVW HMPCCR Sanitas 23Q1



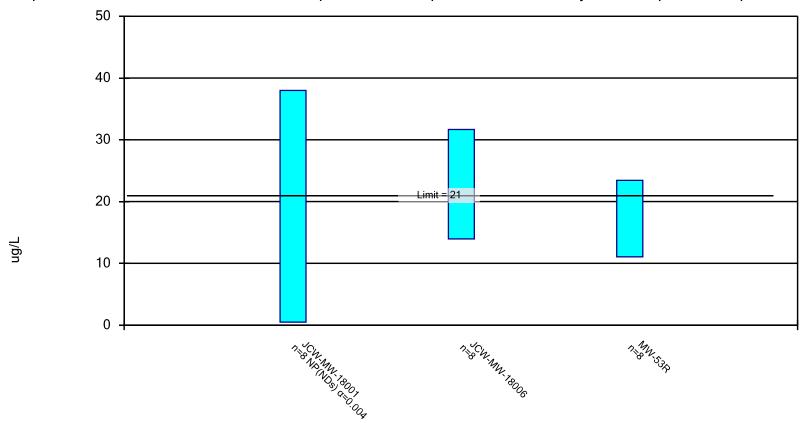
Sen's Slope and 98% Confidence Band Analysis Run 4/3/2023 1:43 PM Client: Consumers Energy Data: JVW HMPCCR Sanitas 23Q1



Sen's Slope and 98% Confidence Band Analysis Run 4/3/2023 1:43 PM Client: Consumers Energy Data: JVW HMPCCR Sanitas 23Q1

### 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: Arsenic, Total Analysis Run 4/3/2023 1:52 PM

#### **Confidence Interval**

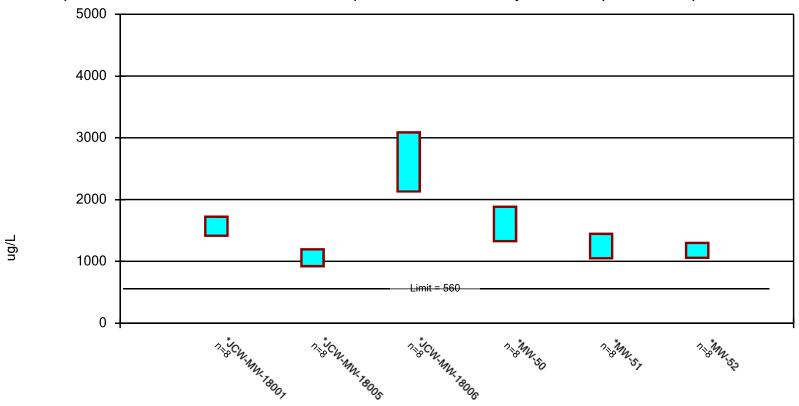
Constituent: Arsenic, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	JCW-MW-18001	JCW-MW-18006	MW-53R
5/10/2021	2		18
5/11/2021		30	
8/2/2021	38		23
8/3/2021		25	
10/11/2021	1		25
10/12/2021		21	
3/7/2022	<1	33	
3/8/2022			10
5/9/2022	<1	22.5 (D)	8
8/1/2022	<1		17
8/2/2022		21	
10/10/2022	<1		20
10/11/2022		25 (D)	
3/8/2023	<1		
3/9/2023		5 (D)	17
Mean	5.438	22.81	17.25
Std. Dev.	13.17	8.358	5.849
Upper Lim.	38	31.67	23.45
Lower Lim.	0.5	13.95	11.05

#### Parametric Confidence Interval

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



Constituent: Boron, Total Analysis Run 4/3/2023 1:52 PM

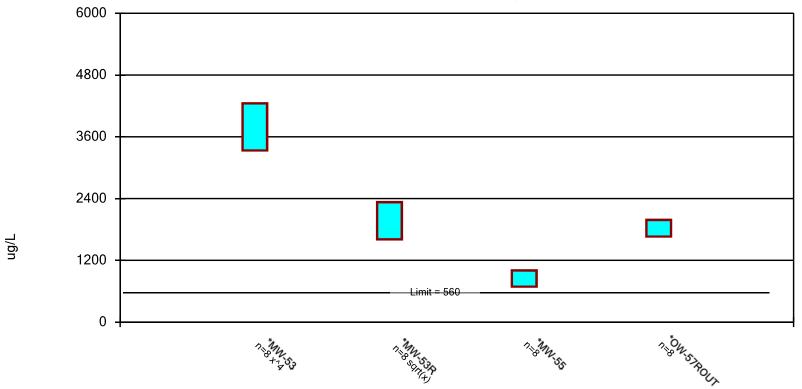
Constituent: Boron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	JCW-MW-18001	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51	MW-52
5/10/2021	1340			1350 (D)	1040	1160
5/11/2021		919	2720			
8/2/2021	1610			1575 (D)	960	1140
8/3/2021		1080	2640			
10/11/2021	1670			1865 (D)	1140	1280
10/12/2021		1190	2600			
3/7/2022	1670	1065 (D)	3220			
3/8/2022				1615 (D)	1420	1310
5/9/2022	1560		3010 (D)	1400 (D)	1350	1090
5/10/2022		1010				
8/1/2022	1470			1290 (D)	1270	1070
8/2/2022		981	2260			
10/10/2022	1790			1700 (D)	1490	1330
10/11/2022		1290	2685 (D)			
3/8/2023	1440			2050 (D)		
3/9/2023		930	1745 (D)		1320	1040
Mean	1569	1058	2610	1606	1249	1178
Std. Dev.	146.3	128.6	450.6	262.4	186	114.1
Upper Lim.	1724	1194	3088	1884	1446	1298
Lower Lim.	1414	921.8	2132	1328	1052	1057

## Parametric Confidence Interval

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



Constituent: Boron, Total Analysis Run 4/3/2023 1:52 PM

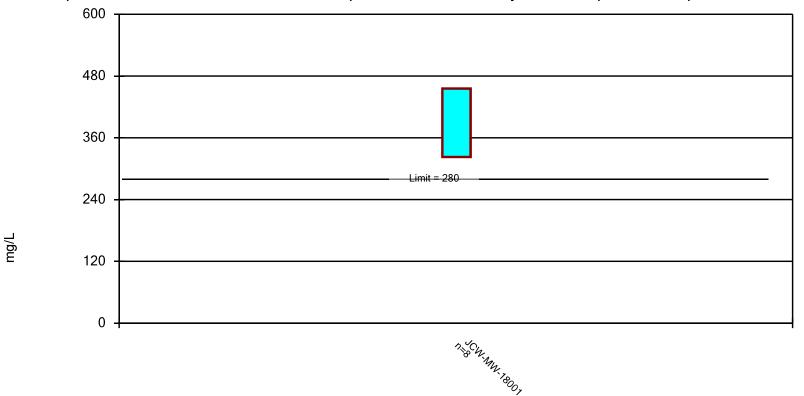
Constituent: Boron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	MW-53	MW-53R	MW-55	OW-57ROUT
5/10/2021	3790	1580		
5/11/2021			866	1710
8/2/2021	3820	1710		
8/3/2021			873	1730
10/11/2021	3820	2060		
10/12/2021			788	1880
3/7/2022			826	
3/8/2022	4100	2330		
3/9/2022				2030
5/9/2022	3880	1830		
5/10/2022			642	1990
8/1/2022	4300	1560	698 (D)	
8/2/2022				1570
10/10/2022	4140	2340	976	
10/11/2022				1830
3/9/2023	2150	2330	1110	1860
Mean	3750	1968	847.4	1825
Std. Dev.	672.5	340.5	148.8	151.6
Upper Lim.	4249	2332	1005	1986
Lower Lim.	3334	1610	689.7	1664

## Parametric Confidence Interval

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



Constituent: Calcium, Total Analysis Run 4/3/2023 1:52 PM

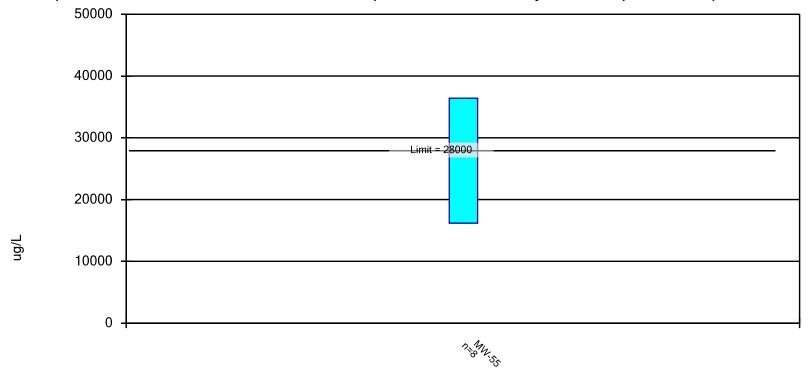
Constituent: Calcium, Total (mg/L) Analysis Run 4/3/2023 1:55 PM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	JCW-MW-18001
5/10/2021	305
8/2/2021	348
10/11/2021	373
3/7/2022	412
5/9/2022	335
8/1/2022	389
10/10/2022	465
3/8/2023	486
Mean	389.1
Std. Dev.	62.82
Upper Lim.	455.7
Lower Lim.	322.5

## Parametric Confidence Interval

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



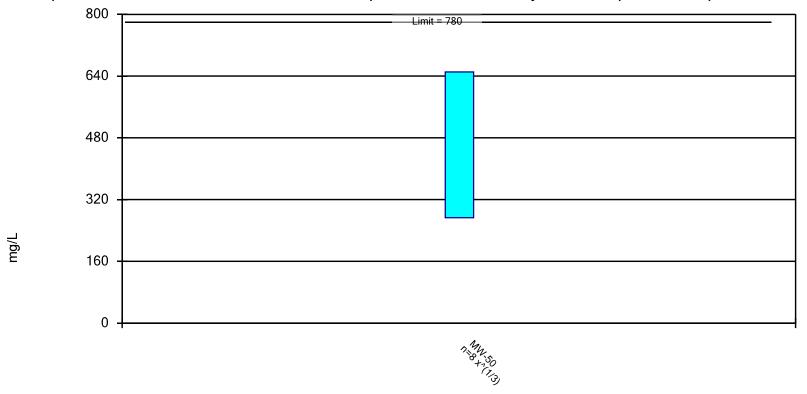
Constituent: Iron, Total Analysis Run 4/3/2023 1:52 PM

Constituent: Iron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	MW-55
5/11/2021	21500
8/3/2021	39400
10/12/2021	40500
3/7/2022	29800
5/10/2022	15000
8/1/2022	17300 (D)
10/10/2022	22100
3/9/2023	24800
Mean	26300
Std. Dev.	9540
Upper Lim.	36412
Lower Lim.	16188

#### Parametric Confidence Interval

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



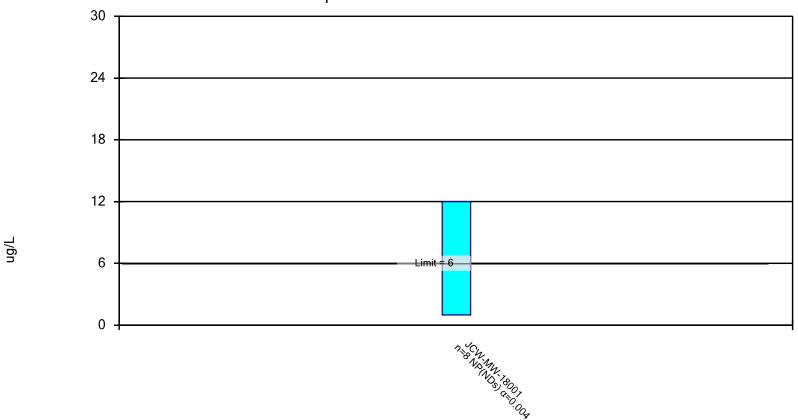
Constituent: Sulfate Analysis Run 4/3/2023 1:52 PM

Constituent: Sulfate (mg/L) Analysis Run 4/3/2023 1:55 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	MW-50
5/10/2021	861.5 (D)
8/2/2021	636 (D)
10/11/2021	504 (D)
3/8/2022	338 (D)
5/9/2022	285.5 (D)
8/1/2022	324.5 (D)
10/10/2022	376 (D)
3/8/2023	328 (D)
Mean	456.7
Std. Dev.	200.8
Upper Lim.	650.7
Lower Lim.	272.9

#### Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



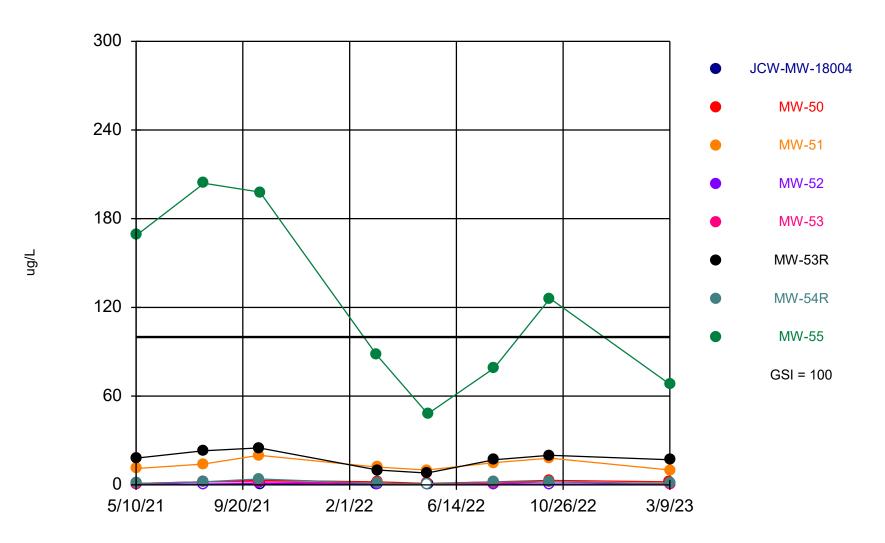
Constituent: Vanadium, Total Analysis Run 4/3/2023 1:52 PM

Constituent: Vanadium, Total (ug/L) Analysis Run 4/3/2023 1:55 PM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	JCW-MW-18001
5/10/2021	2
8/2/2021	12
10/11/2021	<2
3/7/2022	<2
5/9/2022	<2
8/1/2022	<2
10/10/2022	<2
3/8/2023	<2
Mean	2.5
Std. Dev.	3.854
Upper Lim.	12
Lower Lim.	1

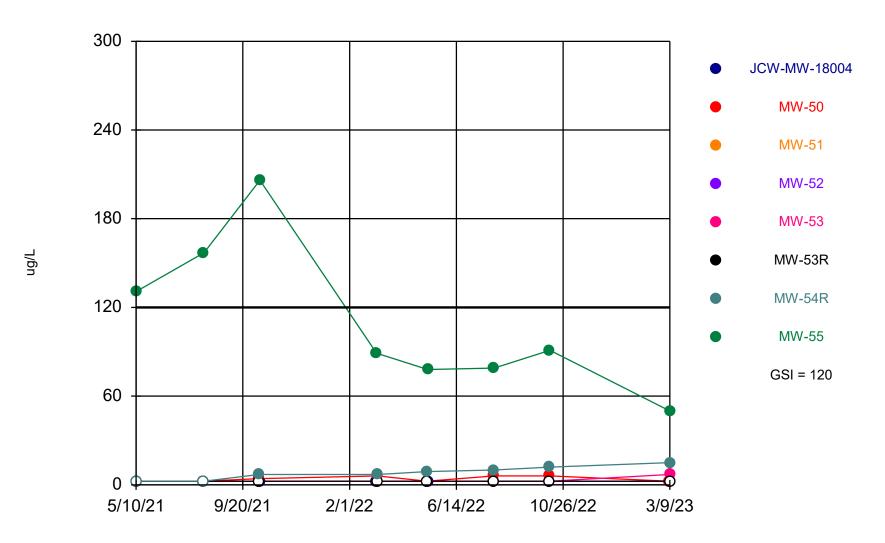
# Attachment 2 GSI Evaluation Sanitas™ Output Files

# Arsenic Comparison to GSI



Time Series Analysis Run 4/5/2023 10:06 AM

# Molybdenum Comparison to GSI



Time Series Analysis Run 4/5/2023 10:07 AM

#### **Summary Report**

Constituent: Arsenic, Total Analysis Run 4/5/2023 10:09 AM
Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 19 Wells = 8 Minimum Value = 0.5 Maximum Value = 204 Mean Value = 19.93 Median Value = 2 Standard Deviation = 44.56 Coefficient of Variation = 2.236 Skewness = 3.034

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
MW-50	8	0	1	3	2	2	0.7559	0.378	0
MW-51	8	0	10	20	13.75	13	3.732	0.2714	0.5619
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.188	1	0.7039	0.5928	0.2719
MW-53R	8	0	8	25	17.25	17.5	5.849	0.3391	-0.3783
MW-54R	8	1	0.5	4	1.688	1.5	1.1	0.6518	1.126
MW-55	8	0	48	204	122.5	107	61.09	0.4987	0.2503

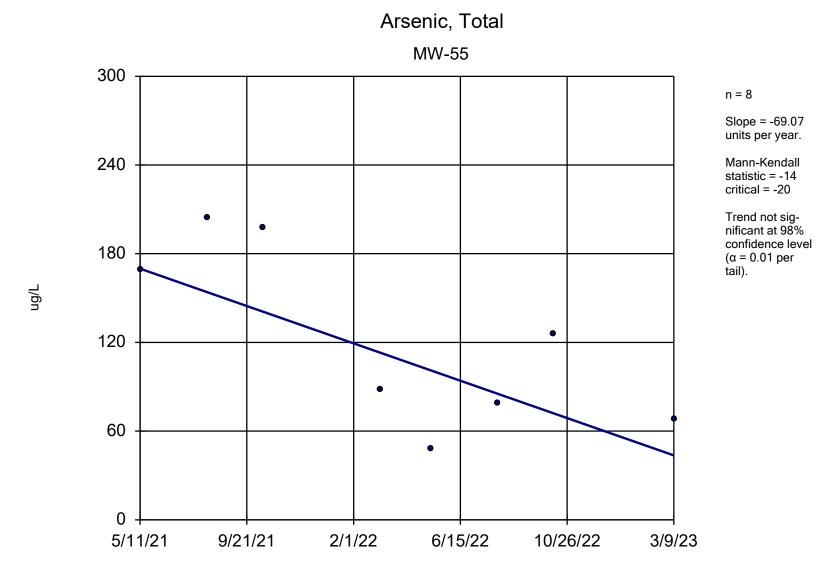
### **Summary Report**

Constituent: Molybdenum, Total Analysis Run 4/5/2023 10:09 AM Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 45 Wells = 8 Minimum Value = 2.5 Maximum Value = 206 Mean Value = 16.92 Median Value = 2.5 Standard Deviation = 39.45 Coefficient of Variation = 2.332 Skewness = 3.161

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-50	8	4	2.5	6	4.031	3.375	1.734	0.4302	0.2501
MW-51	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-52	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-53	8	7	2.5	7	3.063	2.5	1.591	0.5195	2.268
MW-53R	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-54R	8	2	2.5	15	8.125	8	4.349	0.5352	0.05867
MW-55	8	0	50	206	110.1	90	51.06	0.4637	0.7986



Sen's Slope Estimator Analysis Run 4/5/2023 10:09 AM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

ng/L

## Molybdenum, Total

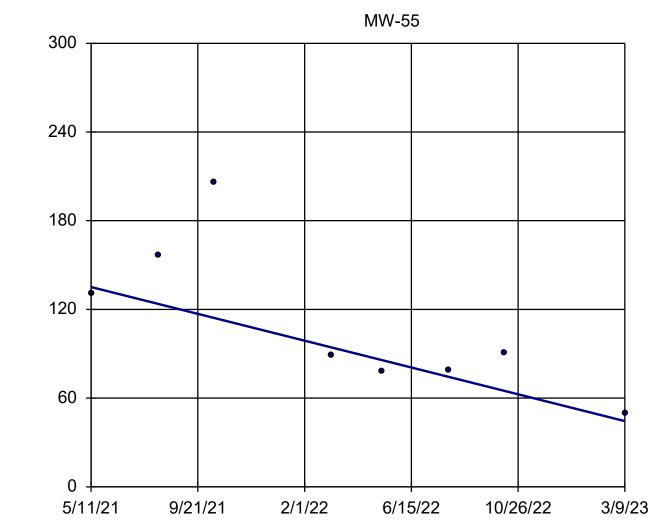
n = 8

Slope = -49.61 units per year.

Mann-Kendall statistic = -14 critical = -20

Trend not significant at 98% confidence level

 $(\alpha = 0.01 \text{ per tail}).$ 

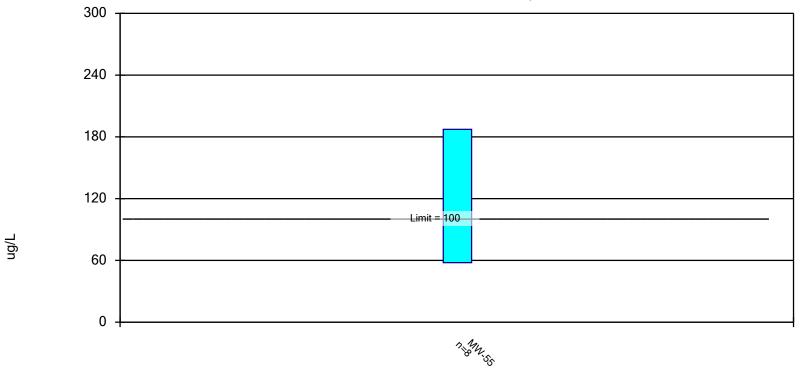


Sen's Slope Estimator Analysis Run 4/5/2023 10:09 AM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

#### Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 4/5/2023 10:10 AM

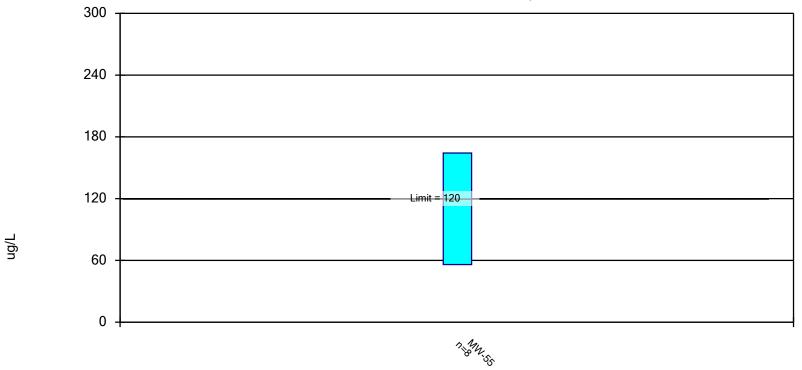
Constituent: Arsenic, Total (ug/L) Analysis Run 4/5/2023 10:10 AM

Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	MW-55
5/11/2021	169
8/3/2021	204
10/12/2021	198
3/7/2022	88
5/10/2022	48
8/1/2022	79 (D)
10/10/2022	126
3/9/2023	68
Mean	122.5
Std. Dev.	61.09
Upper Lim.	187.2
Lower Lim.	57.75

#### Parametric Confidence Interval

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



Constituent: Molybdenum, Total Analysis Run 4/5/2023 10:10 AM

Constituent: Molybdenum, Total (ug/L) Analysis Run 4/5/2023 10:10 AM Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1

	MW-55
5/11/2021	131
8/3/2021	157
10/12/2021	206
3/7/2022	89
5/10/2022	78
8/1/2022	79 (D)
10/10/2022	91
3/9/2023	50
Mean	110.1
Std. Dev.	51.06
Upper Lim.	164.2
Lower Lim.	56



# Appendix E Laboratory Analytical Report



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 24, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q1

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0166

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 03/06/2023 for the 1<sup>st</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 03/09/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q1-2023 DEK-JCW Background Wells

**Date Received:** 3/09/2023 **Chemistry Project:** 23-0166

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0166-01	MW-15002	Groundwater	03/07/2023 11:53	DEK JCW Background
23-0166-02	MW-15008	Groundwater	03/07/2023 14:15	DEK JCW Background
23-0166-03	MW-15016	Groundwater	03/07/2023 12:35	DEK JCW Background
23-0166-04	MW-15019	Groundwater	03/07/2023 13:20	DEK JCW Background
23-0166-05	DUP-Background	Groundwater	03/07/2023 00:00	DEK JCW Background
23-0166-06	FB- Background	Water	03/07/2023 14:20	DEK JCW Background



03/24/23



Counton as

Sample Site: **DEK JCW Background** Laboratory Project: **23-0166** 

 Field Sample ID:
 MW-15002
 Collect Date:
 03/07/2023

 Lab Sample ID:
 23-0166-01
 Collect Time:
 11:53 AM

Mercury by EPA 7470A, Total, Ac			Aliquot #: 23-0	166-01-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02
Metals by EPA 6020B: CCR Rule	Appendix III-IV Tot	tal Metals	s Ехр	Aliquot #: 23-0	166-01-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Arsenic	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Barium	69		ug/L	5.0	03/17/2023	AB23-0317-04
Beryllium	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Boron	ND		ug/L	20.0	03/17/2023	AB23-0317-04
Cadmium	ND		ug/L	0.2	03/17/2023	AB23-0317-04
Calcium	81300		ug/L	1000.0	03/17/2023	AB23-0317-04
Chromium	1		ug/L	1.0	03/17/2023	AB23-0317-04
Cobalt	ND		ug/L	6.0	03/17/2023	AB23-0317-04
Copper	1		ug/L	1.0	03/17/2023	AB23-0317-04
Iron	626		ug/L	20.0	03/17/2023	AB23-0317-04
Lead	1		ug/L	1.0	03/17/2023	AB23-0317-04
Lithium	ND		ug/L	10.0	03/17/2023	AB23-0317-04
Magnesium	9420		ug/L	1000.0	03/17/2023	AB23-0317-04
Molybdenum	ND		ug/L	5.0	03/17/2023	AB23-0317-04
Nickel	3		ug/L	2.0	03/17/2023	AB23-0317-04
Potassium	849		ug/L	100.0	03/17/2023	AB23-0317-04
Selenium	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Silver	ND		ug/L	0.2	03/17/2023	AB23-0317-04
Sodium	83100		ug/L	1000.0	03/17/2023	AB23-0317-04
Thallium	ND		ug/L	2.0	03/17/2023	AB23-0317-04
Vanadium	3		ug/L	2.0	03/17/2023	AB23-0317-04
Zinc	ND		ug/L	10.0	03/17/2023	AB23-0317-04
Anions by EPA 300.0 CCR Rule /	Analyte List, Cl, F, S	SO4, Agu	ieous	Aliquot #: 23-0	166-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	2500000	3	ug/L	1000.0	03/10/2023	AB23-0310-15
Fluoride	ND		ug/L	1000.0	03/10/2023	AB23-0310-15 AB23-0310-15
Sulfate	18300		ug/L	1000.0	03/10/2023	AB23-0310-15
Total Dissolved Solids by SM 25	40C			Aliguot #- 22-0	166-01-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	574	9	mg/L	10.0	03/10/2023	AB23-0310-05
		0166 Bogo (	_	10.0	33, 3,2323	1.220 00.0 00



03/24/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0166** 

 Field Sample ID:
 MW-15008
 Collect Date:
 03/07/2023

 Lab Sample ID:
 23-0166-02
 Collect Time:
 02:15 PM

Mercury by EPA 7470A, Total, Aqueo	us			•	166-02-C01-A01	-			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking			
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02			
Metals by EPA 6020B: CCR Rule App	endix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	166-02-C01-A02	Analyst: EE			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking			
Antimony	ND		ug/L	1.0	03/17/2023	AB23-0317-04			
Arsenic	3		ug/L	1.0	03/17/2023	AB23-0317-04			
Barium	65		ug/L	5.0	03/17/2023	AB23-0317-04			
Beryllium	ND		ug/L	1.0	03/17/2023	AB23-0317-04			
Boron	102		ug/L	20.0	03/17/2023	AB23-0317-04			
Cadmium	ND		ug/L	0.2	03/17/2023	AB23-0317-04			
Calcium	96600		ug/L	1000.0	03/17/2023	AB23-0317-04			
Chromium	1		ug/L	1.0	03/17/2023	AB23-0317-04			
Cobalt	ND		ug/L	6.0	03/17/2023	AB23-0317-04			
Copper	ND		ug/L	1.0	03/17/2023	AB23-0317-04			
Iron	18900		ug/L	20.0	03/17/2023	AB23-0317-04			
Lead	ND		ug/L	1.0	03/17/2023	AB23-0317-04			
Lithium	28		ug/L	10.0	03/17/2023	AB23-0317-04			
Magnesium	13100		ug/L	1000.0	03/17/2023	AB23-0317-04			
Molybdenum	5		ug/L	5.0	03/17/2023	AB23-0317-04			
Nickel	3		ug/L	2.0	03/17/2023	AB23-0317-04			
Potassium	2850		ug/L	100.0	03/17/2023	AB23-0317-04			
Selenium	ND		ug/L	1.0	03/17/2023	AB23-0317-04			
Silver	ND		ug/L	0.2	03/17/2023	AB23-0317-04			
Sodium	130000		ug/L	1000.0	03/17/2023	AB23-0317-04			
Thallium	ND		ug/L	2.0	03/17/2023	AB23-0317-04			
Vanadium	5		ug/L	2.0	03/17/2023	AB23-0317-04			
Zinc	ND		ug/L	10.0	03/17/2023	AB23-0317-04			
Anions by EPA 300.0 CCR Rule Analy	yte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	166-02-C02-A01	Analyst: KDF			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking			
Chloride	219000		ug/L	1000.0	03/10/2023	AB23-0310-15			
Fluoride	ND		ug/L	1000.0	03/10/2023	AB23-0310-15			
Sulfate	18700		ug/L	1000.0	03/10/2023	AB23-0310-15			
Total Dissolved Solids by SM 2540C				Alignot #: 23-0	166-02-C03-A01	Analyst: CLI			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking			
Total Dissolved Solids	743	J	mg/L	10.0	03/10/2023	AB23-0310-05			
. 3.0. 2.00000 001100	. 10		<del>g</del> , <u>–</u>	10.0	33, 13, 2020				



03/24/23



Sample Site:DEK JCW BackgroundLaboratory Project:23-0166Field Sample ID:MW-15016Collect Date:03/07/2023Lab Sample ID:23-0166-03Collect Time:12:35 PM

Mercury by EPA 7470A, Total,		Aliquot #: 23-0	0166-03-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag Uni	ts RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	03/15/2023	AB23-0315-02
Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	tal Metals Exp	Aliguot #: 23-0	0166-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag Uni	-	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Arsenic	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Barium	37	ug/L	5.0	03/17/2023	AB23-0317-04
Beryllium	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Boron	261	ug/L	20.0	03/17/2023	AB23-0317-04
Cadmium	ND	ug/L	0.2	03/17/2023	AB23-0317-04
Calcium	108000	ug/L	1000.0	03/17/2023	AB23-0317-04
Chromium	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Cobalt	ND	ug/L	6.0	03/17/2023	AB23-0317-04
Copper	2	ug/L	1.0	03/17/2023	AB23-0317-04
Iron	421	ug/L	20.0	03/17/2023	AB23-0317-04
Lead	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Lithium	55	ug/L	10.0	03/17/2023	AB23-0317-04
Magnesium	14800	ug/L	1000.0	03/17/2023	AB23-0317-04
Molybdenum	ND	ug/L	5.0	03/17/2023	AB23-0317-04
Nickel	5	ug/L	2.0	03/17/2023	AB23-0317-04
Potassium	7540	ug/L	100.0	03/17/2023	AB23-0317-04
Selenium	ND	ug/L	1.0	03/17/2023	AB23-0317-04
Silver	ND	ug/L	0.2	03/17/2023	AB23-0317-04
Sodium	67700	ug/L	1000.0	03/17/2023	AB23-0317-04
Thallium	ND	ug/L	2.0	03/17/2023	AB23-0317-04
Vanadium	ND	ug/L	2.0	03/17/2023	AB23-0317-04
Zinc	ND	ug/L	10.0	03/17/2023	AB23-0317-04
Anions by EPA 300.0 CCR Rule	e Analyte List, Cl, F,	SO4, Aqueous	6 Aliquot #: 23-0	0166-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Uni		Analysis Date	Tracking
Chloride	71400	ug/L	1000.0	03/10/2023	AB23-0310-15
Fluoride	ND	ug/L	1000.0	03/10/2023	AB23-0310-15
Sulfate	210000	ug/L	1000.0	03/10/2023	AB23-0310-15
Total Dissolved Solids by SM 2	2540C		Aliguot #: 23-4	0166-03-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag Uni	-	Analysis Date	Tracking
Total Dissolved Solids	673	mg/L		03/10/2023	AB23-0310-05
		0166 Daga 7 of 12			



03/24/23



Laboratory Services

Sample Site: **DEK JCW Background** Laboratory Project: **23-0166** 

 Field Sample ID:
 MW-15019
 Collect Date:
 03/07/2023

 Lab Sample ID:
 23-0166-04
 Collect Time:
 01:20 PM

Mercury by EPA 7470A, Total, Aqued			Aliquot #: 23-0	166-04-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02
Metals by EPA 6020B: CCR Rule App	pendix III-IV To	tal Metals	Ехр	Aliguot #: 23-0	166-04-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	1	ug/L	1.0	03/17/2023	AB23-0317-04
Arsenic	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Barium	326		ug/L	5.0	03/17/2023	AB23-0317-04
Beryllium	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Boron	224		ug/L	20.0	03/17/2023	AB23-0317-04
Cadmium	ND		ug/L	0.2	03/17/2023	AB23-0317-04
Calcium	143000		ug/L	1000.0	03/17/2023	AB23-0317-04
Chromium	1		ug/L	1.0	03/17/2023	AB23-0317-04
Cobalt	ND		ug/L	6.0	03/17/2023	AB23-0317-04
Copper	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Iron	21700		ug/L	20.0	03/17/2023	AB23-0317-04
Lead	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Lithium	12		ug/L	10.0	03/17/2023	AB23-0317-04
Magnesium	35700		ug/L	1000.0	03/17/2023	AB23-0317-04
Molybdenum	ND		ug/L	5.0	03/17/2023	AB23-0317-04
Nickel	5		ug/L	2.0	03/17/2023	AB23-0317-04
Potassium	1820		ug/L	100.0	03/17/2023	AB23-0317-04
Selenium	ND		ug/L	1.0	03/17/2023	AB23-0317-04
Silver	ND		ug/L	0.2	03/17/2023	AB23-0317-04
Sodium	208000		ug/L	1000.0	03/17/2023	AB23-0317-04
Thallium	ND		ug/L	2.0	03/17/2023	AB23-0317-04
Vanadium	2		ug/L	2.0	03/17/2023	AB23-0317-04
Zinc	ND		ug/L	10.0	03/17/2023	AB23-0317-04
Anions by EPA 300.0 CCR Rule Anal	lvte List. Cl. F.	SO4. Aque	eous	Aliguot #: 23-0	166-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	325000	_	ug/L	1000.0	03/10/2023	AB23-0310-15
Fluoride	ND		ug/L	1000.0	03/10/2023	AB23-0310-15 AB23-0310-15
Sulfate	91100		ug/L ug/L	1000.0	03/10/2023	AB23-0310-15 AB23-0310-15
Juliate	31100	'	ug/L	1000.0	00/10/2020	AB20-0010-10
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	166-04-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1200	1	mg/L	10.0	03/10/2023	AB23-0310-05
	00	0166 Dago 9	of 12			





A CENTURY OF EXCELLENCE

**DEK JCW Background** Field Sample ID: **DUP-Background** 

Lab Sample ID: 23-0166-05 Matrix: Groundwater

Sample Site:

Laboratory Project: Collect Date: 03/07/2023 Collect Time:

Report Date:

03/24/23

23-0166

12:00 AM

Mercury by EPA 7470A, Total, Aq	ueous			Aliquot #: 23-0	)166-05-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking	
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02	
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals	з Ехр	Aliquot #: 23-0	)166-05-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Arsenic	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Barium	66		ug/L	5.0	03/17/2023	AB23-0317-04	
Beryllium	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Boron	ND		ug/L	20.0	03/17/2023	AB23-0317-04	
Cadmium	ND		ug/L	0.2	03/17/2023	AB23-0317-04	
Calcium	85300		ug/L	1000.0	03/17/2023	AB23-0317-04	
Chromium	1		ug/L	1.0	03/17/2023	AB23-0317-04	
Cobalt	ND		ug/L	6.0	03/17/2023	AB23-0317-04	
Copper	1		ug/L	1.0	03/17/2023	AB23-0317-04	
Iron	570		ug/L	20.0	03/17/2023	AB23-0317-04	
Lead	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Lithium	ND		ug/L	10.0	03/17/2023	AB23-0317-04	
Magnesium	9730		ug/L	1000.0	03/17/2023	AB23-0317-04	
Molybdenum	ND		ug/L	5.0	03/17/2023	AB23-0317-04	
Nickel	3		ug/L	2.0	03/17/2023	AB23-0317-04	
Potassium	824		ug/L	100.0	03/17/2023	AB23-0317-04	
Selenium	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Silver	ND		ug/L	0.2	03/17/2023	AB23-0317-04	
Sodium	84700		ug/L	1000.0	03/17/2023	AB23-0317-04	
Thallium	ND		ug/L	2.0	03/17/2023	AB23-0317-04	
Vanadium	3		ug/L	2.0	03/17/2023	AB23-0317-04	
Zinc	ND		ug/L	10.0	03/17/2023	AB23-0317-04	
Anions by EPA 300.0 CCR Rule A	nalyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	0166-05-C02-A01	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Chloride	210000		ug/L	1000.0	03/10/2023	AB23-0310-15	
Fluoride	ND		ug/L	1000.0	03/10/2023	AB23-0310-15	
Sulfate	18300		ug/L	1000.0	03/10/2023	AB23-0310-15	
Total Dissolved Solids by SM 254	IOC			Aliquot #: 23-0	)166-05-C03-A01	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Total Dissolved Solids	571	_	mg/L	10.0	03/10/2023	AB23-0310-05	





**Report Date:** 03/24/23

Sample Site: **DEK JCW Background** Laboratory Project: **23-0166** 

Field Sample ID: FB- Background Collect Date: 03/07/2023 Lab Sample ID: 23-0166-06 Collect Time: 02:20 PM

Matrix: Water

Mercury by EPA 7470A, Total, Aq	Aliquot #: 23-0	166-06-C01-A01	Analyst: CLE				
Parameter(s)	Parameter(s) Result Fla		Units	RL	Analysis Date	Tracking	
Mercury	ercury ND ug/L		0.2	03/15/2023	AB23-0315-02		
Metals by EPA 6020B: CCR Rule	Aliquot #: 23-0	166-06-C01-A02	Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Arsenic	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Barium	ND		ug/L	5.0	03/17/2023	AB23-0317-04	
Beryllium	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Boron	ND		ug/L	20.0	03/17/2023	AB23-0317-04	
Cadmium	ND		ug/L	0.2	03/17/2023	AB23-0317-04	
Calcium	ND		ug/L	1000.0	03/17/2023	AB23-0317-04	
Chromium	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Cobalt	ND		ug/L	6.0	03/17/2023	AB23-0317-04	
Copper	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Iron	ND		ug/L	20.0	03/17/2023	AB23-0317-04	
Lead	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Lithium	ND		ug/L	10.0	03/17/2023	AB23-0317-04	
Magnesium	ND		ug/L	1000.0	03/17/2023	AB23-0317-04	
Molybdenum	ND		ug/L	5.0	03/17/2023	AB23-0317-04	
Nickel	ND		ug/L	2.0	03/17/2023	AB23-0317-04	
Potassium	ND		ug/L	100.0	03/17/2023	AB23-0317-04	
Selenium	ND		ug/L	1.0	03/17/2023	AB23-0317-04	
Silver	ND		ug/L	0.2	03/17/2023	AB23-0317-04	
Sodium	ND		ug/L	1000.0	03/17/2023	AB23-0317-04	
Thallium	ND		ug/L	2.0	03/17/2023	AB23-0317-04	
Vanadium	ND		ug/L	2.0	03/17/2023	AB23-0317-04	
Zinc	ND		ug/L	10.0	03/17/2023	AB23-0317-04	



03/24/23



Data Qualifiers Exception Summary

No exceptions occurred.

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

#### General Standard Operating Procedure

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

Pi	oject Log-In Number: _	23-1066				
In	spection Date: 3 - 9	.23		Inspection By: This	7	
			23 JCW-	DEK Background		
Sh	ipment Delivered By: E	nter the type of	shipment car	rier.		
	The state of the s	whom)		SUSPS_		borne
	Tracking Number:_				ached: Yes	No
Sh	ipping Containers: Enter	the type and t	number of shi	pping containers received.		
	Coolerl	Cardboard B	ox	Custom Case	Envelop	e/Mailer
	Loose/Unpackaged	Containers		Other		
Co	ndition of Shipment: En	ter the as-recei	ved condition	of the shipment container.		
	Damaged Shipment Other				_ Lea	king
Shi	pment Security: Enter if	any of the ship	pping contain	ers were opened before rece	eipt.	
	Shipping Containers		200			
100				Action Completely	-	
En	closed Documents: Enter	the type of do	cuments encl	osed with the shipment.		
	CoC_X W	ork Request_	-	Air Data Sheet	Other	
Ter	nperature of Containers:	Measure the t	emperature o	f several sample containers.		
	As-Received Temper	ature Range_	1.3°C	Samples Received on	Ice: Yes X N	To
	M&TE # and Expirat	tion LS0277	23/5-25.	23		
Mous					land	
IYUI				er of sample containers rece		25.00
	Container Type	Water	Soil	Other	Broken	Leaking
7H Paper	VOA (40mL or 60mL)	-				
Lat # 230320 Exp: 10.30-23	Quart/Liter (g/p)		-			-
Exa: 10.70-23	9-oz (amber glass jar)	)	_		-	
Crr.	2-oz (amber glass)	10	_		-	-
	125 mL (plastic)	11	_			
	24 mL vial (glass)	_	-		_	_
	500 mL (plastic)	5	_		-	-
	Other 250 mL Plastic		_			

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 1 of 1

SAMPLING SITE / CUSTOMER: Q1-2023 JCW-DEK Background Wells				PROJECT NUMBER: SAP CC or WO#:  23-0166 REQUESTER: Harold Register						ANALYSIS REQUESTED (Attach List if More Space is Needed)									QA REQUIREMENT:				
12	PLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER												Ī		□ NPDES ☑ TNI				
SEND REPORT TO: Caleb Batts					email: phone:														t	☐ ISO 17025			
COPY TO: Harold Register				MATRIX CODES:  GW = Groundwater OX = Other			CC	ONTA	INE	RS										Г	☐ 10 CFR 50 APP. B		
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air		PRESERVATIVE			VE	als								Г	☐ INTERNAL INFO			
LAB SAMPLE COLLECTION \( \frac{1}{2} \)		XX	S = Soil / General Solid WP = Wip	e eral Waste	TOTAL#						Total Metals	suc					c	□ OTHER					
S	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOT	None	HNO	NaOF	HCI	MeOH	Tota	Anions	TDS	3			REMARKS				
11	23-0166-01	317123	(153	GW	MW-15002		3	2	1				x	x	x								
	-02	317/21	1415	GW	MW-15008		3	2	1				x	x	x								
	-03	317123	135	GW	MW-15016		3	2	1				x	x	x								
	-04	3/7/3	1330	GW	MW-15019		3	2	1				x	x	x								
	-05	3/7/23	_	GW	DUP-Background		3	2	1				x	x	x								
	-06	3 4123	142	W	FB- Background		1						x										
												Ŋ.											
RELI	NQUISHED BY:		4 6	DATE/	TIME:	RECEIVED BY:							CC	MMI	ENT	S:							
	_)		3/8/2	13		ed ex																	
RELI	NOURHED BY:			DÁTE/	71ME: 12:05 PM	RECEIVED BY:							166					s □ 1 _°C				LS 327743 rate: 05-25-23	
						3-0166 Page 13 of	f 13																



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 24, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q1

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0172

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 03/06/2023 for the 1<sup>st</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 03/10/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q1-2023 Weadock Porewater Wells

**Date Received:** 3/10/2023 **Chemistry Project:** 23-0172

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0172-01	JCW-MW-18001	Groundwater	03/08/2023 13:40	JCW Solid Waste Disposal Area, Porewater
23-0172-02	JCW-MW-18004	Groundwater	03/09/2023 10:22	JCW Solid Waste Disposal Area, Porewater
23-0172-03	JCW-MW-18005	Groundwater	03/09/2023 12:10	JCW Solid Waste Disposal Area, Porewater
23-0172-04	JCW-MW-18006	Groundwater	03/09/2023 13:07	JCW Solid Waste Disposal Area, Porewater
23-0172-05	MW-50	Groundwater	03/08/2023 14:50	JCW Solid Waste Disposal Area, Porewater
23-0172-06	MW-51	Groundwater	03/09/2023 06:34	JCW Solid Waste Disposal Area, Porewater
23-0172-07	MW-52	Groundwater	03/09/2023 07:23	JCW Solid Waste Disposal Area, Porewater
23-0172-08	MW-53	Groundwater	03/09/2023 08:06	JCW Solid Waste Disposal Area, Porewater
23-0172-09	MW-53R	Groundwater	03/09/2023 08:53	JCW Solid Waste Disposal Area, Porewater
23-0172-10	MW-54R	Groundwater	03/09/2023 09:40	JCW Solid Waste Disposal Area, Porewater
23-0172-11	MW-55	Groundwater	03/09/2023 11:17	JCW Solid Waste Disposal Area, Porewater
23-0172-12	OW-57ROUT	Groundwater	03/09/2023 12:38	JCW Solid Waste Disposal Area, Porewater
23-0172-13	MW-58	Groundwater	03/09/2023 13:45	JCW Solid Waste Disposal Area, Porewater
23-0172-14	DUP-JCW-LF-01	Groundwater	03/08/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0172-15	DUP-JCW-LF-02	Groundwater	03/09/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0172-16	JCW-MW-18001 MS	Groundwater	03/08/2023 13:40	JCW Solid Waste Disposal Area, Porewater
23-0172-17	JCW-MW-18001 MSD	Groundwater	03/08/2023 13:40	JCW Solid Waste Disposal Area, Porewater
23-0172-18	FB-01	Water	03/09/2023 13:53	JCW Solid Waste Disposal Area, Porewater
23-0172-19	EB-01	Water	03/09/2023 13:58	JCW Solid Waste Disposal Area, Porewater



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 03/08/2023

 Lab Sample ID:
 23-0172-01
 Collect Time:
 01:40 PM

Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Antmony         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Arsenic         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Barlium         47         ug/L         1.0         0.3/20/2023         AB23-0320-03           Boron         1440         ug/L         2.0         0.3/20/2023         AB23-0320-03           Cadmium         ND         ug/L         1.00         0.3/20/2023         AB23-0320-03           Calcium         486000         ug/L         1.0         0.3/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Molybdeh	Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	172-01-C01-A01	Analyst: EB
Arsenic ND ug/L 1.0 03/20/2023 AB23-0320-03 Barlum 47 ug/L 5.0 03/20/2023 AB23-0320-03 Beryllium ND ug/L 1.0 03/20/2023 AB23-0320-03 Boron 1440 ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium ND ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium ND ug/L 1000.0 03/21/2023 AB23-0320-03 Cadmium ND ug/L 1000.0 03/21/2023 AB23-0320-03 Chromium ND ug/L 1.0 03/20/2023 AB23-0320-03 Copper 2 ug/L 1.0 03/20/2023 AB23-0320-03 Iron 830 ug/L 20.0 03/21/2023 AB23-0320-03 Iron 830 ug/L 20.0 03/21/2023 AB23-0320-03 Lead ND ug/L 1.0 03/20/2023 AB23-0320-03 Lithium 91 ug/L 10.0 03/20/2023 AB23-0320-03 AB23-0320-03 Magnesium 131000 ug/L 10.0 03/20/2023 AB23-0320-03 Magnesium 131000 ug/L 1000.0 03/21/2023 AB23-0320-03 Nickel ND ug/L 5.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 5.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 5.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 10.0 03/21/2023 AB23-0320-03 Nickel ND ug/L 10.0 03/21/2023 AB23-0320-03 Selenium 2 ug/L 10.0 03/21/2023 AB23-0320-03 Selenium 2 ug/L 10.0 03/21/2023 AB23-0320-03 Selenium 2 vg/L 10.0 03/21/2023 AB23-0320-03 Selenium 2 vg/L 10.0 03/21/2023 AB23-0320-03 Nickel ND ug/L 2.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 10.0 03/21/2023 AB23-0320-03 Selenium 2 vg/L 10.0 03/21/2023 AB23-0320-03 Selenium ND ug/L 2.0 03/20/2023 AB23-0320-03 Selenium ND ug/L 2.0 03/20/2023 AB23-0320-03 Selenium ND ug/L 2.0 03/20/2023 AB23-0320-03 ND ug/L 10.0 03/21/2023 AB23-0320-03 ND ug/L 10.0 03/21/2023 AB23-0320-03 ND ug/L 10.0 03/21/2023 AB23-0320-03 ND ug/L 2.0 03/20/2023 AB23-0320-03 N	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Barium         47         ug/L         5.0         03/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         1440         ug/L         2.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         100.0         03/20/2023         AB23-0320-03           Calcium         486000         ug/L         1.0         03/20/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         1.0         03/20/2023         AB23-0320-03           Malestim         131000         ug/L         100.0         03/21/2023         AB23-0320-03           Mickle         ND	Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         14440         ug/L         2.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         486000         ug/L         1.00         03/20/2023         AB23-0320-03           Chomium         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         1.0         03/20/2023         AB23-0320-03           Malegaesium         131000         ug/L         1.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Nolekel         ND <td>Arsenic</td> <td>ND</td> <td></td> <td>ug/L</td> <td>1.0</td> <td>03/20/2023</td> <td>AB23-0320-03</td>	Arsenic	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron         14440         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         486000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         20.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Selenium         2<	Barium	47		ug/L	5.0	03/20/2023	AB23-0320-03
Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         486000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         100         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         100         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         100         03/21/2023         AB23-0320-03           Selenium         2 </td <td>Beryllium</td> <td>ND</td> <td></td> <td>ug/L</td> <td>1.0</td> <td>03/20/2023</td> <td>AB23-0320-03</td>	Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Calcium         486000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         20.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         1.00         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         2270	Boron	1440		ug/L	20.0	03/20/2023	AB23-0320-03
Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         2.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         227000	Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         20.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Vanadium         ND<	Calcium	486000		ug/L	1000.0	03/21/2023	AB23-0320-03
Copper         2         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         830         ug/L         20.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Mdagnesium         131000         ug/L         100.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Vanadium         <	Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron         830         ug/L         20.0         03/21/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         100.0         03/21/2023         AB23-0320-03           Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         100.0         03/21/2023         AB23-0320-03           Tallilium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 74	Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         100.0         03/21/2023         AB23-0320-03           Potassium         16600         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Init         Result         Result         Result         Result	Copper	2		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium         91         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         131000         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         2277000         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking	Iron	830		ug/L	20.0	03/21/2023	AB23-0320-03
Magnesium         131000         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-01-C02-A01         Analysis: CLE	Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-01-C02-A01         Analyst: KDR	Lithium	91		ug/L	10.0	03/20/2023	AB23-0320-03
Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-01-C02-A01         Analysis: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trac	Magnesium	131000		ug/L	1000.0	03/21/2023	AB23-0320-03
Potassium         16600         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-01-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag	Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-01-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         54200         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/20	Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         54200         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         1640000         ug/L         1000.0         03/15/2023         AB23-0315-03	Potassium	16600		ug/L	100.0	03/21/2023	AB23-0320-03
Sodium         227000         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         54200         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         1640000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-01-C03-A01         An	Selenium	2		ug/L	1.0	03/20/2023	AB23-0320-03
Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-01-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         54200         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         1640000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-01-C03-A01         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-01-C03-A01							



## **Analytical Report**

**Report Date:** 03/24/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 03/08/2023

 Lab Sample ID:
 23-0172-01
 Collect Time:
 01:40 PM

Alkalinity by SM 2320B			Aliquot #: 23-0	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	726000	ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Bicarbonate	726000	ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Carbonate	ND	ug/L	10000.0	03/13/2023	AB23-0313-09



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 JCW-MW-18004
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-02
 Collect Time:
 10:22 AM

Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Antmony         ND         ug/L         1.0         03/20/2023         AB23-032-03           Arsenic         ND         ug/L         1.0         03/20/2023         AB23-032-03           Barlium         24         ug/L         1.0         03/20/2023         AB23-0320-03           Beryllum         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         180         ug/L         1.0         03/20/2023         AB23-0320-03           Cadnium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobatt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Molybdenum <t< th=""><th>Metals by EPA 6020B: CCR Rule Appe</th><th>endix III-IV T</th><th>otal Metals</th><th>s Ехр</th><th>Aliquot #: 23-0</th><th>172-02-C01-A01</th><th>Analyst: EB</th></t<>	Metals by EPA 6020B: CCR Rule Appe	endix III-IV T	otal Metals	s Ехр	Aliquot #: 23-0	172-02-C01-A01	Analyst: EB						
Arsenic         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Barlium         24         ug/L         5.0         03/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         180         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         1000.0         03/21/2023         AB23-0320-03           Calcium         221000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1000         03/21/2023         AB23-0320-03           Malea         18500	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking						
Barium         24         ug/L         5.0         03/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         180         ug/L         2.0.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         1000.0         03/21/2023         AB23-0320-03           Calcium         221000         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Mercur         81500         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND	Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03						
Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         180         ug/L         20.0         03/20/2023         AB23-0320-03           Cadnium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         221000         ug/L         1000.0         03/20/2023         AB23-0320-03           Chomium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Selenium         11	Arsenic	ND		ug/L	1.0	03/20/2023	AB23-0320-03						
Boron         180         ug/L         20.0         03/20/2023         AB23-0320-03           Cadnium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         221000         ug/L         1000.0         03/20/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND	Barium	24		ug/L	5.0	03/20/2023	AB23-0320-03						
Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         221000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         100.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         100.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         100.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         100.0         03/20/2023         AB23-0320-03           Selenium	Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03						
Calcium         221000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         2.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         1.00         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Selenium         1750         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND	Boron	180		ug/L	20.0	03/20/2023	AB23-0320-03						
Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         2.0.0         03/20/2023         AB23-0320-03           Icad         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mickel         ND         ug/L         10.0         03/21/2023         AB23-0320-03           Potassium         1750         ug/L         10.0         03/20/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND<	Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03						
Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Tracking         ND <td>Calcium</td> <td>221000</td> <td></td> <td>ug/L</td> <td>1000.0</td> <td>03/21/2023</td> <td>AB23-0320-03</td>	Calcium	221000		ug/L	1000.0	03/21/2023	AB23-0320-03						
Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         46         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         100.0         03/20/2023         AB23-0320-03           Mdegresium         81500         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Vanadium         N	Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03						
Iron	Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03						
Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         1000,0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Init         Rug/L         10.0         03/20/2023         AB23-0320-03	Copper	1		ug/L	1.0	03/20/2023	AB23-0320-03						
Lithium         39         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         81500         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking	Iron	46		ug/L	20.0	03/20/2023	AB23-0320-03						
Magnesium         81500         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/20/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-02-C01-A01         Analyst: CLE <td>Lead</td> <td>ND</td> <td></td> <td>ug/L</td> <td>1.0</td> <td>03/20/2023</td> <td>AB23-0320-03</td>	Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03						
Molybdenum         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-02-C01-A02         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR <td>Lithium</td> <td>39</td> <td></td> <td>ug/L</td> <td>10.0</td> <td>03/20/2023</td> <td>AB23-0320-03</td>	Lithium	39		ug/L	10.0	03/20/2023	AB23-0320-03						
Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C01-A01         Analysis: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Track	Magnesium	81500		ug/L	1000.0	03/21/2023	AB23-0320-03						
Potassium         1750         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Para	Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03						
Selenium         11         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analysis: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0 <td< td=""><td>Nickel</td><td>ND</td><td></td><td>ug/L</td><td>2.0</td><td>03/20/2023</td><td>AB23-0320-03</td></td<>	Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03						
Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         22600         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analysis KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03	Potassium	1750		ug/L	100.0	03/21/2023	AB23-0320-03						
Sodium	Selenium	11		ug/L	1.0	03/20/2023	AB23-0320-03						
Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-02-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01 <td <="" colspan="6" td=""><td>Silver</td><td>ND</td><td></td><td>ug/L</td><td>0.2</td><td>03/20/2023</td><td>AB23-0320-03</td></td>	<td>Silver</td> <td>ND</td> <td></td> <td>ug/L</td> <td>0.2</td> <td>03/20/2023</td> <td>AB23-0320-03</td>						Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-02-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tr	Sodium	22600		ug/L	1000.0	03/21/2023	AB23-0320-03						
Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03						
Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-02-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03						
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03						
Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	172-02-C01-A02	Analyst: CLE						
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-02-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking						
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04						
Chloride         12700         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Anions by EPA 300.0 CCR Rule Analy	te List, CI, F	, SO4, Aqւ	ieous	Aliquot #: 23-0	172-02-C02-A01	Analyst: KDR						
Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking						
Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Chloride	12700		ug/L	1000.0	03/15/2023	AB23-0315-03						
Sulfate         533000         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-02-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Fluoride	ND		-		03/15/2023							
Parameter(s) Result Flag Units RL Analysis Date Tracking	Sulfate	533000		-	1000.0	03/15/2023	AB23-0315-03						
Parameter(s) Result Flag Units RL Analysis Date Tracking	Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-02-C03-A01	Analyst: LMO						
Total Dissolved Solids 1250 mg/L 10.0 03/13/2023 AB23-0313-03	Parameter(s)	Result	Flag	Units	RL	Analysis Date							
	Total Dissolved Solids	1250		mg/L	10.0	03/13/2023	AB23-0313-03						



03/24/23



Laboratory Services
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Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 JCW-MW-18005
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-03
 Collect Time:
 12:10 PM

Parameter(s)  Antimony Arsenic Barium Beryllium Boron Cadmium	Result ND 4 115 ND 930 ND	Flag	Units ug/L ug/L ug/L	<b>RL</b> 1.0 1.0	Analysis Date 03/20/2023	Tracking AB23-0320-03
Arsenic Barium Beryllium Boron	4 115 ND 930		ug/L			AB23-0320-03
Barium Beryllium Boron	115 ND 930		-	1.0		
Beryllium Boron	ND 930		ug/L		03/20/2023	AB23-0320-03
Boron	930			5.0	03/20/2023	AB23-0320-03
			ug/L	1.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	20.0	03/20/2023	AB23-0320-03
Oddiniani	112		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	262000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	1		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	1720		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	36		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	50900		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	6		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	3070		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	3		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	21000		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	172-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	172-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	25400		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	435000		ug/L	1000.0	03/16/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-03-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1250		mg/L	10.0	03/13/2023	AB23-0313-03



03/24/23



Laboratory Services
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Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 JCW-MW-18006
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-04
 Collect Time:
 01:07 PM

					172-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	5		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	232		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1730		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	121000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	2930		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	21		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	45400		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	1380		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	2		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	82200		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	172-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	172-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	79900		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	32500		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-04-C03-A01	Analyst: LMC
	Dogult	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Result	riay	Ullits	11/1	Allalysis Date	Hacking



03/24/23



Laboratory Services
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Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-50
 Collect Date:
 03/08/2023

 Lab Sample ID:
 23-0172-05
 Collect Time:
 02:50 PM

Metals by EPA 6020B: CCR Rule App	penaix III-IV 10	tai wetais E	.xp	Aliquot #: 23-0	172-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	uç	g/L	1.0	03/20/2023	AB23-0320-03
Arsenic	2	uç	g/L	1.0	03/20/2023	AB23-0320-03
Barium	89	uç	g/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND	uç	g/L	1.0	03/20/2023	AB23-0320-03
Boron	2020	u	g/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND	u	g/L	0.2	03/20/2023	AB23-0320-03
Calcium	152000	u	g/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND	u	g/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND	u	g/L	6.0	03/20/2023	AB23-0320-03
Copper	ND	u	g/L	1.0	03/20/2023	AB23-0320-03
Iron	604	u	g/L	20.0	03/20/2023	AB23-0320-03
Lead	ND	u	g/L	1.0	03/20/2023	AB23-0320-03
Lithium	65	u	g/L	10.0	03/20/2023	AB23-0320-03
Magnesium	51500	u	g/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND	u	g/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND	u	g/L	2.0	03/20/2023	AB23-0320-03
Potassium	6700	u	g/L	100.0	03/21/2023	AB23-0320-03
Selenium	1	u	g/L	1.0	03/20/2023	AB23-0320-03
Silver	ND	u	g/L	0.2	03/20/2023	AB23-0320-03
Sodium	60100	uç	g/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND	u	g/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND	u	g/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND	uç	g/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqued	ous			Aliquot #: 23-0	172-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	uç	g/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Anal	yte List, Cl, F,	SO4, Aqueo	ous	Aliquot #: 23-0	172-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	35900	ug	g/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		g/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	341000		g/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-05-C03-A01	Analyst: CLE
		-				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



03/24/23



Laboratory Services
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Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-51
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-06
 Collect Time:
 06:34 AM

Metals by EPA 6020B: CCR Rule Ap	penaix III-IV 10	tai wetais Exp	Aliquot #: 23-0	172-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Uni	ts RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	10	ug/L	1.0	03/20/2023	AB23-0320-03
Barium	178	ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1320	ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	169000	ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND	ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Iron	514	ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	46	ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	53500	ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND	ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	4770	ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	2	ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	141000	ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND	ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aque	eous		Aliquot #: 23-0	172-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Uni	ts RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Ana	alyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	172-06-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Uni	ts RL	Analysis Date	Tracking
Chloride	98400	ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND	ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	360000	ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 25400			Aliquot #: 23-0	172-06-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag Uni	ts RL	Analysis Date	Tracking



03/24/23



Laboratory Services
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Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-52
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-07
 Collect Time:
 07:23 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	172-07-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	102		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1040		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	228000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	1		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	2820		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	27		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	90300		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	2930		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	1		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	64500		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	172-07-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyt	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	172-07-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	36300		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	581000		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-07-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1430		mg/L	10.0	03/13/2023	AB23-0313-03
	23-(	0172 Page 1	2 of 28			



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-53
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-08
 Collect Time:
 08:06 AM

Parameter(s)         Result         Flag Units         RL         Analysis Date         Tracking           Antimory         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Arsenic         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Barlium         202         ug/L         1.0         0.3/20/2023         AB23-0320-03           Boron         2150         ug/L         2.0         0.3/20/2023         AB23-0320-03           Cadmium         ND         ug/L         2.0         0.3/20/2023         AB23-0320-03           Calcium         82500         ug/L         1.0         0.3/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Malebal <td< th=""><th>Metals by EPA 6020B: CCR Rule Ap</th><th>pendix III-IV To</th><th>otal Metals</th><th>Ехр</th><th>Aliquot #: 23-0</th><th>172-08-C01-A01</th><th>Analyst: EB</th></td<>	Metals by EPA 6020B: CCR Rule Ap	pendix III-IV To	otal Metals	Ехр	Aliquot #: 23-0	172-08-C01-A01	Analyst: EB
Arsenic ND ug/L 1.0 03/20/2023 AB23-0320-03 Barlum 202 ug/L 5.0 03/20/2023 AB23-0320-03 Beryllium ND ug/L 1.0 03/20/2023 AB23-0320-03 Boron 2150 ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium ND ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium ND ug/L 1000.0 03/21/2023 AB23-0320-03 Cadmium ND ug/L 1000.0 03/21/2023 AB23-0320-03 Chromium ND ug/L 1.0 03/20/2023 AB23-0320-03 Copper ND ug/L 1.0 03/20/2023 AB23-0320-03 Iron 403 ug/L 20.0 03/20/2023 AB23-0320-03 Iron 403 ug/L 1.0 03/20/2023 AB23-0320-03 Lead ND ug/L 1.0 03/20/2023 AB23-0320-03 Lithium 33 ug/L 10.0 03/20/2023 AB23-0320-03 AB23-0320-03 Iron 403 ug/L 10.0 03/20/2023 AB23-0320-03 AB23-0320-03 Magnesium 24200 ug/L 10.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 5.0 03/20/2023 AB23-0320-03 Nickel ND ug/L 1.0 03/20/2023 AB23-0320-03 Selenium 1 ug/L 1.0 03/20/2023 AB23-0320-03 Selenium 1 ug/L 1.0 03/20/2023 AB23-0320-03 Selenium 1 ug/L 1.0 03/20/2023 AB23-0320-03 Selenium ND ug/L 2.0 03/20/2023 AB23-0320-03 Nodium 41800 ug/L 1.0 03/20/2023 AB23-0320-03 Nodium ND ug/L 2.0 03/20/2023 AB23-0320-03 NDdium ND ug/L 2.0 03/20/2023 AB23-0320-03	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Barium         202         ug/L         5.0         03/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         2150         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         100.0         03/20/2023         AB23-0320-03           Calcium         82500         ug/L         1.0         03/20/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         100.0         03/21/2023         AB23-0320-03           Mickle         ND	Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         2150         ug/L         20.0         03/20/2023         AB23-0320-03           Cadrium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         82500         ug/L         1000.0         03/20/2023         AB23-0320-03           Chomium         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Males         ND         ug/L         5.0         03/20/2023         AB23-0320-03           Mollybdenum         7         ug/L         2.0         03/20/2023         AB23-0320-03           Nolekel         ND	Arsenic	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron         2150         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         82500         ug/L         1000.0         03/20/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Selenium         1	Barium	202		ug/L	5.0	03/20/2023	AB23-0320-03
Cadmium         ND         ug/L         0,2         03/20/2023         AB23-0320-03           Calcium         82500         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         1.00         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/21/2023         AB23-0320-03           Silver         ND	Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Calcium         82500         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         41800<	Boron	2150		ug/L	20.0	03/20/2023	AB23-0320-03
Chromium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         2.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         41800	Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         0.2         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         100.0         03/21/2023         AB23-0320-03           Vanadium         ND	Calcium	82500		ug/L	1000.0	03/21/2023	AB23-0320-03
Copper         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         403         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Mdgnesium         24200         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         0.2         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Vanadium         ND<	Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         100.0         03/21/2023         AB23-0320-03           Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Sodium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Variet         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, T	Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium         33         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         24200         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Ug/L         10.0         03/20/2023         AB23-0320-03	Iron	403		ug/L	20.0	03/20/2023	AB23-0320-03
Magnesium         24200         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-08-C02-A01         Analysis: CLE	Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Molybdenum         7         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-08-C02-A01         Analysis: KDR	Lithium	33		ug/L	10.0	03/20/2023	AB23-0320-03
Nickel         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-08-C01-A02         Analysis: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracki	Magnesium	24200		ug/L	1000.0	03/21/2023	AB23-0320-03
Potassium         4660         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Param	Molybdenum	7		ug/L	5.0	03/20/2023	AB23-0320-03
Selenium         1         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-08-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         24800         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/202	Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-08-C02-A01         Analysis: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         24800         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         93600         ug/L         1000.0         03/15/2023 <t< td=""><td>Potassium</td><td>4660</td><td></td><td>ug/L</td><td>100.0</td><td>03/21/2023</td><td>AB23-0320-03</td></t<>	Potassium	4660		ug/L	100.0	03/21/2023	AB23-0320-03
Sodium         41800         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-08-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         24800         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         93600         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-08-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date							



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-53R
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-09
 Collect Time:
 08:53 AM

				Allquot #. 25-0	172-09-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	17		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	179		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	2330		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	195000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	1		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	1580		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	59		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	65200		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	5540		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	1		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	46800		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	172-09-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyt	te List, CI, F,	SO4, Aqι	ieous	Aliquot #: 23-0	172-09-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	27200		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	101000		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-09-C03-A01	Analyst: LM0
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-54R
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-10
 Collect Time:
 09:40 AM

Metals by EPA 6020B: CCR Rule A	opendix III-IV To	tal Metals Exp	Aliquot #: 23-0	)172-10-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	1	ug/L	1.0	03/20/2023	AB23-0320-03
Barium	126	ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Boron	5660	ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	168000	ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND	ug/L	6.0	03/20/2023	AB23-0320-03
Copper	2	ug/L	1.0	03/20/2023	AB23-0320-03
Iron	262	ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	71	ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	49200	ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	15	ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	1720	ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	1	ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	30900	ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND	ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aque	eous		Aliquot #: 23-0	)172-10-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule An	alyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	)172-10-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Chloride	49600	ug/L	1000.0	03/16/2023	AB23-0315-03
Fluoride	ND	ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	62000	ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540	<b>C</b>		Aliquot #: 23-0	)172-10-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Total Dissolved Solids	770	mg/L	10.0	03/13/2023	AB23-0313-03
	00.	0172 Dago 15 of 29			



03/24/23



A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-55
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-11
 Collect Time:
 11:17 AM

				Allquot #. 20 0	172-11-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	68		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	287		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1110		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	162000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	24800		ug/L	20.0	03/21/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	27		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	30300		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	50		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	4		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	3560		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	3		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	120000		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	172-11-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analy	yte List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	172-11-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	24200		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	94600		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-11-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



03/24/23



A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

Field Sample ID: OW-57ROUT Collect Date: 03/09/2023
Lab Sample ID: 23-0172-12 Collect Time: 12:38 PM

Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Antmony         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Arsenic         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Barlium         75         ug/L         1.0         0.3/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Boron         1860         ug/L         2.0         0.3/20/2023         AB23-0320-03           Cadrilium         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Colatium         116000         ug/L         1.0         0.3/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         0.3/20/2023         AB23-0320-03           Lead         ND         ug/L         5.0         0.3/20/2023         AB23-0320-03           M	Metals by EPA 6020B: CCR Rule Ap	pendix III-IV To	tal Metals E	хр	Aliquot #: 23-0	172-12-C01-A01	Analyst: EB
Arsenic ND ug/L 1.0 03/20/2023 AB23-0320-03 Barlum 75 ug/L 5.0 03/20/2023 AB23-0320-03 Beryllium ND ug/L 1.0 03/20/2023 AB23-0320-03 Beryllium ND ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium ND ug/L 20.0 03/20/2023 AB23-0320-03 Cadmium 116600 ug/L 1000.0 03/21/2023 AB23-0320-03 Cadmium 116600 ug/L 1000.0 03/21/2023 AB23-0320-03 Chromium 4 ug/L 1.0 03/20/2023 AB23-0320-03 Chromium 4 ug/L 1.0 03/20/2023 AB23-0320-03 Chromium 4 ug/L 1.0 03/20/2023 AB23-0320-03 Chromium 53 ug/L 1.0 03/20/2023 AB23-0320-03 Copper 1 ug/L 1.0 03/20/2023 AB23-0320-03 Iron 53 ug/L 20.0 03/20/2023 AB23-0320-03 Iron 53 ug/L 20.0 03/20/2023 AB23-0320-03 Lead ND ug/L 1.0 03/20/2023 AB23-0320-03 Lead ND ug/L 1.0 03/20/2023 AB23-0320-03 AB23-0320-03 Iron 53 ug/L 20.0 03/20/2023 AB23-0320-03 AB23-0320-03 Iron 53 ug/L 10.0 03/20/2023 AB23-0320-03 AB23-0320-03 Iron 54 ug/L 10.0 03/20/2023 AB23-0320-03 Iron 55 ug/L 10.0 03/20/2023 AB23-0320-03 AB23-0320-03 Iron 55 ug/L 10.0 03/20/2023 AB23-0320-03 Iron 1560 ug/L 10.0 03/20	Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Barium         75         ug/L         5.0         03/20/2023         AB23-0320-03           Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         1860         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         1000.0         03/20/2023         AB23-0320-03           Calcium         116000         ug/L         1.0         03/20/2023         AB23-0320-03           Crobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         10.0         03/21/2023         AB23-0320-03           Nickel         15         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         2	Antimony	ND	uç	g/L	1.0	03/20/2023	AB23-0320-03
Beryllium         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Boron         1860         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         1.00         03/20/2023         AB23-0320-03           Calcium         116000         ug/L         1.00         03/20/2023         AB23-0320-03           Chromium         4         ug/L         6.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         20.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         10.0         03/20/2023         AB23-0320-03           Selenium         2	Arsenic	ND	ug	g/L	1.0	03/20/2023	AB23-0320-03
Boron         1860         ug/L         20.0         03/20/2023         AB23-0320-03           Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         116000         ug/L         1000.0         03/20/2023         AB23-0320-03           Chromium         4         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         6	Barium	75	ug	g/L	5.0	03/20/2023	AB23-0320-03
Cadmium         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Calcium         116000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         4         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         2.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         1.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         1.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         2.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         1.0         03/20/2023         AB23-0320-03           Selenium         2	Beryllium	ND	ug	g/L	1.0	03/20/2023	AB23-0320-03
Calcium         116000         ug/L         1000.0         03/21/2023         AB23-0320-03           Chromium         4         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         2.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         1.00         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         1.00         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         10.0         03/21/2023         AB23-0320-03           Silver         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Sodium         59400 <td>Boron</td> <td>1860</td> <td>ug</td> <td>g/L</td> <td>20.0</td> <td>03/20/2023</td> <td>AB23-0320-03</td>	Boron	1860	ug	g/L	20.0	03/20/2023	AB23-0320-03
Chromium         4         ug/L         1.0         03/20/2023         AB23-0320-03           Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         2.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         10.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Silver         15         ug/L         10.0         03/21/2023         AB23-0320-03           Silver         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         10.0         03/20/2023         AB23-0320-03           Vanadium         ND	Cadmium	ND	ug	g/L	0.2	03/20/2023	AB23-0320-03
Cobalt         ND         ug/L         6.0         03/20/2023         AB23-0320-03           Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         5.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         10.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Tracking         ND	Calcium	116000	ug	g/L	1000.0	03/21/2023	AB23-0320-03
Copper         1         ug/L         1.0         03/20/2023         AB23-0320-03           Iron         53         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         100.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         100.0         03/20/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND	Chromium	4	ug	g/L	1.0	03/20/2023	AB23-0320-03
Iron         53         ug/L         20.0         03/20/2023         AB23-0320-03           Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         100.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/20/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Tallilium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Parameter(s)	Cobalt	ND	ug	g/L	6.0	03/20/2023	AB23-0320-03
Lead         ND         ug/L         1.0         03/20/2023         AB23-0320-03           Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         100.0         03/21/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Init         Result         Flag         Unit         Rule         A	Copper	1	ug	g/L	1.0	03/20/2023	AB23-0320-03
Lithium         26         ug/L         10.0         03/20/2023         AB23-0320-03           Magnesium         68300         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         100.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         100.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking	Iron	53	ug	g/L	20.0	03/20/2023	AB23-0320-03
Magnesium         68300         ug/L         1000.0         03/21/2023         AB23-0320-03           Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analys	Lead	ND	ug	g/L	1.0	03/20/2023	AB23-0320-03
Molybdenum         6         ug/L         5.0         03/20/2023         AB23-0320-03           Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR	Lithium	26	ug	g/L	10.0	03/20/2023	AB23-0320-03
Nickel         15         ug/L         2.0         03/20/2023         AB23-0320-03           Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-12-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Paramet	Magnesium	68300	ug	g/L	1000.0	03/21/2023	AB23-0320-03
Potassium         1560         ug/L         100.0         03/21/2023         AB23-0320-03           Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Param	Molybdenum	6	ug	g/L	5.0	03/20/2023	AB23-0320-03
Selenium         2         ug/L         1.0         03/20/2023         AB23-0320-03           Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/202	Nickel	15	ug	g/L	2.0	03/20/2023	AB23-0320-03
Silver         ND         ug/L         0.2         03/20/2023         AB23-0320-03           Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/	Potassium	1560	ug	g/L	100.0	03/21/2023	AB23-0320-03
Sodium         59400         ug/L         1000.0         03/21/2023         AB23-0320-03           Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-12-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         An	Selenium	2	ug	g/L	1.0	03/20/2023	AB23-0320-03
Thallium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Vanadium         ND         ug/L         2.0         03/20/2023         AB23-0320-03           Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-12-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01	Silver	ND	ug	g/L	0.2	03/20/2023	AB23-0320-03
Vanadium         ND         ug/L ug/L ug/L         2.0 03/20/2023         AB23-0320-03 AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-12-C01-A02         Analyst: CLE           Parameter(s)         Result Flag Units         RL Analysis Date         Tracking           Mercury         ND         ug/L         0.2 03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result Flag Units         RL Analysis Date         Tracking           Chloride         59000         ug/L 1000.0 03/15/2023         AB23-0315-03           Fluoride         ND ug/L 1000.0 03/15/2023         AB23-0315-03           Sulfate         79700 ug/L 1000.0 03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result Flag Units         RL Analysis Date         Tracking	Sodium	59400	ug	g/L	1000.0	03/21/2023	AB23-0320-03
Zinc         ND         ug/L         10.0         03/20/2023         AB23-0320-03           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Thallium	ND	ug	g/L	2.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0172-12-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Vanadium	ND	ug	g/L	2.0	03/20/2023	AB23-0320-03
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Zinc	ND	นดู	g/L	10.0	03/20/2023	AB23-0320-03
Mercury         ND         ug/L         0.2         03/20/2023         AB23-0320-04           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Mercury by EPA 7470A, Total, Aque	eous			Aliquot #: 23-0	172-12-C01-A02	Analyst: CLE
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0172-12-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Mercury	ND	นดู	g/L	0.2	03/20/2023	AB23-0320-04
Chloride         59000         ug/L         1000.0         03/15/2023         AB23-0315-03           Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Anions by EPA 300.0 CCR Rule Ana	alyte List, Cl, F,	SO4, Aqueo	us	Aliquot #: 23-0	172-12-C02-A01	Analyst: KDR
Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C           Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Fluoride         ND         ug/L         1000.0         03/15/2023         AB23-0315-03           Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Chloride	59000	uç	g/L	1000.0	03/15/2023	AB23-0315-03
Sulfate         79700         ug/L         1000.0         03/15/2023         AB23-0315-03           Total Dissolved Solids by SM 2540C         Aliquot #: 23-0172-12-C03-A01         Analyst: LMO           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking			_				
Parameter(s) Result Flag Units RL Analysis Date Tracking	Sulfate		_				
Parameter(s) Result Flag Units RL Analysis Date Tracking	Total Dissolved Solids by SM 25400	c			Aliquot #: 23-0	172-12-C03-A01	Analyst: LMO
Total Dissolved Solids 790 mg/L 10.0 03/13/2023 AB23-0313-03	Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	
	Total Dissolved Solids	790	m	g/L	10.0	03/13/2023	AB23-0313-03



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 MW-58
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-13
 Collect Time:
 01:45 PM

Metals by EPA 6020B: CCR Rule Apper	1412 111 17 10	- Inotal	- AP	Aliquot #: 23-0	172-13-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	2		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	106		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	88		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	96300		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	11700		ug/L	20.0	03/21/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	20		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	15400		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	2		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	5520		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	173000		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	3		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueous	<b>.</b>			Aliquot #: 23-0	172-13-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyte	List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	172-13-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	281000		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	35700		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-13-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



03/24/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

Field Sample ID: DUP-JCW-LF-01 Collect Date: 03/08/2023 Lab Sample ID: 23-0172-14 Collect Time: 12:00 AM

			s Ехр	Aliquot #: 23-0	172-14-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	2		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	92		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	2080		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	601		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	65		ug/L	10.0	03/20/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Selenium	1		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	172-14-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyte	List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	172-14-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	36700		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	315000		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	172-14-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
r ai ailietei (3)		-				



03/24/23

23-0172

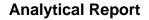


Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project:

Field Sample ID: DUP-JCW-LF-02 Collect Date: 03/09/2023 Lab Sample ID: 23-0172-15 Collect Time: 12:00 AM

				Allquot #. 20 0	172-15-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	5		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	238		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1760		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	121000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	2910		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	23		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	46300		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	1350		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	2		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	85200		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	2		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	172-15-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	172-15-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	82800		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	33900		ug/L	1000.0	03/15/2023	AB23-0315-03
Total Disselved Solide by SM 2540C				Aliquot #: 23-0	172-15-C03-A01	Analyst: LMO
Total Dissolved Solids by SM 2540C						
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



03/24/23



**Laboratory Services** A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

Field Sample ID: JCW-MW-18001 MS

Collect Date: 03/08/2023 Lab Sample ID: 23-0172-16 Collect Time: 01:40 PM

etals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp				Aliquot #: 23-0	172-16-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	101		%	1.0	03/20/2023	AB23-0320-03
Arsenic	103		%	1.0	03/20/2023	AB23-0320-03
Barium	90		%	5.0	03/20/2023	AB23-0320-03
Beryllium	88		%	1.0	03/20/2023	AB23-0320-03
Boron	107		%	20.0	03/20/2023	AB23-0320-03
Cadmium	95.9		%	0.2	03/20/2023	AB23-0320-03
Calcium	104		%	1000.0	03/21/2023	AB23-0320-03
Chromium	95		%	1.0	03/20/2023	AB23-0320-03
Cobalt	99		%	6.0	03/20/2023	AB23-0320-03
Copper	91		%	1.0	03/20/2023	AB23-0320-03
Iron	107		%	20.0	03/21/2023	AB23-0320-03
Lead	90		%	1.0	03/20/2023	AB23-0320-03
Lithium	93		%	10.0	03/20/2023	AB23-0320-03
Magnesium	110		%	1000.0	03/21/2023	AB23-0320-03
Molybdenum	114		%	5.0	03/20/2023	AB23-0320-03
Nickel	95		%	2.0	03/20/2023	AB23-0320-03
Potassium	104		%	100.0	03/21/2023	AB23-0320-03
Selenium	93		%	1.0	03/20/2023	AB23-0320-03
Silver	94.0		%	0.2	03/20/2023	AB23-0320-03
Sodium	114		%	1000.0	03/21/2023	AB23-0320-03
Thallium	94		%	2.0	03/20/2023	AB23-0320-03
Vanadium	104		%	2.0	03/20/2023	AB23-0320-03
Zinc	88		%	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	172-16-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	107		%	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F	, SO4, Aque	eous	Aliquot #: 23-0	172-16-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	101		%	1000.0	03/15/2023	AB23-0315-03
Fluoride	87		%	1000.0	03/15/2023	AB23-0315-03
Sulfate	93		%	1000.0	03/15/2023	AB23-0315-03



03/24/23



A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

Field Sample ID: JCW-MW-18001 MSD

Collect Date: 03/08/2023 Lab Sample ID: 23-0172-17 Collect Time: 01:40 PM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV T	otal Metals	Ехр	Aliquot #: 23-0	172-17-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	103	•	%	1.0	03/20/2023	AB23-0320-03
Arsenic	105	•	%	1.0	03/20/2023	AB23-0320-03
Barium	91	•	%	5.0	03/20/2023	AB23-0320-03
Beryllium	91	•	%	1.0	03/20/2023	AB23-0320-03
Boron	107	•	%	20.0	03/20/2023	AB23-0320-03
Cadmium	95.8	•	%	0.2	03/20/2023	AB23-0320-03
Calcium	108	•	%	1000.0	03/21/2023	AB23-0320-03
Chromium	98	•	%	1.0	03/20/2023	AB23-0320-03
Cobalt	95	•	%	6.0	03/20/2023	AB23-0320-03
Copper	92	•	%	1.0	03/20/2023	AB23-0320-03
Iron	106	•	%	20.0	03/21/2023	AB23-0320-03
Lead	91	•	%	1.0	03/20/2023	AB23-0320-03
Lithium	98	•	%	10.0	03/20/2023	AB23-0320-03
Magnesium	116	•	%	1000.0	03/21/2023	AB23-0320-03
Molybdenum	113	•	%	5.0	03/20/2023	AB23-0320-03
Nickel	95	•	%	2.0	03/20/2023	AB23-0320-03
Potassium	110	•	%	100.0	03/21/2023	AB23-0320-03
Selenium	96	•	%	1.0	03/20/2023	AB23-0320-03
Silver	96.1	•	%	0.2	03/20/2023	AB23-0320-03
Sodium	115	•	%	1000.0	03/21/2023	AB23-0320-03
Thallium	95	•	%	2.0	03/20/2023	AB23-0320-03
Vanadium	104	•	%	2.0	03/20/2023	AB23-0320-03
Zinc	90	•	%	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	172-17-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	109	•	%	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F	, SO4, Aque	eous	Aliquot #: 23-0	172-17-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	101		%	1000.0	03/15/2023	AB23-0315-03
Fluoride	87	•	%	1000.0	03/15/2023	AB23-0315-03
Sulfate	90	•	%	1000.0	03/15/2023	AB23-0315-03



03/24/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0172

 Field Sample ID:
 FB-01
 Collect Date:
 03/09/2023

 Lab Sample ID:
 23-0172-18
 Collect Time:
 01:53 PM

Matrix: Water

	ule Appendix III-IV To	tai Metais Exp	Aliquot #: 23-0	172-18-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Barium	ND	ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Boron	ND	ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	ND	ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND	ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Iron	ND	ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	ND	ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	ND	ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND	ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	ND	ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	ND	ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND	ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	ND	ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND	ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND	ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total	, Aqueous		Aliquot #: 23-0	172-18-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Ru	ıle Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	172-18-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	ND	ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND	ug/L	1000.0	03/15/2023	AB23-0315-03





Laboratory Services
A CENTURY OF EXCELLENCE

JCW Solid Waste Disposal Area, Porewater (395457)

Laboratory Project: 23-0172

Report Date:

03/24/23

Collect Date: 03/09/2023 Collect Time: 01:58 PM

Lab Sample ID: 23-0172-19 Matrix: Water

Field Sample ID: EB-01

Sample Site:

Metals by EPA 6020B: CCR Ru	ne Appendix III-IV TO	lai Welais	Exp	Aliquot #: 23-0	172-19-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	ı	ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	ND		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	ND	1	ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND	1	ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	ND	ı	ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND	ı	ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND	ı	ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND	1	ug/L	1.0	03/20/2023	AB23-0320-03
Iron	ND		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND	ı	ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	ND	ı	ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	ND	ı	ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	ND	ı	ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND	ı	ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	ND	ı	ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	ND	ı	ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND	ı	ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	ND	ı	ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND	ı	ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND	ı	ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND	ı	ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total,	Aqueous			Aliquot #: 23-0	172-19-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	1	ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rul	e Analyte List, Cl, F,	SO4, Aque	eous	Aliquot #: 23-0	172-19-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND	ı	ug/L	1000.0	03/15/2023	AB23-0315-03





**Report Date:** 03/24/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

General Standard Operating Procedure

## TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number: 23-017	2			
Inspection Date: 03.10.23			2	
Sample Origin/Project Name: Weado	ck Pore	water		
Shipment Delivered By: Enter the type of	shipment carrier			
Pony FedEx	UPS_	USPS	Air	borne
Other/Mand Carry (whom) TR	C			
Tracking Number:				No
Shipping Containers: Enter the type and no	ımber of shippin	ng containers received	d.	
Cooler (1) Cardboard Bo		Custom Case		e/Mailer
Loose/Unpackaged Containers		Other		
Condition of Shipment: Enter the as-receive		the shipment contain	er.	
Damaged Shipment Observed: Non	ie	Dented	Lea	king
Other	2			
Shipment Security: Enter if any of the ship	ping containers	were opened before r	eceipt.	
Shipping Containers Received: Ope				
			_	
Enclosed Documents: Enter the type of doc		at regard that is the control of		
CoC Work Request_		Air Data Sheet	Other	
Temperature of Containers: Measure the te		*		
As-Received Temperature Range 1.				Io.
		Samples Received	on icc. Tes_/c iv	
M&TE # and Expiration LS 0 2	1123			
S. 25 Number and Type of Containers: Enter the	total number of	sample containers re	eceived.	
Container Type Water		Other	Broken	Leaking
VOA (40mL or 60mL) 2				
Quart/Liter (g/p)				
9-oz (amber glass jar)	<b>=</b> :			
2-oz (amber glass)				
125 mL (plastic) 38				
24 mL vial (glass)				
25% 500 mL (plastic) 15				

# **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 1 of 2

27 000	PLING SITE / CU				PROJECT NUMBER;	SAP CC or W	/O#:												ESTE		QA REQUIREMENT:
Q1-2	023 Weadock P	orewater Wells			23-0172	REQUESTER	R: Haro	old	Regi	ister	r			(Attach List if More Space is Needed)				eded)	□ NPDES  INI		
SAM	PLING TEAM:				TURNAROUND TIME REQUIRED:	ANDARD 🛮 OT	THER_														
SEN	D REPORT TO:	Caleb Batts			email:	phone:															☐ ISO 17025
	COPY TO:	Harold Regis	ster		MATRIX CODES; GW = Groundwater OX = Other		11:	C	ONT	CAI	NER	es									☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludg	OX = Other		als.							☐ INTERNAL INFO						
	LAB	SAMPLE COL	LECTION	XIX	S = Soil / General Solid WP = Wip	e eral Waste	TOTAL#						1	James I		Alkalinity					□ OTHER
S	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOT	None	HINO	H <sub>2</sub> SO	NaOF	MeOH	Total	Anions	TDS	Alka					REMARKS
16	23-0172-01	3/8/3	1340	GW	JCW-MW-18001		5	4	1				,	c x	x	x					
	-02	3/9/3	1000	GW	JCW-MW-18004		5	4	1		ĺ,		,	c x	x						
	-03	319103	1210	GW	JCW-MW-18005		5	4	ı		I		,	c x	x						
	-04	3/9/33	1307	GW	JCW-MW-18006		5	4	1				,	c x	x						
	-05	3/8/53	Mac	GW	MW-50		5	4	1		Į.		,	c x	x						
	-06	3/9/03	0634	GW	MW-51		5	4	1				,	c x	x						
	-07	31962	6733	GW	MW-52		5	4	1				,	c x	x						
	-08	31912	0804	GW	MW-53		5	4	1				3	c x	x						
	-09	3/9/00	0853	GW	MW-53R		5	4	1				1	c x	x						
	-10	319100	0940	GW	MW-54R		5	4	1				;	c x	x						
	-11	3/9/33	(1)	GW	MW-55		5	4	1				1	c x	x						
	-12	319153	1338	GW	OW-57ROUT		5	4	1					x >	x						
	NQUISHED BY:		1	BATE/	46/20 OBe	RECEIVED BY:  COLUMN RECEIVED BY:	89n	le	3 H	- 10	0.7	3 15			ed on	Ice?		es □ 3 °C		M&TE	E#:LS 0277 23 ue Date; 5 · 25 · 23

# **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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Page 2 of 2

SAMPL	ING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or W	O#;							A	NAI	YSI	SREC	OUES	STED		0.1.00000000000000000000000000000000000
Q1-202	3 Weadock P	orewater Wells			23-0172	REQUESTER	: Haro	old I	Regi	ster				(Attach List if More Space is Needed)					ed)	QA REQUIREMENT:	
SAMPL	ING TEAM:		TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER								☐ NPDES  ⊠ TNI										
SEND	REPORT TO:	Caleb Batts			email:	phone:							1								□ ISO 17025
C	OPY TO:	Harold Registe	er		MATRIX CODES: GW = Groundwater OX = Other			C	ONT	AIN	ERS										☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludg W = Water / Aqueous Liquid A = Air	ge		1	PRES	SERV	AT	IVE	Metals	. J		_			☐ INTERNAL INFO		
LAB	LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gene	e eral Waste	TOTAL#				7 - 7			suc		Alkalinity					□ OTHER
SAI	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOT	None	HNO3	H <sub>2</sub> SO	HCI	MeOF	Total	Anions	TDS	Alk					REMARKS
23	-0172-13	3 4/3	1345	GW	MW-58		5	4	1				x	x	x						
	-14	31863		GW	DUP-JCW-LF-01		5	4	1				x	x	x						
	-15	3/9/03	-	GW	DUP-JCW-LF-02		5	4	1				x	x	x						
	-16	3/8/53	1340	GW	JCW-MW-18001 MS		4	3	1				x	x							
	-17	31863	1340	GW	JCW-MW-18001 MSD		4	3	1				x	x							
	-18	319/33	1353	W	FB-01		2	1	1				x	x							
+	-19	319 103	1358	w	EB-01		2	1	1				x	x				П			
																		П			
								Ī		1											
								I													
												h									
RELING	UISHED BY:	> =	3 (F)	DATE/	7.5	RECEIVED BY:	ues	Н		. 10				MMI							
RELING	UISHED BY:			DATE/		RECEIVED BY:											4 Yes 2.3				#: LS 027723 ue Date: <u>05 · 25 · 23</u>



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 24, 2023

Subject: HMP GROUNDWATER MONITORING – JCWEADOCK ASD – 2023 Q1

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0173

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 03/06/2023 for the 3<sup>rd</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The sample was received for analysis by the Chemistry department of Laboratory Services on 03/10/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

## II. Methodology

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

#### III. Results/Quality Control

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

### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

**Customer Name:** Karn/Weadock Complex **Work Order ID:** Q1-2023 Weadock ASD

**Date Received:** 3/10/2023 **Chemistry Project:** 23-0173

Sample # Field Sample ID Matrix Sample Date Site

23-0173-01 JCW-OW-18001 Groundwater 03/08/2023 14:17 JC Weadock ASD



03/24/23



Sample Site: JC Weadock ASD Laboratory Project: 23-0173

 Field Sample ID:
 JCW-OW-18001
 Collect Date:
 03/08/2023

 Lab Sample ID:
 23-0173-01
 Collect Time:
 02:17 PM

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	з Ехр	Aliquot #: 23-0	173-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Arsenic	149		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	100		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	1510		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	231000		ug/L	1000.0	03/21/2023	AB23-0320-03
Chromium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Cobalt	ND		ug/L	6.0	03/20/2023	AB23-0320-03
Copper	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Iron	14200		ug/L	20.0	03/20/2023	AB23-0320-03
Lead	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Lithium	62		ug/L	10.0	03/20/2023	AB23-0320-03
Magnesium	53200		ug/L	1000.0	03/21/2023	AB23-0320-03
Molybdenum	8		ug/L	5.0	03/20/2023	AB23-0320-03
Nickel	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Potassium	9940		ug/L	100.0	03/21/2023	AB23-0320-03
Selenium	1		ug/L	1.0	03/20/2023	AB23-0320-03
Silver	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Sodium	62400		ug/L	1000.0	03/21/2023	AB23-0320-03
Thallium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Vanadium	ND		ug/L	2.0	03/20/2023	AB23-0320-03
Zinc	ND		ug/L	10.0	03/20/2023	AB23-0320-03
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	173-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/20/2023	AB23-0320-04
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	173-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	43400		ug/L	1000.0	03/16/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/16/2023	AB23-0315-03
Sulfate	515000		ug/L	1000.0	03/16/2023	AB23-0315-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	173-01-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1270		mg/L	10.0	03/10/2023	AB23-0310-06
	23	-0173 Page	5 of 9			



A CENTURY OF EXCELLENCE

## **Analytical Report**

**Report Date:** 03/24/23

Sample Site: JC Weadock ASD

Field Sample ID: JCW-OW-18001

Laboratory Project: 23-0173

Collect Date: 03/08/2023

Collect Date: 03/08/2023
Collect Time: 02:17 PM

Lab Sample ID: 23-0173-01 Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot #: 23-0	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	418000	ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Bicarbonate	418000	ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Carbonate	ND	ug/L	10000.0	03/13/2023	AB23-0313-09





**Report Date:** 03/24/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

## General Standard Operating Procedure

## TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number:	23 -0	173		_		
Inspection Date: 03	10.23		Inspection	By: Cle		
Sample Origin/Project Name	: Wead	OCK ASA	7			
Shipment Delivered By: Ent	er the type	of shipment c	earrier.			
PonyOther/Fland Carry (w.	FedEx	TRC U	PS	USPS	Aiı	bome
Tracking Number:			Shipp	ing Form Atta	ched: Yes	No
Shipping Containers: Enter t	he type and	number of sl	hipping containe	ers received.		
Cooler <u>()</u> Loose/Unpackaged C		Box		Case	Envelop	oe/Mailer
Condition of Shipment: Ente	r the as-rec	eived conditi	on of the shipme	ent container.		
Damaged Shipment C		Ione		ented	. Lea	king
Shipment Security: Enter if a	ny of the ch	inning conta	iners were onen	ed before race	int	
Shipping Containers F				aled M	-	
Enclosed Documents: Enter t	he type of d	ocuments en	closed with the s	shipment.		
CoC Wo	rk Request		Air Data S	Sheet	Other	
Temperature of Containers: 1	Measure the	temperature	of several samp	le containers.		
As-Received Tempera	ture Range_	1.1.2.30	Samples	Received on l	ce: Yes_X_ 1	4o
M&TE # and Expiration	on LS 02	1723				
Number and Type of Contain	5.25 ers: Enter	·23 the total num	ber of sample co	ontainers recei	ved.	
Container Type	Water	Soil	Oth		Broken	Leaking
VOA (40mL or 60mL)	1					
Quart/Liter (g/p)						
9-oz (amber glass jar)						
2-oz (amber glass)						
125 mL (plastic)	2					
24 mL vial (glass)						
25 0500 mL (plastic)	1					
Other		_	-			



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Page	of	
1 450		_

SAMPLING SITE / CU				PROJECT NUMBER:	SAP CC or W	O#:							ANALYSIS REQUESTED (Attach List if More Space is Needed)				QA REQUIREMENT:					
Q1-2023 Weadock A	ISD			23-0173	REQUESTER	: Haro	old I	Regi	ster				(Att	ach L	ist if	Mor	e Spa	ice is	Needed	i)		
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:  24 HR 48 HR 3 DAYS 5 ST	RNAROUND TIME REQUIRED:  24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER								l						□ NPDES ☑ TNI			
SEND REPORT TO:	Caleb Batts			email: phone:																	☐ ISO 17025	
COPY TO:	Harold Regis	ster		MATRIX CODES:  GW = Groundwater OX = Other		1	C	ONT	AIN	ER	S										☐ 10 CFR 50 APP. B	
	TRC			WW = Wastewater SL = Sludg W = Water / Aqueous Liquid A = Air					PRESERVATIVE			sle			500						☐ INTERNAL INFO	
LAB	SAMPLE COL	LECTION	XIX	S = Soil / General Solid   WP = Wip   O = Oil   WT = Gen	e eral Waste	AL#							ns		Alkalinity	dime.					OTHER	
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO		Waste # TOLOL		HNO H <sub>2</sub> SO		H <sub>2</sub> SO <sub>4</sub> NaOH HCl MeOH		Total Metals	Anions	TDS	Alka	AINA				REMARKS		
23-0173-01	3/8/33	141)	GW	JCW-OW-18001		5	4	1				x	x	x	x						KEMAKKS	
						+	H		1	H		-	-		-	-	-	-				
										+		t	H			ł	+			H		
							Ħ			Ī		t	t				t					
							L			L												
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							F					t	-			+		+				
										t		T						T		Ħ		
RELINQUISHED BY:	3/		DATE/	. 7	RECEIVED BY:	3.12							OMN									
RELIMOUSHED BY:	3		DATE/		RECEIVED BY:								eceivo								#: LS027723 Date: 5.25.23	



## **Appendix F Field Records**

# TRC

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NUMBER:	514403.0000.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	3 18 13 3 19 133 212712029 TO 3/0/2023 First Quarter HMP Sampling Event
PURPOSE OF FIELDWORK:	
WORK PERFORMED BY:	Javier Jasso

SIGNED 3/13/37 DATE

CHECKED BY 3-13-23

DATE



#### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com DATE:	3/8/22	TIME ARRIVED 2500
PROJECT NUMBER:	514403.0000.0	0000 AUTHO	R: Javier Jasso	TIME LEFT: 1517
			·	•
		WEATH		
TEMPERATURE: 34	<mark>∂ °F</mark> WIND:	20 MPH	VISIBIL	ITY: Clar
	Wo	ORK / SAMPLING	PERFORMED	/
weller SA	nre= Jca- M	w 18001	wramed '7cr	n-on+800(
MW-SO (D	4p +01			
		•	·	
PDOF	I FMC FNCOUNTEDE	D	CORRECTI	VE ACTION TAKEN
PROE	BLEMS ENCOUNTERE	<u> </u>	CORRECTI	VE ACTION TAKEN
	0.100	<u> </u>		
		COMMUNIC	ATION	
NAME	REPRESENTING		SUBJECT / COM	IMENTS
Darby Litz	TRC	PM - Updates		·
Caleb Batts	Consumers	Site Contact		
	INVESTI	GATION DERIVE	D WASTE SUMMARY	
WASTE MATRIX	QUANTITY	· · · · · · · · · · · · · · · · · · ·	COMMENT	
Groundwater	NM	To Ground		
13778			Λ	
	2/12/2		11e 2	3-13-23
SIGNED	<del>_ ^ '''')</del>	DATE	CHECKED BY	DATE

REVISED 04/2019



#### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com DATE:	3/9/23	TIME ARRIVED:
PROJECT NUMBER:	514403.0000.0	0000 AUTHO	R: Javier Jasso	TIME LEFT: MO
		WEATH	≣R	
TEMPERATURE: 3	) °F WIND:	is to what	VISIBILIT	Color Clyan
	WC	ORK / SAMPLING	PERFORMED	
wells SA	mac (= MW =	51,52,5	3,53 R,54R, 10 -, Jan Mu 180	wmw 16004
MW-55, bu	UMW 18005	,57 ROW	-, Jan Ma 180	or Dupts
58, EB, F	= B			\
L.M.		· · · · · ·		
PROE	BLEMS ENCOUNTERE	D	CORRECTIVE	ACTION TAKEN
·		_		
148.50				<u></u>
		COMMUNIC	ATION	
NAME	REPRESENTING		SUBJECT / COMMI	ENTS
Darby Litz	TRC	PM - Updates		
Caleb Batts	Consumers	Site Contact		
	INVESTI	GATION DERIVE	D WASTE SUMMARY	
WASTE MATRIX	QUANTITY		COMMENTS	
Groundwater	NM	To Ground		
		•		•

3/13/03 DAT

CHECKED BY

3-13-23

DATE

REVISED 04/2019



#### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC Weadock LF: 202	23 GW Co	SAMPLER NAME: Javier Jasso								
PROJECT NO.:	514403.0000.0000		OCIVIL LET INCIVIL. JAVIEL JASSU								
WATER LEVEL MEASI	JREMENTS COLLECTED	WITH:									
HEF	RON DIPPER- <b>T</b>	•	TRC A2								
NAME AND MODEL OF IN	NSTRUMENT		SERIAL NUMBER (IF APPLICABLE)								
PRODUCT LEVEL MEA	ASUREMENTS COLLECT	ED WITH	l:								
	NA		NA								
NAME AND MODEL OF IN	NSTRUMENT		SERIAL NUMBER (IF APPLICABLE)								
<b>DEPTH TO BOTTOM C</b>	OF WELL MEASUREMENT	TS COLL	ECTED WITH:								
HEI	RON DIPPER-T		TRC A2								
NAME AND MODEL OF IN	NSTRUMENT		SERIAL NUMBER (IF APPLICABLE)								
PURGING METHOD											
PERISTALTIC PUMP			TRC A2								
NAME AND MODEL OF F	PUMP OR TYPE OF BAILER		SERIAL NUMBER (IF APPLICABLE)								
SAMPLING METHOD											
PER	IS <b>T</b> ALTIC PUMP		TRC A2								
NAME AND MODEL OF F	PUMP OR TYPE OF BAILER		SERIAL NUMBER (IF APPLICABLE)								
GEOTECH	I DISPOSABLE FILTER		0.45 MICRON								
NAME AND MODEL OF F	FILTERATION DEVICE		FILTER TYPE AND SIZE								
DEDICA	ATED POLY TUBING		LOW-FLOW SAMPLING EVENT								
TUBING TYPE			<u>-</u>								
PURGE WATER DISP	OSAL METHOD										
✓ GROUND	DRUM	POTW	☐ POLYTANK ☐ OTHER								
DECONTAMINATION	AND FIELD BLANK WATI	ER SOUI	RCE								
S	TORE BOUGHT		LABORATORY PROVIDED								
POTABLE WATER SOUR	RCE		DI WATER SOURCE								
( )_	- 3/12/2		Je Ly 3-13-23								
SIGNED	<del>) (( ) '( )</del>	DATE	CHECKED BY DATE								
REVISED 04/2019			V								

## ?TRC

#### WATER QUALITY METER CALIBRATION LOG

	WATER Q	UALITI	MICI	EK C	4LIDKA	HON LOG			
PROJECT NAME:	CEC Weadock LF: 2023 GV	V Complian	ce	MODEL:	YSI Pro DS	S	SAMPLER: JJ		
PROJECT NO.:	514403.0000,0000			SERIAL#	#: REN	ΓAL	DATE: 3/7/	63	
PH C	CALIBRATION CHECK				SP	ECIFIC CONDU	ICTIVITY CALIBI	RATION CI	HECK
	pH 4/10 (LOT #): HO 1 304 (EXP. DATE): GLOY POST-CAL. READING/STANDARD	CAL. RANGE	TIME	,	(LOT #): (EXP. DATE):	READING (1017 9123 READING/STANDARD	TEMPERATURE	CAL. RANGE	TIME
700 1700	400 1 400	WITHIN PANGE	056	-	1304	11309	200	WITHIN RANGE	050
/	1	RANGE WITHIN RANGE				/ /		RANGE WITHIN RANGE	
1	1	WITHIN				1		WITHIN	
ORP	CALIBRATION CHECK	- RANGE	L	1	L	D.O. CAL	IBRATION CHE		L
CAL. READING	TEMPÉRATURE			1	CAL	. READING	TEMPERATURE	1 · · · · · · · · · · · · · · · · · · ·	
(LOT#): (C/K 1000)(e (EXP. DATE): G (J.Y) POST-CAL READING/STANDARD	(*CELSIUS)	CAL. RANGE	TIME			ADING/SATURATED AIF	(°CELSIUS)	CAL. RANGE	TIME
220 1820	210	WITHIN			85	11801	<i>2</i> a.	WITHIN	0510
/		WITHIN RANGE				1		WITHIN RANGE	0
1		WITHIN RANGE				1		WITHIN RANGE	
1		WITHIN		1		1		WITHIN RANGE	
TURBID	ITY CALIBRATION CHEC	<del></del>	1		L		COMMENTS	.1	
	READING (NTU)			1	AUTO	CAL SOLUTION	✓ STANDAR	SOLUTION	(S)
(LOT #): AV2 173 (EXP. DATE): 6124	(LOT #): (EXP. DATE):	CAL. RANGE	TIME		(LOT#): (EXP. DATE)	· •	LIST LOT NUMBERS UNDER CAL	AND EXPIRAT	
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	1			CALIBRA	TED PARAMETERS	CALIBRAT	ION RANGES	(1)
0 10	1	WITHIN	05L			ρН	pH: +/- 0.2 S	.U.	
100 /100	/	WITHIN	05/0	7		COND	COND: +/- 1% (	OF CAL. STA	NDARD
/	1	WITHIN RANGE		1		ORP	ORP: +/- 25 m	V	
1	1	WITHIN RANGE				D.O.	D.O.: VARIES		
	NOTES			7		TURB	TURB: +/- 5% (	OF CAL. STAI	NDARD
				-			THE MODEL OF THE		
	PROBLEMS ENCOUNTERED			<u> </u>	·····	CORREC	TIVE ACTIONS	·· · · · · · · · · · · · · · · · · · ·	
			·	-			· · · · · · · · · · · · · · · · · · ·		
					· · · · · · · · · · · · · · · · · · ·	·			
				1					
SIGNED	3/13/2	)2 DATE	_		c⊬€	KED BY		3-13-	23 DATE

## → TRC

#### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Weadock LF: 2023 GV	V Compliano	œ	MODEL: YSI F	ro DSS	<u> </u>	SAMPLER		JJ	
PROJECT NO.:	514403.0000.0000			SERIAL #:	RENT	AL .	DATE: 🎖	915	`````````	
DH (	CALIBRATION CHECK			I	SPF	CIFIC CONDU	CTIVITY (	:ALIBR	ATION C	HECK
(LOT #): 26 163 4 (EXP. DATE): 26	pH 4 / 10 (LOT #): 20 300 (EXP. DATE): 2 6-4	CAL. RANGE	TIME	(LOT:	CAL.	READING 9101 9133	TEMPERA	TURE	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL, READING / STANDARD	rt wrrein		i		ADING/STANDARD	<b>3</b> (		<b>M</b> WITHIN	
100 /700	40 /40	WITHIN RANGE	000	\\3	09	109	<u></u> 게.		WITHIN	uscu
1	,	RANGE				1			RANGE	
· /	,	RANGE WITHIN RANGE		-		. 1			RANGE WITHIN RANGE	
ORP	CALIBRATION CHECK	I KANGE				D.O. CAL	IBRATION	CHEC		
CAL READING	TEMPERATURE				CAL.	READING	TEMPERA	TURE		
(LOT #): [CINIOOC (CEXP. DATE): 9 124  POST-CAL. READING / STANDARD	(°CELSIUS)	CAL. RANGE	TIME	POST	CAL REAL	DING /SATURATED AIR	(°CELS	(US)	CAL. RANGE	TIME
220 / 23C	210	WITHIN	o (w	<b>!</b>		1805	25	<u> </u>	WITHIN	0500
1	<i>y</i> (3)	WITHIN	0 (00			1			WITHIN	
1 .		WITHIN RANGE		]		1			WITHIN RANGE	
1		WITHIN RANGE				1			WITHIN RANGE	
TURBID	ITY CALIBRATION CHEC	K					COMMEN	ITS		
	READING (NTU)	1		I I		L SOLUTION	✓ STA	NDARD	SOLUTION	(S)
(LOT #): A2 [7]	(LOT #): (EXP. DATE):	CAL. RANGE	TIME	(LOT	#): DATE):				ND EXPIRAT	
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			C.A	LIBRATE	D PARAMETERS	C/	LIBRATIO	ON RANGES (	1)
010	. 1	WITHIN	050	[	] pl	4	pH: +	·/- 0.2 S.U	J.	
100/100	1	WITHIN	a re	1   [	] c	OND	COND: +	/- 1% OF	CAL. STAN	IDARD
1	1	WITHIN			_	RP		-/- 25 mV		
/		WITHIN RANGE		]   _	_	.O.	1	/ARIES		
	NOTES			,   _	יד <u>ן</u>	URB	TURB: +	/- 5% OF	CAL. STAN	NDARD
				]   [	] -		<sup>(1)</sup> CALIBRA THE MODEL		IGES ARE SF WATER QUAL	
								,		
	PROBLEMS ENCOUNTERED					CORRECT	VE ACTIONS			
	2/13/24					le re	<u> </u>	3-	13-2	3
SIGNED	, , , , , , , , , , , , , , , , , , , ,	DATE			CH <b>E</b>	(ED BY	0			DATE



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 3 (6123
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

	011100.00				11. 041101 04000	·
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW-MW-18001	0430	TOC	17.35	23.75	NA	NM
JCW-MW-18004	0721	TOC	12.24	14.97	NA	NM
JCW-MW-18005	0739	TOC	しょうう	16.28	NA	NM
JCW-MW-18006	0754	TOC	1296	2363	, NA	NM
JCW-OW-18001	06271	TOC	Ce.44.	26.5 €	NA	NM
JCW-OW-18002	064c	TOC	8.64	19.41	NA	NM
JCW-OW-18003	bu 51	TOC	7,60	Dar aw	NA	NM E
JCW-OW-18004	222	TOC	6.69	14.87	NA	NM
JCW-OW-18006	6757	TOC	6.58	2345	NA	NM
LH-103R	0710	TOC	23.5%	33.46	NA	NM
LH-104	6729	TOC	7.51	14.00	NA	NM
JCW-MW-20	67岁0	TOC	5.27	20 W	NA	NM
MW-50	0651	тос	13.96	19.40	NA	NM
MW-51	ouu-	TOC	14.7)	20.00	NA	NM
MW-52	06,70	TOC	(5.38)	(9.74	NA	NM
MW-53	0659	TOC	1402	18.16	NA	NM
MW-53R	0703	тос	14.84	18.80	NA	NM
MW-54R	0715	тос	14.00	17.27	NA	NM
MW-55	6727	тос	14.16	14.3 4	NA	NM
MW-58	OED W	тос	534	(8.) (	NA	NM
OW-51	blosh	TOC ,	9.50	17.78	NĄ	NM
OW-53	טזט	тос	6.64	18.00	NA ,	NM
OW-54	0716	тос	6.47	16.46	NA	NM
OW-55	0734	тос	5.00	18.47	NA	NM
OW-56	0747	тос	4.40	1927	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).  $_{\Lambda}$ 

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3-13-23

DATE



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 3 WB3
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
OW-56R	0744	TOC	4.38	20.93	NA	NM
OW-57 IN	0751	TOC	4.61	19,60	NA	NM
OW-57R IN	0750	TOC	4.50	20.18	NA	NM
OW-57 OUT	07460	TOC	9,10	19.48	NA	NM
OW-57R OUT	0749	TOC	8.50	20.20	NA	NM
JCW-MW-15007	delo	TOC	3.18	13.8	, NA	NM
JCW-MW-15009	060 t4	TOC	19.79	13.00	NA	NM
JCW-MW-15010	8053	TOC	17.64	1947	NA	NM
JCW-MW-15028	rsei3	TOC	C644)	25,16	NA	NM
MW-15002	0839	ТОС	Cell	(6-80	ŅA	NM
MVV-15008	0023	TOC	4.31	17.48	NA	NM
MW-15016	0843	тос	3,14	8.10	NA	NM
MW-15019	०७३३	тос	Cochs	16.67	<sub>6</sub> NA	NM
JCW-15082	Oe TT	,4 <u>1</u> ;	15.40	100 plus		
JOW MU 1502C	0704		14,94	160 plus		
MW.16R	6717		1402	19.85		
Jan Mulson	0724		15.49	works		4
06-61	083		826	3707		
MW-19	0817		Ele7	2083		
MWISOSC	0835	脊	502	100 plus		
muller	6630		4.74	32.74		
MW-15024	0631		5.74	17.17	a	
MUL5018	0636	2	5.16	9.94		·
SCUMULSOUL	0841		9.23	100 plus		
			· · · · · · · · · · · · · · · · · · ·			

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 3 (13/03

CHECKED

3-13-23

DATE

REVISED 04/2019

## → TRC

PROJECT NAME: CEC Weadock LF: 2023 GW C PREPARED CHECKED									CKED		
PROJECT	NUMBER	R: 514403	3.0000.0000	BY	JJ	DATE: 3k3	bン BY:	2K	DATE: 3-17-23		
SAMPLE I	D: YU	- Mw-	18001	WELL DIA	METER: 🗸	2"	6" OT	HER			
WELL MAT	ERIAL:	✓ PVC	ss	IRON GA	LVANIZED S	STEEL	От	HER			
SAMPLE T	/PE:	☑ GW	□ww □	SW 🗌 DI		LEACHATE	□ от	HER	_		
PURC	SING	TIME:しろ	O T DA	TE3 (815		AMPLE			DATE:318 63		
PURGE METHOD	. –	PUMP BAILER	PERISTALTIC F	PUMP		<u>(4.68</u> s -55.5 m		исті <b>літу<u>33</u> 83</b> 7	mg/L umhos/cm		
DEPTH TO	WATER:	17.35	T/ PVC		ŢURBI	DITY: U.	NTU				
DEPTH TO	воттом:	<i>7</i> 371	T/ PVC		- H NOI	NE 🗌 SLI	GНТ □	MODERATE	□ VERY		
WELL VOL	WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 100 OTHER:										
VOLUME F	VOLUME REMOVED: THE LITERS GALLONS COLOR: COLOR: MON										
COLOR:	0	won	OD(	ORMON L	FILTRA	TE (0.45 um)	YES	<b>₽</b> NO			
		TURI	) BIDITY		FILTRA	TE COLOR:		FILTRATE O	DDOR:		
NONE	SLI	GHT	MODERATE	<b>∠</b> VERY		MPLE: MS	/MSD	DUP-			
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:											
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERAT	LEVE	L PURGE VOLUME		
ED 63	(ML/MIN)	(SU)	(umhos/cm)	(I), C	(mg/L)	(NTU) 350	9.9	(FEET	· · · · · · · · · · · · · · · · · · ·		
1301	200	(27)			+			170 3			
1710		(Pet)	3406	(0,1	0./	(ec	(0,6	11/1-	<u> </u>		
(3/5		Coll	3300	-210	089	40	108				
1370		Cotor	3760	·uo	058	14.8	110	10/6	5 3		
13,5		ColeT	3315	-50	648	10	10.4	1716	5 4		
1330		low	3339	~ 55.0	643	5.0	11.0	17/0	5 7		
(ろうじ		Galin	3347	-95-3	641	4,5	11.0	1713			
300		Gle	3343	-55.5	0.39	4.5	tho	17/	<b>4</b> 7		
NC pH: +/-		ILIZATION 1	TEST IS COMPL		SUCCESSIV D.O.: +/- 0.3			THE FOLLOW	VING LIMITS:		
BOTTLES	S FILLED	PRESERVA	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaC	DH E-	HCL F		
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTER	ED NUMB	BER SIZE	TYPE	PRESERV	ATIVE FILTERED		
3	701	gla	0		N				□Y □N		
(	250	PI	A		- N						
3	101	DI	A		] N				□Y □N		
3	105	PI	12		N				□Y □N		
		L		□ Y □	] N				☐ Y ☐ N		
SHIPPING	METHOD:	fed	las Depos	TE SHIPPED:	3-10	7-23	AIRBILI	NUMBER:			
COC NUM	BER:		SI	GNATURE:		$\supset$	DATE S	SIGNED: 3	(13/03		

## **◇** TRC

PROJECT NAME:	CEC Wea	adock LF: 20	023 GW C	PR	EPARED		CHEC	KED		
PROJECT NUMBER	R: 514403.0	000.0000	BY:	JJ	DATE:3\()	lsろ BY:	2K	DATE:3-13-23		
SAMPLE ID: X W	-0W18	306 (	WELL DIAM	METER: 🗸	2"	6"  OTH	IER			
	✓ PVC		IRON GAI	LVANIZED S	STEEL	□ от⊦	IER			
SAMPLE TYPE:	☑ GW 🔲	ww 🗆	SW DI		LEACHATE	□ от⊦	IER	·		
PURGING	TIME: (3°	<b>) )</b> DA	TE:3(8()3	,	AMPLE	TIME: (	117 D	ATE:3 (& (2)		
METHOD: —	PUMP PE BAILER	RISTALTIC F	PUMP	1	<u>LeleU</u> s <u>~151.3</u> m		0,40 mg	umhos/cm		
DEPTH TO WATER:	6.44 T/	PVC		TURBI	DITY: 6.	NTU				
DEPTH TO BOTTOM	700 TI	PVC		T NO		GНТ 🗌	MODERATE	☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS TEMPERATURE: 43 °C OTHER:										
VOLUME REMOVED:		LITERS	GALLONS	COLO	r clucy		ODOR:	2000		
COLOR:	Juan	OD	OR: <b>NO NU</b>	2 FILTRA	TE (0.45 um)	YES	<b>₹</b> NO			
	TURBID	TY			TE COLOR:		FILTRATE OD	OR:		
☐ NONE 📝 SLI		DDERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP-			
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:										
TIME PURGE RATE (ML/MIN)		ONDUCTIVITY	ORP	D.O.	TURBIDITY (NTU)	TEMPERATU	JRE WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)		
1353 24		(umhos/cm) $_{\mathcal{O}}$ $_{\mathcal{O}}$ $_{\mathcal{O}}$	(m/)	(mg/L)	30	9.0	650	INITIAL		
	1 / -	1701		10	110	8.8	لو،لون			
1357	(ale)	696	-37.0		8.9	9.0		1 2		
1407			-50,8		9.0		loca			
1407	( V ~ \ )	1693		QSI		9.3	lalec			
1417		lesco	<b> </b>	044	8.7	9.3	blac	4		
14(7)	Ce. Le 4	1674	· 51.3	040	8.5	4.3	Certeo	5		
U		***************************************								
NOTE: STAB	LIZATION TES	ST IS COMPI	ETE WHEN 3	SUCCESSIV	'E READINGS A	RE WITHIN	THE FOLLOWIN	IG LIMITS:		
pH: +/- <b>0.1</b>	COND.: +/- 3 9	% ORP:	+/- 10	D.O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-		
BOTTLES FILLED	PRESERVAT	IVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaO	H E- H	CL F		
NUMBER SIZE	TYPE P	RESERVATI	VE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVAT	IVE FILTERED		
2 125	aleur	A		N				N U Y		
1 250	P1	A		N				□ Y □ N		
105	PI	A		N			<u> </u>	UY UN		
761	pl	B		JN						
		· <i>y</i>		N				□ Y □ N		
SHIPPING METHOD:	lab drap	off D	ATE SHIPPED:	3-1	O-23	AIRBILL	NUMBER: 4			
SHIPPING METHOD:	lab drap		ATE SHIPPED: GNATURE:	3-1	0-23		IGNED: 7/12	133		

## TRC

PROJECT NAI	ME:	CEC W	eadock LF:	2023 GW C	PR	EPARED			CHEC	KED ,
PROJECT NU	MBER	t: 514403	3.0000.0000	BY	: JJ	DATE	りり	(: J	۷ .	DATE: 3-13-23
SAMPLE ID:	ηιι	50	)	WELL DIA	METER: 🗸	2" 🔲 4" 🔲	6" 🔲 🤇	THER		
WELL MATERIA	۱L:	√ PVC	ss [	] IRON   GA	LVANIZED	STEEL		OTHER		
SAMPLE TYPE:		☑ GW	ww	] SW 🔲 DI		LEACHATE		THER		
PURGING	G [	TIME:	30 [	DATE: 3 (8 /2	7 I	AMPLE	TIME: \		<del>-   </del>	TE:3 (4 b)
PURGE METHOD:	_	PUMP BAILER	PERISTALTIC	C PUMP		7.2 s	U CON	Det 1		umhos/cm
DEPTH TO WA	TER:	1396	T/ PVC		TURB	DITY: 4, C	NTU			
DEPTH TO BO	ттом:	194c	T/ PVC		Ø NO		GHT	МОГ	ERATE	☐ VERY
WELL VOLUME: NA LITERS CALLONS TEMPERATURE: 400 OTHER:										
VOLUME REM	OVED:		LITERS	GALLONS		r: <u>C</u> Q	CeV_	ODC		ONY
COLOR:		/wev		DOOR: nor	FILTRA	ATE (0.45 um)	YES	_ <del>□</del>	<del>N</del> O	
			BIDITY		FILTRA	TE COLOR:			RATE ODC	)R:
	J SLI		MODERATE	☐ VERY	QC SA	AMPLE: MS	/MSD	×	DUP- 🕢	<u> </u>
DISPOSAL ME	THOD:	✓ GROUN	ID DRUI	M 🗌 OTHER	COM	MENTS:				
I IME R	RGE ATE	PH	CONDUCTIVIT		D.O.	TURBIDITY	TEMPER		WATER LEVEL	CUMULATIVE PURGE VOLUME
	/MIN) ~ ( )	(SU) 7らう	(umhos/cm)		(mg/L)	(NTU)	<u>ල</u> ව්.	7	(FEET) 13つく	(GAL OR L) INITIAL
	4	7.29		-)(e, c		340		,	<u></u>	1
10/3 (		7 35	1338	32.0	1.5	9.6	9.0		1380	
10,40	_ _	[K 15 ]	1341	- 35.8	1.0	9.2	93		(380	<u> 1</u>
1902 T	_	29)	1340	€35.E	099	6.7	90		1380	3
1450		7,27	1398	=36.0	095	9,1	9.	ን	1380	4
14									1386	<del>                                     </del>
	1									
	1									
							<u> </u>			
NOTE: pH: +/- <b>0.1</b>		ILIZATION 1 COND.: +/-		IPLETE WHEN 3 P: +/- 10	SUCCESSIND.O.: +/- 0.3			IIN THE I		IG LIMITS: TEMP.: +/-
BOTTLES FIL	LED	PRESERVA	ATIVE CODE	S A - NONE	B - HNO3	C - H2SO4	1 D-N	laOH	E - HC	CL F
	SIZE	TYPE	PRESERVA	<del></del>	<del></del>		TYPE	PR	ESERVAT	IVE FILTERED
	50	DI	A		1 N					
1	<del>)</del> 7	DI	A				<del> </del>			
		21	5		7 N					
9 10	7	r · ·	(*)		] N		<del> </del>	_		
					] N			_		
SHIPPING MET	THOD:	lab Dro	op off	DATE SHIPPED:	3-10	-23	- AIRE	ILL NUM	IBER:	
COC NUMBER	:			SIGNATURE:			DAT	E SIGNE	D:3//3	133
						1				- — , — — —

### ♦ TRC

PROJECT NAME: CEC Weadock LF: 2023 GW C		PREF	PARED			CHEC	KED		
PROJECT NUMBER: 514403.0000.0000	BY:	IJ	DATE: 1/3	<sub>フ</sub> カ BY	JK		DATE:3:-13-127		
SAMPLE ID: 1 WELL WELL MATERIAL: PVC SS IRON		TER: 2			THER THER				
SAMPLE TYPE: GW WW SW	DI		EACHATE		THER				
PURGING TIME: 1054 DATE3 9	<del></del>	SAI	MPLE	TIME: ř.C.	·2 4	DA	TE3 9/3		
PURGE ✓ PUMP PERISTALTIC PUMP	<u>~)</u> _	PH: 7.	) 3 SI	<del> </del>	UCTIVI	1	umhos/cm		
METHOD: BAILER		ORP:	.t <b>₹</b>	/ DO:	07		/L		
DEPTH TO WATER: 1473 T/ PVC		TURBIDI		NTU					
DEPTH TO BOTTOM: US.CV T/ PVC NONE SLIGHT MODERATE VERY									
WELL VOLUME: NA LITERS GALLO	NS	TEMPER	ATURE: <u>(</u>	<u>,v</u> .c	отн				
VOLUME REMOVED:		COLOR:	Gear		ODC	$R: \mathcal{M}$			
color: Clarka odor: Od	<u>~</u> _	FILTRATE	E (0.45 um)	YES	7	NO			
TURBIDITY		FILTRATE	COLOR:	<del></del>	FILT	RATE ODG	DR:		
NONE SLIGHT MODERATE VE	RY	QC SAM	PLE: MS/	MSD		DUP-			
DISPOSAL METHOD: GROUND DRUM OTHE	R	COMME	NTS:						
TIME PURGE PH CONDUCTIVITY ORP			TURBIDITY	TEMPERA		WATER LEVEL	CUMULATIVE PURGE VOLUME		
(ML/MIN) (SU) (umhos/cm) (mV)		(mg/L)	(NTU) 5 4	(°°) G 🔻		(FEET)	(GAL OR L) INITIAL		
000 1 000 1 211				1 8.5		1475	,		
V /		26	37	<u> 6. 4</u>	`	1475	1		
Sely 7.24 1686 215		1.3	(4, 8)	<u> (4. )</u>		11055	3		
ac19 7.22 1701 200		CO	5.7	<u> (%()</u>		17/	3		
5624 723 1698 150	1	330	49	હિ.દ		1475	4		
6004 7.23 1703 148		ردد٩	5.0	6.9	<i>)</i>	1475	9		
6634 7.23 1700 145	(	570	4.9	<i>پ</i> ٠٤	,	1475	<i>\(\begin{array}{c}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>		
NOTE: STABILIZATION TEST IS COMPLETE WHE	N 3 SUC	CCESSIVE	READINGS A	RF WITHII	N THE E	OLLOWIN	GLIMITS:		
pH: +/- <b>0.1</b> COND.: +/- <b>3</b> % ORP: +/- <b>10</b>		.: +/- 0.3	TURB: +/-		r ≔</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-		
BOTTLES FILLED PRESERVATIVE CODES A - NONE		- HNO3	C H3804	D - Na	.04	E - HC			
	ERED	NUMBE	C - H2SO4	TYPE		ESERVAT			
	lea l	+	SIZE	1156	1 - 1	LOLIVATI	TY N		
	BN.		-		_				
	KN.				-				
135 21 B DY	N ELL		_		_				
	ШИ								
SHIPPING METHOD: Int drop of DATE SHIPP	ED:	3~10	7-23	AIRBII	L NUM	BER:			
COC NUMBER: SIGNATURE	:			DATE	SIGNEÍ	2 [12]	()}		
1						<i>-</i>			

## ↑ TRC

PROJECT	NAME:	CEC W	Veadock LF:	2023 GW C	PR	EPARED		CHECKED		
PROJECT	NUMBEF	R: 514403	3.0000.0000	BY:	JJ	DATE:	by BY:	2K	DATE: 7-13-23	
SAMPLE	D: M	U-5	7	WELL DIAN	METER: 🗸	2" 4"	6" O	THER		
WELL MAT	ERIAL:	✓ PVC	ss [	] IRON   GAL	VANIZED S	STEEL	□ o	THER		
SAMPLE T	YPE:	☑ GW	□ww □	SW DI		LEACHATE	o	THER		
PURG	SING	TIME	48	ATE: 3/4/30	3 S	AMPLE	TIME: O	£ & C	DATE: 7 (4/3)	
PURGE		PUMP	PERISTALTIC	PUMP	PH: t	<del>4.13</del> 6.8	COND	UCTIVITY: _	<u>n (v² ′</u> umhos/cm	
METHOD	):	BAILER			ORP:	<u> 39                                    </u>	V DO:	050	mg/L	
DEPTH TO	WATER:	5.36	T/ PVC	,	TURBI	DITY: <u>"7. (</u>	NTU			
DEPTH TO	воттом:	1974	T/ PVC		Дио	NE SLI	GHT [	MODERAT	E VERY	
WELL VOL	WELL VOLUME: NA ☐ LITERS ☐ GALLONS TEMPERATURE: C OTHER:									
VOLUME F	REMOVED:		LITERS	GALLONS	COLO	7: <u>(</u>		ODOR:	non	
COLOR:	(	100 5	رم ه	DOR: AOK	_ FILTRA	TE (0.45 um)	YES	X NO		
		TURI	BIDITY		FILTRA	TE COLOR:		FILTRATE	ODOR:	
☐ NONE	SLI	gнт <b>Д</b> ́	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP-		
DISPOSAL	. METHOD:	✓ GROUN	ND DRUM	1 OTHER	COMM	IENTS:				
TIME	PURGE	PH	CONDUCTIVIT	Y ORP	D.O.	TURBIDITY	TEMPERA	TURE WAT		
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	LEV FEE		
15040	24	7.68	1040	100	9.0	60	4,2	150		
de 53		697	1734	121	1.5	23	5.9	150	1	
06256		(0.80	1754	100	1.0	الع	6,4		15 व	
0703		600	1786	90	080	11	لو، نو			
709		(274	1759	78	069	9.5	(e. 3		45 4	
7		( 7°	1767	u 6	059	(ei)	6.3			
6713 6716					053	6,6	(y, 1			
		(e.77	ner	40		70	(2)			
الرزري	. !	4.77	176	39	650	<i>k</i> O	· ·	1 13		
									·	
NC	TE: STAB	ILIZATION		PLETE WHEN 3 S						
pH: +/-	0.1	COND.: +/-	3 % ORI	P: +/- <b>10</b>	).O.: +/- <b>0.3</b>	TURB: +/-	10 % c	or = 10</td <td>TEMP.: +/-</td>	TEMP.: +/-	
BOTTLES		PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - Na	OH E	- HCL F	
NUMBER	SIZE	TYPE	PRESERVA	1 1 1 4		ER SIZE	TYPE	PRESER	VATIVE FILTERED	
t	216	PI	A		N				☐ Y ☐ N	
	100	71	Λ		N				□ Y □ N	
1	101	21	B		N				□Y □N	
					N				N Y	
					N				□Y □N	
SHIPPING	METHOD:	lab Dop	066	DATE SHIPPED:	3-10	-23	AIRBII	L NUMBER:		
COC NUMI		TO UNIT		SIGNATURE:			·	SIGNED:	10/12	
ICOC MOINI	DEN.	te		DIOINATURE.	/_		DATE		12105	

## ○ STRC

PROJECT NAM	ME: CEC V	Veadock LF: 20	23 GW C	PRI	EPARED		CHECKED			
PROJECT NUM	/IBER: 51440	3.0000.0000	BY:	JJ	DATEZ	63	SY: J	٢	DATE: 3-13-23	
SAMPLE ID: N	1W 53		WELL DIA	METER: 🗸	2"	6"	OTHER			
WELL MATERIAL	L: V PVC	SS   I	RON GA	LVANIZED S	STEEL		OTHER			
SAMPLE TYPE:	☑ GW	□ww □ s	SW 🗌 DI		LEACHATE		OTHER	<del>.</del>		
PURGING	TIME: &7	3 Co DAT	E: 3 9/15	კ s	AMPLE		०७४८	-	TE: 7/9/3	
PURGE METHOD:	✓ PUMP  BAILER	PERISTALTIC PI	JMP	PH: ORP: *	<u>7.39</u> s - <u>25.6</u> m	V DO:	NDUCTIV	<sub>ITY:</sub> <u>フリ</u> 5 8 mg.		
DEPTH TO WAT		T/ PVC		TURBI	DITY: 3.	7 NTI				
DEPTH TO BOT		T/ PVC		_ Noi	NE SLI	GHŢ	мо	DERATE	☐ VERY	
WELL VOLUME:										
VOLUME REMO	VED: _ لو	LITERS [	GALLONS	COLO	e Cluea	<u>(,                                     </u>	ODO	OR: 🛆	or	
COLOR: _	C/Q4	ODC	OR: 100K	_ FILTRA	TE (0.45 um)	YES	s 🔼	-00_		
		BIDITY			TE COLOR:		FIL	TRATE ODC	PR:	
ANONE [	SLIGHT	MODERATE	VERY		MPLE: MS	/MSD		DUP-		
DISPOSAL MET	HOD: GROU	ND DRUM [	OTHER	COMM	IENTS:					
TIME PUF	TE PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY		ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME	
(ML/	12	(umhos/cm)	(mV)	( mg/L)	(NTU)		(°C)	(FEET)	(GAL OR L) INITIAL	
0736 20		400	५५ र	10	31		. 1	1403	INITIAL	
0741	7.44	791	45.3	3.6	10.5		26	1410	1	
0746	736	761	34,3	1.6	<u>57</u>		٠٠٠	1410	2	
0751	233	757	20.0	1.0	4.0		4	1410	3	
6756	7.37	749	-31.0	675	4.0		<u></u>	1416	4	
0801	7.32	747	- 25-3	064	3.9		و. ٤	1410	\	
0806	7.37	746	-75.8	058	3.9	(	a Y	1410	4	
	\									
NOTE: \$	STABILIZATION COND.: +/-	TEST IS COMPLI		SUCCESSIV D.O.: +/- 0.3			THIN THE		G LIMITS: TEMP.: +/-	
BOTTLES FILL		ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D -	NaOH	E - HC	CL F	
	ZE TYPE	PRESERVATIV			<del>.</del>	TYI		RESERVAT		
1 20	60 PI	Δ		N					□Y □N	
	13 01	A		N				***************************************	□ Y □ N	
1 13		B		N					□Y □N	
				N				***************************************	□Y □N	
				N .					□Y □N	
SHIPPING METI	HOD: Wb NA	op off DA	TE SHIPPED:	3-1	0-23	AIF	RBILL NUN	/BER: .		
COC NUMBER:			SNATURE:			DA	TE SIGNE	:D: 0 /	12/22	
	COC NUMBER: SIGNATURE.									

## ✓ TRC

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED								
PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATE 3 (3) >	BY: JK DATE: 3,-13-23								
SAMPLE ID: MW STR WELL DIAMET	ER: 2" 4" 6"	OTHER								
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVA	NIZED STEEL [	OTHER								
SAMPLE TYPE:	LEACHATE [	OTHER								
PURGING TIME: 0833 DATE: 4133		U893 DATE 3/9/57								
PURGE ☑ PUMP PERISTALTIC PUMP  METHOD: ☐ BAILER		CONDUCTIVITY: (433 umhos/cm								
DEPTH TO WATER: (U. 1862) T/ PVC	TURBIDITY: C S	ITU .								
DEPTH TO BOTTOM: 6 E T/ PVC										
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: COTHER										
VOLUME REMOVED: LITERS GALLONS	COLOR: C(COW	ODOR: NO NO								
		ES TNO								
TURBIDITY	FILTRATE COLOR:	FILTRATE ODOR:								
NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP-										
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:										
TIME PURGE PH CONDUCTIVITY ORP	D.O. TURBIDITY TEM	MPERATURE WATER CUMULATIVE LEVEL PURGE VOLUME								
RAIE	mg/L) (NTU)	(°C) (FEET) (GAL OR L)								
		4, C 1465 INITIAL								
6636 1 (27) 1419 71.1										
0000		56 1477 1								
0833 674 1435 64.8 0		4.7 1975 3								
	575 14 1	e3 1470 3								
		a4 1478 4								
049/ 671 1434 30		6.4 1478 5								
		<u> </u>								
9, 1	548 95 (	64 1471 4								
O'C'SO		7477								
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUC										
pH: +/- <b>0.1</b> COND.: +/- <b>3</b> % ORP: +/- <b>10</b> D.O	: +/- <b>0.3</b> TURB: +/- <b>10</b> %	or = 10 TEMP.: +/-</td								
BOTTLES FILLED PRESERVATIVE CODES A - NONE B	- HNO3 C - H2SO4 [	D - NaOH E - HCL F								
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE T	TYPE PRESERVATIVE FILTERED								
1 2 X 01 K		□ Y □ N								
1 (); b ( A DY DIN										
CIST POLICE DIVIDIN	<del>                                     </del>									
SHIPPING METHOD: ( ) SHIPPED:	3-10-23	AIRBILL NUMBER:								
		DATE SIGNED: - /15 /13								
COC NUMBER: DATE SIGNED: 2 13 13										

### ♦ TRC

PROJECT	NAME:	CEC W	/eadock LF: 20	023 GW C	PRI	EPARED			CHEC	KED.	
PROJECT	NUMBER	: 514403	3.0000.0000	BY:	JJ	DATE	<sup>β</sup>	λ: <b>.</b> ΖΚ		DATE:3-13-23	
SAMPLE I WELL MATE	ERIAL:	> 5년 고 PVC 고 GW		WELL DIAM	VANIZED S			OTHER OTHER			
										TE-21/15	
PURG		TIME:O 9		TE3 19 133		AMPLE	<del></del>	394C	11/2	TE: 9/4/33	
PURGE METHOD	. =	BAILER	PERISTALTIC F	PUMP	PH: ORP:	الله المراقع ا المراقع المراقع المراق	DO:	DUCTIVI <u>Q</u>	-4	umhos/cm 'L	
DEPTH TO	WATER:		T/ PVC		TURBI	DITY: <u> </u>	<u>3</u> NTU				
DEPTH TO	DEPTH TO BOTTOM: ( ) T/ PVC										
WELL VOLU	WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 5.3 °C OTHER:										
VOLUME R	REMOVED:	Co	LITERS	GALLONS	COLO	: <u>((</u> w	<u>\</u>	ODC	R: 🗘	ory_	
COLOR:		10W	<u> </u>	OR: NOM	FILTRA	TE (0.45 um)	YES	4	ИО		
NONE	☐ SLI		BIDITY MODERATE	VERY		TE COLOR: MPLE: MS	/MSD		RATE ODO	R:	
DISPOSAL	METHOD:	 ☑ GROUN	ID DRUM	OTHER	COMM	ENTS:		-			
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPER		WATER LEVEL	CUMULATIVE PURGE VOLUME	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°(		(FEET)	(GAL OR L) INITIAL	
	200	7.13	1709		0	400	4,		1400	INITIAL	
6915		6-89	1190	99.5	Q.Q	100	4. 8		1415		
0970		(0.6)	1192	109.0	60	18	5.6	)	1415	<u>3</u>	
0915		6-80	1993	120.5	4,7	É	5.1		1415		
0930	,	6.80	1493	122.5	3.0	64	5.1		1411	4	
6935		Le 800	1193	133.8	3.0	(or V	5.1	٠	(4)0	1	
09 LE		CARC	1192	133.5	ત્ર.ધ	(e, E)		3	1428	0	
NC pH: +/-		LIZATION T		LETE WHEN 3 S +/- 10 D	O.: +/- 0.3			IN THE F		G LIMITS: TEMP.: +/-	
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - N	 NaOH	E - HC	L F	
NUMBER	SIZE	TYPE	PRESERVAT			1	TYPE		ESERVATI		
t	230	[S]	A		N					□Y □N	
	101	D/	A		N					□Y □N	
i	135	771	B		N					OY ON	
,	1 7 1	t	* //		N		<b> </b>			□ Y □ N	
					N					□ Y □ N	
SHIPPING	METHOD:	Jab Dres	, off D.	ATE SHIPPED:	3-10-	-23	AIRE	BILL NUM	BER: •		
COC NUMI				GNATURE:			DAT	E SIGNE	D:	2/12	
					0	$\rightarrow$	-		3/+	1101	

PROJECT	NAME:	CEC V	/eadock LF: 20	023 GW C	PRI	EPARED		CHEC	CKED
PROJECT	NUMBER	: 514403	3.0000.0000	BY:	JJ	DATE 13	by BY:	2K	DATE: 3
SAMPLE ID	): <u>)</u> (4	) Mu	× (800)	WELL DIAN	METER: 🗸	2"	6" OTI	HER	
WELL MATE	RIAL: [	√ PVC	ss 🗆	IRON 🗌 GAL	VANIZED S	STEEL	□ оті	HER	
SAMPLE TY	PE: [	☑ GW	□ww □	SW 🗌 DI		LEACHATE	П ОТІ	HER	
PURG	ING	TIME:O	(57 DA	TE3 4 133	s	AMPLE	TIME: (C)	, <u>)</u>	DATE: G
PURGE		PUMP	PERISTALTIC F		PH: (	4.74 s		CTIVITY: 149	un un
METHOD:		BAILER					V DO:	9.4 m	ıg/L
DEPTH TO		7 /	T/ PVC		TURBI		NTU GHT	MODERATE	□ve
DEPTH TO		NA NA	T/ PVC	GALLONS	V	RATURE: UK		OTHER:	
VOLUME RI			LITERS	GALLONS	COLO	V			1010
COLOR:		éw	T	OR: 101		TE (0.45 um)	YES	Ø NO	
002011.			BIDITY			TE COLOR:		FILTRATE OD	OR:
<b>∄</b> NONE	SLIC		MODERATE	☐ VERY			/MSD	DUP-	
DISPOSAL	METHOD:	✓ GROU	DRUM	OTHER	COMM	IENTS:			
TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERAT	URE WATER	
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	LEVEL (FEET)	(GAL
6957	(O#	705	1527	1646	11.0	0	3.6	1287	NIT
1007		682	1495	1745	9.5	5.7	4.3	1350	
(007		4.78	1465	188.0	9.4	5.0	4,3	1768	- 1
1012		4.74	1492	200,5	94	りょう	4.5	178	1.
1017		4.74	1494	200.0	9:4	4, 5	4,5	1340	(ر
400		(e-76	1494	200.9	9.4	4.5	4,1	177	٦,
	1								
NO <sup>2</sup>	TE: STABI	LIZATION	TEST IS COMPL	ETE WHEN 3 S	SUCCESSIV	E READINGS /	ARE WITHIN	THE FOLLOWI	NG LIMITS:
pH: +/- 0		COND.: +/-			0.O.: +/- <b>0.3</b>			= 10</td <td>TEMP.: +,</td>	TEMP.: +,
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaC	)H E-H	ICL F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE			TYPE	PRESERVA*	
	350		A		N				
	761	<u> </u>	A						
1	761	D!	A						
	111	( ' '			N				
		•			N				
		: 1 \	.00  -	ATE OLUBBED.	2 -	10-27	AIDDILL	NUMBER:	
SHIPPING N	METHOD:	lab no	0 OFF 10/	ATE SHIPPED:	٠, ٢	(D &)	AIRBILL	INDIVIDER.	

PROJECT N	NAME:	CEC W	/eadock LF: 2	2023 GW C	PR	EPARED			CHEC	KED
PROJECT	NUMBEF	R: 514403	3.0000.0000	ВУ	: JJ	DATE: 313	by BY	ZK		DATE: 7-13-23
SAMPLE ID	o:Mu	) S 5	)	WELL DIA	METER: 🗸	2"	6" 🗌 C	THER		
WELL MATE	RIAL:	✓ PVC	ss	IRON G	ALVANIZED S	STEEL	c	THER		
SAMPLE TYP	PE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE	c	THER		
PURGI	ING	TIME: (O:	3 n	ATE: 3/9/3	<b>3</b> S	AMPLE	TIME: )	(1)	DA	TE:3/9/3
PURGE METHOD:	_	PUMP BAILER	PERISTALTIC	PUMP	PH: ORP:		SU COND	OUCTIVI	TY: (4 )	umhos/cm /L
DEPTH TO \	WATER:	1416	T/ PVC		TURBI	IDITY: 9.	NTU			
DEPTH TO BOTTOM: 430 T/ PVC										
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 6.8 °C OTHER:										
VOLUME RE	EMOVED:	<u> 9</u>	LITERS	GALLONS	COLO	R:( <u>(</u> زرن	× -	ODC	DR: <u>N</u> C	γ <b>ભ</b>
COLOR:		range	<b>l</b> 01	OOR: NOW	FILTRA	ATE (0.45 um)	YES	<b>/</b>	<del>-N</del> O	
		TURE	BIDITY		FILTRA	TE COLOR:		_  / _   FILT	RATE ODC	PR:
☐ NONE	SLI	GHT 🗌	MODERATE	<b>∫</b> VERY	QC SA	AMPLE: MS	S/MSD		DUP-	
DISPOSAL	METHOD:	GROUN	ID 🗌 DRUM	OTHER	COMM	MENTS:				
IIME	PURGE RATE	<b>!</b>	CONDUCTIVITY		D.O.	TURBIDITY	TEMPERA		WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	O°C		(FEET)	(GAL OR L)
£	200	705	646	31.9	9.0	470	(0.1		142	INITIAL
1047		6.7G	1391	(e3.5	1.7	235	6.4		1475	)
1647		676	1415	-35.0	075	つて	6.		1471	ي
1053		675	1416	-500	060	45	(0.)		1475	3
1057		6.75	1412	-60.5	7,0	20	6.	3	7475	4
1107		6.75	1409	-70.5	048	10	W.		1425	「 <b>く</b>
1107		6.74	1407	-710	044	10	4.8	,	1495	6
-6011		6.75	(405		643	9.9	68		1435	· 7
ilia		6.75	1 Web 1	-71.0	047	95	66)		1415	8
		<b>Q</b> (1)	1 - 10			\(\frac{1}{2}\)	1 2			
				PLETE WHEN 3						
pH: +/- 0		COND.: +/-		<sup>2</sup> : +/- 10			10 %	=/> וכ		TEMP.: +/-
BOTTLES	FILLED	PRESERVA	ATIVE CODES		B - HNO3	C - H2SO4	1 D - Na		E - HC	
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTER	ED NUME	BER SIZE	TYPE	PR	ESERVATI	VE FILTERED
(	J90	2	_()	□ Y <b>7</b>			ļ			Y N
	76)	71	B		<del></del>					□ Y □ N
( (	()5	וֹקֹי	B	□ Y t	Í N					Y N
				_ Y [	] N					□Y □N
				□ Y □	] N					□Y □N
SHIPPING M	//ETHOD:	lab dro	, oft [	ATE SHIPPED	3-10	0-23	AIRBI	LL NUM	BER: °	
COC NUMBI	ER:			SIGNATURE:			-	SIGNEI		112/23
		·	1				<u> </u>		<del>- 7</del>	H7 10 )
						<i>/</i>				

## **⇒**TRC

PROJECT	NAME:	CEC W	Veadock LF: 2	023 GW C	PR	EPARED		CHECKED		
PROJECT	NUMBER	R: 514403	3.0000.0000	BY	; JJ	DATE 3 13	b3	3A: 2A	<u> </u>	DATE:3-17-23
SAMPLE	10: Xie	me	400 T	WELL DIA	METER: 🗸		6" 🗌	OTHER		
WELL MAT	ERIAL:	✓ PVC	ss 🗆	IRON GA	LVANIZED S	STEEL		OTHER		
SAMPLE T	YPE:	√ GW		SW DI		LEACHATE		OTHER		
PURC	SING	TIME: / [	30 D	ATE3 (9 b3	s	AMPLE	TIME: \			TE:3/9/23
PURGE METHOD	٠	PUMP BAILER	PERISTALTIC	PUMP	PH: ORP:	Coclet s	U CON	NDUCTIVI	TY: <u>しんり</u> ひ mg.	
DEPTH TO			T/ PVC		TURBI	2.2	NTU			
DEPTH TO			T/ PVC		D NO		GHT	_	DERATE	☐ VERY
WELL VOL		NA	LITERS	GALLONS	TEMPE	RATURE: 4	<u> </u>	C OTH		January Williams
VOLUME F	REMOVED:	u .	LITERS	GALLONS	COLO	R: ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	_	ODO	DR:	01
COLOR:		WWW	<u> </u>	OOR: nore	FILTRA	TE (0.45 um)	YES	4	ЙО	
	··· ·	TUR	BIDITY	•	FILTRA	TE COLOR:		FIL	TRATE ODC	DR:
☐ NONE	SLI	GHT 🗌	MODERATE	<b>₩</b> VERY		MPLE: MS	/MSD		DUP-	1
DISPOSAL	METHOD:	✓ GROUN	ND DRUM	OTHER	COMM	IENTS:				
TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPE	RATURE	WATER	CUMULATIVE
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)		°C)	LEVEL (FEET)	PURGE VOLUME (GAL OR L)
1/30	(00)	697	1927	-326	10	320		,-E	6.55	INITIAL
1135		6.64	10 0-	-12.5	1.2	33.7	Ce.		7.30	7.
1140		Caleco	1545	-7.~	088	335	(a)		ファン	ľ
Ikui		(e.6s	1514	-2.4	067	100	Co.	?	7.7i	1.5
1150		le lès		3. (	100C	40	Cor		780	J
1155		later	1477	9.5	1.10	20	5,0	1	765	2,5
1200		664	1483	26,0	1.13	10	م)	W	7.90	3
1205		bley	1487	20.0	1.10	lo	le	0	74c	3.1
1210		ielett	1487	19-9	1.10	w	10	0	7.90	4
	ţ									
NC	TE: STABI	LIZATION 1	TEST IS COMP	LETE WHEN 3	SUCCESSIV	'E READINGS A	ARE WIT	HIN THE I	OLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP	: +/- <b>10</b>	D.O.: +/- <b>0.3</b>	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	SFILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - <b>H</b> 2SO4	D -	NaOH	E - HC	CL F
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTER	ED NUME	SER SIZE	TYP	E PR	ESERVATI	VE FILTERED
1	250	p l	<u> </u>		N					☐ Y ☐ N
l	105	7 (	Δ	☐ Y 🗔	N					
(	121	PI	$\beta$		] N					□ Y □ N
			A	□ Y L	] N					□Y □N
				Y	] N					□ Y □ N
SHIPPING	METHOD:	lab brog	000 D	ATE SHIPPED:	3-11	0-23	AIR	BILL NUM	BER: -	
COC NUM	BER;			IGNATURE:			DAT	E SIGNE	D: ス//2	3/23
	COC NUMBER: DATE SIGNED: 3/13/33									

## ♦ TRC

PROJECT	NAME:	CEC V	Veadock LF: 20	023 GW C	PREPARED				CHECKED			
PROJECT	NUMBER	R: 51440	3.0000.0000		3Y:	JJ		しろ	BY: J	_	DATE: 3-13-23	
SAMPLE	ID: YU	<u> </u>	7 Rou	∵¶ WELL D	IAMET	ER: 🗸 2"	' 🗌 4" 🔲	6"	OTHER			
WELL MAT	ERIAL:	✓ PVC				NIZED STE			OTHER			
SAMPLE T	YPE:	☑ GW	□ww □	sw 🔲 i	DI		ACHATE		OTHER			
PUR		TIME:( 🤊			<u> 25</u>		MPLE	TIME:	1338	P DA	TE3 (4) 27	
PURGE METHOD	. =	PUMP BAILER	PERISTALTIC F	PUMP			261 SI	y Do:	NDUCTIVI	· · · <u>· · · · · · · · · · · · · · · · </u>	- uninosom	
DEPTH TO	WATER:	050	T/ PVC	<del></del>		TURBIDI						
DEPTH TO	воттом:	JO 70	T/ PVC		· ·	₩.NONE		GHT	□ мог	DERATE	☐ VERY	
WELL VOL	UME:	NA	LITERS	☐ GALLO	vs	TEMPER/	·· • • =		°С ОТ⊦	IER:		
VOLUME I	REMOVED:		LITERS	☐ GALLO		COLOR:	<u>Clea</u>		ODO	DR: <u>1</u>	or_	
COLOR:	<u> </u>	<u> </u>	OD	OR: 🔑 🕻		FILTRATE	E (0.45 um)	YES	3 <b>[</b> ]	NO		
			BIDITY	_		FILTRATE	COLOR:		FIL	TRATE ODO	PR:	
NONE			MODERATE	VER		QC SAMI		/MSD		DUP-		
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:												
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPE	ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	_ (	mg/L)	(NTU)	(	(°C)	(FEET)	(GAL OR L)	
1323	140	7.14	513	134.5	10	3.6	14	Co	, c <sub>1</sub>	9.58_	INITIAL	
326		601	1192	1350		1.0	4.9	Ç	۰.6	1011	7,	
1233		4.91	1193	124.9		40	۲4. Y	Q	.9	10°CC	}	
1238		491	1195	1248		40	45		, (7	1195	1, 7	
1											-3-	
						************					-),	
			**************************************								-	
-												
4												
					_							
N( pH: +/-		ILIZATION COND.: +/-	TEST IS COMPL 3 % ORP:	ETE WHEN +/- 10		CESSIVE +/- 0.3	READINGS A		Or =</td <td></td> <td>G LIMITS: TEMP.: +/-</td>		G LIMITS: TEMP.: +/-	
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D-	NaOH	E - HC	L F	
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	RED	NUMBER	R SIZE	TYF	PE PR	RESERVATI	VE FILTERED	
r	25C	Oi	1	□ Y	AN						□Y □N	
ť	101	01	A	□ Y	N						□Y □N	
(	101	C(	B	□ Y	N						☐ Y ☐ N	
				□ Y	N N							
SHIDDING	METHOD:	lab drop	220	ATE SHIPPE		3-11	)-23	AIF	RBILL NUM	IBED:		
<u> </u>		שוט טוט			.D.	3-70	<u>, ~3</u>		<del>,</del>		<u> </u>	
COC NUM	BEK:		SI	GNATURE:			)	DA	TE SIGNE	<del>□ } /</del>	15/23	
										. *		

## ♦ TRC

PROJECT	NAME:	CEC V	Veadock LF: 2	:023 GW C	PRI	EPARED			CHEC	KED	
PROJECT	NUMBER	R: 51440	3.0000.0000	BY:	IJ	DATE: \()	by B	(: 21	۷	DATE: 3-13-23	
SAMPLE I	D: YW	MW	18006	WELL DIAM	ETER: 🗸	2"	6" 🔲 0	THER			
WELL MAT	ERIAL:	☑ PVC	ss 🗆	IRON GAL	VANIZED S	STEEL		OTHER			
SAMPLE T	YPE:	☑ GW	w	SW 🗌 DI		LEACHATE		THER		****	
PURC	SING	C j:amit	53 D	ATE: 3/9/33		AMPLE	TIME: \	313	DA	TE:3(91)3	
PURGE		PUMP ·	PERISTALTIC	PUMP			U CON	DUCTIVI	TA: 799	umhos/cm	
METHOD		BAILER			ORP:~	<u> </u>	V DO:	<u>D</u>	g∖ mg	/L	
DEPTH TO			T/ PVC		TURBI		NTU			<u></u> .	
DEPTH TO	воттом:	7367	T/ PVC		J. NOI		GHT	MOI	DERATE	☐ VERY	
WELL VOL	UME:	NA	LITERS	GALLONS	TEMPE		51\ <sub>°C</sub>	OTH	IER:		
VOLUME F	REMOVED:		LITERS	GALLONS	COLOF	z Clier	<u> </u>	ODO		1010	
COLOR:	(	'Yeer		DOR: MON	. FILTRA	TE (0.45 um)	YES	_/	<b>N</b> O		
l			BIDITY	_		TE COLOR:			TRATE ODG		
NONE	Ø SLI		MODERATE	VERY		MPLE: MS	/MSD	1	DUP:AI	<b>)</b> .	
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:											
TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPER	ATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME	
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C	<b>;</b> )	(FEET)	(GAL OR L)	
1257	200	208	1230	164.7	10.0	23	64		12.46	INITIAL	
1257		690	1378	1360	099	47	ا ع		1360	1	
1302		660	1334	-260	095	40	٠. ع	)	1360	2	
1707		6.89	120	-74.3	095	4.3	હ	1	1360	3	
1713									1360	<u> </u>	
										<del></del>	
										(v)	
		<u> </u>		<u> </u>							
	ι										
										L	
NC pH: +/-		<b>ilization</b> Cond.: +/-		LETE WHEN 3 SI : +/- 10 D.	UCCESSIV O.: +/- 0.3			IN THE I		IG LIMITS: TEMP.: +/-	
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - N	аОН	E - HO	CL F	
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERE	D NUMB	ER SIZE	TYPE	PF	RESERVAT	IVE FILTERED	
2	210	71	A		N					□Y □N	
2	121	ର (	À		N						
÷).	194	6	B		N		<u> </u>			□ Y □ N	
			<u> </u>		N						
					N					Y N	
SHIPPING	METHOD:	Kb Dr	op 886 0	ATE SHIPPED:	3-1	0-23	AIRB	ILL NUM	IBER: ~		
COC NUMI	BER:		s	IGNATURE:			DATI	E SIGNE	D: אנהי	13/83	
L	3713107										
					,	,					

## **◇** TRC

PROJECT NUMBER: 514403.0000.0000   BY: J   DATE;   3   BY: TK   DATE;   47   BY: TK   B	PROJECT	NAME:	CEC W	leadock LF: 2	2023 GW C	PREPARED				CHECKED			
WELL MATERIAL:     PVC   SS	PROJECT	NUMBEF	R: 514403	3.0000.0000		BY:	JJ	DATE: 13	[23] E	3Y: 3	د _	DATE: <b>3-13-23</b>	
WELL MATERIAL:     PVC   SS	SAMPLE II	o:Mu	5-55	(	WELL (	DIAMET	ER: 🗸 2	2"	6" 🗌	OTHER		·	
PURGING TIME: 13 3				·····	IRON _	GALVA	NIZED ST	EEL .		OTHER			
PURGE	SAMPLE TY	PE:	☑ GW	□ww □	sw 🗌	DI		EACHATE		OTHER			
METHOD:	PURG	ING	TIME: 13	D 0	ATE: 3/9	133			TIME: \(	345			
DEPTH TO WATER   S39	1			PERISTALTIC	PUMP		PH: (@_	1 ) SI 140 m	U COI	NDUCTIVI	TY: (	i	
WELL VOLUME:   NA     UTERS   GALLONS   TEMPERATURE: CRO!   CO   OTHER:				T/ PVC			1 /		7,00	(EK)			
VOLUME REMOVED:   SELECTED   GALLONS   COLOR:	DEPTH TO	воттом:	1875	T/ PVC			D-MON	E SLIC		☐ MOE	ERATE	☐ VERY	
COLOR:	WELL VOLU	JME:			☐ GALLO	NS		<del></del>	<u> ۲۰۲</u>	с отн			
TURBIDITY	VOLUME R	<u> </u>		· · · · · · · · · · · · · · · · · · ·			COLOR	chear	<u> </u>			DVC	
NONE	COLOR:	_ <u></u>	<u>ου Ωα</u>	OI	DOR: NOV		FILTRAT	E (0.45 um)	YES	<u> </u>	NO		
DISPOSAL METHOD.										FILT	RATE ODO	R:	
TIME RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL (CMINIATIVE PURGE VOLUME (MINIM) (SU) (umhos/cm) (my) (mg/L) (NTU) (NTU) TEMPERATURE (EVEL (EVEL) PURGE VOLUME (ALORL)						₹Y 			MSD		DUP-		
TIME   RATE   PH   CONDUCTIVITY   ORP   D.O.   TURBIDITY   TEMPERATURE   LEVEL   PURGE VOLUME (GALOR L)													
(MJMIN)	I TIME I I DU ICONDUCTIVITVI ODD I DO I TIDDIDITVI TEMBEDATIDE I I I												
33			(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	('	,C)			
33	1320	200	7,34	1766	Le8 .	1 10	J.C	60	"76"	ר (	5.38	INITIAL	
1370			694	1806	-13.0	1	.)	370	7.	4	5.40		
33	1330			1497	=75.0	-0	210	416	<b>68</b>	5	540	Ċ Ç	
1	-V				.75			7.0			540	3	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1							550				540		
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10% or = 10 TEMP.: +/-  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 2</td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>نها</td> <td>, Q,</td> <td>¿16</td> <td>· ·</td>									نها	, Q,	¿16	· ·	
pH: +/- 0.1         COND.: +/- 3%         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10%         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F	<u> </u>	-	W									<del></del>	
pH: +/- 0.1         COND.: +/- 3%         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10%         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F													
pH: +/- 0.1         COND.: +/- 3%         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10%         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F		-				_				44			
pH: +/- 0.1         COND.: +/- 3%         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10%         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F				A									
pH: +/- 0.1         COND.: +/- 3%         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10%         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F					į							ļ	
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F - NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE NUMBER SIZE TYPE NUMBER SIZE TYPE NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE NUMBER SIZE													
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED  1 340 P1 A	pH: +/- l	J.1 (	JOND.: +/-	3% ORF	7: +/- 10 	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEIVIP.: +/-</td>	10	TEIVIP.: +/-	
	BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F	
1   1   7   7   A	NUMBER	SIZE		PRESERVAT	TIVE FILT	ERED	NUMBE	R SIZE	TYP	E PR	ESERVATI	VE FILTERED	
	1		61	1		J N						☐ Y ☐ N	
SHIPPING METHOD: No broke off Date Shipped: 3-10-23 AIRBILL NUMBER:	(	196	19	<u> </u>	ΔY	QN						□ Y □ N	
SHIPPING METHOD: 105 Drop off DATE SHIPPED: 3-10-23 AIRBILL NUMBER:		196	19	B	Y	(D) N						☐ Y ☐ N	
SHIPPING METHOD: Jab drop off DATE SHIPPED: 3-10-23 AIRBILL NUMBER:					Y	□N						☐ Y ☐ N	
				_	Y	□ N						Y N	
	SHIPPING	METHOD:	lab dro.	0 OFF [	DATE SHIPPI	ED:	3-10	7-23	AIR	BILL NUM	BER:		
b) 1919	COC NUMB	BER:			SIGNATURE:			\	DAT	ΓE SIGNEI	D: 9/1/	12/12	
		1919 B											

## \_**◇** TRC

PROJECT	PROJECT NAME: CEC Weadock LF: 2023 GW C PREPARED CHECKED										
PROJECT	NUMBER	: 514403	3.0000.0000	E	3Y:	JJ	DATE: ?\(3	103	BY: 3	šk.	DATE: 7-17-23
SAMPLE	ID: I	B - C	<del>)</del> (	WELL D	IAMETI	ER: 🗸 2"	4"	6"	OTHER		
WELL MAT	ERIAL.	√ PVC	ss 🗆	IRON 🔲 C	BALVA	VIZED STE	EL		OTHER		
SAMPLE T	YPE:	☑ GW	□ww □	SW 🔲 [	)I	LE	ACHATE		OTHER		
PURC	SING	TIME:	DA	TE:		SAN	MPLE	TIME: 1	135	3 0/	ATE 7 (4 )3
PURGE METHOD	٠	PUMP BAILER	PERISTALTIC F	PUMP	:	PH: 4	4 / V)	U CO	NDUCTIV	- E.	/ umhos/cm
DEPTH TO	WATER)		T/ PVC			ŢURBIDIT	ry: 1)	NTU	J		
DEPTH TO	<del>-/-\</del>		T/ PVQ	/	**********	NONE	SLI	GHT	□ мо	DERATE	☐ VERY
WELL VOL	UMÆ:	NA.	LITER\$	GALLON	18	TEMPERA	ATURE:	<u>) () (</u>	°C ОТІ	HER: _	
VOLUME F	REMOVED:		LITERS	GALLON	1S	COLOR:	Clic		OD	OR: N	
COLOR:	I		V <sub>OD</sub>	OR:		FILTRATE	(0.45 um)	YES	s 🚺	NO	
	1	TUR	BIDITY			FILTRATE	COLOR:		FIL	TRATE OD	OR:
NONE	`∏ SLI	GHT 🗌	MODERATE	☐ VER	Υ	QC SAM	PLE: 🗌 MS	/MSD		DUP-	
DISPOSAL	. METHOD:	☑ GROUN	ND DRUM	OTHER		COMMEN	NTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP			TURBIDITY		ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)		(°C)	(FEET)	(GAL OR L) INITIAL
											<u> </u>
	.,									<u> </u>	
	:								HIMANA I WANTAN IN		
	-					05000/5				TOL   014/15	
pH: +/-		COND.: +/-	TEST IS COMPI 3 % ORP:	+/- 10		+/- 0.3	TURB: +/-		or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - H	CL F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	RED	NUMBER	R SIZE	TYI	PE PI	RESERVAT	IVE FILTERED
<b>\</b>	いく	PI	A		N						□ Y □ N
	175	n	17		N						□Y □N
		•			□N			<u> </u>			□ Y □ N
					□N		1				U Y U N
					N		1				T N
SHIPPING	METHOD:	lab Dro	poff D	ATE SHIPPE	D:	3-10-	23	AIF	RBILL NUM	/IBER:	
COC NUM		<del></del>		GNATURE:			)	DA	TE SIGNE	D: 2) /1	2 /x ?
DATE SIGNED. 4113133											

## ♦ TRC

PROJECT NAME: CEC Weadook LF. 2023 GW C PROJECT NUMBER: 514403,0000,0000 BY: JJ DATE													
WELL DIAMETER:   2"   4"   6"   OTHER	PROJECT	NAME:	CEC V	Veadock LF: 2	023 GW C		PREPARED			CHECKED			
WELL MATERIAL:	PROJECT	NUMBEF	R: 514403	3.0000.0000	В	BY:	JJ	DATE3\(3	しろ	BA: 2	K	DATE 3-13-23	
SAMPLE TYPE:	SAMPLE	D: 6	3#1		WELL DI	IAMETI	ER: 🗸 2"	' 🗌 4" 🔲	6"	OTHER			
PURGING TIME: DATE: SAMPLE TIME: \$ \$ DATE: 3 \$ \$ Q \$ DATE: 3 \$ DATE: 3 \$ Q \$ DATE: 3 \$	WELL MAT	ERIAL:	✓ PVC	ss 🗆	IRON 🗌 G	ALVA	VIZED STE	EEL		OTHER			
PURGE	SAMPLE T	YPE:	☑ GW	ww	SW 🔲 🗆	DI .	LE	ACHATE		OTHER			
METHOD:	PURC	SING	TIME:	DA	TE:		SAI	MPLE	TIME:	135E	DA	ATE:3 (9(33)	
DEPTH TO WATER		· _		PERISTALTIC I	PUMP			7 17					
WELL VOLUME   NA	DEPTH TO	WATER:_		TV PVC	\		TURBIDI	TY: V	NTI	U			
VOLUME REMOVED:			$\sum$	T/ PVC			•		— GHT —Δ	□ мог	DERATE	☐ VERY	
COLOR:	WELL VOL	UNE:	NA	LITER	GALLON	ıs	TEMPERA	ATURE: <u> </u>	f)	.°С ОТ⊦	IER:		
TURBIDITY   VERY   VERY   VERY   VERY   VERY   VERY   CO SAMPLE:   MS/MSD   DUP-   VERY   CO SAMPLE:   MS/MSD   DUP-   VERY   CO SAMPLE:   MS/MSD   DUP-   VERY   COMMENTS:   VERY   VERY   COMMENTS:   VERY	VOLUME F	REMOVED:		LITERS	GALLON	ıs	COLOR:	_ CV		ODO	DR: $\int$	WY	
NONE	COLOR:			OD	OR:		FILTRATE	E (0.45 um)	☐ YE	s A	NO		
NONE			TUD				************					JB.	
DISPOSAL METHOD:		□su			□ VER				/MSD			JK.	
TIME													
NOTE: STABILIZATION TEST IS COMPLETÉ WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or =   NOTE: STABILIZATION TEST IS COMPLETÉ WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or = 10   TEMP.: +/-   NUMBER   SIZE   TYPE   PRESERVATIVE   FILTERED   NUMBER   SIZE   TYPE   PRESERVATIVE   FILTERED     ( 137</td <td>  Did: 00: 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td>MATER</td> <td>L CUMULATIVE</td>	Did: 00: 1						1				MATER	L CUMULATIVE	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1	TIME		PH	CONDUCTIVITY	ORP		D.O	TURBIDITY	TEMP	ERATURE			
NOTE: STABILIZATION TEST IS COMPLETÉ WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  ph: +/- 0.1			(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)		(°C)	(FEET)	(GAL OR L)	
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F												INITIAL	
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A- NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F	***************************************								<u> </u>				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F						_			<u> </u>				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F													
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F				******************************									
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F			!										
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F													
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F	·····				·	-							
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F									<del> </del>				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F									ļ				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F								~	<u></u>				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F													
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F	NC	TE: STAR	I IZATION	TEST IS COMP	FTÉ WHEN	3 SUC	CESSIVE	READINGS A	ARF WI	THIN THE	FOLLOWIN	IG LIMITS:	
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED  ( 1) 7 7													
130 71	BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E- HO	CL F	
( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	NUMBER	SIZE	TYPE	PRESERVAT	VE FILTE	RED	NUMBER	R SIZE	TY	PE PF	RESERVAT	IVE FILTERED	
	{	125	DI	A		J N						□ Y □ N	
	(	,)(	ົດ	P		₹ N						□Y □N	
SHIPPING METHOD: 65 brop off DATE SHIPPED: 3-10-23 AIRBILL NUMBER:			· · · · · · · · · · · · · · · · · · ·	<u> </u>					<b> </b>		4	□ Y □ N	
SHIPPING METHOD: 105 brop off DATE SHIPPED: 3-10-23 AIRBILL NUMBER:						_ N			<del>                                     </del>				
SHIPPING METHOD: 105 brop off DATE SHIPPED: 3-10-23 AIRBILL NUMBER:						=	ļ		<del> </del>				
					L_J Y  L	N		1	<u> </u>				
COC NUMBER: SIGNATURE: DATE SIGNED: P3/13/33	SHIPPING	METHOD:	las bo	op off D	ATE SHIPPE	D:	310-	-23	Alf	RBILL NUM	IBER:	(	
	COC NUM	BER:		S	GNATURE:			<u> </u>	DA	TE SIGNE	D: 123/	13/22	
						-2							

## TRC

PROJECT NAME: CEC Weadock BAP: 2023 GW PREPARED CHECKED												
PROJECT I	NUMBER	: 514403.	0001.0000	BY:	JJ	DATE	)カ BY: "	2K [	DATE: 3-13-23			
SAMPLE (C	mw	-150	202	WELL DIAM	ETER: 🗸	2"	6" OTHE	R				
WELL MATE	RIAL: [	√ PVC [	ss 🗌	IRON GAL	VANIZED S	TEEL	☐ OTHE	R				
SAMPLE TYI	PE: [	☑ GW [	ww	SW DI		LEACHATE	OTHE	R				
PURG	ING	TIME:	Cer DA	TE:317 133	S	AMPLE	TIME: (	<u> </u>	TE317153			
PURGE METHOD:	_	PUMP F BAILER .	PERISTALTIC F	PUMP	PH: ORP:	7,3 3 si 69.5 m		TIVITY: <u>10分</u> 3.8 mg/1				
DEPTH TO	WATER:	Cell	T/ PVC		TURBII	DITY: Le.C	2 NTU					
DEPTH TO	BOTTOM:	1689	T/ PVC		ION-	NE 🗌 SLIC	знт 🔲 и	MODERATE	☐ VERY			
WELL VOLU	ME:	NA [	LITERS	GALLONS	TEMPE	RATURE:	°c	OTHER:				
VOLUME RI	EMOVED:	[	LITERS	GALLONS	COLOF	R Chou		DDOR:	1016			
COLOR:		Jew	OD	OR: NOV	_ FILTRA	TE (0.45 um)	YES	√NO				
		TURE	IDITY		FILTRA	TE COLOR:		FILTRATE ODO				
NONE	Ø SLI	GHT 🔲 I	MODERATE	☐ VERY			MSD d	JOUP- #	01			
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:												
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME												
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)			
1118	240	763	1015	1040	11.0	40	6.4	(e38	INITIAL			
1123		7.43	1689	100.0	5.0	120	Ceil	(e.70	l			
1178	\	7.34	1061	900	4.2	8.8	Cont	680	а			
1123		7.30	1056	80.0	40	88	60	680	3			
1138		720	1050	70.0	38	G, O	Coil	682	4			
1143		233	1042	_	38	les	(pcl	680	5			
1148		7.3)	1636	69.5	3.8	لورن	(eil	300	ip			
(153		7.33	1036	64.5	3.8	leic	61	٥٥٩	7			
			· · · · · · · · · · · · · · · · · · ·									
NO	TE: STAB	LIZATION 1	EST IS COMP	LETE WHEN 3 S	SUCCESSIV	E READINGS	ARE WITHIN T	HE FOLLOWIN	G LIMITS:			
pH: +/-	0.1	COND.: +/-	3 % ORP	: +/- <b>10</b>	).O.: +/- <b>0.3</b>	TURB: +/-	10 % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-			
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E-HC	CL F			
NUMBER	SIZE	TYPE	PRESERVAT		<del>,                                     </del>	BER SIZE	TYPE	PRESERVATI				
D	250	PL	Λ		- <del> </del>				OY ON			
3	175	PI	μ		N				□ Y □ N			
2	125	PI	B	□ Y + <b>[</b> ]	N				☐ Y ☐ N			
				□ Y □	N				OY ON			
				Y	N				N O Y			
SHIPPING	METHOD:	Fede		ATE SHIPPED:	3	1-8-23	AIRBILL I	NUMBER:				
COC NUMI	BER;			SIGNATURE:		<u> </u>	DATE SK	GNED: 5/	11/12			
L	COC NOWIBER. SIGNATURE.											

			C
A	題	(A)	A NAME OF TAXABLE PARTY.

						<del></del>					
PROJECT NAME:	CEC W	eadock BAP: 2	:023 GW	PRE	PARED			CHECK	ED		
PROJECT NUMBER	R: 514403	.0001.0000	BY:	JJ	DATE 3 13	loラ BY:	Jk		DATE:3-13-23		
SAMPLE ID:	U-150	oilo	WELL DIAM	ETER: 🗸	2"	6" 🗌 07	ΓHER				
WELL MATERIAL:	✓ PVC	ss 🔲 ı	RON GAL	VANIZED S	TEEL	07	THER				
SAMPLE TYPE:	☑ GW	□ww □:	SW 🗌 DI		LEACHATE	o	THER				
PURGING	TIME:	DAT	E:3 3 133	' '		TIME: 1)			E3 17 (2)3		
PURGE X		PERISTALTIC P	UMP		7.10 si		UCTIVIT US	ry: 976			
	BAILER				<u> </u>		<u>U, 3</u>	mg/l	_		
DEPTH TO WATER:		T/ PVC		TURBII		NTU	7 мор	.cn.atc	☐ VERY		
DEPTH TO BOTTOM		T/ PVC	7 0444 0440	LENOI				ERATE	L VERT		
WELL VOLUME:	NA [	LITERS	GALLONS		RATURE: ろ	<u>/_°</u> c	OTH				
VOLUME REMOVED: 3, S LITERS GALLONS COLOR: ODOR: OOV											
COLOR:	Clou	NY ODG	DR: NOV	_ FILTRA	TE (0.45 um)	∐ YES		NO			
∏NONE ∏SL		BIDITY MODERATE	☐ VERY		TE COLOR:	/MSD		RATE ODO	R:		
DISPOSAL METHOD			OTHER	COMM							
TIME PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERA	TURE	WATER	CUMULATIVE		
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	,	LEVEL (FEET)	PURGE VOLUME (GAL OR L)		
12ce 100	763	613	136.5	10.0	3,6.0	4.3		318	INITIAL		
1301	7.33	છ 🚺	123.0	2.95	70.0	3,8		3,40	7.		
1310	7.17		010(e0	097	18.3	3,7	)	3.43			
1361	7.00	913	81.9	Nou	1	<u></u> ろ・	7	345	1.5		
1330	7.10	937	60.0	059	7.1	3		345	<u>)</u>		
1375	7.10	957	59.8	0.73	6.6	3.		345	<u> 7,C</u>		
1230	7.10	9(4)	5400	053	Corci	3.	7	347	3		
17661	7.10	9.70	59.0	05 7	WO.	3.	<u> </u>	341	3.1		
				<del>333 ),</del>					and the state of t		
	1							tinger regar			
		TEST IS COMPL									
pH: +/- 0.1	COND.: +/-			0.0.: +/- <b>0.3</b>					TEMP.: +/-		
BOTTLES FILLED  NUMBER SIZE	TYPE	PRESERVATI		B - HNO3		D - N		E - HC RESERVATI			
1 25c	19	A	DY F	<del>,                                    </del>	7		+-		N N		
1 125	PI	A		<del> </del>		<del> </del>		is an an Alain Simhnas, Tanninis Booms / ar	Y N		
1 125	PI	B		N		<del> </del>			□Y □N		
1 10		<del>                                     </del>		N		1			□ Y □ N		
	1			N		<del> </del>	_	array at room bender as entender Ard years agreeding.			
SHIPPING METHOL	): Fed	or D	ATE SHIPPED:	7 8	7-23	AIRB	ILL NUN	1BER: +	1 1 1		
COC NUMBER:		<del></del>	GNATURE:			-		<u>-</u>	m./12		
COC NUMBER: SIGNATURE: DATE SIGNED: 3 / 13 / 3											

## **TRC**

PROJECT NAME: CEC Weadock BAP: 2023 GW PREPARED CHECKED											
PROJECT NUMBER	: 514403	.0001.0000	BY:	JJ	DATE:	D'3 BY	: 2K		DATE:3-13-23		
SAMPLE ID: N	- 140	19615019	WELL DIAMI	ETER: 🗸			THER				
	✓ PVC [		RON GAL	VANIZED S	TEEL	o	THER				
SAMPLE TYPE: [	☑ GW [	□ww □	SW 🔲 DI		LEACHATE		THER				
PURGING	TIME: 12	SO DAT	E:3 7 (3-	3 S	AMPLE	TIME: (	320	DA	TE3/7/3		
PURGE 🎜	PUMP I	PERISTALTIC P	UMP		<u> ۹,70</u> s	-	UCTIVITY:		umhos/cm		
METHOD:	BAILER			ORP:	- 66.0 m	V DO:	<u>0.3</u>	$\underline{C}_{mg/l}$			
DEPTH TO WATER:		T/ PVC	· · · · · · · · · · · · · · · · · · ·	TURBII		NTU _	_		_ ·		
DEPTH TO BOTTOM:	1 leles	T/ PVC		J NOI	NE SLI	GHT [	MODE	RATE	VERY		
WELL VOLUME:	NA [	LITERS [	GALLONS	TEMPE	RATURE:	c <u>،حام</u>	OTHER	₹:			
VOLUME REMOVED:	<u> </u>	LITERS [	GALLONS	COLO	e <u>Ch</u> e	2 <b>V</b>	ODOR:		016		
COLOR:	3 www	<u>\151^</u> ODC	DR: <u>1701/</u>	FILTRA	TE (0.45 um)	YES	<b>∃</b> -NC	)	ngar mang makanggal awa ga makang makanana mahan mengang mengang menanan		
		BIDITY		FILTRA	TE COLOR:		FILTRA	ATE ODO	R:		
	4-	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD		JP			
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:											
TIME PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERA	ΔIUR⊬ I	VATER LEVEL	CUMULATIVE PURGE VOLUME		
(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C	- 1	(FEET)	(GAL OR L)		
1250 200	705	1586	1516	49	\$3.c	(a	j c	318	INITIAL		
1355	669	2054	-520	1.0	7.6	(e;	7	3.27			
13in	6,69	2673	-80.0	OP	50	Cel	0	500	Ž		
1307	670	2070	-885	040	50	Cer	7 6	537	3		
1310	Le 70	adde	- 888	639	5.0	ره، لر		5 J)	Ψ		
135	6.70	2064	. 885	030	4.9	(e.	<u> </u>	537			
13.00	6.70	2064	-890	030	4.9	(0.(	0	<u>537</u>	6		
						ļ					
					<u> </u>						
NOTE: STAB	ILIZATION	TEST IS COMPL	ETE WHEN 3 S	UCCESSI	E READINGS	ARE WITH	IN THE FO	LLOWIN	G LIMITS:		
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORP:	+/- <b>10</b> D	.O.: +/- <b>0.3</b>	TURB: +/-	10 %	or = 10</td <td>0</td> <td>TEMP.: +/-</td>	0	TEMP.: +/-		
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO	4 D-N	laOH	E-HC	CL F		
NUMBER SIZE	TYPE	PRESERVATI	VE FILTERE	D NUME	BER SIZE	TYPE	PRE	SERVAT	VE FILTERED		
1 250 DI A DYFIN											
1 134	PI	1 1	口Y贝	N				7 American de l'American d	□Y □N		
161	וס	B		N			1	h - p. comp 1 p. c/h = ma chinar -	□Y □N		
			□ Y □	N					N 🗆 Y		
				N	l			rinnensen vyra ennelsekti era	□ Y □ N		
SHIPPING METHOD:	Fede	<b>χ</b> D,	ATE SHIPPED:	3-6	8-23	AIRE	SILL NUMBI	ER:			
an hymnyymyteisiady hayte – et konstendaudy hardydd y arfai fei fen and ddy yaar y'i y y o darryn agen ac					- :	=-+			x		
COC NUMBER: SIGNATURE: DATE SIGNED: 3/23/32											

## TRC

PROJECT NAME: CEC Weadock BAP: 2023 GW	PREPARED		CHECKED
PROJECT NUMBER: 514403.0001.0000 BY:	JJ DATE:3113	) P BY: 2k	DATE: 3-13-23
SAMPLE ID: MW. 15008 WELL DIAME	TER: ✓ 2"	6" OTHER	
	ANIZED STEEL	OTHER	
SAMPLE TYPE: 🔽 GW 🗌 WW 🗌 SW 🔲 DI	LEACHATE	OTHER	
PURGING TIME: 1330 DATE: 3/7/33	SAMPLE	TIME: 1415	DATE 3 (7/33)
PURGE PUMP PERISTALTIC PUMP METHOD:	PH: 4.71 St		1
LI BAILER	100	v 100	mg/L
DEPTH TO WATER: 4.5 T/ PVC DEPTH TO BOTTOM: 746 T/ PVC	TURBIDITY: VOC		DERATE VERY
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 7	с отн	ER:
VOLUME REMOVED: 9 SLITERS GALLONS	COLOR: Che		
COLOR: ROWNIST ODOR: NONE	FILTRATE (0.45 um)	YES '	
	<del></del>		
TURBIDITY  NONE SLIGHT MODERATE DVERY	FILTRATE COLOR: ☐ MS/		DUP-
DISPOSAL METHOD: ☐ GROUND ☐ DRUM ☐ OTHER	COMMENTS:		
PURGE DI CONDUCTIVITY OPP	D.O. TURNINITY	TEMPERATURE	WATER CUMULATIVE
RATE PH CONDUCTIVITY ORP	D.O. TURBIDITY	TEMPERATURE (10)	LEVEL PURGE VOLUME
(ML/MIN) (SU) (umhos/cm) (mV)	( mg/L) (NTU) 4. ( 115		(FEET) (GAL OR L)
1000	` ` L '	(-)	<u> </u>
	79 223	(e.)	440 1
the state of the s	038 Jac	6.9	46 3
	029 32.7	7.0	440 3
	024 14.6	7.0	444
	U23 10	7.0	44 6
140 1209-101.5	020 362	7, /	44c 6
1405 16.74 1318 48.5	0.01 060	7.1	440 7
140 6.79 1318 980	019 100	7.1	440 8
The state of the s	019 100	7, 1	440 9
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SU		<del>1</del>	FOLLOWING LIMITS:
	D.: +/- <b>0.3</b> TURB: +/-		
BOTTLES FILLED PRESERVATIVE CODES A - NONE	3 - HNO3 C - H2SO4	D - NaOH	E-HCL F
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE	TYPE PF	RESERVATIVE FILTERED
1 350 PI A DY B	N		N N Y
1 10 701 10	N		□Y □N
1 DC DI B DY			□Y □N
	N	1	OY ON
	N .	<del>                                     </del>	□ Y □ N
SHIPPING METHOD: Fed- DATE SHIPPED:	3-8-23	AIRBILL NUM	MBER:
COC NUMBER: SIGNATURE:		DATE SIGNE	D: 7/1)
Old Williams	<del></del>	-7.1.2 010111	111-5 13-

		00
AN	4 12 T	W ASSESSMENT

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PROJECT	NAME:	CEC W	eadock BAP: 2	2023 GW	F	PREPA	RED	====		CHEC	KED
PROJECT	NUMBER		.0001.0000	BY:	JJ		<sup>)ATE</sup> 3 (3)	か	אב' י <sup>YB</sup>	۷	DATE:7-13-23
SAMPLE II	): F P	, # Ba	ckground	WELL DIAI	METER:	<b>√</b> 2" [	4"	6"	OTHER		
WELL MATE	RIAL:	√ PVC	□ss □ı	RON 🗌 GA	LVANIZE	D STEE	L		OTHER		
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#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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	-08	31912	0804	GW	MW-53		5	4	1				3	c x	x					
	-09	3/9/00	0853	GW	MW-53R		5	4	1				1	c x	x					
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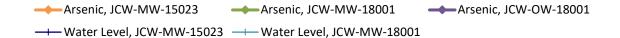
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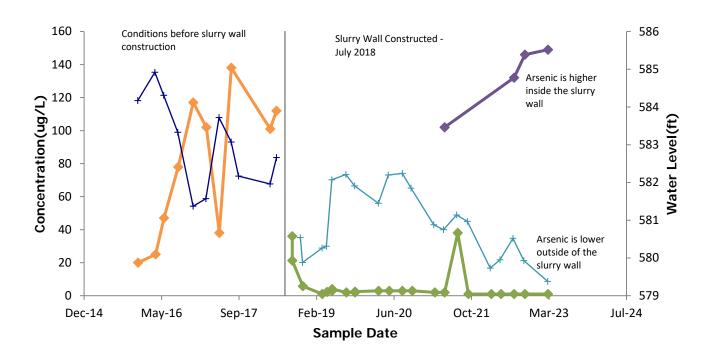
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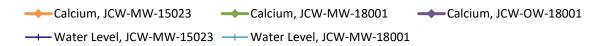


# Appendix G Alternate Source Demonstration Supporting Information

Figure G1: Time Series Plots for JCW-MW-18001 ASD







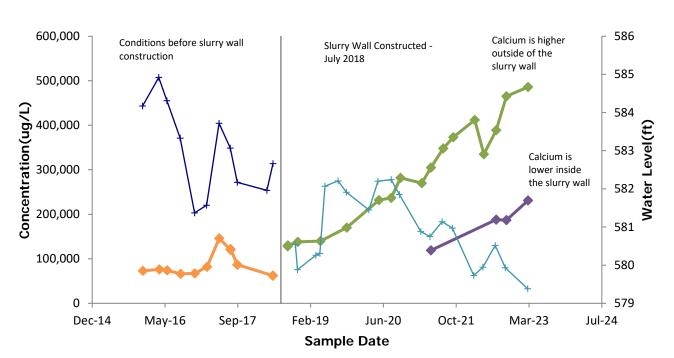
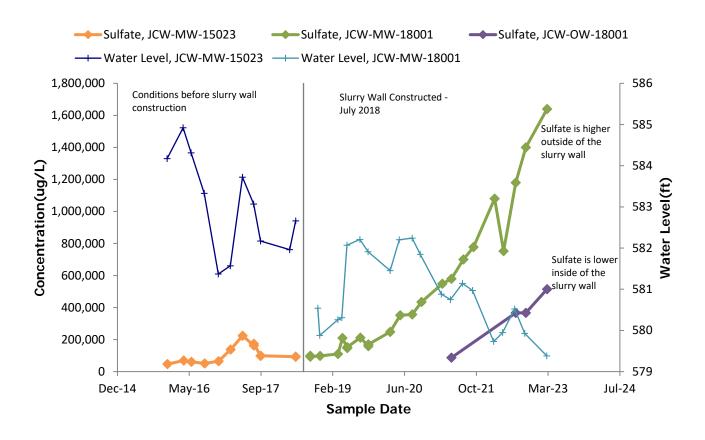


Figure G1: Time Series Plots for JCW-MW-18001 ASD



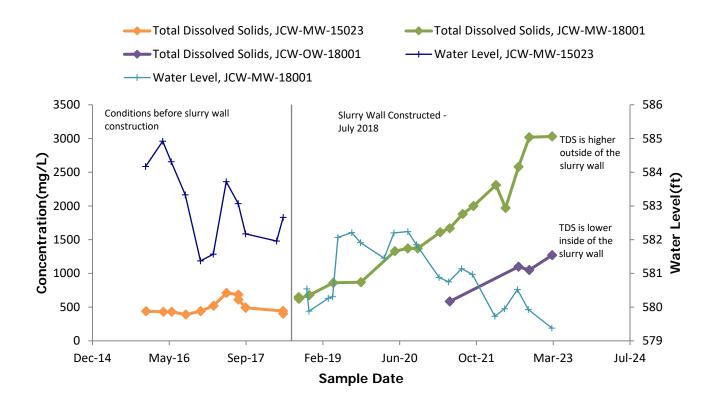
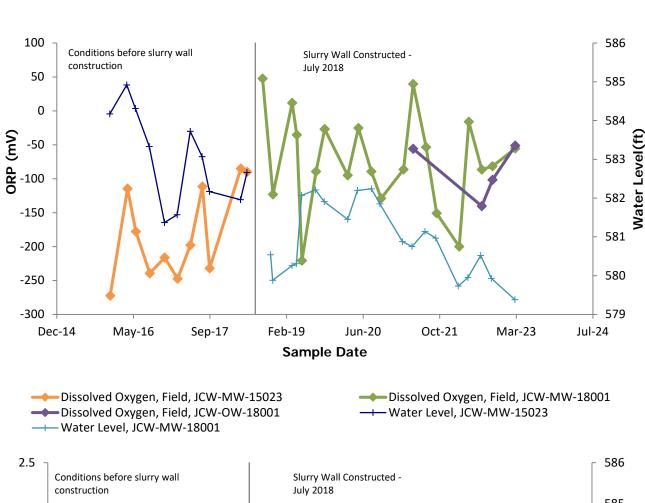


Figure G1: Time Series Plots for JCW-MW-18001 ASD

Oxidation Reduction Potential, Field, JCW-MW-15023
Oxidation Reduction Potential, Field, JCW-MW-18001
Water Level, JCW-MW-18001

Water Level, JCW-MW-18001



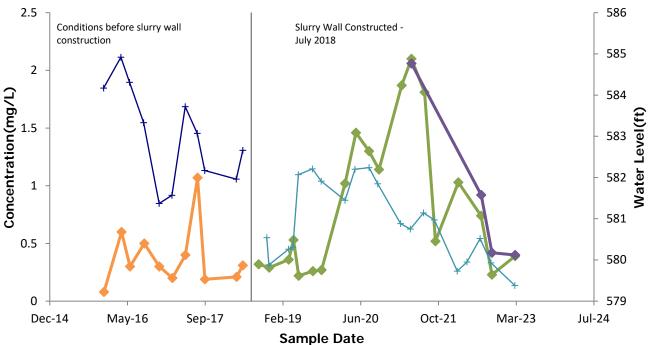
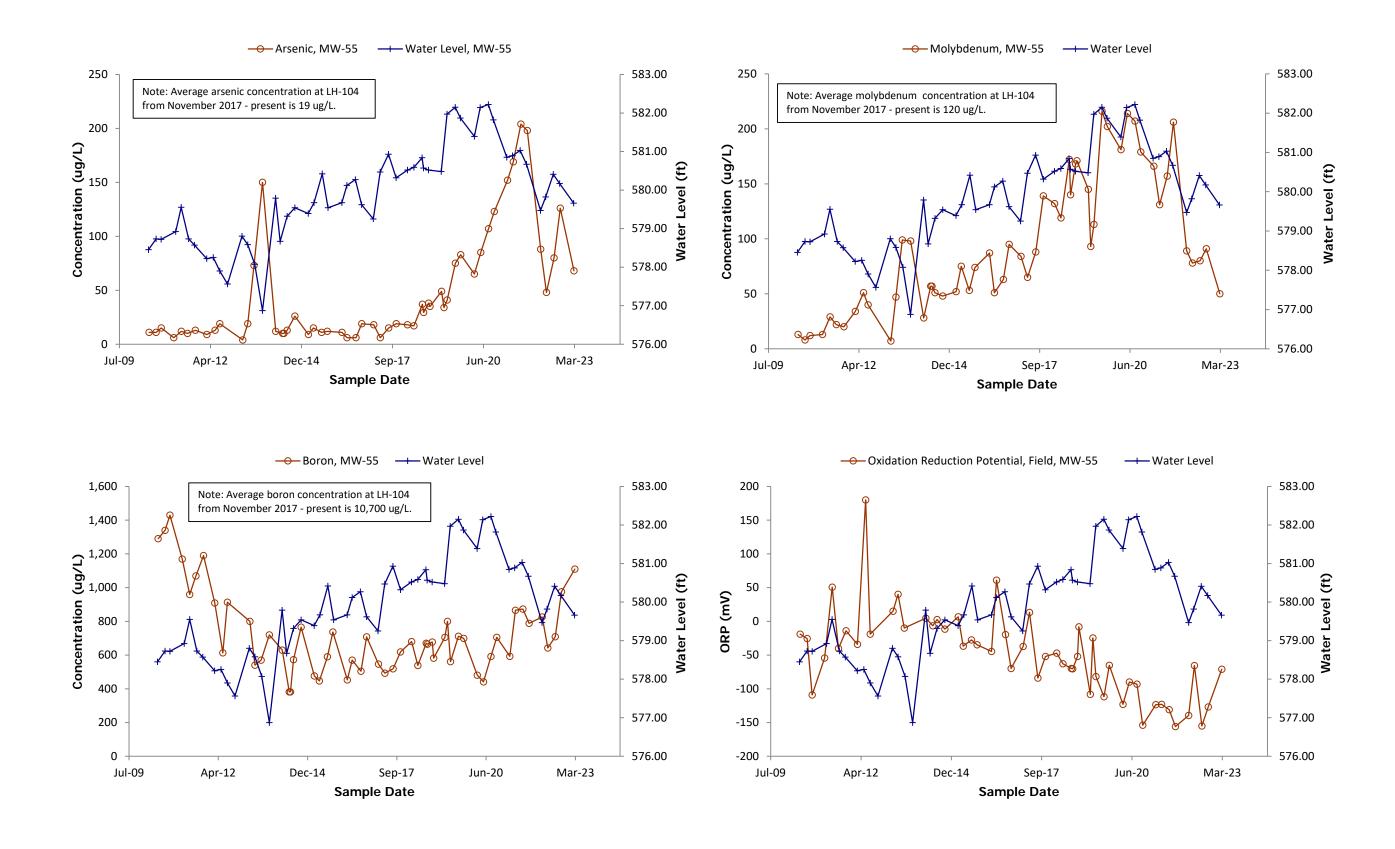
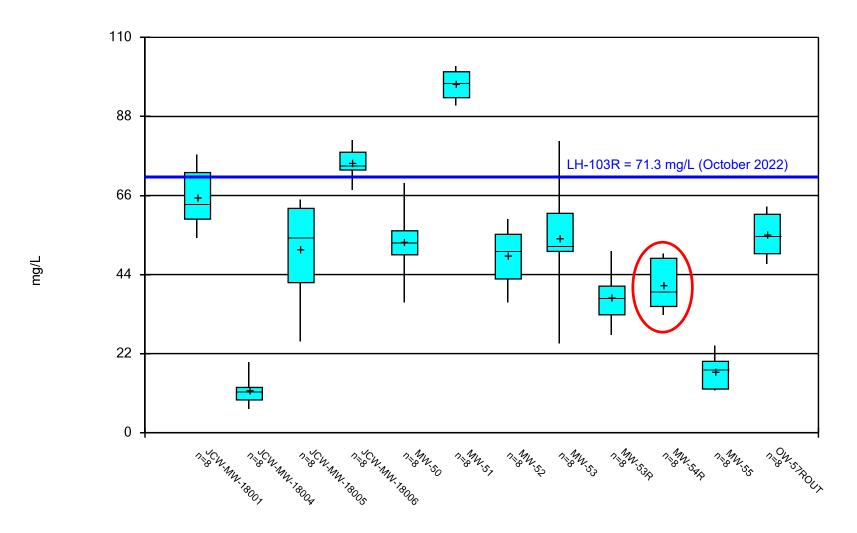


Figure G2: Time Series Plots for MW-55 ASD



### Chloride



Box & Whiskers Plot Analysis Run 4/25/2023 8:09 AM Client: Consumers Energy Data: JVW\_HMPCCR\_Sanitas\_23Q1



# 2023 Semiannual Groundwater Monitoring Report and Second Quarter 2023 Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

**Essexville, Michigan** 

July 2023

Darby Litz

Project Manager/Hydrogeologist

#### **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

#### **Prepared By:**

TRC

1540 Eisenhower Place Ann Arbor, Michigan 48108

Kristin Lowery, P.E. Project Engineer



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#### **FIGURES**

Figure 1 Site Location Map

Figure 2 Site Map

Figure 3 Potentiometric Surface Map – May 2023

#### **APPENDICES**

Appendix A Static Water Level Evaluation

Appendix B Data Quality Review

Appendix C Detection Monitoring Statistical Trend Tests

Appendix D Assessment Monitoring and GSI Statistical Evaluation

Appendix E Laboratory Analytical Report

Appendix F Field Records

Appendix G Alternate Source Demonstration Supporting Information



#### 1.0 Introduction

Consumers Energy implemented a comprehensive compliance monitoring plan documented in the *Revised Hydrogeological Monitoring Plan* (Natural Resource Technology, 2010) for the JC Weadock Solid Waste Disposal Area required by Special License Condition 20.b in Solid Waste Disposal Area Operating License No. 9233 issued on October 15, 2009. Since that time, 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) imposing groundwater monitoring and corrective action requirements that apply to the landfill (Weadock Landfill). Michigan amended Part 115 of the Natural Resources and Environmental Protection Act (NREPA) PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management) to provide a basis for establishing a groundwater monitoring system and initiating detection and assessment monitoring to conform requirements for any licensed coal ash impoundment or landfill after December 28, 2018 with Part 115 amendments and the CCR Rule.

On January 15, 2021, Consumers Energy submitted the *Landfill Hydrogeological Monitoring Plan, JC Weadock Power Plant, Essexville, Michigan* (Weadock Landfill HMP), which includes components for Detection Monitoring and Assessment Monitoring, as well as Groundwater Surface Water Interface (GSI) Compliance Monitoring, to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115 and the CCR Rule. The Weadock Landfill HMP (TRC, February 2021) was revised per EGLE comments, submitted, and approved by EGLE on February 19, 2021 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021.

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

This Second Quarter 2023 JC Weadock Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash landfill. 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 (MDEQ) – Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 *Format for Solid Waste Disposal Facility Monitoring Submittals*. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the approved Weadock Landfill HMP that was approved by the EGLE on February 19, 2021. The Weadock Landfill HMP is compliant with Public Act No. 640 of 2018 (PA 640) to amend the NREPA, also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

#### 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the second quarter 2023 at the JC Weadock Solid Waste Disposal Area located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). This JC Weadock Disposal Area is currently authorized under a permit (Groundwater Discharge Authorization GWE-0005) issued pursuant to Part 31 to



discharge to the unusable aquifer directly underlying the solid waste that vents almost immediately to the Saginaw River and Saginaw Bay.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule. Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report JC Weadock Power Plant Bottom Ash Pond CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JCW-MW-15011, JCW-MW-15012, JCW-MW-15023; and
- Field pH at JCW-MW-15023 (high).

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 notice to the Department on January 14, 2019 that arsenic was detected at statistically significant levels above the federal groundwater protection standards (GWPS) established pursuant to §257.95(h) in one monitoring well at the JC Weadock Landfill (JCW-MW-15023), which was located downgradient of a 1,600 linear foot vent within the slurry wall enclosing the historical fly ash disposal area. The vent was designed to direct groundwater flow beneath the landfill to the discharge channel immediately upgradient from the National Pollutant Discharge Elimination System (NPDES) external outfall to prevent water from building up within the facility. In July 2018, this vent was closed (Golder, 2018) and the engineering improvement was approved the by the Department (MDEQ, 2018). As a part of the vent closure, monitoring wells JCW-MW-15011, JCW-MW-15012, and JCW-MW-15023 were decommissioned by overdrilling, removing the well material, and sealing the borehole to allow for the slurry wall construction as discussed in the 2018 Annual Groundwater Monitoring Report for the JC Weadock Landfill CCR Unit (TRC, 2019a). Consumers Energy installed an additional nine monitoring wells in August 2018 to supplement the preexisting Michigan Part 115 compliance groundwater well network and provide appropriate coverage for the collection of groundwater levels and water quality data along the perimeter of the Weadock Landfill, as discussed in the Weadock Landfill HMP. Closing the vent and completely encircling the Weadock Landfill with a soil-bentonite slurry wall has demonstrated reduced groundwater flux around the entire perimeter of the landfill.

In March 2019, Consumers Energy submitted a Response Action Plan (Consumers, 2019), which identified interim response activities taken or to be taken to control possible sources of contamination. Consumers Energy further evaluated arsenic in groundwater at the Weadock Landfill as part of the nature and extent analysis and outlined potential remedies in the Assessment of Corrective Measures (TRC, 2019b), which was initiated on April 14, 2019 and completed on September 11, 2019, and focused on materials management with an emphasis on improving source control through the closure plan.

Compliance monitoring is being implemented under the Weadock Landfill HMP dated February 2021 and approved by the EGLE on February 19, 2021. Groundwater data collected in accordance with the Weadock Landfill HMP are used to:



- Assess background groundwater quality for the purposes of establishing and updating GWPS (HMP Section 7.1 Background Determination)
- Perform detection monitoring to assess whether a new release has occurred during operation of the landfill (i.e. statistically significant increase (SSI) over background) (HMP Section 7.2 Detection Monitoring)
- Perform assessment monitoring to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. statistically significant level over the GWPS) (HMP Section 7.3 Assessment Monitoring)
- Assess compliance with the GSI pathway (HMP Section 7.4)

Consumers Energy also continues 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. Assessment monitoring data collected in accordance with the CCR Rule is used to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (*i.e.* statistically significant level over the Appendix IV GWPS).

#### 1.3 Site Overview

The JC Weadock Solid Waste Disposal Area is located within the former JC Weadock Power Plant (Site), located south of the DE Karn Power Plant, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). In addition to the disposal area, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 continued to operate through April 15, 2016.

#### 1.4 Geology/Hydrogeology

The majority of Weadock Landfill area is comprised of surficial CCR and sand fill, as described in the Weadock Landfill HMP. USGS topographic maps and aerial photographs dating back to 1950, in addition to field descriptions of subsurface soil at the Site, indicate that the Site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10-30 feet below ground surface (ft bgs) overlying a clay till which is observed at depth ranging from 25-75 ft bgs. A sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well-graded sand present at depths ranging from 10 to 20 ft bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the landfill perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.



The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the Site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs.

The Weadock Landfill is bounded by several surface water features (Figures 1 and 2): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in this water bearing zone is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay.



#### 2.0 Leachate Monitoring

The leachate monitoring program consists of an annual laboratory leachate sampling program (Q1) and an annual field leachate sampling program (Q4) per the Weadock Landfill HMP. This program was instituted to maintain the facility under the applicable portions of Part 115, Rule 311 – Leaching tests to evaluate potential for groundwater contamination at unlined industrial waste landfills. Specifically, Subrule (3) states that waste that is disposed of in an industrial waste landfill shall be retested to evaluate potential for groundwater contamination annually or on a more frequent schedule as specified by the solid waste control agency. The Weadock Landfill HMP includes laboratory leachate testing, which consists of four dry-handled Coal Combustion Residual (CCR) samples collected under normal plant operating conditions during the active life of the landfill. There are no leachate data to report this quarter.

Additional support for evaluating the potential for groundwater contamination at the unlined industrial waste landfill includes the field leachate monitoring program conducted during the fourth quarter of each year. This program consists of an annual sampling collection from two (2) leachate headwells; LH-103R and LH-104. This program was implemented to determine constituents in the leachate as measured under actual conditions in the field and to assess which constituents have the potential to exceed applicable criteria at the compliance well locations.



#### 3.0 Groundwater Monitoring

#### 3.1 Monitoring Well Network

The groundwater monitoring system presented in the HMP has been established in accordance with R 299.4906 and the CCR Rule §257.91 and consists of 16 monitoring wells (four background monitoring wells and 12 downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well network has been designed to provide appropriate coverage for water level and water quality data collection along the perimeter of the landfill. The monitoring well locations are shown on Figure 2. Monitoring well specifications and purpose (i.e. static water level monitoring, groundwater quality monitoring, or GSI monitoring) are included in Table 1.

The Weadock Landfill HMP groundwater monitoring system consists of the following:

- **Background Groundwater Quality:** Four monitoring wells located southwest of the Weadock Landfill provide data on background groundwater quality that has not been affected by the CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019) and are used to establish groundwater protection standards (GWPSs) for the landfill:
  - MW-15002 MW-15008 MW-15016 MW-15019
- **Downgradient Groundwater Quality:** The twelve downgradient monitoring wells, located on the outside of the perimeter slurry wall include:

– JCW-MW-18001 – JCW-MW-18004 – JCW-MW-18005 – JCW-MW-18006

- MW-50 - MW-51 - MW-52 - MW-53

MW-53R
 MW-54R
 MW-55
 OW-57R Out

■ Groundwater-Surface Water Interface (GSI) Monitoring: Monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the monitoring program to meet the requirements of Part 31. Locations and alignments were established in the Phase II Groundwater Discharge Evaluation, Figure: Appendix K (Natural Resource Technology, 2005) as a baseline for monitoring future results. These monitoring wells are screened across the water table of the uppermost aquifer and will serve as GSI monitoring wells to determine compliance with generic GSI criteria or site-specific mixing zone-based criteria as appropriate. The eight GSI compliance monitoring wells include:

- MW-50 - MW-51 - MW-52 - MW-53

– MW-53R – MW-54R – MW-55 – JCW-MW-18004

■ **Static Water Level Measurement Only:** Eleven (11) monitoring wells, located on the inside of the perimeter slurry wall, at paired locations with several of the downgradient monitoring wells include:

– JCW-OW-18001 – JCW-OW-18002 – JCW-MW-18003 – JCW-MW-18004

JCW-MW-18005 - JCW-MW-18006 - MW-20 - OW-51

– OW-53– OW-54– OW-55– OW-56R

– OW-57R IN – OW-61 – OW-63



#### 3.2 May 2023 Monitoring Event

In accordance with the Weadock Landfill HMP, TRC conducted the second quarter 2023 monitoring event for the Weadock Landfill by collecting water levels on May 1, 2023, and collecting groundwater samples on May 8 through 10, 2023. Samples that were collected during this event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan for analysis of total metals and inorganic parameters. Radium Analysis was performed by Eurofins Environment Testing in Cleveland, Ohio. Semiannual monitoring constituents include:

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

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity. Analytical results from the monitoring event are included in the attached laboratory reports (Appendix E).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the Weadock Landfill HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix F).

Groundwater samples were collected using a peristaltic pump. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Groundwater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of two field blanks, one equipment blank, three



field duplicates (MW-15019, JCW-MW-18006, and MW-50), and one field matrix spike/matrix spike duplicate samples collected at JCW-MW-18001.

#### 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The laboratory data were found to be complete and usable for the purposes of the Weadock Landfill HMP. The data quality reviews for the JC Weadock Disposal Area network wells are summarized in Appendix B.

#### 3.3 Groundwater Flow Rate and Direction

Potentiometric monitoring initiated in the unusable aquifer beneath the facility includes static water level data collected for development of water table contours and evaluation of the potential for discharge from the facility. The monitoring under this section will be conducted quarterly until closure, as approved by the Director, and semiannually during the 30-year post-closure period. Monitoring will continue until the end of post closure (30 years) or as otherwise approved by the Director.

The measurements for top of casing (TOC) and quarterly recorded depth to water (DTW) with corresponding calculated static water level (SWL) is tabulated and presented in Table 1. A potentiometric surface map is provided as Figure 3.

Groundwater elevations measured at the Site in May 2023 are generally within the range of 579 to 596 feet above mean sea level (ft NAVD88). Groundwater elevations in monitoring wells located adjacent to Saginaw Bay and adjoining surface water bodies are typically encountered at a similar or slightly higher elevation relative to surrounding surface water features measured by the NOAA gauging station. A time-series plot included in Appendix A compares the groundwater elevation of MW-50, MW-51, MW-52, MW-53, MW-54R, JCW-MW-18004, and MW-55 to the nearby NOAA staff gauge. Water levels in wells adjacent to surface water bodies (e.g. Saginaw Bay, Tacey Drain) closely mirror the surface water elevation. Such conditions would result in a minimal gradient to potentially a reverse gradient (i.e., toward the landfill) between the well and the drain which would result in minimal to zero mass flux to the drain (Appendix A: Table A1).

The groundwater monitoring system is structured such that there are eleven (11) monitoring well pairs used to evaluate the hydraulic gradient and potential for water flux across the slurry wall. Static water level observations from the paired wells are shown on time series charts in Appendix A. The static water level elevations inside of the Weadock Landfill perimeter slurry wall are generally significantly different (>3 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairings inside and outside of the constructed slurry wall. As such, the water level elevations indicate that the slurry wall is performing as designed. The general flow direction observed within the confinement of the slurry wall is similar to that identified in previous monitoring rounds. Due to the potential for radial flow, the downgradient wells are appropriately positioned to detect the presence of detection or assessment parameters that could potentially migrate from the Weadock Landfill. As shown on Figure 3 and in Appendix A, the static water level outside of the



slurry wall is lower than the static water level inside of the wall; therefore, the potential groundwater flux across the slurry wall was calculated and included in Table A2 of Appendix A.

#### 3.4 Groundwater Analytical Data and Relevant Screening Criteria

Groundwater analytical data are evaluated in accordance with the Weadock Landfill HMP to determine the effectiveness of landfill structural and operational enhancement measures on the quality and quantity of groundwater flow beneath the footprint of the facility (Section 3.4.1 Detection Monitoring and Section 3.4.2 Assessment Monitoring). Additionally, analytical results for these wells are being evaluated in support of GSI compliance. GSI criteria only apply to the designated compliance point as specified in Section 3.4.3 below; however, analytical results and data trends in groundwater collected from the perimeter dike wells are evaluated to identify potential GSI compliance issues. Data are evaluated by using a combination of screening against relevant criteria, as well as utilizing statistical analyses.

Analytical results from the second quarter 2023 monitoring event are included in the attached laboratory report (Appendix E). Groundwater analytical data from the second quarter 2023 monitoring event are summarized in Table 3 (background monitoring wells) and Table 4 (Weadock Landfill Monitoring Wells), as well as the associated Part 201 generic GSI and site-specific mixing-zone GSI criteria. Field data are summarized in Table 2.

Mixing-zone criteria for arsenic, boron, and selenium are provided for the Karn-Weadock complex in the mixing zone determination, dated December 23, 2015 (MDEQ, 2015). As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. All data are screened against GSI criteria; however, compliance with GSI criteria is determined at select monitoring locations as noted in Section 3.4.3 below.

The mixing zone determination included both final acute values (FAV) and final chronic values (FCV). If a concentration of a constituent at a groundwater well exceeds the acute criteria, and the exceedances are upgradient of the GSI compliance monitoring wells, Consumers Energy must demonstrate that data from all of the compliance monitoring wells are, and will be, in compliance with acute mixing zone-based GSI criteria for those parameters. Averaging of groundwater data is not allowed for comparison to generic GSI or acute mixing zone-based GSI criteria. Acute mixing zoned-based or generic GSI criteria may not be exceeded in any individual GSI compliance monitoring well. If a concentration of a constituent at a well exceeds the chronic criterion, compliance can be demonstrated on a mass-flux basis. The facility can choose to demonstrate compliance by evaluating the total chronic loading based upon the contribution from each compliance well with respect to the total flux observed in the mixing zone.

Table 6 provides a summary of the statistically significant increases or exceedances over the most recent four quarters in accordance with the EGLE-prescribed format; only well/constituent pairs that exceed the relevant GSI criteria (within the last four quarters) are included.



#### 3.4.1 Detection Monitoring

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. The potentiometric analysis, as discussed in Section 3.3, demonstrates that the slurry wall is performing as designed.

In addition to the comparison of analytical data to relevant screening criteria (Table 4), statistical trend analyses are used to evaluate groundwater quality each quarter. Consumers Energy manages and evaluates its groundwater data using Sanitas<sup>TM</sup> Statistical Software. Consumers Energy conducts intrawell trend analyses to examine data for a given well over time to determine if changes in water quality are occurring that may be associated with the landfill and to identify potential GSI compliance issues. Specifically, the Mann-Kendall test for trend was performed at a significance level ( $\alpha$ ) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant.

Appendix C includes a table summarizing the results of the trend tests as well as the Sanitas<sup>™</sup> output summary statistics and graphs. Data are stable or declining for the majority of the well/constituent pairs, with the following exceptions:

- The previously observed increasing trend for boron at MW-54R continued in Q2 2023.
- The previously observed increasing trend for calcium at JCW-MW-18001 continued in Q2 2023.
- The previously observed increasing trend for sulfate at JCW-MW-18001 continued in Q2 2023
- The previously observed increasing trend for TDS at JCW-MW-18001 did not continue to be observed in Q2 2023 (no statistically significant trend).

Although increasing trends for detection monitoring constituents were observed, individual constituent trends provide a *potential indication* that there may be a release coming from the monitored unit. When these indicator trends are evaluated with other co-monitored conditions and parameters at the Weadock Landfill, the increasing trends for detection monitoring constituents do not appear to be a result of a new release from operation of the landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Several of these newly observed trends, such as those observed for calcium and sulfate are likely a result of localized geochemical changes influenced by changes in lake levels rather than a change in flux from the landfill and will continue to be evaluated. The increasing trends of calcium and sulfate in JCW-MW-18001 are attributed to localized changes in geochemistry proximal to each well, rather than a change in flux from the landfill, as discussed further in Section 3.5.



Consumers is further evaluating possible causes of the increasing boron concentrations at several porewater compliance monitoring wells. Previous studies (NRT, 2005) documented boron at significantly elevated concentrations at the Karn-Weadock Power Generating Complex. Boron was also identified at SSI background levels in the 2017 *Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit* (TRC, 2018) and was one of the detection monitoring constituents that triggered the initiation of the assessment monitoring program. Statistical significance above the GWPS established for boron has been noted for these monitoring wells per the Part 115 groundwater monitoring program requirements, as discussed in Section 3.4.2.2. Continued monitoring and assessment for potential future actions is warranted at this time; however, observed concentrations of boron in each of the monitoring wells are less than the relevant Part 115 compliance standard - the GSI pathway standard (Section 3.4.3).

#### 3.4.2 Assessment Monitoring Data Evaluation

Assessment monitoring is continuing at the Weadock Landfill in accordance with the Weadock Landfill HMP and §257.95. The assessment monitoring data were statistically evaluated in accordance with the procedures in the Weadock Landfill HMP. The statistical evaluation details are provided in Appendix D. A summary of the confidence interval evaluation is provided in Table 5.

#### 3.4.2.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess constituent concentrations present in groundwater as a result of CCR unit operations by statistically comparing concentrations in the downgradient wells to each of the respective GWPSs for each detection and assessment monitoring constituent. The calculation of the GWPSs in accordance with the Weadock Landfill HMP is documented in the *Groundwater Protection Standards* technical memorandum included as Appendix H of the *First Quarter 2021 Hydrogeological Monitoring Report* (TRC, April 2021). The Federal CCR Rule requires establishment of GWPSs for assessment monitoring (Appendix IV) constituents only. Part 115 requires establishment of GWPSs for both detection and assessment monitoring constituents.

#### 3.4.2.2 Data Comparison to Groundwater Protection Standards

Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*, *Unified Guidance* (Unified Guidance) (USEPA, 2009) and the Weadock Landfill HMP, 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.

**Detection Monitoring Constituents (Part 115):** The second quarter 2023 statistical evaluation indicates that boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001 were present at statistically significant levels above the GWPS. Boron was one of the Appendix III SSIs that originally triggered assessment monitoring. Boron concentrations have been consistently above the GWPS but less than the chronic-based mixing zone-based GSI criterion of 44,000 ug/L within the Weadock Landfill monitoring well network



since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate was present at JCW-MW-18001 at statistically significant levels above the GWPS for the first time in second quarter 2023 due to increasing concentrations. Consumers is asserting an ASD for the increases in calcium and sulfate at JCW-MW-18001, as detailed in Section 3.5.1.

The GWPSs for boron, calcium, and sulfate were established based on background concentrations observed in wells unaffected by the Weadock Landfill or Weadock Bottom Ash Pond. Detection monitoring (i.e., Appendix III) constituents do not have associated health-based criteria and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. Overall, data continue to demonstrate compliance with the applicable GSI criteria, as discussed in Section 3.4.3.

Assessment Monitoring Constituents (Part 115 and Federal CCR): Based on the second quarter 2023 statistical evaluation, there are no assessment monitoring constituents present at statistically significant levels above the GWPSs within the Weadock Landfill groundwater monitoring system. Although concentrations of arsenic and molybdenum at MW-55 observed during individual sampling events are above the GWPS, the elevated concentrations of those constituents are not a result of a release from the Weadock Landfill, as detailed in Section 3.5. The head differential of 8.78 feet between OW-55 inside the slurry wall and MW-55 outside of the slurry wall also suggests that the integrity of the slurry wall is maintained and groundwater flow from the landfill to the south is impeded by the low permeability of the slurry wall. Groundwater conditions at MW-55 will continue to be monitored.

#### 3.4.3 GSI Compliance Monitoring

The GSI monitoring program consists of the eight monitoring points located along the surface water features:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

Second quarter 2023 data from the GSI monitoring points are tabulated in Table 4. Consistent with the Weadock Landfill HMP, confidence limits were established for the following GSI monitoring program constituents:

■ Boron ■ Iron

■ pH ■ Sulfate

■ Arsenic ■ Chromium

■ Lithium ■ Molybdenum

■ Selenium ■ Vanadium

The confidence interval calculations are provided in Appendix D. The confidence interval test compares the lower confidence limit to the GSI. Overall, data continue to demonstrate compliance with the applicable GSI criteria.



**Boron:** The assessment monitoring statistical evaluation found that boron was present at statistically significant levels above the GWPS at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT. Boron is a detection monitoring (i.e. Appendix III) constituent and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. All observations of boron are less than the recommended mixing-zone based GSI value specified in Table 3 of the *Implementation of a Mixing Zone Request, Consumers Energy DE Karn/JC Weadock Complex* (MDEQ, 2015) (Appendix D: Table 2).

Arsenic and Molybdenum at MW-55: Concentrations of arsenic and molybdenum at MW-55 have at times exceeded the GSI criteria on a direct comparison to the fixed limit basis (Appendix D: Table 2). The May 2023 sampling event results show that both arsenic and molybdenum concentrations are below applicable GSI criteria. The statistical evaluation presented in Appendix D shows that the lower confidence limits of the arsenic and molybdenum data over the past 8 events do not exceed the GSI criteria. Additionally, water levels in MW-55 closely mirror the surface water elevation measured at the NOAA gauging station, which indicates there is a minimal outward gradient to a potentially, modest reverse gradient (i.e., toward the landfill) between the monitoring well and the drain, resulting in a minimal to zero mass flux to the drain (Appendix A).

#### 3.5 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed below:

- Calcium and sulfate in monitoring well JCW-MW-18001;
- Arsenic and molybdenum in monitoring well MW-55; and
- Chloride in monitoring well MW-54R.

The groundwater conditions do not conclusively indicate a release from the unit for several reasons as detailed below. The Professional Engineer Certification Statement is included in Appendix G.

#### 3.5.1 Monitoring Well JCW-MW-18001: Calcium and Sulfate

Although confirmed increasing trends were observed at JCW-MW-18001 for calcium and sulfate (through Q2 2023), these trends are not indicative of a new release from the landfill. Calcium and sulfate are two of several constituents that contribute to the overall TDS concentration and increasing calcium and sulfate concentrations could result in an increase in TDS as well. Although, TDS concentrations are not currently exhibiting a statistically significant upward trend, TDS concentrations have been increasing in past events and the data are discussed as part of this ASD. Increases of calcium, sulfate, and TDS concentrations at JCW-MW-18001 are attributed to changes occurring outside of the slurry wall as a result of changing water levels, rather than a change in flux from the landfill; therefore, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for these constituents. The following lines of evidence as well as additional time series charts included in Appendix G support this ASD:



- The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill (Appendix A).
- Concentration data also support that the slurry wall is effective in reducing the flux of groundwater from the landfill, based on the following observations (Appendix G1):
  - JCW-MW-18001 was installed after the 1,600 linear foot gap in the landfill perimeter slurry wall was closed, as discussed in Section 1.2. Prior to the slurry wall expansion in July 2018, monitoring well JCW-MW-15023 was located within the gap of the slurry wall and was sampled between December 2015 and May 2018 as a part of the original Federal CCR program monitoring well network. The groundwater quality data collected from JCW-MW-15023 shows that groundwater in contact with CCR managed within the landfill was high in arsenic, and low in sulfate, calcium, and TDS (Appendix G1).
  - To accommodate the July 2018 slurry wall expansion, JCW-MW-15023 was decommissioned. Once slurry wall construction was completed, JCW-MW-18001 was installed within 10-ft of the location of the former JCW-MW-15023 well, on the discharge channel side of the slurry wall. Additionally, an observation well, JCW-OW-18001, was installed on the landfill side of the slurry wall to monitor water levels to assess the effectiveness of the hydraulic control. Both JCW-MW-18001 (outside) and JCW-OW-18001 (inside) have been sampled recently to assess concentration trends.
    - Concentrations of arsenic are much higher inside of the slurry wall, within the landfill, while arsenic concentration remain low on the outside of the landfill.
    - Concentrations of sulfate, calcium, and TDS are much lower on the inside of the slurry wall and are higher outside of the slurry wall.
- These combined lines of evidence support that increasing concentrations of calcium, sulfate, and TDS are not a result of a change in flux from the landfill and instead are a result of changing groundwater conditions on the outside of the slurry wall.

#### 3.5.2 Monitoring Well MW-55: Arsenic and Molybdenum

Additionally, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for arsenic and molybdenum at MW-55 indicating elevated levels of constituents at that location are not related to materials management of the Weadock Landfill (2021 Annual Groundwater Monitoring and Corrective Action Report; TRC, January 2022). The basis for this ASD is summarized below and updated time series plots in support of this ASD are included in Appendix G (Figure G2).

Data collected from the 2018 investigation as well as data collected during routine sampling events for Part 115 and Federal CCR groundwater compliance show the following:

■ **Distinct Chemistry from Leachate** – The leachate chemistry from a monitoring well screened at the base of the ash fill (LH-104) is distinctly different from the groundwater chemistry near MW-55 and the temporary monitoring wells installed by TRC in the investigation area, as illustrated Appendix G of the 2019 Annual Groundwater Monitoring and Corrective Action Report (TRC, January 2020). Additionally, concentrations of arsenic and molybdenum are generally much lower, and concentrations of boron are much higher within the landfill (LH-104) than outside of the landfill at MW-55 (Figure G2).



- Conservative Tracer Boron is a metalloid known to be present in coal ash and can be used as a conservative tracer in groundwater. Concentrations of boron in Leachate Headwell LH-104 (10,800 ug/L in October 2022) are significantly higher than concentrations observed at any of the other locations sampled as a part of this monitoring program. Additionally, recently observed boron concentrations at MW-55 are similar to or lower than historical concentrations, which further supports that the water quality at MW-55 is not directly affected by groundwater migrating from the landfill.
- Reducing Conditions and Groundwater Head Levels Water levels observed at MW-55, as shown in Appendices A and G, increased over 4-ft between 2010 and 2020. The oxidation-reduction potential (ORP) at MW-55 has generally decreased (i.e., is more reducing) since 2010. The lowering of ORP over time as a result of increased water levels has changed the geochemical conditions in the vicinity of MW-55 and has resulted in increased solubility of arsenic and molybdenum. Since 2021, water levels have been generally decreasing, resulting in a slight increase in ORP (i.e., is less reducing) and decreases in concentrations of both arsenic and molybdenum, which further illustrates the relationship between groundwater elevations, redox state, and concentration of arsenic and molybdenum in groundwater.

#### 3.5.3 Chloride at MW-54R

An observation of an increasing trend of chloride at MW-54R without other corroborating lines of evidence is not indicative of a release from the Landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Changes in chloride at MW-54R are likely a result of localized geochemical changes influenced by changes in lake levels. Additionally, chloride was identified as naturally elevated in the Phase II Discharge Evaluation (NRT, September 2005) and was eliminated as a constituent of concern when the mixing zone was first authorized based on the data supporting that conclusion. The box and whiskers plot in Appendix G further illustrates that the chloride concentrations observed at MW-54R are within the range of concentrations observed regionally within other wells in the compliance well network and well below the chloride concentration observed at leachate headwell LH-103R in October 2022.



#### 4.0 Conclusions and Recommendations

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. Evaluation of the second quarter 2023 data demonstrate that the slurry wall is functioning as designed.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule, as discussed in the 2022 Annual Groundwater Monitoring and Corrective Action Report, due to observed groundwater concentrations that are indicative of impact from past landfill operations. Evaluation of the second quarter 2023 data in accordance with the Weadock Landfill HMP demonstrate that boron, calcium, and sulfate are present at concentrations above the GWPSs. Boron, calcium, and sulfate are detection monitoring (i.e., Appendix III) constituents that do not have associated health-based criteria and there is not a complete drinking water pathway onsite. As such, the relevant Part 115 compliance pathway is the GSI pathway. The statistical evaluation in second quarter 2023 found that no constituents were present at statistically significant levels above applicable GSI criteria.

Therefore, Consumers Energy will continue with the detection and assessment monitoring as required by the CCR rule as well as the monitoring program relative to the implementation of the site-specific mixing zone authorization at the Weadock Landfill unit in conformance with the JC Weadock Landfill HMP. The third quarter monitoring event for is scheduled for July 2023.



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- TRC. 2019b. Assessment of Corrective Measures JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company. September.
- TRC. 2020. 2019 Annual Groundwater Monitoring Report JC Weadock Power Plant Landfill CCR Unit. Prepared for Consumers Energy Company. January.
- TRC. 2021. Landfill Hydrogeological Monitoring Plan JC Weadock Power Plant, Essexville, Michigan. Prepared for Consumers Energy Company. February.



- TRC. 2021. First Quarter 2021 Hydrogeological Monitoring Report JC Weadock Solid Waste Disposal Area, Essexville, Michigan. Prepared for Consumers Energy Company. April.
- TRC. 2022. 2021 Annual Groundwater Monitoring and Corrective Action Report JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residuals (CCR) Units. Prepared for Consumers Energy Company. January.
- TRC. 2022. 2022 Semiannual Groundwater Monitoring Report and Second Quarter 2022

  Hydrogeological Monitoring Report JC Weadock Solid Waste Disposal Area, Essexville,

  Michigan. Prepared for Consumers Energy Company. July.
- TRC. 2023. 2022 Semiannual Groundwater Monitoring Report and Fourth Quarter 2022

  Hydrogeological Monitoring Report JC Weadock Solid Waste Disposal Area, Essexville,
  Michigan. Prepared for Consumers Energy Company. January.
- TRC. 2023. 2022 Annual Groundwater Monitoring and Corrective Action Report JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residuals (CCR) Units. Prepared for Consumers Energy Company. January.
- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.
- USEPA. 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301). April
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Table 1

# Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	тос		Screen Interval	May	1, 2023
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water	Groundwater Elevation
				(ft BTOC)	(ft)
Background Monitori	ng Wells		•		•
MW-15002	587.71	Sand	580.9 to 570.9	6.41	581.30
MW-15008	585.36	Sand with clay	578.7 to 568.7	4.31	581.05
MW-15016	586.49	Sand	581.2 to 578.2	3.25	583.24
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	5.21	580.96
Bottom Ash Pond: Do	wngradient Monito	oring Wells			
JCW-MW-15007	587.40	Sand	582.7 to 579.2	3.24	584.16
JCW-MW-15009	589.64	Sand	581.9 to 576.9	8.70	580.94
JCW-MW-15010	597.76	Sand	579.7 to 578.2	17.19	580.57
JCW-MW-15028	589.64	Sand	567.7 to 564.7	6.95	582.69
Landfill: Downgradier	nt Monitoring Wells	s (outside slurry wall)			
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3 to 573.3	16.92	579.81
JCW-MW-18004	593.04	Sandy Clay	583.9 to 578.9	12.23	580.81
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0 to 575.0	8.22	582.67
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8 to 577.8	12.39	588.33
MW-50	593.36	Sand	577.8 to 574.8	13.51	579.85
MW-51	594.29	Sand and Clay	577.8 to 574.8	14.37	579.92
MW-52	594.90	Sand	579.3 to 576.3	14.98	579.92
MW-53	593.68	Sand and Clay	579.1 to 576.1	13.79	579.89
MW-53R	594.25	Sand and Clay	580.4 to 575.4	14.40	579.85
MW-54R	593.89	Clay and Sand	581.3 to 576.3	13.75	580.14
MW-55	593.82	Sand	581.5 to 578.5	14.03	579.79
OW-57R OUT	591.00	Sandy Clay	577.0 to 572.0	9.85	581.15
Landfill: Static Water	Level Only (inside	slurry wall)			
JCW-OW-18001	595.84	Fly Ash and Sand	581.1 to 576.1	6.51	589.33
JCW-OW-18002	593.63	Sand	578.9 to 573.9	9.68	583.95
JCW-OW-18003	593.99	Sand and Clay	580.5 to 575.5	7.65	586.34
JCW-OW-18004	594.19	Sandy Clay	584.6 to 579.6	5.95	588.24
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9 to 577.9	6.43	594.18
MW-20	592.73	NR	~581.1 to ~578.1	5.86	586.87
OW-51	593.62	Clay and Sand	578.9 to 575.9	9.41	584.21
OW-53	593.64	Clay and Sand	579.0 to 576.0	6.53	587.11
OW-54	594.10	Clay and Sand	580.0 to 577.0	5.80	588.30
OW-55	594.67	Clay (or Sand and Clay)	580.9 to 577.9	6.10	588.57
OW-56R	592.01	Ash and Sand	577.5 to 572.5	5.30	586.71
OW-57R IN	590.86	Sandy Clay	575.7 to 570.7	5.53	585.33
OW-61	602.15	Ash and Sand	588.0 to 585.0	6.65	595.50
Landfill: Leachate He	adwells				
LH-103R	612.70	Fly Ash	30.2 to 33.2	22.26	590.44
LH-104	596.56	Fly Ash	8.0 to 11.0	7.40	589.16

#### Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

Table 2

## Summary of Field Parameters JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Background							
MW-15002	5/1/2023	0.48	-80.3	7.20	413	9.0	3.1
MW-15008	5/1/2023	0.22	-106.3	6.61	1,032	9.0	8.9
MW-15016	5/2/2023	0.37	-43.9	6.89	914	8.1	3.0
MW-15019	5/1/2023	0.49	-99.3	6.56	1,457	8.1	3.5
Weadock Landfill							
JCW-MW-18001	5/8/2023	0.26	-190.5	6.71	3,458	11.2	6.9
JCW-MW-18004	5/9/2023	7.70	-26.5	6.84	1,814	9.0	5.7
JCW-MW-18005	5/9/2023	0.30	-116.5	6.75	1,535	10.2	10.0
JCW-MW-18006	5/9/2023	0.30	-161.0	6.98	1,252	12.4	6.4
MW-50	5/8/2023	0.38	-139.3	7.36	1,231	10.0	4.5
MW-51	5/8/2023	0.29	-159.3	7.33	1,765	9.2	5.4
MW-52	5/8/2023	0.21	-145.7	6.88	1,800	9.6	4.5
MW-53	5/8/2023	0.33	-174.3	7.41	1,014	9.1	4.2
MW-53R	5/8/2023	0.19	-154.0	6.84	1,590	9.4	8.0
MW-54R	5/9/2023	0.58	-116.0	6.87	1,214	7.8	6.4
MW-55	5/9/2023	0.21	-150.5	6.94	1,421	9.6	7.1
OW-57ROUT	5/9/2023	1.60	-115.3	7.05	1,253	11.2	5.9

#### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

# Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	5/1/2023	5/1/2023	5/1/2023	5/1/2023
				MI Non-			Doole	ground	
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		Баско	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	< 20	107	347	211
Calcium	mg/L	NC	NC	NC	500 <sup>EE</sup>	48.4	108	175	159
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	64.5	259	106	302
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500 <sup>EE</sup>	14.9	10.5	253	94.2
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	351	877	889	1,170
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	7.2	6.6	6.9	6.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	1	2	1
Barium	ug/L	2,000	2,000	2,000	1,200	63	71	58	317
Beryllium	ug/L	4	4.0	4.0	33	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	170	350	440	< 10	24	64	13
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	< 0.183	< 0.249	< 0.127	0.31
Radium-228	pCi/L	NC	NC	NC	NC	< 0.547	< 1.16	< 1.01	< 0.859
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.547	< 1.16	< 1.01	< 0.859
Selenium	ug/L	50	50	50	5.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5(2)								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	729	17,900	1,970	21,500
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	1	< 1.0	< 1.0	< 1.0
Nickel	ug/L	NC	100	100	120	< 2	2	6	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	5	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000€	260	< 10	< 10	< 10	< 10

#### Notes:

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

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

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 21, 2020.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

 $\ensuremath{\mathbf{BOLD}}$  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.

## Summary of Groundwater Sampling Results (Analytical) JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

							Sample Location:	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
							Sample Date:	5/8/2023	5/9/2023	5/9/2023	5/9/2023	5/8/2023	5/8/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient	Downgradient/ GSI	Downgradient	Downgradient	Downgradient/ GSI	Downgradient/ GSI
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,380	227	992	2,450	1,720	1,230
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	496	265	258	118	142	166
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	51.1	16.8	22.3	73.6	31.5	99.9
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	1,670	722	422	34.2	314	356
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	1,580	1,530	1,190	734	878	1,240
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.71	6.84	6.75	6.98	7.36	7.33
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	< 1	2	23	2	8
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	50	28	105	464	114	180
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	83	42	33	45	55	40
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	NC	NC	< 0.122	< 0.131	0.134	0.337	0.155	0.143
Radium-228	pCi/L	NC	NC	NC	NC	NC	NC	< 0.547	< 0.600	< 0.573	0.746	0.686	1.01
Radium-226/228	pCi/L	5	NC	NC	NC	NC	NC	< 0.547	< 0.600	< 0.573	1.08	0.841	1.15
Selenium	ug/L	50	50	50	5.0	55	120	2	2	2	1	1	1
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>												
Iron	ug/L	300**	300€	300 <sup>E</sup>	500,000EE	NC	NC	1,180	67	676	6,890	755	450
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	NC	NC	3	2	< 1	< 1	< 1	1
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	9	4	3	3
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

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 21, 2020.
- \*\* 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

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- <sup>E</sup> Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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.

Page 1 of 2 July 2023

#### Summary of Groundwater Sampling Results (Analytical) JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

							c, iviiciligati						
							Sample Location:	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
							Sample Date:	5/8/2023	5/8/2023	5/8/2023	5/9/2023	5/9/2023	5/9/2023
						Chronic-Based	Acute-Based	Davin and diam't	Davin and diam't	Daywa awa di anat/	Daywa awa dia at/	Davin and diam't	
				MI Non-		Mixing Zone GSI	Mixing Zone GSI	Downgradient/	Downgradient/	Downgradient/ GSI	Downgradient/	Downgradient/	Downgradient
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^	Criteria^	Criteria^	GSI	GSI	GSI	GSI	GSI	
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	993	2,620	2,140	5,240	1,140	1,740
Calcium	mg/L	NC	NC	NC	500 <sup>EE</sup>	NC	NC	217	104	202	163	165	117
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	32.4	56.5	30	46.5	16.9	64.2
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	581	50.8	185	67.2	208	80.5
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	1,430	613	1,060	759	929	743
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.88	7.41	6.84	6.87	6.94	7.05
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	< 1	14	< 1	44	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	95	272	174	98	267	72
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	23	34	56	65	24	23
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	< 5	13	30	6
Radium-226	pCi/L	NC	NC	NC	NC	NC	NC	< 0.128	0.198	0.275	< 0.141	0.276	0.149
Radium-228	pCi/L	NC	NC	NC	NC	NC	NC	< 0.594	< 0.518	0.490	< 0.836	< 0.916	< 0.663
Radium-226/228	pCi/L	5	NC	NC	NC	NC	NC	< 0.594	0.700	0.765	< 0.836	< 0.916	< 0.663
Selenium	ug/L	50	50	50	5.0	55	120	< 1	2	1	1	< 1	2
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>												
Iron	ug/L	300**	300€	300 <sup>E</sup>	500,000EE	NC	NC	2,720	569	1,410	74	21,600	78
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	NC	NC	1	< 1	1	1	< 1	1
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	< 2	< 2	5	15
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

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 21, 2020.
- \*\* 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

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is

to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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.

Page 2 of 2 July 2023

# Summary of Confidence Interval Evaluation: May 2023 JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Assessment Mor	sessment Monitoring Statistical Evaluation																							
Constituent	Units	GWPS	MW	<i>l</i> -50	MW	<i>l-</i> 51	MW	<i>l</i> -52	MW	<i>l</i> -53	MW	-53R	MW	-54R	MW	V-55	OW-57	'R OUT	JCW-MV	V-18001	JCW-M	N-18005	JCW-M\	W-18006
Constituent	Offics	GWPS	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron <sup>(1)</sup>	ug/L	560	1,400	1,900	1,100	1,400	1,000	1,300	2,900	4,300	1,700	2,400	4,000	5,500	690	1,100	1,700	2,000	1,400	1,700	940	1,200	2,100	3,100
Calcium	mg/L	280			110	240													350	480				
Sulfate	mg/L	780	270	650															850	2,200				
Arsenic	ug/L	21									10	23			(2)	(2)			0.5	38			15	29
Molybdenum	ug/L	73													(2)	(2)								
Iron	ug/L	28,000				-									16,000	36,000						-		
Vanadium	ug/L	6																	1.0	12				

GSI Statistical Evaluation										
Constituent	Units	GSI	MW	<i>l-</i> 55						
Constituent	Offics	GSI	LCL	UCL						
Arsenic	ug/L	100	40	170						
Molybdenum	ug/L	120	37	160						

#### Notes:

ug/L - micrograms per Liter

mg/L - milligrams per Liter

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

GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated April 23, 2021

GSI - Groundwater Surface Water Interface Criteria; GSI criteria is the generic Michigan Part 201 GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

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

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

1,300	Indicates a statistically significant exceedance of the GWPS (detection monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the GWPS (assessment monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the applicable GSI criterion. An exceedance occurs when the LCL is greater than the criterion.

<sup>(1)</sup> Boron concentrations were confirmed as a statistically significant increase (SSI) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

(2) The concentrations of arsenic and molybdenum at MW-55 are not a result of a release from the unit, as detailed in the Alternate Source Demonstration (TRC, January 2022); therefore, confidence intervals were not calculated for comparison to GWPSs.

# EGLE Exceedance Summary Table JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

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

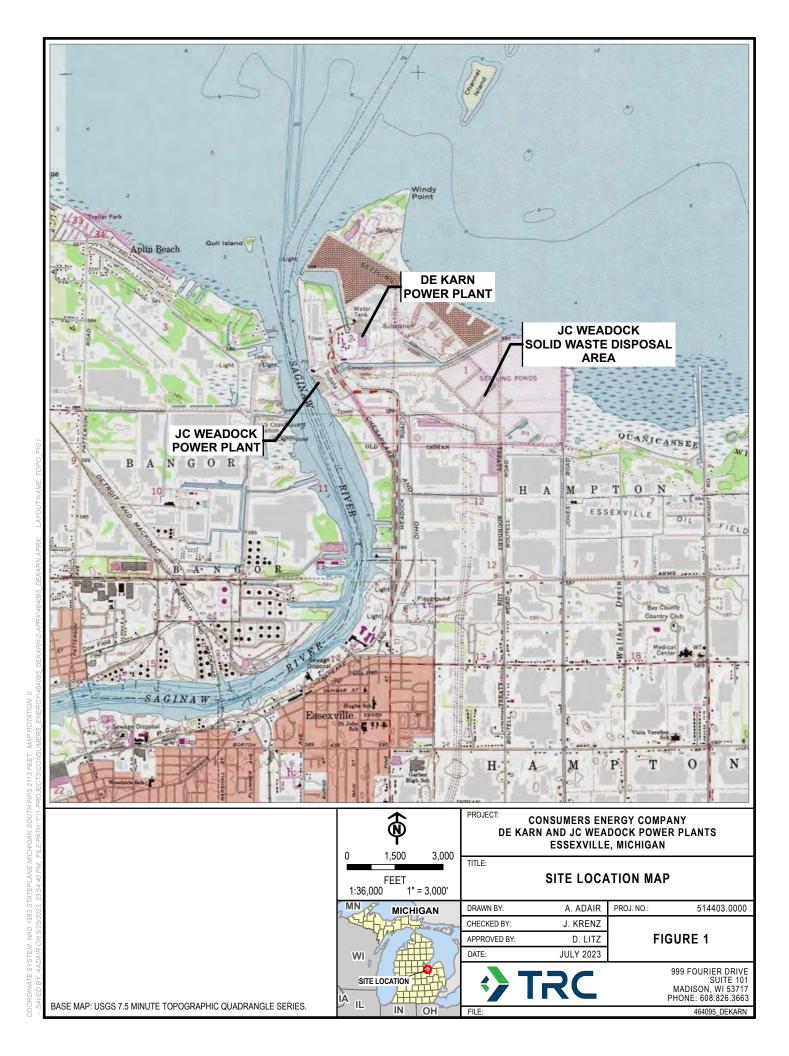
Data is in	(X) ug/L	or
	( ) mg/L	
unless otherwise	stated	

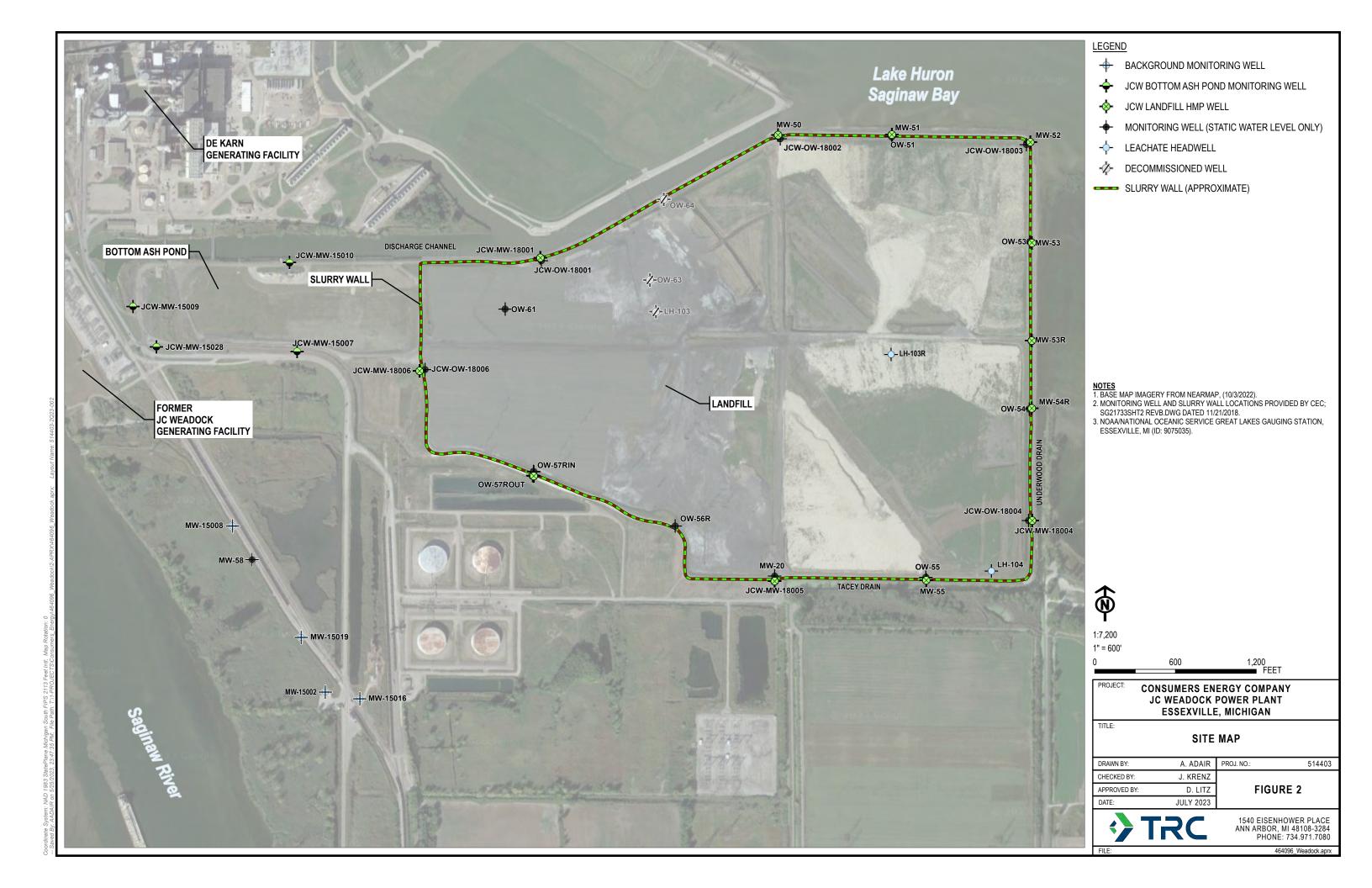
Facility: JC Weadock - WDS# 395457

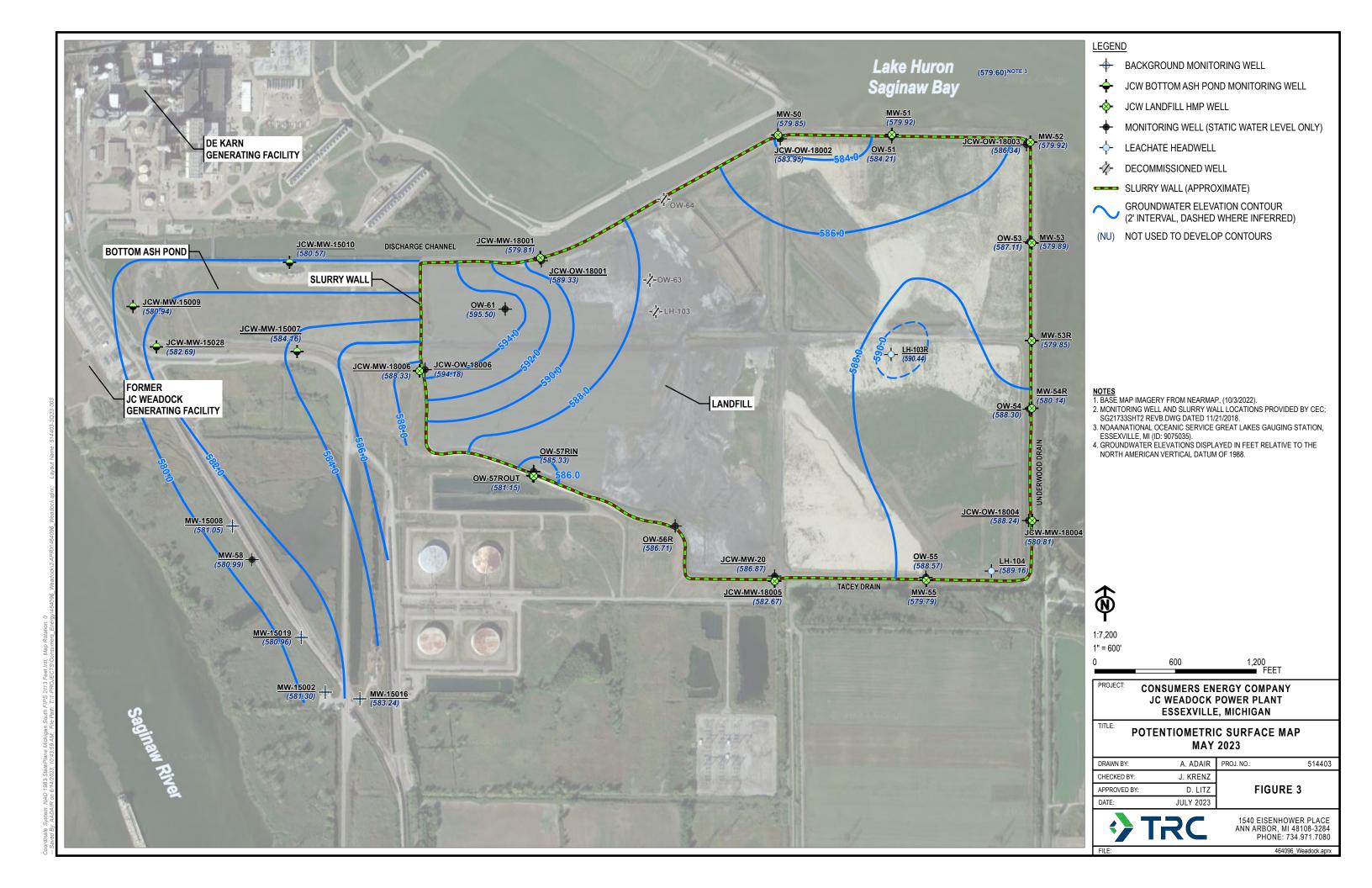
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	2 Qtr. 2023 ( <b>bold</b> >201)	1 Qtr. 2023 ( <b>bold</b> >201)	4 Qtr. 2022 ( <b>bold</b> >201)	3 Qtr. 2022 ( <b>bold</b> >201)					
	No Exceedances at Compliance Locations												



## **Figures**









# Appendix A Static Water Level Evaluation

### Table A1

Static Water Levels for Select Perimeter Dike Monitoring Wells and NOAA Staff Gauge JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Well Location	Data I		Saginaw Bay Surface Water Elevation (SWE) (ft)	Elevation Difference (GWE- SWE) <sup>(1)</sup>
MW-50	5/1/2023	579.85		0.25
MW-51	5/1/2023	579.92		0.32
MW-52	5/1/2023	579.92		0.32
MW-53	5/1/2023	579.89	F70 60	0.29
MW-53R	5/1/2023	579.85	579.60	0.25
MW-54R	5/1/2023	580.14		0.54
MW-55	5/1/2023	579.79		0.19
JCW-MW-18004	5/1/2023	580.81		1.21
Average	e:	580.02		

## Notes:

Elevation in feet above North American Vertical Datum 1988 (NAVD 88)

TOC: top of well casing

ft BTOC: feet below top of well casing

(1) Positive elevation difference indicates flow toward the surface water body.

### Table A2

### Slurry Wall Gradient and Flux

## JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	· · ·	Saturated	Mean	Section	K	- i	Area	Flow	Flow	Flow
_		_		1					(5: (5:)		-		_
Discharge Channel	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
JCW-OW-18001 <sup>(6)</sup>	589.33		22.37	4.26E-01	2.00	2.88	1,010		0.43	2,904	8.06E-02	0.60	220
JCW-MW-18001		579.81			3.75			2.30E-08	0.10	2,001	0.002 02	0.00	220
JCW-OW-18002	583.95		28.87	1.42E-01	4.00	4.25	970	2.50L-00	0.14	4,123	3.82E-02	0.29	104
MW-50		579.85			4.50				0.14	4,123	3.02L-02	0.29	104
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-51	584.21		14.38	2.98E-01	4.00	4.31	1,850		0.30	7,974	1.55E-01	1.16	423
MW-51		579.92			4.62				0.30	7,974	1.55E-01	1.10	423
JCW-OW-18003	586.34		33.85	1.90E-01	3.50	3.82	740	2.30E-08	0.19	2,823	3.49E-02	0.26	95
MW-52		579.92			4.13			2.50L-00	0.19	2,023	3.49L-02	0.20	90
OW-53	587.11		20.14	3.58E-01	1.25	1.65	730		0.36	1,204	2.82E-02	0.21	77
MW-53		579.89			2.05				0.00	1,204	2.022 02	0.21	.,
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Non-Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-54	588.30		21.23	3.84E-01	2.00	2.25	510		0.38	1.148	2.88E-02	0.22	79
MW-54R		580.14			2.50				0.36	1,140	2.00E-U2	0.22	79
JCW-OW-18004	588.24		26.59	2.79E-01	8.00	4.45	820		0.00	2.052	C CCE 00	0.50	400
JCW-MW-18004		580.81			0.91			2.30E-08	0.28	3,653	6.66E-02	0.50	182
OW-55	588.57		23.95	3.67E-01	2.00	1.89	1,220	2.30E-08	0.37	2,312	5.53E-02	0.41	151
MW-55		579.79			1.79				0.37	2,312	J.JJE-02	0.41	131
MW-20	586.87		40.93	1.03E-01	1.50	1.38	1,120		0.10	1,540	1.03E-02	0.08	28
JCW-MW-18005		582.67			1.25				0.10	1,340	1.03E-02	0.00	20

Calculated Groundwater Discharge from JC Weadock (gal per day) =

(cubic ft per day) = 0.50 (cubic ft per min) 3.5E-04

3.72

2.03E-02

Calculated Groundwater Discharge from JC Weadock (gal per yr) = 1,359

(cubic ft per yr) = 182

Calculated Groundwater Discharge from JC Weadock (gal per year per linear foot of dike) = 0.15

(cubic feet per year per linear foot of dike)

### Notes:

Water level data collected on May 1, 2023 are shown by yellow cells:

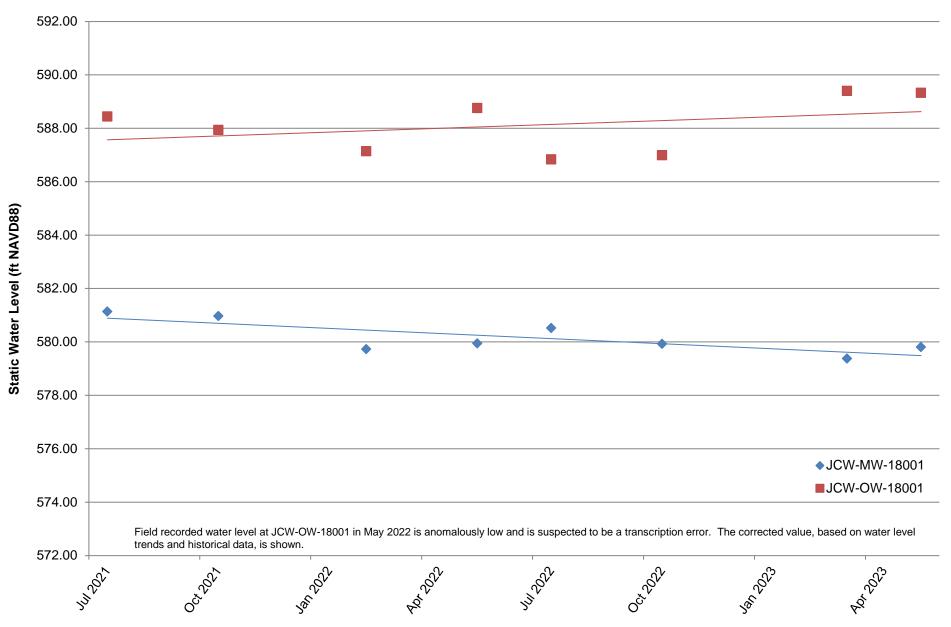
- 1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
- 2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above the top of the sand unit, or the measured saturated thickness of the sand unit if the SWL is below the top of the sand unit.
- 3. Hydraulic conductivity taken as harmonic mean of laboratory tests done on in-place slurry wall from NTH Certified Quality Assurance Report, Appendix E, April 24, 2009
- 4. Arithmetic average used to develop geometric properties of each section/zone (e.g. discharge channel, adjacent, and non-adjacent)
- 5. If Obs well SWL < MW SWL calculated flow will be zero.
- 6. Field recorded water level is anomalously low and is suspected to be a transcription error. The corrected value, based on water level trends and historical data, is used to calculate flux.

SWL = Static Water Level; Obs Well = Observation Well; MW= Monitoring Well; ft NAVD 88 = feet above North American Vertical Datum 1988

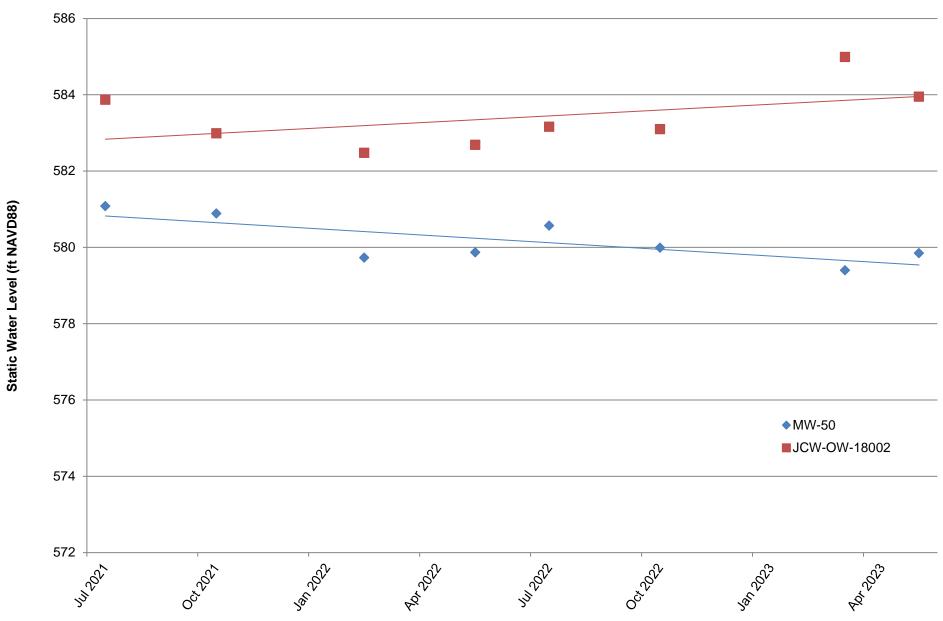
ft/ft = feet per foot; cm/sec = centimeters per second; ft<sup>2</sup> = square feet; ft<sup>3</sup>/day = cubic feet per day; Gal/day = gallons per day; Gal/yr = gallons per year

i = hydraulic gradient; K = hydraulic conductivity; x<sub>wells</sub> = distance between well pairs

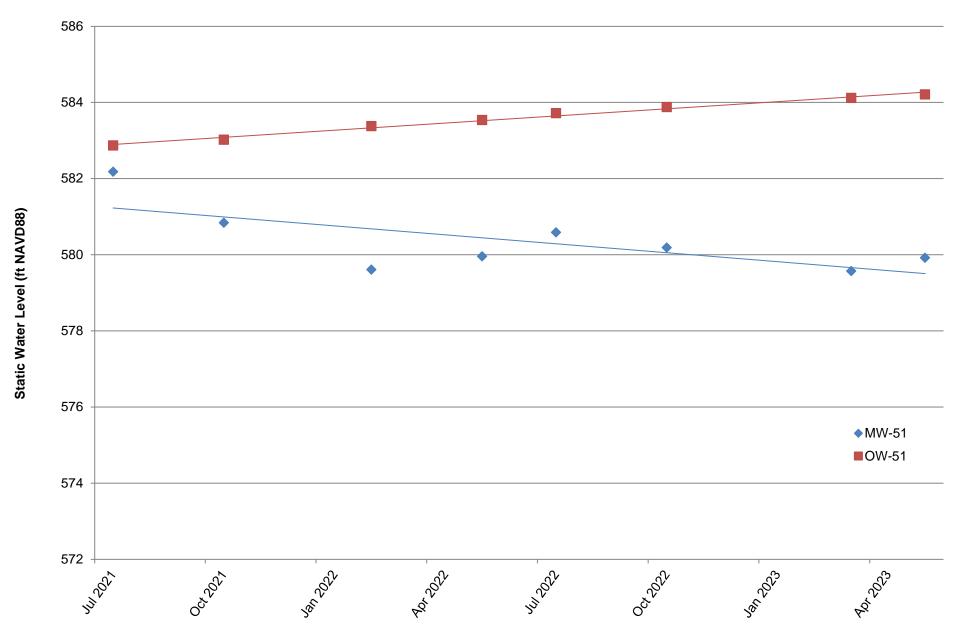
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



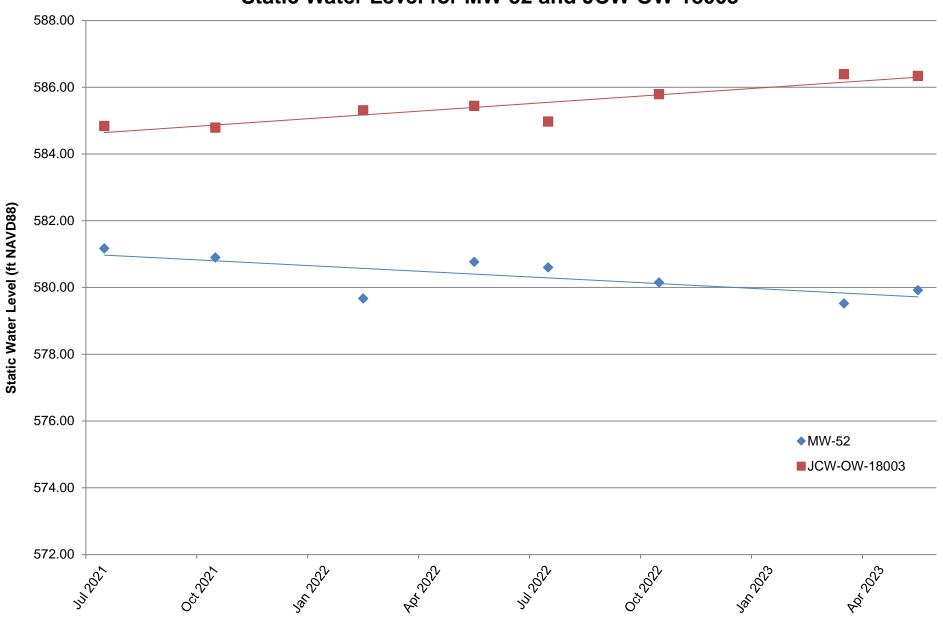
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



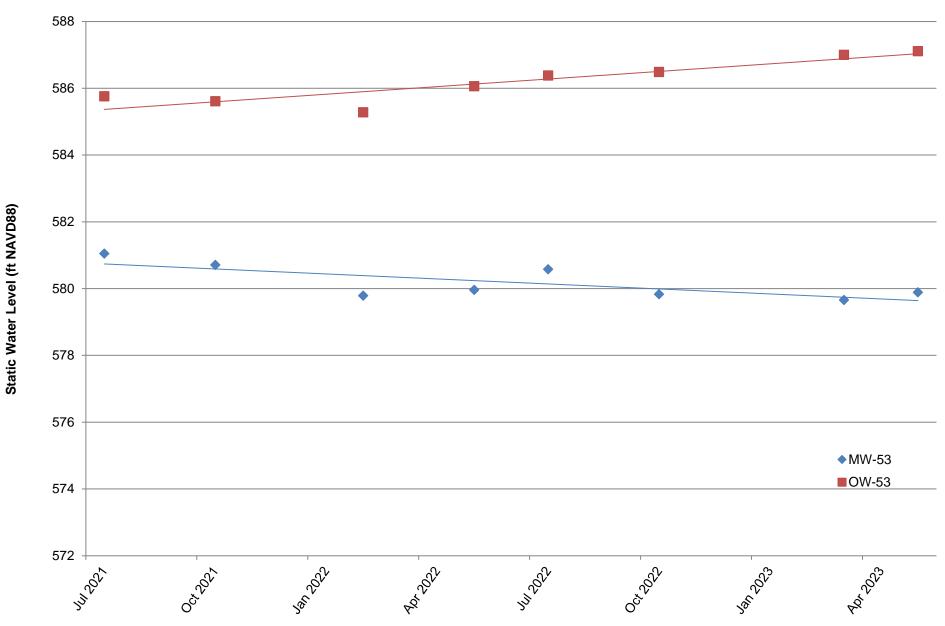
Appendix A
Static Water Level for MW-51 and OW-51



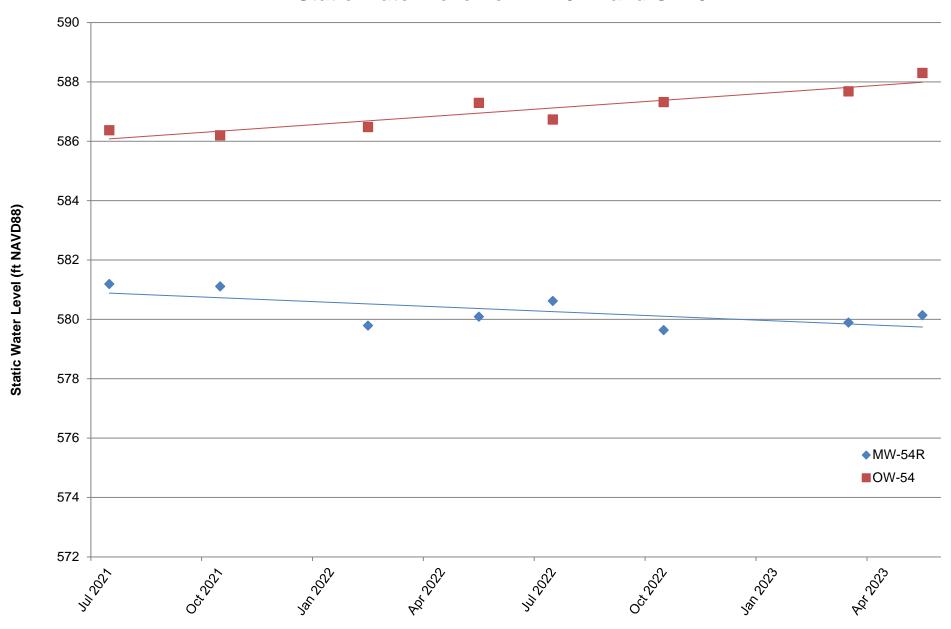
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



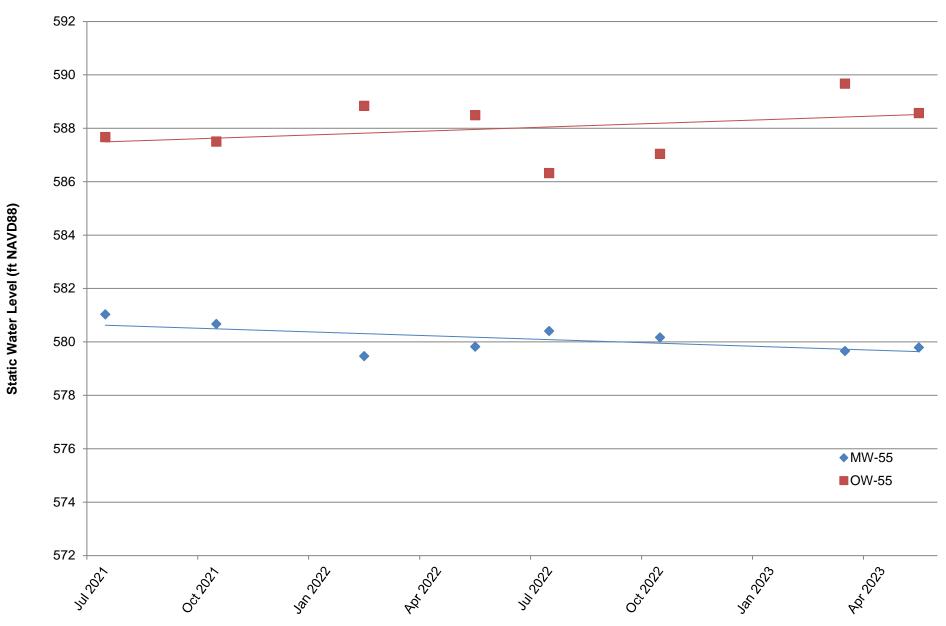
Appendix A
Static Water Level for MW-53 and OW-53



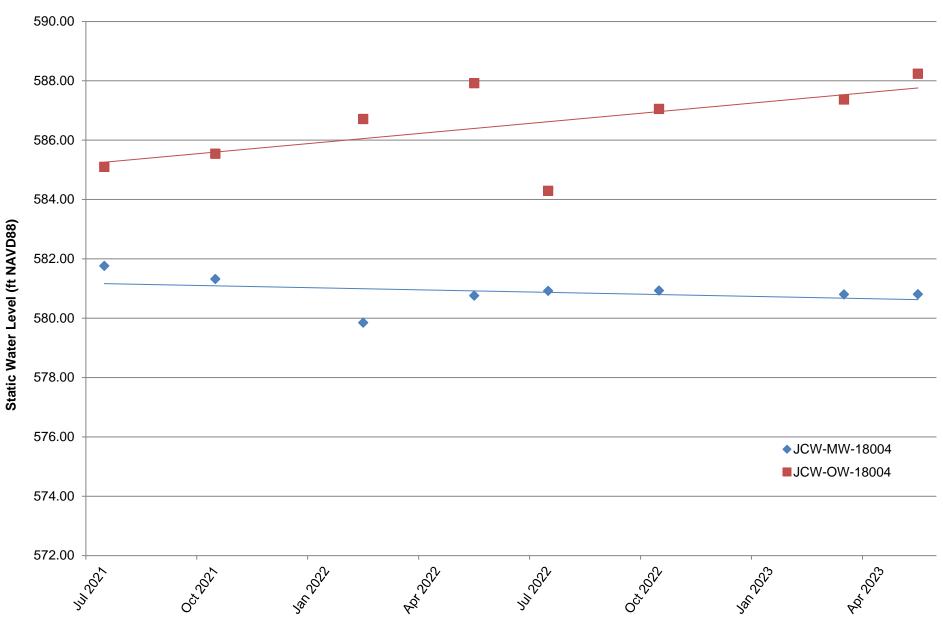
Appendix A
Static Water Level for MW-54R and OW-54



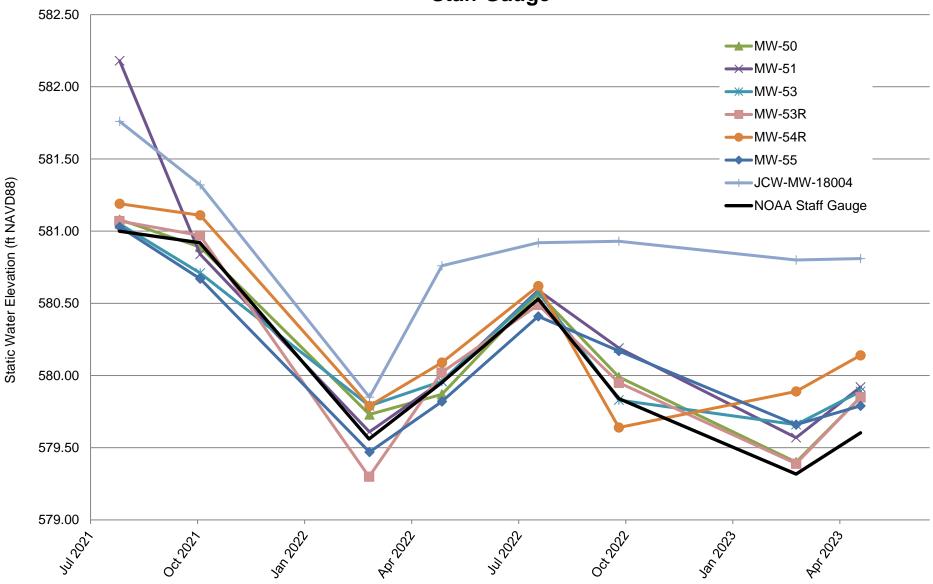
Appendix A
Static Water Level for MW-55 and OW-55



Appendix A
Static Water Level for JCW-MW-18004 and JCW-OW-18004



Appendix A
Static Water Elevations for Select Perimeter Dike Monitoring Wells and NOAA
Staff Gauge





# Appendix B Data Quality Review

# Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0404.

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

■ MW-15002

■ MW-15008

MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses:
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium 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**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- The field duplicate pair samples were DUP-Background and MW-15019; all criteria between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and/or alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0406.

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

JCW-MW-18001 JCW-MW-18004 JCW-I
---------------------------------

■ JCW-MW-18006 ■ MW-50 ■ MW-51

■ MW-53 ■ MW-53R

■ MW-54R ■ MW-55 ■ MW-58

OW-57R OUT

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

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the 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**

- One field blank (FB-01) and one equipment blank (EB-01) sample were collected. Total metals and anions were not detected in these blank samples.
- MS and MSD analyses were performed on sample JCW-MW-18001 for select metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-JCW-LF-02/JCW-MW-18006 and DUP-JCW-LF-01/MW-50; all criteria between the parent and duplicate samples were within the QC limits with the following exceptions.

- Selenium was detected in both field duplicate pairs at concentrations <5x the RL and
  the absolute difference was equal to the RL. Therefore, the positive results for selenium
  should be considered estimated in the porewater samples in this data set, as
  summarized in the attached table, Attachment A.</li>
- Nickel was detected in sample JCW-MW-18006 but was nondetect in sample DUP-JCW-LF-02 and the absolute difference was equal to the RL. Therefore, the positive and nondetect results for nickel should be considered estimated in all porewater samples in this data set except for MW-50/DUP-JCW-LF-01, as summarized in the attached table, Attachment A.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event May 2023 JC Weadock/Karn DEK Background

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-184759-1 Revision 1.

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

■ MW-15002

■ MW-15008

■ MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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;
- 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.

- The reviewed 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**

- Target analytes were not detected in the method blanks (MBs) with the following exception.
  - Radium-226 was detected in MB 160-611074/1-A at 0.1185 +/- 0.0829 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96. as summarized in attachment A.</li>
- One field blank (FB-Background) was collected. Target analytes were not detected in the field blank sample.
- LCS/LCSD recoveries and relative percent differences for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this SDG.
- The field duplicate pair samples were DUP-Background/MW-15019. All criteria were met.
- Carrier recoveries were within 40-110%.

## Attachment A

Summary of Data Non-Conformances for Landfill Groundwater Analytical Data DE Karn /JC Weadock Background – CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15019	5/1/2023	Radium 226	Detected result is potentially a false positive due to method blank contamination.
DUP-BACKGROUND	5/1/2023	Radiuiii 220	Detected result is potentially a raise positive due to method blank contamination.

# Laboratory Data Quality Review Porewater Monitoring Event May 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-185122-1.

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

<ul><li>JCW-MW-18001</li></ul>	■ JCW-MW-18004	■ JCW-MW-18005
■ JCW-MW-18006	■ MW-50	■ MW-51
■ MW-52	■ MW-53	■ MW-53R
■ MW-54R	■ MW-55	■ MW-58

OW-57ROUT

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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:

- 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.

- The reviewed 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**

- Results for radium 226 were reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. Positive radium-226 results should be considered to be potentially high biased, as summarized in the attached table.
- Target analytes were not detected in the method blanks.
- One equipment blank (EB-01) was collected. Target analytes were not detected in the equipment blank sample.
- LCS/LCSD recoveries and relative percent differences for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this SDG.
- The field duplicate pair samples were DUP-01/MW-50 and DUP #02/JCW-MW-18006. All criteria were met.
- Carrier recoveries were within 40-110%.

### Attachment A

Summary of Data Non-Conformances for Landfill Groundwater Analytical Data

JC Weadock Landfill – CCR Monitoring Program

Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JCW-MW-18005	5/9/2023		
JCW-MW-18006	5/9/2023		
MW-50	5/8/2023		
MW-51	5/8/2023		
MW-53	5/8/2023	Radium 226	Deputte are notestably bigged high due to not undergoing 24 day uniting period prior to probable
MW-53R	5/8/2023	Radium 226	Results are potentially biased high due to not undergoing 21-day waiting period prior to analysis.
MW-55	5/9/2023		
OW-57ROUT	5/9/2023		
MW-58	5/9/2023		
DUP-01	5/8/2023		



# **Appendix C Detection Monitoring Statistical Trend Tests**

## Appendix C

## Detection Monitoring Statistical Summary for JC Weadock Facility Second Quarter 2023 Data from August 2021 to May 2023

Porewater Monitoring Points								
PARAMETER	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51		
Boron <sup>(1)</sup>	0	0	0	0	0	0		
Calcium	↑ <sup>ASD</sup>	0	0	0	<b>↓</b>	$\downarrow$		
Chloride	<b>↓</b>	0	↓*	0	$\downarrow$	0		
Fluoride	O*	O*	O*	O*	O*	O*		
Iron	0	0	↓*	0	0	0		
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0		
Sulfate	↑ <sup>ASD</sup>	0	0	0	0	<b>↓</b>		
Total Dissolved Solids	0	0	0	0	0	<b>↓</b>		

### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

= Upward trend, confirmed

= Downward trend, continuous

↓\* = Downward trend, new

↑ ASD = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

## Appendix C

## Detection Monitoring Statistical Summary for JC Weadock Facility Second Quarter 2023 Data from August 2021 to May 2023

Porewater Monitoring Points							
PARAMETER	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57R OUT	
Boron <sup>(1)</sup>	0	0	0	1	0	0	
Calcium	0	$\downarrow$	0	0	0	0	
Chloride	$\downarrow$	0	0	0	0	0	
Fluoride	O*	O*	O*	O*	O*	O*	
Iron	0	↓*	0	0	0	0	
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0	
Sulfate	0	0	0	0	0	0	
Total Dissolved Solids	0	$\downarrow$	0	0	0	0	

### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

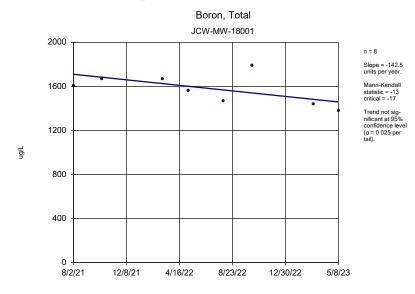
= Upward trend, confirmed

= Downward trend, continuous

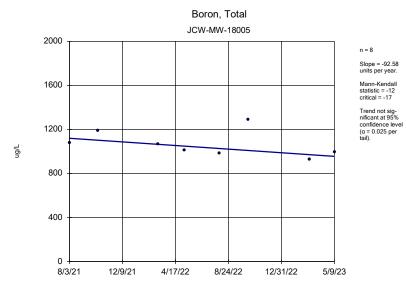
\* = Downward trend, new

ASD = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

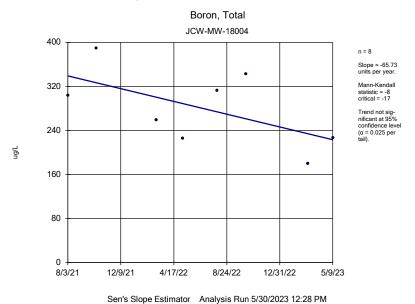


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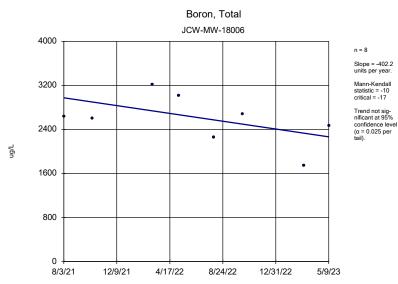
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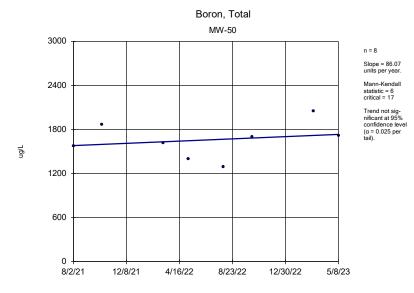


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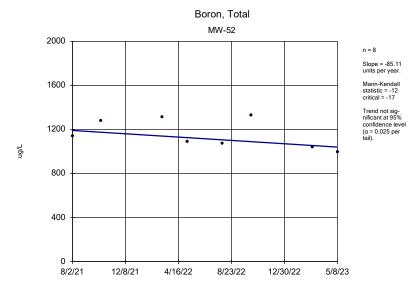
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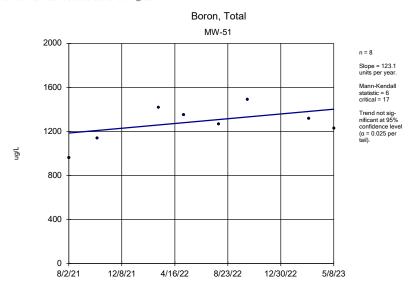
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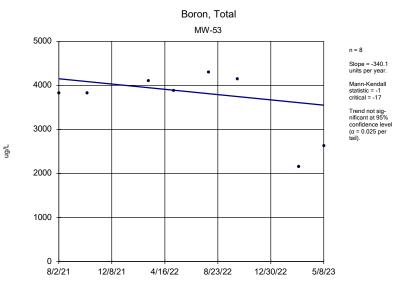
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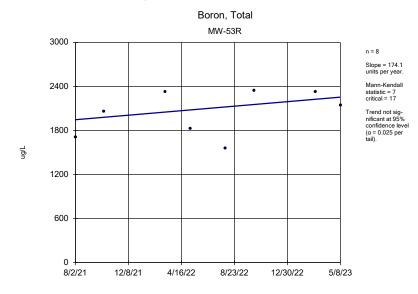
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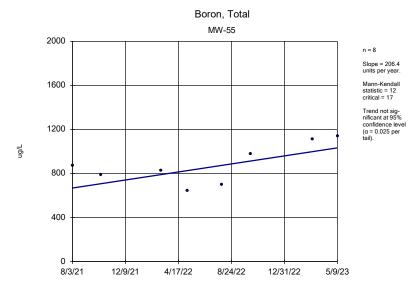
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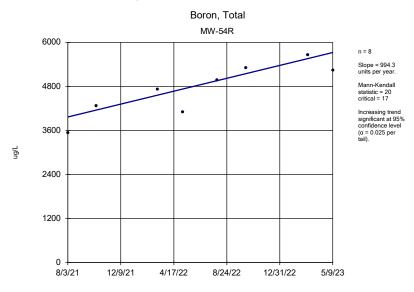


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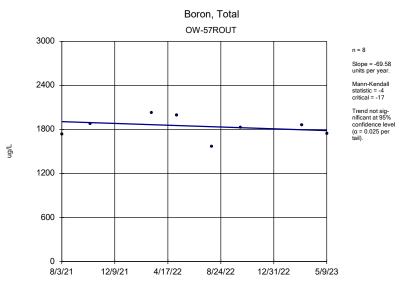
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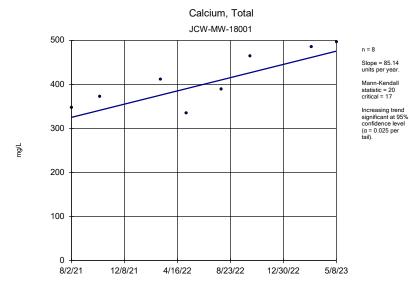


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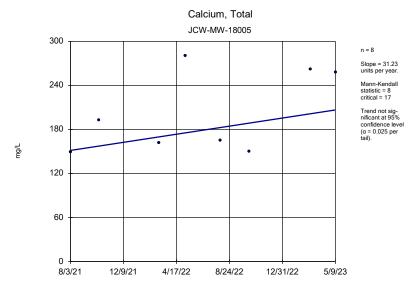
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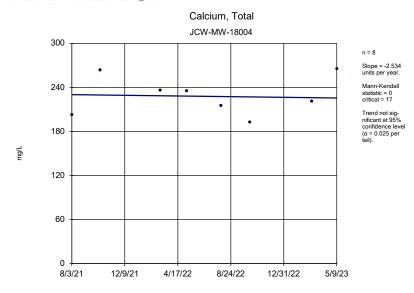


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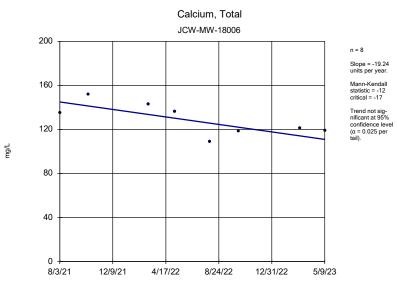


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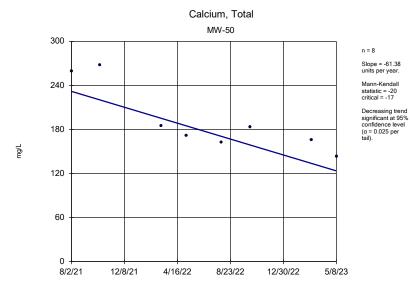
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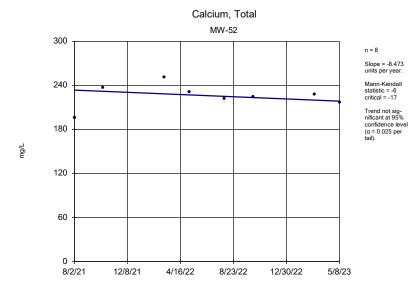
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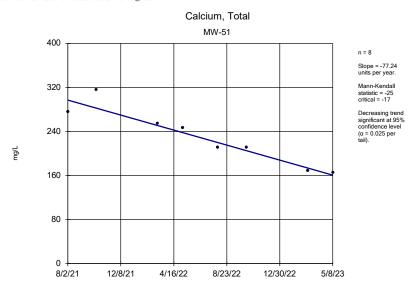


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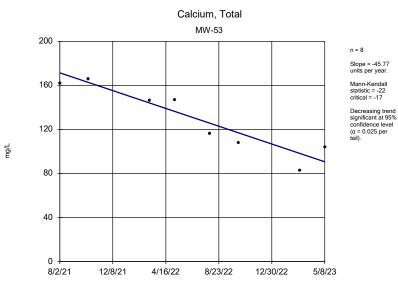
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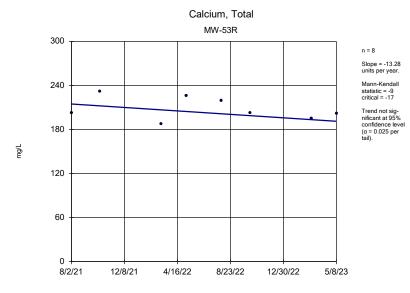


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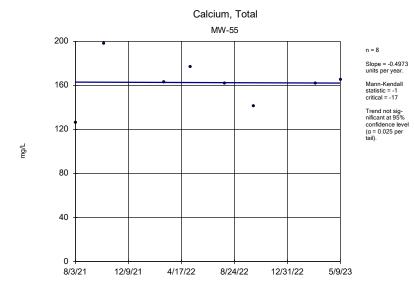
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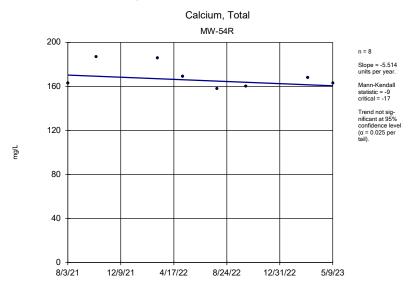


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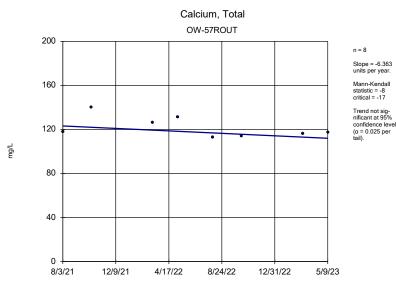
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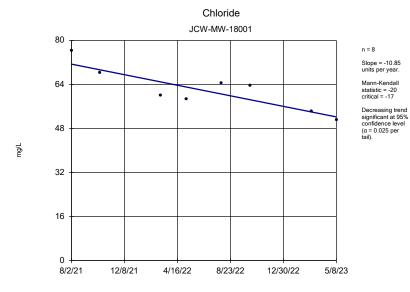
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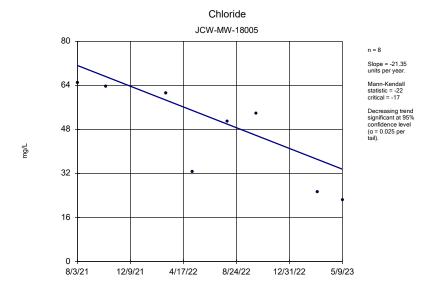
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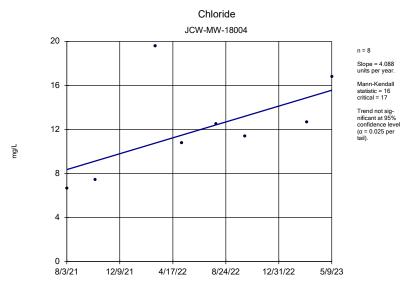


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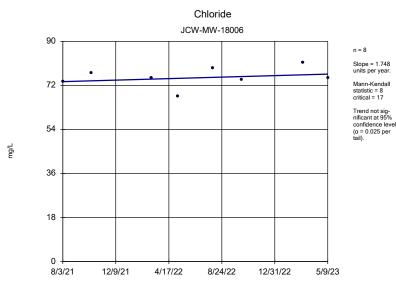


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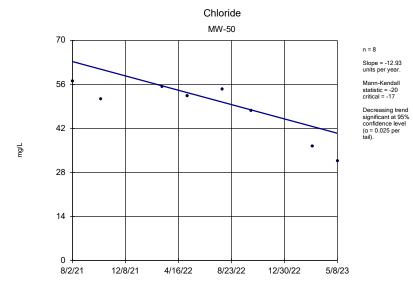


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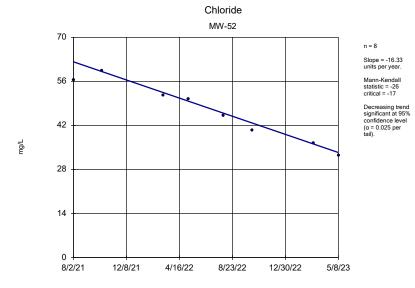
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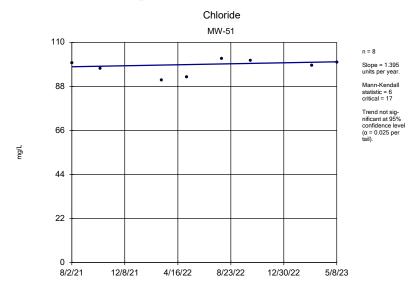
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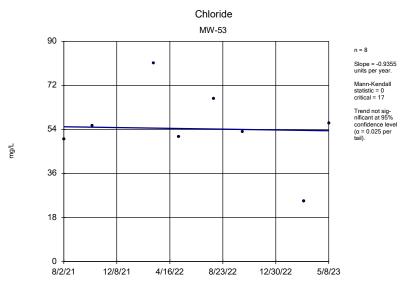
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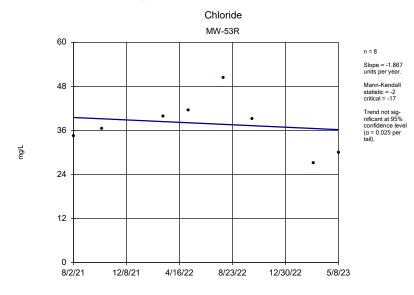
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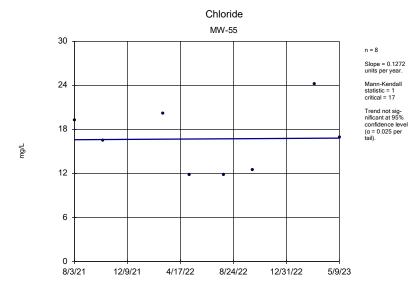


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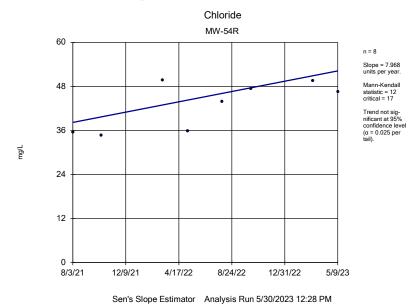


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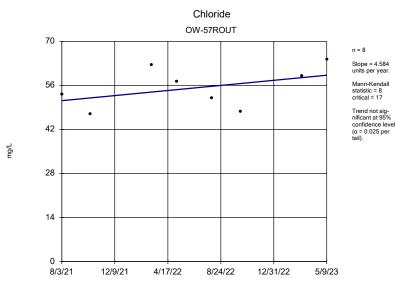
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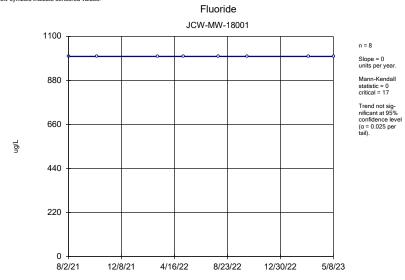
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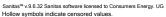
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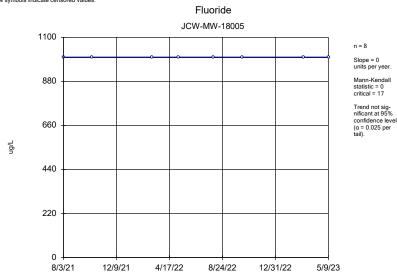
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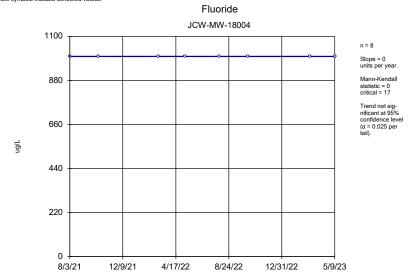




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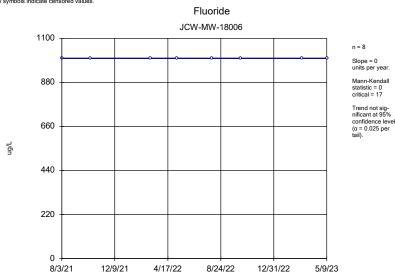
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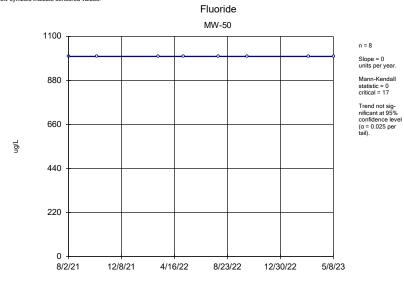
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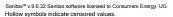


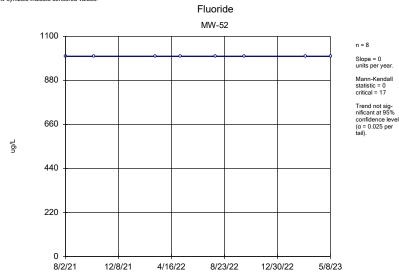
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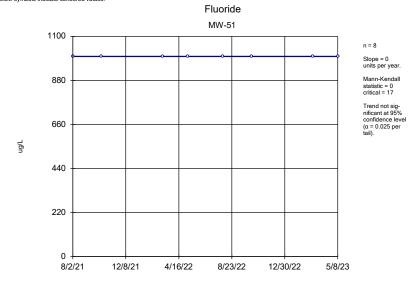




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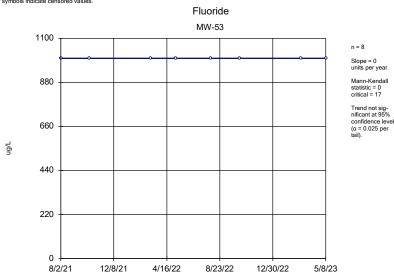
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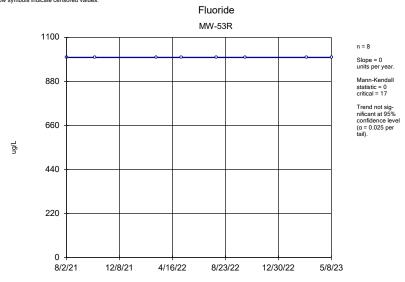
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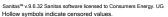
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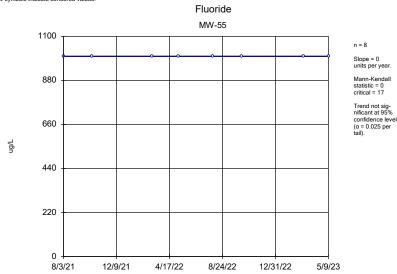
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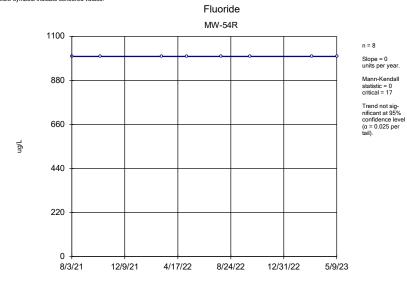




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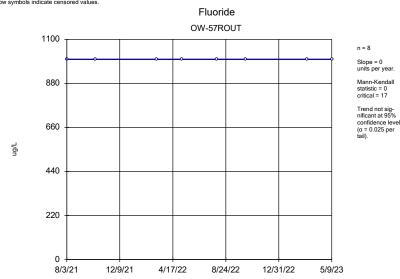
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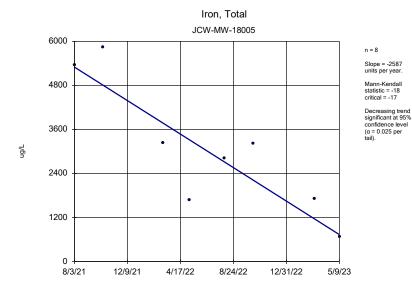
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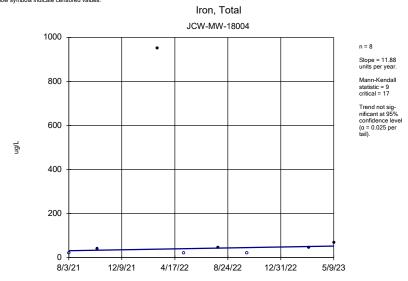
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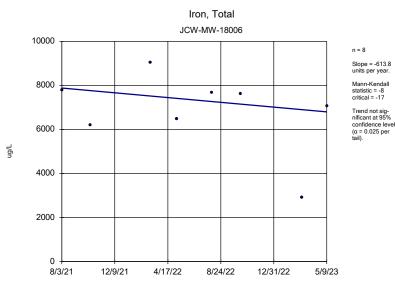
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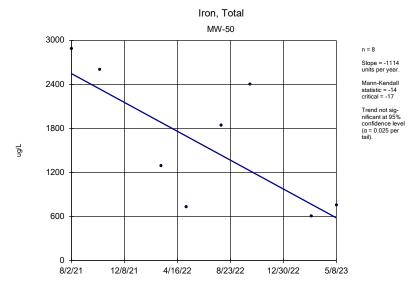


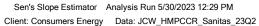
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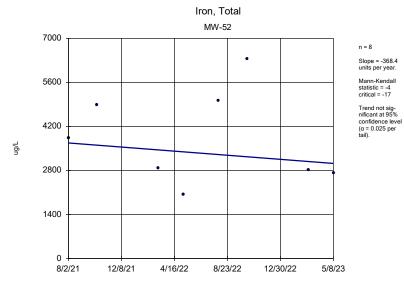


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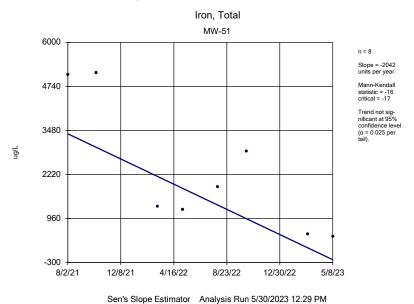




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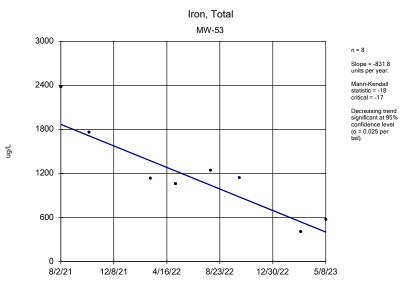


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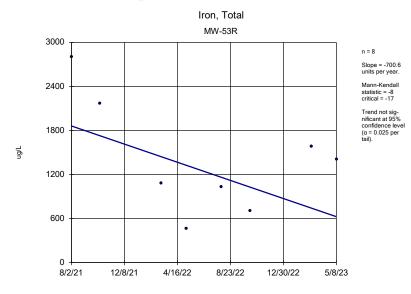


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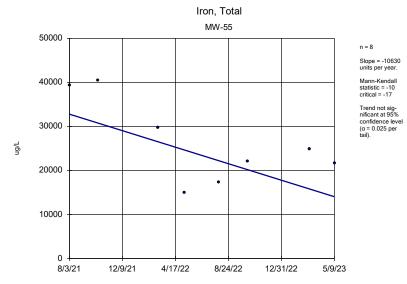
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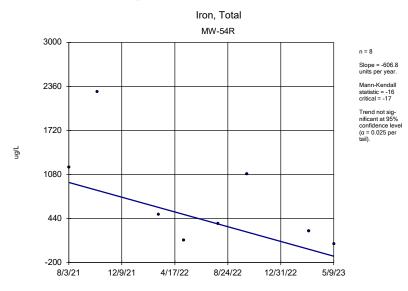
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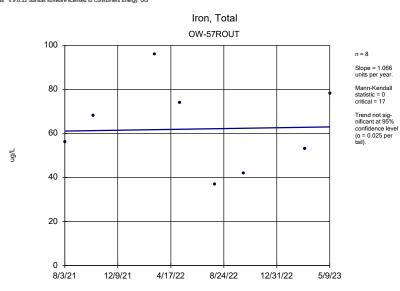
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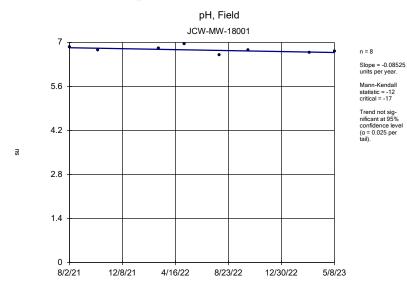
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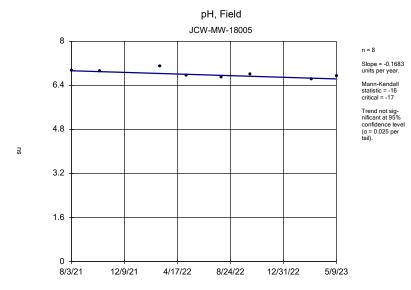
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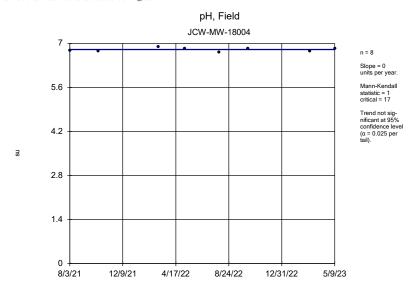
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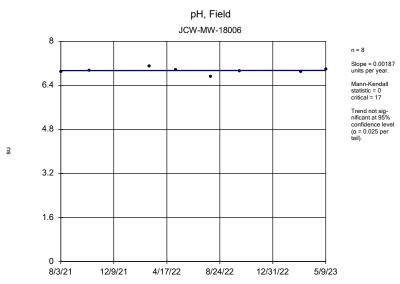
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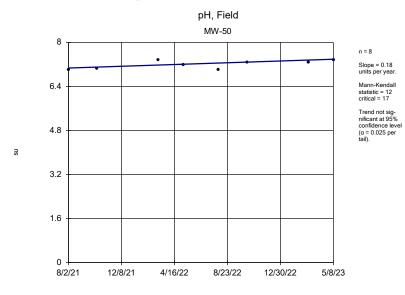


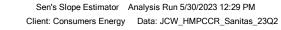
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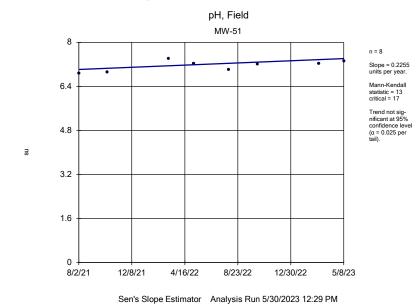


# pH, Field MW-52 Slope = -0.06518 units per year. Mann-Kendall 6.4 critical = -17 Trend not sig-nificant at 95% confidence level 4.8 (α = 0.025 per tail). 3.2 1.6 8/2/21 12/8/21 4/16/22 8/23/22 12/30/22 5/8/23

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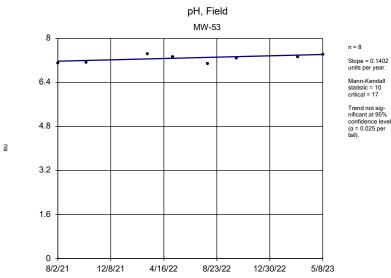
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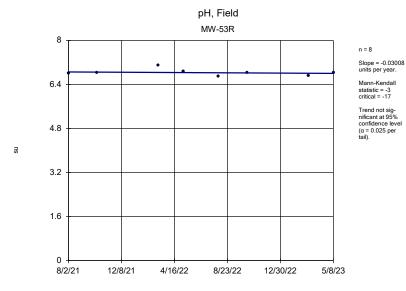
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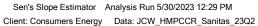


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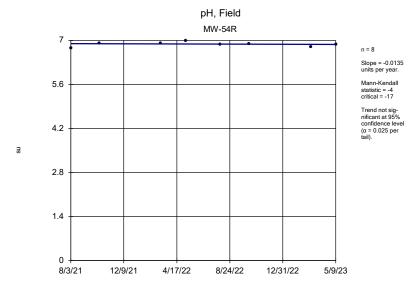
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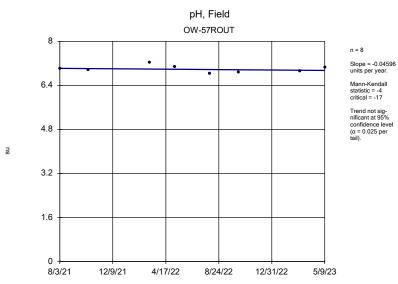
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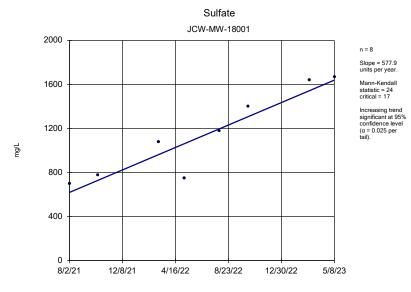
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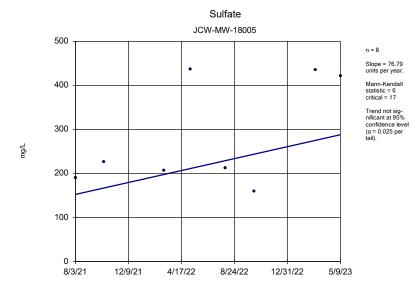
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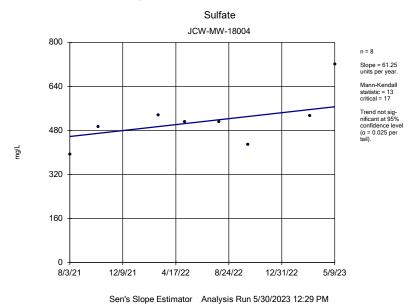


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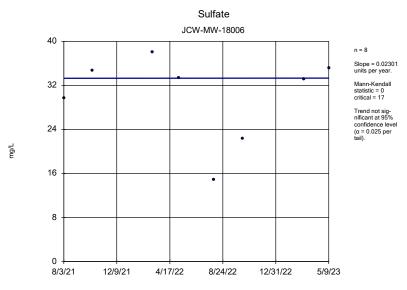


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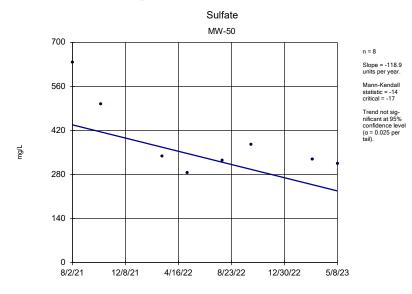
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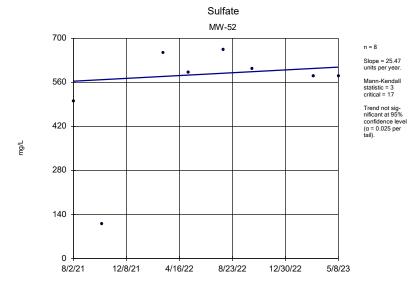


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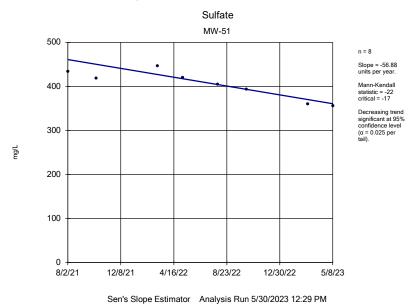


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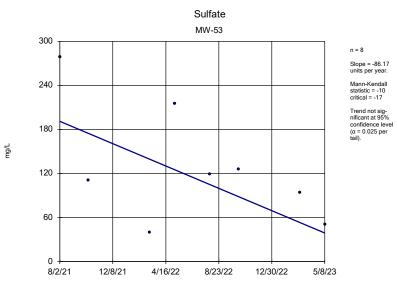


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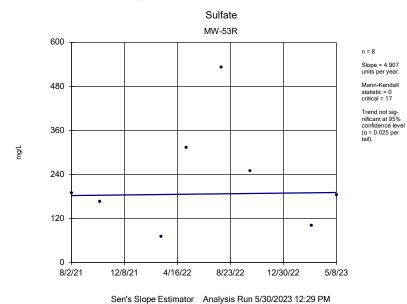


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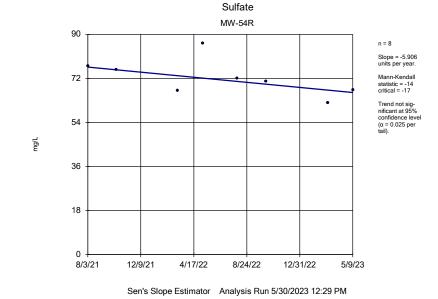
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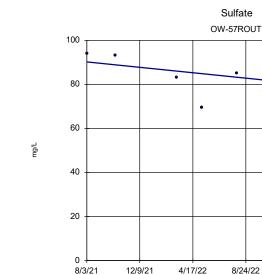


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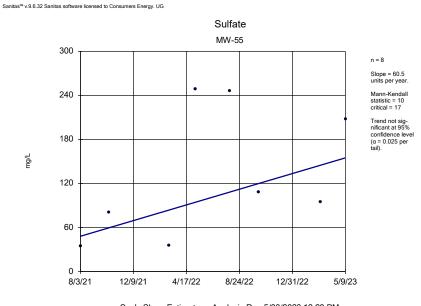


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units per year. Mann-Kendall statistic = -12 critical = -17 Trend not sig-nificant at 95% confidence level  $(\alpha = 0.025 \text{ per})$ 

Slope = -6.956

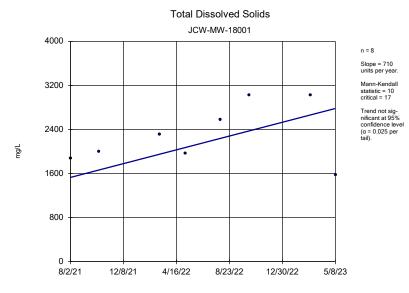
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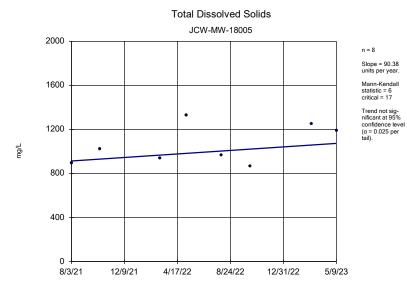
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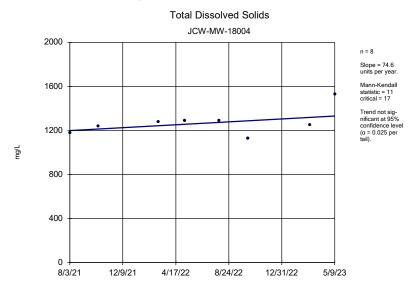


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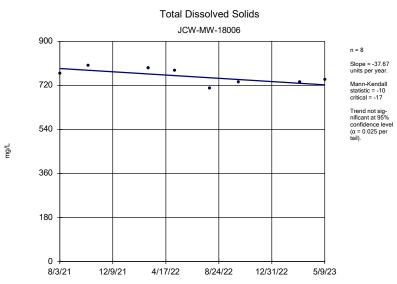


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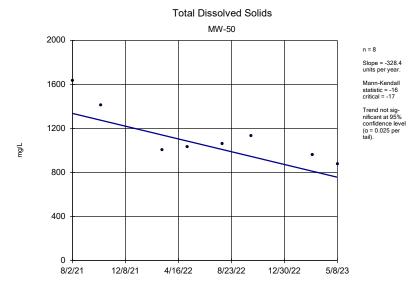
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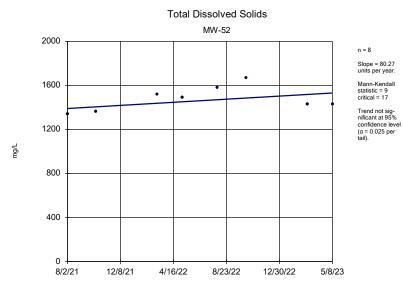
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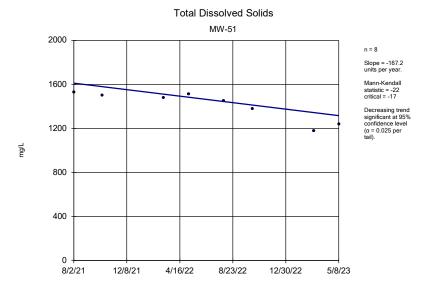


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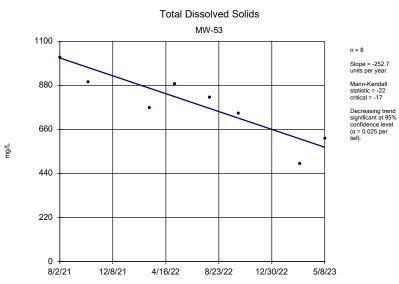


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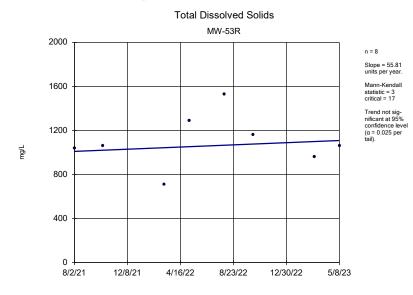
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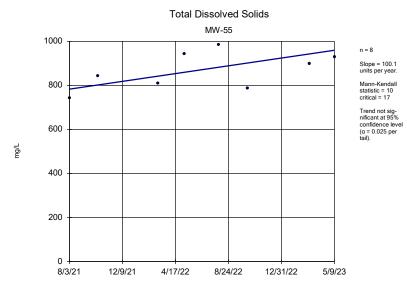
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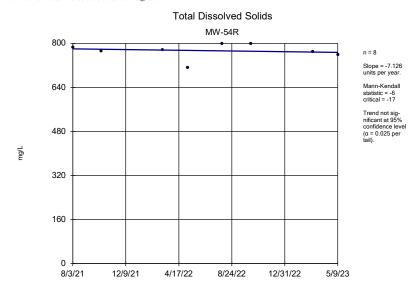






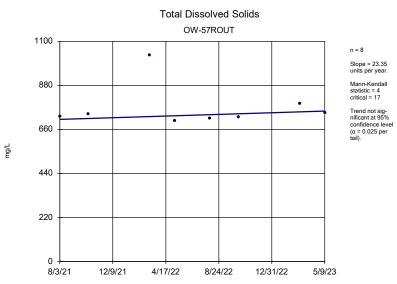
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# Appendix D Assessment Monitoring and GSI Statistical Evaluation



**Date:** June 29, 2023

To: J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

**Project No.:** 514403.0000 Phase 002, Task 002

Subject: Assessment Monitoring and GSI Statistical Evaluation of the Second Quarter 2023

Sampling Event

JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), arsenic was present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019.

Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule¹ at the JC Weadock Power Plant Landfill and quarterly groundwater monitoring in accordance with the February 2021 Landfill Hydrogeological Monitoring Plan (HMP). The second quarter 2023 monitoring event was conducted on May 8 and 9, 2023. In accordance with §257.95 and the HMP, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix III and Appendix IV constituents, and additional Michigan Part 115 (as amended by PA 640) Section 11511a(3) and Section 11519b(2) constituents, are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h) and Part 115, as detailed in the April 23, 2021 Groundwater Protection Standards technical memorandum, which was also included in the First Quarter 2021 Hydrogeological Monitoring Report². In accordance with the HMP, groundwater monitoring data from the designated groundwater-surface water (GSI) monitoring wells must be also compared to the GSI criteria to determine whether or not the GSI monitoring constituents are detected at statistically significant levels above the GSI criteria.

The evaluation of the initial semiannual assessment monitoring event data (April and May 2018) indicated that arsenic was present at statistically significant levels above the GWPS at one of the three former downgradient wells. The three downgradient wells were located within a vent (e.g., opening) of the perimeter soil/bentonite slurry wall to assess the quality of groundwater passing the waste boundary. As discussed in detail below, in July 2018, the vent in the perimeter soil/bentonite slurry wall was closed and the slurry wall is now continuous along the entire perimeter of the Weadock Landfill.

<sup>&</sup>lt;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).

<sup>&</sup>lt;sup>2</sup> TRC. 2021. First Quarter 2021 Hydrogeological Monitoring Report – JC Weadock Solid Waste Disposal Area, Essexville, Michigan. Prepared for Consumers Energy Company. April.

As a result of the change in groundwater flow conditions, the groundwater monitoring system was revised, as documented in the HMP. The monitoring well network now consists of twelve (12) downgradient monitoring wells and eight (8) GSI monitoring wells.

The statistical evaluation of the second quarter 2023 assessment monitoring event data indicates that the following constituents are present at statistically significant levels above the GWPSs in downgradient monitoring wells at the Weadock Landfill:

Constituent	GWPS	#Downgradient Wells Exceeded
Boron	560 μg/L	11 of 12
Calcium	280 mg/L	1 of 12
Sulfate	780 mg/L	1 of 12

Corrective action has been triggered as a result of data collected during the initial assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and execute the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria.

# **Statistical Evaluation Procedures**

Following each quarterly sampling event, compliance well data for the Weadock Landfill are evaluated in accordance with the Assessment Monitoring Statistical Data Evaluation and GSI Data Evaluation procedures in the HMP. The assessment monitoring and GSI monitoring programs were developed to evaluate concentrations of constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs or GSI criteria). To evaluate whether or not a criterion exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given monitoring event compared to the applicable criterion 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 3, the preferred method for comparisons to a fixed standard is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample 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 the 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 criterion. If the confidence interval straddles the criterion (i.e. the lower confidence level is below the criterion, 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 criterion and thus no compelling evidence that the measured concentration is a result of a release from the CCR unit versus the inherent

<sup>&</sup>lt;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.

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 Part 115, 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 constituent, the concentrations for each well were first compared directly to the GWPS, as shown on Table 1, or the GSI criteria, as shown on Table 2. Parameter-well combinations that included a direct exceedance of the criteria within the most recent two years of sampling events (eight quarterly sampling events, August 2021 through May 2023) were retained for further analysis. Data collected under the previous HMP is used where available.

Groundwater data were evaluated utilizing Sanitas<sup>TM</sup> statistical software. Sanitas<sup>TM</sup> is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas<sup>TM</sup> 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 for each parameter with a direct exceedance using a per test<sup>4</sup> 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<sup>TM</sup> 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.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the assessment and GSI monitoring programs. Initially, the results were observed visually for potential trends. No outliers were identified in the data set.

The Sanitas<sup>TM</sup> software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. The tests were run with a per-test significance of  $\alpha = 0.01$ . Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

<sup>&</sup>lt;sup>4</sup> Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

The Sanitas<sup>™</sup> software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes data transformations, as appropriate.

# **Assessment Monitoring Statistical Evaluation**

The assessment monitoring statistical evaluation is performed on the downgradient monitoring wells in accordance with the HMP. The downgradient monitoring wells include:

■ JCW-MW-18001 ■ JCW-MW-18004 ■ JCW-MW-18005 ■ JCW-MW-18006

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ OW-57R Out

The concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Constituent-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events were retained for further analysis (Attachment 1). Direct comparison GWPS exceedances include the following constituent well combinations:

- Boron in MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, OW-57R OUT, JCW-MW-18001, JCW-MW-18005, and JCW-MW-18006;
- Calcium in MW-51 and JCW-MW-18001;
- Sulfate in JCW-MW-18001;
- Arsenic in MW-53R, MW-55, JCW-MW-18001, and JCW-MW-18006;
- Molybdenum in MW-55;
- Iron in MW-55; and,
- Vanadium in JCW-MW-18001.

The purpose of assessment monitoring is to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. GWPS). As detailed in the *Alternate Source Demonstration* (TRC, December 2019), the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit; therefore, comparison of these concentrations to the GWPS is not appropriate and assessment monitoring confidence intervals were not calculated.

The software outputs for the assessment monitoring data evaluation 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. Visual trends were apparent in multiple wells for arsenic, boron, calcium, and sulfate. These data sets were tested further in Sanitas™ utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test to test for significance of the trend at the 98% confidence level. The trend tests show that the trends for calcium at MW-51 and sulfate at JCW-MW-18001 are statistically significant (Attachment 1). The trends are causing the confidence intervals to widen. Calculating a confidence interval around a trending data set incorporates not only variability present naturally in the underlying dataset, but also incorporates variability due to the trend itself. Based on the observed trends, confidence bands were selected as a more appropriate assessment for calcium at MW-51 and sulfate at JCW-MW-18001. Confidence bands are selected by the Unified Guidance as the appropriate method for calculating confidence intervals on trending data. A confidence band calculates upper and lower confidence limits at each point along the trend to reduce variability and create a narrower confidence interval.

The Sanitas<sup>™</sup> software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53R, MW-54R, MW-55, and OW-57R OUT Calcium at JCW-MW-18001 Arsenic at MW-53R Iron at MW-55
Normalized by power transformation	Boron at MW-53 (X^3) Arsenic at JCW-MW-18006 (X^2)
Non-Parametric (over 50% non-detect)	Arsenic at JCW-MW-18001 Vanadium at JCW-MW-18001
Not Applicable – confidence bands used	Calcium at MW-51 Sulfate at JCW-MW-18001

The confidence bands and interval tests compare the lower confidence limit to the GWPS. Arsenic concentrations at JCW-MW-18006 were previously considered statistically significant; however, the lower confidence limit has been at or below the GWPS since the second quarter 2021. Calcium concentrations at MW-51 were previously considered statistically significant; however, calcium concentrations are generally decreasing and the lower confidence limit has been below the GWPS since the first quarter 2022. Concentrations trends will continue to be monitored. Statistically significant exceedances of the GWPS were noted for boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001. Boron concentrations have been consistently above the GWPS since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate was present at statistically significant levels above the GWPS for the first time in second quarter 2023 due to increasing concentrations. As noted in the Alternate Source Demonstration (Second Quarter 2022 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023), multiple lines of evidence indicate that the increase in sulfate concentration is not a result of a change in flux from the landfill and is instead the result of changing groundwater conditions outside the slurry wall. Corrective action has been triggered for the site as a result of data collected during the initial May 2018 assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

# **GSI Statistical Evaluation**

Eight monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the GSI monitoring program to meet the requirements of Part 31:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

The concentrations from each well were first compared directly to the GSI criteria, as shown on Table 2. Constituent-well combinations that included a direct exceedance of the GSI criteria within the past eight monitoring events were retained for further analysis (Attachment 2). Direct comparison GSI criteria exceedances include the following constituent well combinations:

- Arsenic in MW-55; and
- Molybdenum in MW-55.

The purpose of the GSI statistical evaluation is to assess compliance with the GSI pathway. Although the *Alternate Source Demonstration* supports that the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit, these concentrations still affect compliance with the GSI pathway. Therefore, it is appropriate to calculate confidence limits for arsenic and molybdenum at MW-55 for comparison to the GSI criteria.

The software outputs for the assessment monitoring data evaluation are included in Attachment 2 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 2.

The Sanitas<sup>™</sup> 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 distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Arsenic at MW-55 Molybdenum at MW-55

The confidence interval tests compare the lower confidence limit to the GSI. The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria. Arsenic and molybdenum concentrations at MW-55 were previously considered statistically significant; however, the arsenic and molybdenum concentrations decreased in 2022 and 2023. The lower confidence limits for arsenic and molybdenum continued to be below the GWPS in second quarter 2023.

# **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Table 2 Comparison of Groundwater Sampling Results to GSI

Attachment 1 Assessment Monitoring Sanitas™ Output Files

Attachment 2 GSI Evaluation Sanitas™ Output Files

# **Tables**

Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards

JC Weadock Landfill – Hydrogeological Monitoring Program

Essexville, Michigan

									z, iviiciligari									
		Sample Location:	-							MW	<b>/-50</b>							
		Sample Date:	8/2/2021	8/2/2021	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023	5/8/2023	5/8/2023
Constituent	Unit	GWPS																
Appendix III <sup>(1)</sup>				Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	1,520	1,630	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720
Calcium	mg/L	280	267	252	274	261	186	185	169	175	161	164	186	181	152		142	144
Chloride	mg/L	2,300	57.0	57.2	51.0	51.7	54.9	55.6	53.3	51.6	54.2	54.9	47.7	47.6	35.9	36.7	31.5	31.9
Fluoride	ug/L	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
Sulfate	mg/L	780	638	634	496	512	346	330	285	286	324	325	376	376	341	315	314	316
Total Dissolved Solids	mg/L	4,700	1,630	1,640	1,440	1,380	999	1,010	1,020	1,050	1,080	1,040	1,120	1,150	939	984	878	880
pH, Field	SU	6.5 - 8.5	7.0		7.1		7.4		7.2		7.0		7.3		7.3		7.4	
Appendix IV <sup>(1)</sup>																		
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	2	3	3	2	2	1	1	2	2	3	3	2	2	2	2
Barium	ug/L	2,000	91	97	102	89	115	117	86	86	90	94	106	108	89	92	114	87
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	79	81	93	68	77	77	69	66	64	61	62	62	65	65	55	54
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA			< 0.215	0.243			< 0.310	< 0.287			0.158	0.343			0.155	0.144
Radium-228	pCi/L	NA			1.15	1.22			< 0.493	0.648			1.14	1.37			0.686	< 0.606
Radium-226/228	pCi/L	5.0			1.21	1.46			0.518	0.904			1.30	1.72			0.841	0.633
Selenium	ug/L	50	3	2	4	4	2	2	2	2	2	2	2	2	1	1	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	s <sup>(2)</sup>																	
Iron	ug/L	28,000	3,000	2,780	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756
Copper	ug/L	1,000	1	< 1	1	< 1	< 1	< 1	1	1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	11	12	16	11	< 2	19	< 2	6	6	7	4	7	< 2	< 2	3	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyze

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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		Sample Location:				MW	<i>I</i> -51			
		Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	960	1,140	1,420	1,350	1,270	1,490	1,320	1,230
Calcium	mg/L	280	276	316	255	247	211	211	169	166
Chloride	mg/L	2,300	99.8	97.1	91.1	92.8	102	101	98.4	99.9
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	434	418	446	420	404	394	360	356
Total Dissolved Solids	mg/L	4,700	1,530	1,500	1,480	1,510	1,450	1,380	1,180	1,240
pH, Field	SU	6.5 - 8.5	6.9	6.9	7.4	7.2	7.0	7.2	7.2	7.3
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	14	20	12	10	15	18	10	8
Barium	ug/L	2,000	148	197	198	150	169	188	178	180
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	47	64	58	56	53	50	46	40
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.451		< 0.423		< 0.397		0.143
Radium-228	pCi/L	NA		2.01		< 0.494		2.19		1.01
Radium-226/228	pCi/L	5.0		2.46		0.576		2.51		1.15
Selenium	ug/L	50	1	3	3	2	2	1	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	5,080	5,130	1,310	1,210	1,860	2,880	514	450
Copper	ug/L	1,000	< 1	1	< 1	2	< 1	1	< 1	1
Nickel	ug/L	100	11	18	< 2	< 2	6	4	< 2	3
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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		Sample Location:				MW	<i>l</i> -52			
		Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,140	1,280	1,310	1,090	1,070	1,330	1,040	993
Calcium	mg/L	280	196	237	251	231	222	224	228	217
Chloride	mg/L	2,300	56.5	59.4	51.6	50.5	45.1	40.4	36.3	32.4
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	501	110	654	591	663	603	581	581
Total Dissolved Solids	mg/L	4,700	1,340	1,360	1,520	1,490	1,580	1,670	1,430	1,430
pH, Field	SU	6.5 - 8.5	6.9	6.9	7.1	7.0	6.7	6.9	6.8	6.9
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	115	152	170	107	118	122	102	95
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	21	31	27	25	29	26	27	23
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.274		< 0.489		0.205		< 0.128
Radium-228	pCi/L	NA		0.778		< 0.532		< 0.694		< 0.594
Radium-226/228	pCi/L	5.0		1.03		0.875		0.805		< 0.594
Selenium	ug/L	50	1	3	2	2	2	2	1	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	3,830	4,880	2,870	2,030	5,020	6,340	2,820	2,720
Copper	ug/L	1,000	< 1	1	1	2	2	2	1	1
Nickel	ug/L	100	9	14	< 2	< 2	5	3	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

July 2023

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		Sample Location:				MW	/-53			
		Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	3,820	3,820	4,100	3,880	4,300	4,140	2,150	2,620
Calcium	mg/L	280	162	166	146	147	116	108	82.5	104
Chloride	mg/L	2,300	49.9	55.5	81.1	50.9	66.5	53	24.8	56.5
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	279	111	39.5	215	119	126	93.6	50.8
Total Dissolved Solids	mg/L	4,700	1,020	896	768	886	820	740	489	613
pH, Field	SU	6.5 - 8.5	7.1	7.1	7.4	7.3	7.1	7.3	7.3	7.4
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	2	1	< 1	1	2	< 1	< 1
Barium	ug/L	2,000	200	212	401	356	313	285	202	272
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	38	53	48	41	42	38	33	34
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	7	< 5
Radium-226	pCi/L	NA		0.399	-	0.406		0.269		0.198
Radium-228	pCi/L	NA		0.979	-	< 0.518		1.15		< 0.518
Radium-226/228	pCi/L	5.0		1.38	-	0.824		1.42		0.700
Selenium	ug/L	50	3	< 1	3	1	3	1	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,380	1,760	1,130	1,060	1,240	1,140	403	569
Copper	ug/L	1,000	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	6	10	< 2	< 2	4	2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

		Sample Location:		T T		MW-	-53R	T T		1
		Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,710	2,060	2,330	1,830	1,560	2,340	2,330	2,140
Calcium	mg/L	280	203	232	188	226	219	203	195	202
Chloride	mg/L	2,300	34.5	36.6	39.9	41.6	50.4	39.2	27.2	30
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	189	166	71.7	314	533	250	101	185
Total Dissolved Solids	mg/L	4,700	1,040	1,060	709	1,290	1,530	1,160	960	1,060
pH, Field	SU	6.5 - 8.5	6.8	6.8	7.1	6.9	6.7	6.8	6.7	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	23	25	10	8	17	20	17	14
Barium	ug/L	2,000	204	189	203	147	97	118	179	174
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	56	57	56	61	70	63	59	56
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.344		< 0.325		0.239		0.275
Radium-228	pCi/L	NA		1.05		< 0.480		0.967		0.490
Radium-226/228	pCi/L	5.0		1.40		< 0.480		1.21		0.765
Selenium	ug/L	50	2	3	2	2	2	2	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,800	2,170	1,080	460	1,030	702	1,580	1,410
Copper	ug/L	1,000	1	< 1	2	2	2	1	1	1
Nickel	ug/L	100	10	2	< 2	< 2	5	3	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

July 2023

# Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

					z, iviichigan					
		Sample Location:				MW	-54R			
		Sample Date:	8/3/2021	10/11/2021	3/9/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	3,530	4,270	4,720	4,110	4,970	5,310	5,660	5,240
Calcium	mg/L	280	163	187	186	169	158	160	168	163
Chloride	mg/L	2,300	35.5	34.7	49.8	35.8	43.9	47.4	49.6	46.5
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	77.0	75.7	67.1	86.3	72.1	70.9	62	67.2
Total Dissolved Solids	mg/L	4,700	786	772	776	712	800	799	770	759
pH, Field	SU	6.5 - 8.5	6.8	6.9	6.9	7.0	6.9	6.9	6.8	6.9
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	4	1	< 1	2	2	1	< 1
Barium	ug/L	2,000	124	129	154	111	109	123	126	98
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	2	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	60	59	74	64	74	74	71	65
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	7	7	9	10	12	15	13
Radium-226	pCi/L	NA		< 0.231		< 0.347		0.208		< 0.141
Radium-228	pCi/L	NA		0.759		< 0.552		1.31		< 0.836
Radium-226/228	pCi/L	5.0		0.965		< 0.552		1.52		< 0.836
Selenium	ug/L	50	1	2	2	2	1	2	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	1,190	2,280	496	121	367	1,090	262	74
Copper	ug/L	1,000	1	< 1	1	1	1	1	2	1
Nickel	ug/L	100	9	< 2	< 2	< 2	2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

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					Essexville, iviicilig	uii					
		Sample Location:					MW-55				
		Sample Date:	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>								Field Dup			
Boron	ug/L	560	873	788	826	642	709	687	976	1,110	1,140
Calcium	mg/L	280	126	198	163	177	159	165	141	162	165
Chloride	mg/L	2,300	19.3	16.5	20.2	11.8	11.8	11.8	12.5	24.2	16.9
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	34.3	80.7	35.4	249	248	245	108	94.6	208
Total Dissolved Solids	mg/L	4,700	743	844	808	942	930	1,040	786	898	929
pH, Field	SU	6.5 - 8.5	7.1	7.0	7.1	7.0	6.9		7.0	6.8	6.9
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	204	198	88	48	80	78	126	68	44
Barium	ug/L	2,000	347	330	299	222	232	231	223	287	267
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	25	34	28	24	29	28	30	27	24
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	157	206	89	78	80	78	91	50	30
Radium-226	pCi/L	NA		0.467	-	< 0.478			0.365		0.276
Radium-228	pCi/L	NA		1.10		< 0.646			0.966		< 0.916
Radium-226/228	pCi/L	5.0		1.56	-	0.696			1.33		< 0.916
Selenium	ug/L	50	1	2	1	3	3	4	< 1	3	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	39,400	40,500	29,800	15,000	18,000	16,600	22,100	24,800	21,600
Copper	ug/L	1,000	< 1	< 1	< 1	1	< 1	1	1	< 1	< 1
Nickel	ug/L	100	6	8	4	3	6	6	4	4	5
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

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All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

July 2023

		-			z, wichigan					
		Sample Location:				OW-57	R OUT			
		Sample Date:	8/3/2021	10/12/2021	3/9/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,730	1,880	2,030	1,990	1,570	1,830	1,860	1,740
Calcium	mg/L	280	118	140	126	131	113	114	116	117
Chloride	mg/L	2,300	53.1	46.9	62.5	57.3	52.0	47.6	59	64.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	93.9	93.1	83.1	69.4	85.0	86.8	79.7	80.5
Total Dissolved Solids	mg/L	4,700	725	737	1,030	702	714	722	790	743
pH, Field	SU	6.5 - 8.5	7.0	7.0	7.2	7.1	6.8	6.9	6.9	7.1
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	72	75	85	79	67	75	75	72
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	1	< 1	1	2	1	< 1	4	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	20	21	26	27	23	22	26	23
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	7	9	8	7	7	8	6	6
Radium-226	pCi/L	NA		< 0.227		< 0.440		0.199		0.149
Radium-228	pCi/L	NA		1.12		< 0.539		< 0.711		< 0.663
Radium-226/228	pCi/L	5.0		1.26		< 0.539		0.870		< 0.663
Selenium	ug/L	50	< 1	2	1	3	1	2	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	56	68	96	74	37	42	53	78
Copper	ug/L	1,000	2	1	2	2	1	2	1	1
Nickel	ug/L	100	21	12	17	14	17	16	15	15
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed

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July 2023

				LOGOXVIIIC	s, Michigan					
		Sample Location:				JCW-M	W-18001			
		Sample Date:	8/2/2021	10/11/2021	3/7/2022	5/9/2022	8/1/2022	10/10/2022	3/8/2023	5/8/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,610	1,670	1,670	1,560	1,470	1,790	1,440	1,380
Calcium	mg/L	280	348	373	412	335	389	465	486	496
Chloride	mg/L	2,300	76.4	68.3	60.0	58.8	64.6	63.6	54.2	51.1
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	700	777	1,080	752	1,180	1,400	1,640	1,670
Total Dissolved Solids	mg/L	4,700	1,880	2,000	2,310	1,970	2,580	3,020	3,030	1,580
pH, Field	SU	6.5 - 8.5	6.9	6.8	6.8	7.0	6.6	6.8	6.7	6.7
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	38	1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	199	184	129	80	61	66	47	50
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	8	< 1	< 1	2	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	71	103	87	76	95	97	91	83
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	9	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.337		< 0.327		< 0.142		< 0.122
Radium-228	pCi/L	NA		1.05		0.494		0.852		< 0.547
Radium-226/228	pCi/L	5.0		1.39		0.586		0.893		< 0.547
Selenium	ug/L	50	2	3	2	2	3	1	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	13,600	91	86	210	196	818	830	1,180
Copper	ug/L	1,000	6	2	2	3	2	3	2	3
Nickel	ug/L	100	16	20	6	8	14	15	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	12	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	12	< 10	< 10	< 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.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018
Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

				Loodaviii	e, Michigan					
		Sample Location:	JCW-MW-18004							
		Sample Date:	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	304	389	259	226	313	343	180	227
Calcium	mg/L	280	203	264	236	235	215	193	221	265
Chloride	mg/L	2,300	6.65	7.45	19.6	10.8	12.5	11.4	12.7	16.8
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	393	493	537	512	512	428	533	722
Total Dissolved Solids	mg/L	4,700	1,180	1,240	1,280	1,290	1,290	1,130	1,250	1,530
pH, Field	SU	6.5 - 8.5	6.8	6.8	6.9	6.8	6.7	6.8	6.8	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	36	41	32	26	31	37	24	28
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	47	63	34	42	51	46	39	42
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.182		< 0.417		< 0.135		< 0.131
Radium-228	pCi/L	NA		0.796		0.790		< 0.742		< 0.600
Radium-226/228	pCi/L	5.0		0.978		0.910		< 0.742		< 0.600
Selenium	ug/L	50	4	3	2	2	1	1	11	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	< 20	39	952	< 20	45	< 20	46	67
Copper	ug/L	1,000	1	2	1	2	2	2	1	2
Nickel	ug/L	100	9	16	4	< 2	2	5	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

# Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Landfill – Hydrogeological Monitoring Program Essexville, Michigan

					Essexville, Michiga	all					
		Sample Location:					JCW-MW-1800	5			
		Sample Date:	8/3/2021	10/12/2021	3/7/2022	3/7/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>						Field Dup					
Boron	ug/L	560	1,080	1,190	1,030	1,100	1,010	981	1,290	930	992
Calcium	mg/L	280	149	193	159	164	280	165	150	262	258
Chloride	mg/L	2,300	64.9	63.6	61.7	60.7	32.6	50.9	53.9	25.4	22.3
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	190	227	204	211	437	213	160	435	422
Total Dissolved Solids	mg/L	4,700	895	1,020	942	934	1,330	967	868	1,250	1,190
pH, Field	SU	6.5 - 8.5	7.0	6.9	7.1		6.8	6.7	6.8	6.6	6.8
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	9	9	5	5	5	4	5	4	2
Barium	ug/L	2,000	98	124	108	110	110	71	80	115	105
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	28	39	32	30	33	32	32	36	33
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	5	5	6	< 5	5	6	5
Radium-226	pCi/L	NA		< 0.262	-		< 0.414	-	0.193		0.134
Radium-228	pCi/L	NA		0.984	-		< 0.521	-	< 0.800	-	< 0.573
Radium-226/228	pCi/L	5.0		1.16	-		0.622	-	< 0.800	-	< 0.573
Selenium	ug/L	50	2	4	3	3	2	< 1	2	3	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters (	2)										
Iron	ug/L	28,000	5,350	5,840	3,300	3,170	1,680	2,810	3,220	1,720	676
Copper	ug/L	1,000	12	1	< 1	< 1	2	< 1	< 1	1	< 1
Nickel	ug/L	100	29	22	10	25	< 2	9	11	< 2	9
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

# Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards JC Weadock Landfill – Hydrogeological Monitoring Program Essexville, Michigan

		Sample Location:						JCW-M	W-18006					
		Sample Date:	8/3/2021	10/12/2021	3/7/2022	5/9/2022	5/9/2022	8/2/2022	10/11/2022	10/11/2022	3/9/2023	3/9/2023	5/9/2023	5/9/2023
Constituent	Unit	GWPS												
Appendix III <sup>(1)</sup>							Field Dup			Field Dup		Field Dup		Field Dup
Boron	ug/L	560	2,640	2,600	3,220	2,990	3,030	2,260	2,720	2,650	1,730	1,760	2,450	2,480
Calcium	mg/L	280	135	152	143	136	136	109	118	119	121	121	118	120
Chloride	mg/L	2,300	73.6	77.0	75.0	67.3	67.7	79.0	74.2	74.7	79.9	82.8	73.6	76.6
Fluoride	ug/L	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
Sulfate	mg/L	780	29.7	34.7	38.1	32.8	34.0	14.9	21.6	23.0	32.5	33.9	34.2	36.1
Total Dissolved Solids	mg/L	4,700	769	802	792	788	772	709	720	746	715	753	734	751
pH, Field	SU	6.5 - 8.5	6.9	7.0	7.1	7.0		6.7	6.9		6.9		7.0	
Appendix IV <sup>(1)</sup>														
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	25	21	33	22	23	21	25	25	5	5	23	23
Barium	ug/L	2,000	492	351	665	514	509	452	480	499	232	238	464	465
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	46	47	63	56	57	52	52	52	21	23	45	47
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.268		< 0.416			0.516	0.259			0.337	< 0.192
Radium-228	pCi/L	NA		0.872		< 0.518			< 0.609	0.869			0.746	< 0.816
Radium-226/228	pCi/L	5.0		1.14		0.690			0.999	1.13			1.08	< 0.816
Selenium	ug/L	50	2	4	2	< 1	1	< 1	1	1	2	2	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	2)													
Iron	ug/L	28,000	7,790	6,200	9,040	6,600	6,360	7,670	7,620	7,630	2,930	2,910	6,890	7,210
Copper	ug/L	1,000	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	6	10	6	< 2	< 2	5	5	6	< 2	< 2	4	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	4	2	4	3	3	3	3	4	< 2	2	2	3
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

					Sample Location:								MW	-50							_
					Sample Date:	8/2/2021	8/2/2021	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023	5/8/2023	5/8/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**																
Appendix III <sup>(1)</sup>							Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	4,000	44,000	69,000	44,000	1,520	1,630	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	638	634	496	512	346	330	285	286	324	325	376	376	341	315	314	316
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.0		7.1		7.4		7.2		7.0		7.3		7.3		7.4	
Appendix IV <sup>(1)</sup>																					
Arsenic	ug/L	10	100	680	100	2	2	3	3	2	2	1	1	2	2	3	3	2	2	2	2
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	79	81	93	68	77	77	69	66	64	61	62	62	65	65	55	54
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	2	4	4	2	2	2	2	2	2	2	2	1	1	1	2
MI Part 115 Parame	eters <sup>(2)</sup>																	•		•	
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	3,000	2,780	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

\*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

<sup>F</sup> - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\rm EE}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	<i>I</i> -51			
					Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													1
Boron	ug/L	4,000	44,000	69,000	44,000	960	1,140	1,420	1,350	1,270	1,490	1,320	1,230
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	434	418	446	420	404	394	360	356
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	6.9	7.4	7.2	7.0	7.2	7.2	7.3
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	14	20	12	10	15	18	10	8
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	47	64	58	56	53	50	46	40
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	1	3	3	2	2	1	2	1
MI Part 115 Parame	ters <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	5,080	5,130	1,310	1,210	1,860	2,880	514	450
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	<i>I</i> -52			
					Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,140	1,280	1,310	1,090	1,070	1,330	1,040	993
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	501	110	654	591	663	603	581	581
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	6.9	7.1	7.0	6.7	6.9	6.8	6.9
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	21	31	27	25	29	26	27	23
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	1	3	2	2	2	2	1	< 1
MI Part 115 Paramet	ters <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	3,830	4,880	2,870	2,030	5,020	6,340	2,820	2,720
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	V-53			-
					Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	3,820	3,820	4,100	3,880	4,300	4,140	2,150	2,620
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	279	111	39.5	215	119	126	93.6	50.8
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.1	7.4	7.3	7.1	7.3	7.3	7.4
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	2	2	1	< 1	1	2	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	38	53	48	41	42	38	33	34
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	7	< 5
Selenium	ug/L	5.0	55	120	55	3	< 1	3	1	3	1	1	2
MI Part 115 Paramet	ters <sup>(2)</sup>											_	
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,380	1,760	1,130	1,060	1,240	1,140	403	569
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

\*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	-53R			
					Sample Date:	8/2/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,710	2,060	2,330	1,830	1,560	2,340	2,330	2,140
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	189	166	71.7	314	533	250	101	185
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.8	7.1	6.9	6.7	6.8	6.7	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	23	25	10	8	17	20	17	14
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	56	57	56	61	70	63	59	56
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	2	3	2	2	2	2	1	1
MI Part 115 Paramet	ters <sup>(2)</sup>	_				_							
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,800	2,170	1,080	460	1,030	702	1,580	1,410
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	-54R			
					Sample Date:	8/3/2021	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	3,530	4,270	4,720	4,110	4,970	5,310	5,660	5,240
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	77.0	75.7	67.1	86.3	72.1	70.9	62	67.2
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.9	6.9	7.0	6.9	6.9	6.8	6.9
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	2	4	1	< 1	2	2	1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	2	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	60	59	74	64	74	74	71	65
Molybdenum	ug/L	120	NC	NC	120	< 5	7	7	9	10	12	15	13
Selenium	ug/L	5.0	55	120	55	1	2	2	2	1	2	1	1
MI Part 115 Parame	ters <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,190	2,280	496	121	367	1,090	262	74
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

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- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:					MW-55				
					Sample Date:	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**									
Appendix III <sup>(1)</sup>											Field Dup			1
Boron	ug/L	4,000	44,000	69,000	44,000	873	788	826	642	709	687	976	1,110	1,140
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	34.3	80.7	35.4	249	248	245	108	94.6	208
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.0	7.1	7.0	6.9		7.0	6.8	6.9
Appendix IV <sup>(1)</sup>														
Arsenic	ug/L	10	100	680	100	204	198	88	48	80	78	126	68	44
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	25	34	28	24	29	28	30	27	24
Molybdenum	ug/L	120	NC	NC	120	157	206	89	78	80	78	91	50	30
Selenium	ug/L	5.0	55	120	55	1	2	1	3	3	4	< 1	3	< 1
MI Part 115 Parame	ters <sup>(2)</sup>												•	
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	39,400	40,500	29,800	15,000	18,000	16,600	22,100	24,800	21,600
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- <sup>F</sup> Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				JCW-M	W-18004			
					Sample Date:	8/3/2021	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	304	389	259	226	313	343	180	227
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	393	493	537	512	512	428	533	722
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.8	6.9	6.8	6.7	6.8	6.8	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	47	63	34	42	51	46	39	42
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	4	3	2	2	1	1	11	2
MI Part 115 Paramet	ters <sup>(2)</sup>	<u> </u>											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	< 20	39	952	< 20	45	< 20	46	67
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

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- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

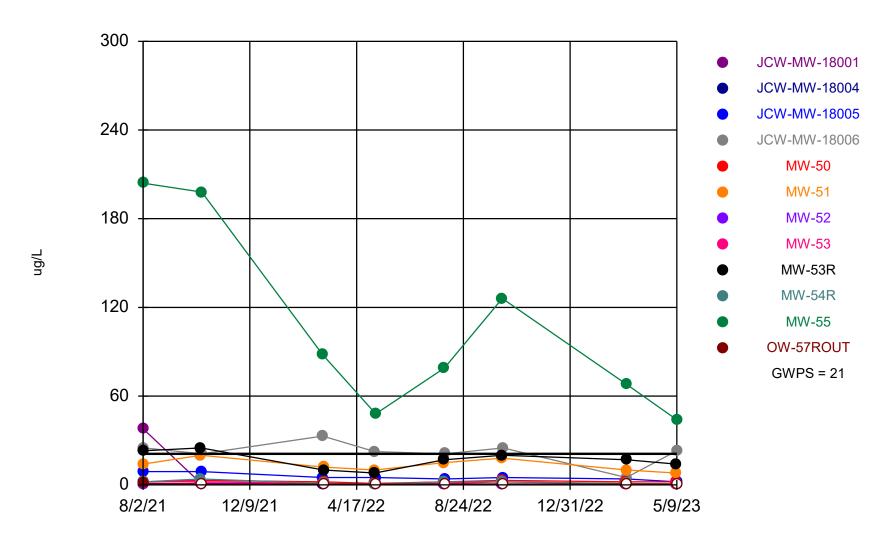
the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional assessment monitoring constituents (vanadium and zinc) are reported.

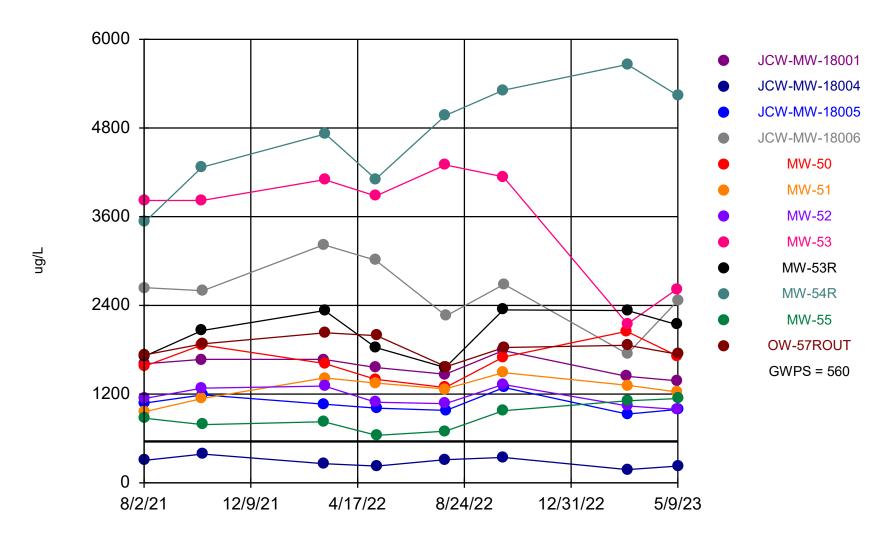
## Attachment 1 Assessment Monitoring Sanitas<sup>™</sup> Output Files

## Arsenic Comparison to GWPS



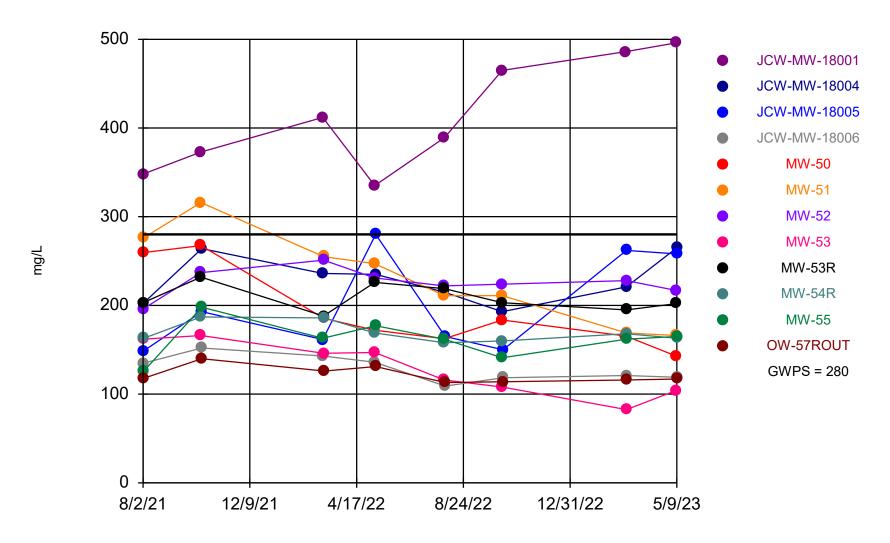
Time Series Analysis Run 5/30/2023 1:24 PM

## Boron Comparison to GWPS



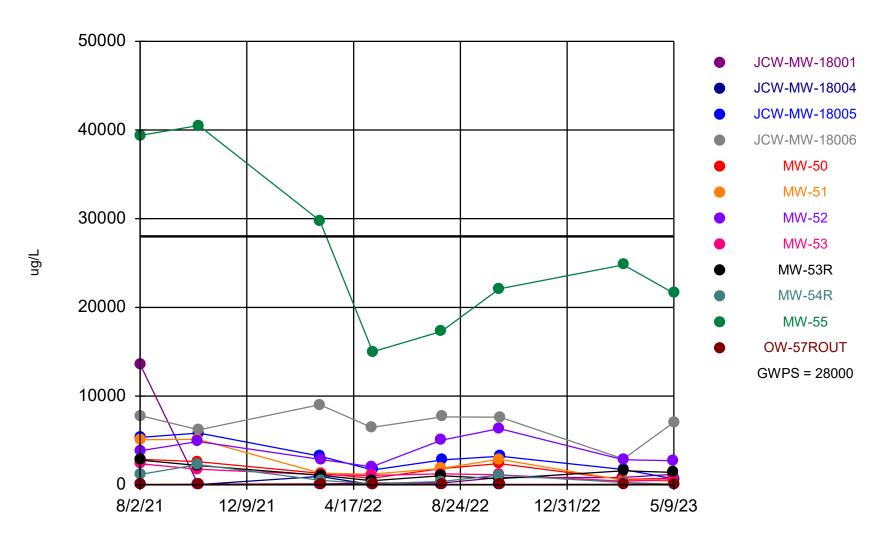
Time Series Analysis Run 5/30/2023 1:48 PM

## Calcium Comparison to GWPS



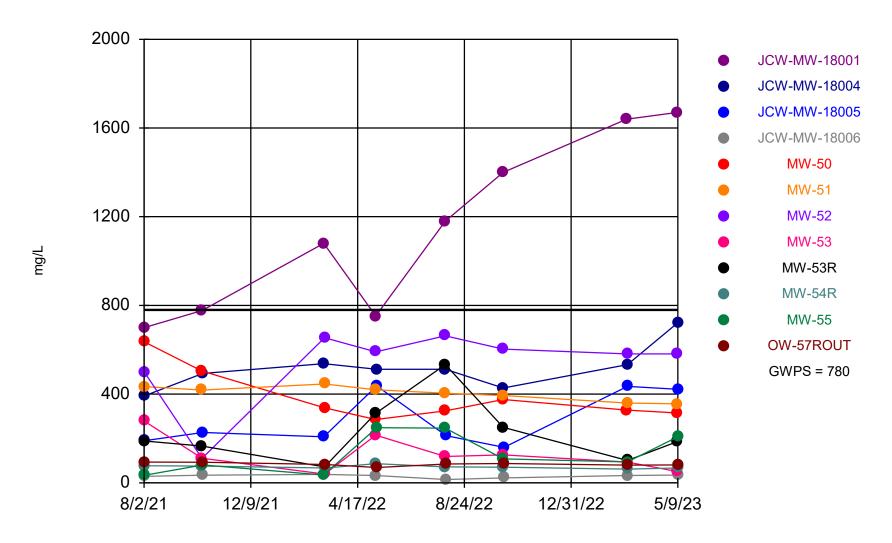
Time Series Analysis Run 5/30/2023 1:50 PM

## Iron Comparison to GWPS



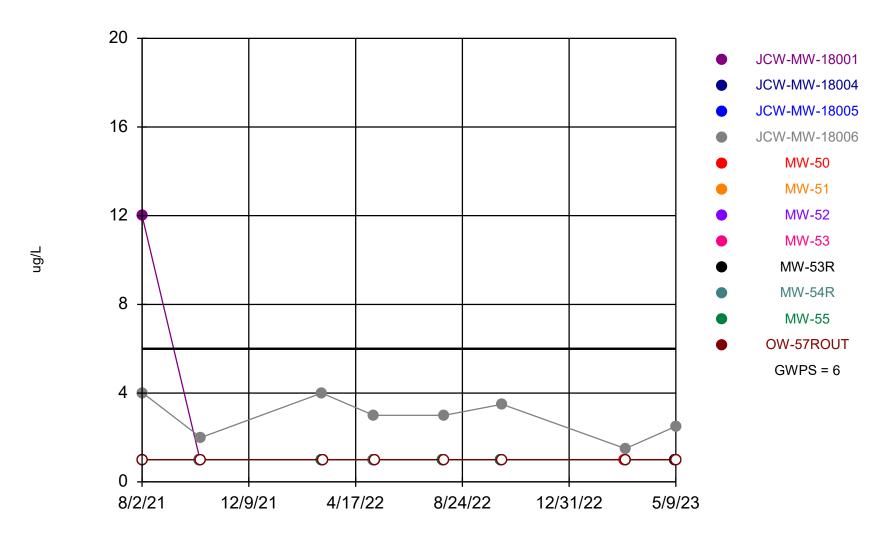
Time Series Analysis Run 5/30/2023 1:54 PM

## Sulfate Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:55 PM

## Vanadium Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:58 PM

Constituent: Arsenic, Total Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 33 Wells = 12 Minimum Value = 0.5 Maximum Value = 204 Mean Value = 14.68 Median Value = 2 Standard Deviation = 33.87 Coefficient of Variation = 2.308

Skewness = 4.104

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	<u>CV</u>	<u>Skewness</u>
JCW-MW-18001	8	6	0.5	38	5.25	0.5	13.23	2.521	2.267
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
JCW-MW-18005	8	0	2	9	5.375	5	2.446	0.455	0.5372
JCW-MW-18006	8	0	5	33	21.94	22.75	7.849	0.3578	-1.089
MW-50	8	0	1	3	2.125	2	0.6409	0.3016	-0.0544
MW-51	8	0	8	20	13.38	13	4.173	0.312	0.3352
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.188	1	0.7039	0.5928	0.2719
MW-53R	8	0	8	25	16.75	17	5.946	0.355	-0.115
MW-54R	8	2	0.5	4	1.625	1.5	1.157	0.7122	1.007
MW-55	8	0	44	204	106.9	83.5	63.43	0.5935	0.6822
OW-57ROUT	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268

Constituent: Boron, Total Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 180 Maximum Value = 5660 Mean Value = 1888 Median Value = 1573 Standard Deviation = 1240 Coefficient of Variation = 0.6566 Skewness = 1.241

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	Median	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	1380	1790	1574	1585	137.8	0.08758	0.06756
JCW-MW-18004	8	0	180	389	280.1	281.5	69.37	0.2476	0.122
JCW-MW-18005	8	0	930	1290	1067	1038	119.6	0.112	0.8098
JCW-MW-18006	8	0	1745	3220	2578	2620	450.8	0.1748	-0.4426
MW-50	8	0	1290	2050	1652	1658	242.8	0.147	0.0997
MW-51	8	0	960	1490	1273	1295	166.6	0.1309	-0.6223
MW-52	8	0	993	1330	1157	1115	131.7	0.1139	0.2528
MW-53	8	0	2150	4300	3604	3850	781	0.2167	-1.08
MW-53R	8	0	1560	2340	2038	2100	305.2	0.1498	-0.3982
MW-54R	8	0	3530	5660	4726	4845	712.6	0.1508	-0.3704
MW-55	8	0	642	1140	881.6	849.5	181.6	0.206	0.2309
OW-57ROUT	8	0	1570	2030	1829	1845	148.7	0.08129	-0.3011

Constituent: Calcium, Total Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 82.5 Maximum Value = 496 Mean Value = 201.1 Median Value = 184.5 Standard Deviation = 81.82 Coefficient of Variation = 0.4069

Skewness	=	1.631	

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	<u>CV</u>	<u>Skewness</u>
JCW-MW-18001	8	0	335	496	413	400.5	62.57	0.1515	0.1711
JCW-MW-18004	8	0	193	265	229	228	26.29	0.1148	0.19
JCW-MW-18005	8	0	149	280	202.3	179	55.32	0.2734	0.3958
JCW-MW-18006	8	0	109	152	129.2	128	14.56	0.1127	0.1962
MW-50	8	0	143	267.5	192.4	177.8	45.89	0.2386	0.8698
MW-51	8	0	166	316	231.4	229	52.03	0.2249	0.1875
MW-52	8	0	196	251	225.8	226	15.93	0.07055	-0.3546
MW-53	8	0	82.5	166	128.9	131	30.4	0.2358	-0.1581
MW-53R	8	0	188	232	208.5	203	15.46	0.07417	0.3226
MW-54R	8	0	158	187	169.3	165.5	11.26	0.06653	0.8116
MW-55	8	0	126	198	161.8	162.5	21.61	0.1336	-0.0516
OW-57ROUT	8	0	113	140	121.9	117.5	9.583	0.07863	0.9058

Constituent: Iron, Total Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 3 Wells = 12 Minimum Value = 10 Maximum Value = 40500 Mean Value = 4139 Median Value = 1300 Standard Deviation = 7598 Coefficient of Variation = 1.836

Skewness = 3.157

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	<u>CV</u>	<u>Skewness</u>
JCW-MW-18001	8	0	86	13600	2126	514	4654	2.189	2.233
JCW-MW-18004	8	3	10	952	147.4	42	325.8	2.211	2.249
JCW-MW-18005	8	0	676	5840	3066	3015	1792	0.5843	0.3843
JCW-MW-18006	8	0	2920	9040	6847	7338	1813	0.2647	-1.243
MW-50	8	0	602.5	2890	1639	1565	919.7	0.5611	0.1392
MW-51	8	0	450	5130	2304	1585	1892	0.8209	0.6689
MW-52	8	0	2030	6340	3814	3350	1475	0.3868	0.4894
MW-53	8	0	403	2380	1210	1135	628.9	0.5196	0.5974
MW-53R	8	0	460	2800	1404	1245	774.2	0.5514	0.626
MW-54R	8	0	74	2280	735	431.5	751.2	1.022	1.13
MW-55	8	0	15000	40500	26313	23450	9533	0.3623	0.4895
OW-57ROUT	8	0	37	96	63	62	19.73	0.3132	0.2502

Constituent: Sulfate Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 14.9 Maximum Value = 1670 Mean Value = 329.5 Median Value = 236.8 Standard Deviation = 330.4 Coefficient of Variation = 1.003

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Well	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	<u>CV</u>	<u>Skewness</u>
JCW-MW-18001	8	0	700	1670	1150	1130	392.6	0.3414	0.1714
JCW-MW-18004	8	0	393	722	516.3	512	97.54	0.1889	1.012
JCW-MW-18005	8	0	160	437	286.4	220	121.6	0.4246	0.4385
JCW-MW-18006	8	0	14.9	38.1	30.18	33.3	7.775	0.2576	-1.068
MW-50	8	0	285.5	636	388.4	333	120.2	0.3094	1.288
MW-51	8	0	356	446	404	411	32.64	0.08078	-0.3903
MW-52	8	0	110	663	535.5	586	179	0.3343	-1.935
MW-53	8	0	39.5	279	129.2	115	80.81	0.6253	0.7908
MW-53R	8	0	71.7	533	226.2	187	145.7	0.6442	1.163
MW-54R	8	0	62	86.3	72.29	71.5	7.472	0.1034	0.5613
MW-55	8	0	34.3	249	132.1	101.3	89.49	0.6776	0.3188
OW-57ROUT	8	0	69.4	93.9	83.94	84.05	7.877	0.09384	-0.4396

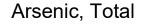
Constituent: Vanadium, Total Analysis Run 5/30/2023 3:43 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 87 Wells = 12 Minimum Value = 1 Maximum Value = 12 Mean Value = 1.276 Median Value = 1 Standard Deviation = 1.254 Coefficient of Variation = 0.9829 Skewness = 6.948

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	7	1	12	2.375	1	3.889	1.638	2.268
JCW-MW-18004	8	8	1	1	1	1	0	0	NaN
JCW-MW-18005	8	8	1	1	1	1	0	0	NaN
JCW-MW-18006	8	0	1.5	4	2.938	3	0.9039	0.3077	-0.269
MW-50	8	8	1	1	1	1	0	0	NaN
MW-51	8	8	1	1	1	1	0	0	NaN
MW-52	8	8	1	1	1	1	0	0	NaN
MW-53	8	8	1	1	1	1	0	0	NaN
MW-53R	8	8	1	1	1	1	0	0	NaN
MW-54R	8	8	1	1	1	1	0	0	NaN
MW-55	8	8	1	1	1	1	0	0	NaN
OW-57ROUT	8	8	1	1	1	1	0	0	NaN

ng/L



JCW-MW-18001

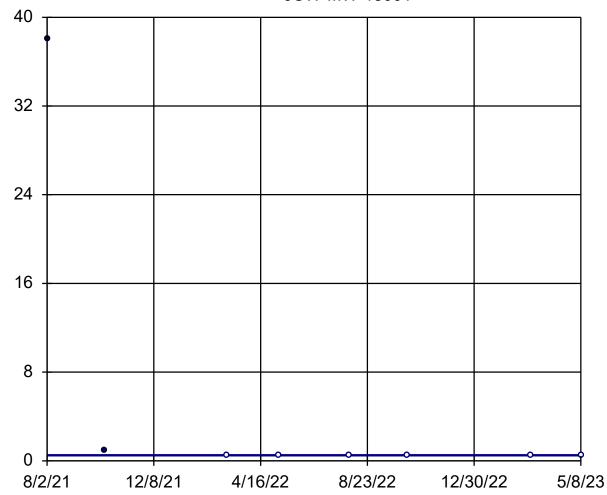
n = 8

Slope = 0 units per year.

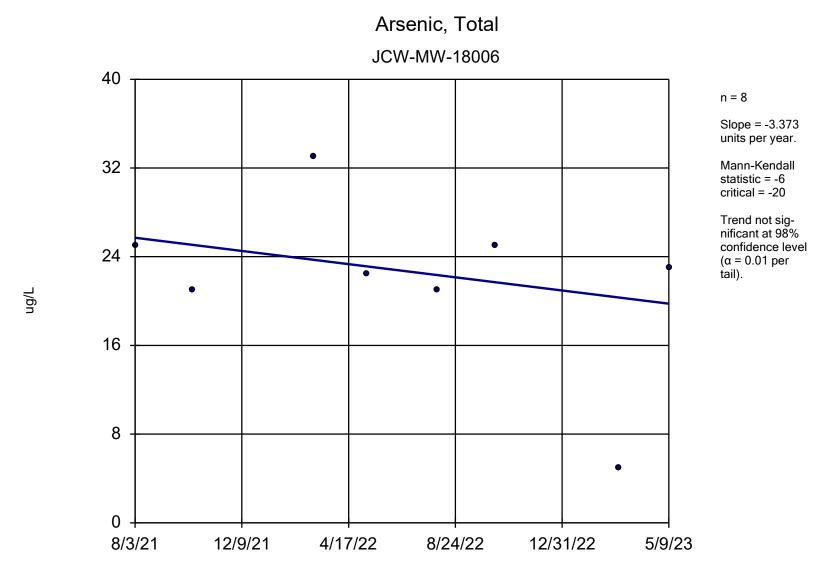
Mann-Kendall statistic = -13 critical = -20

Trend not significant at 98% confidence level

 $(\alpha = 0.01 \text{ per tail}).$ 

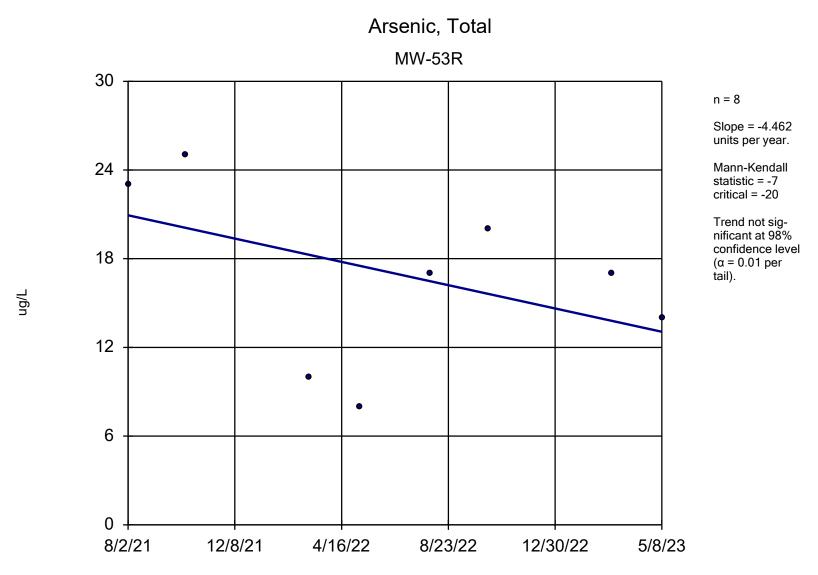


Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM



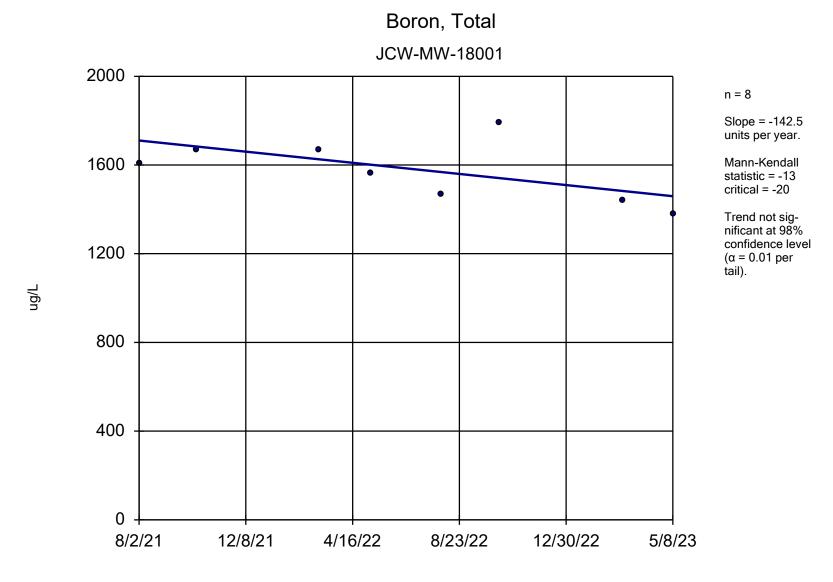
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



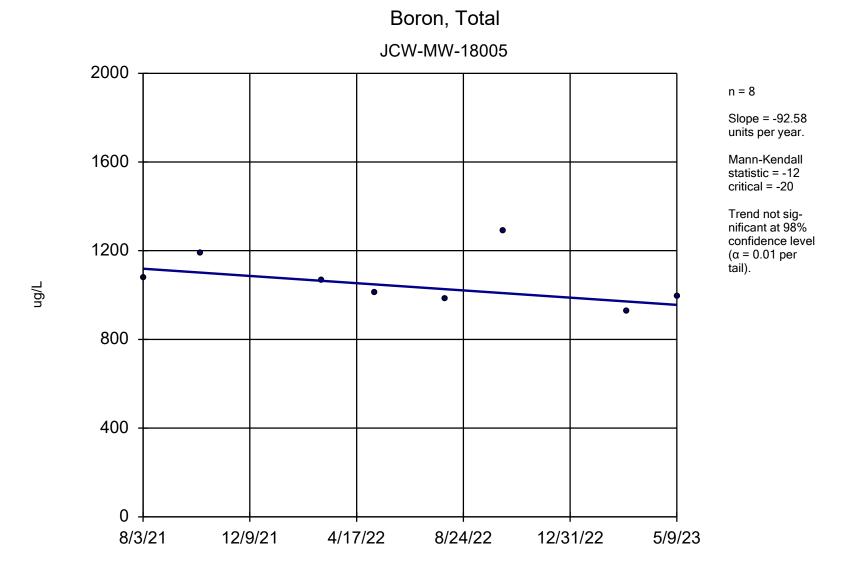
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



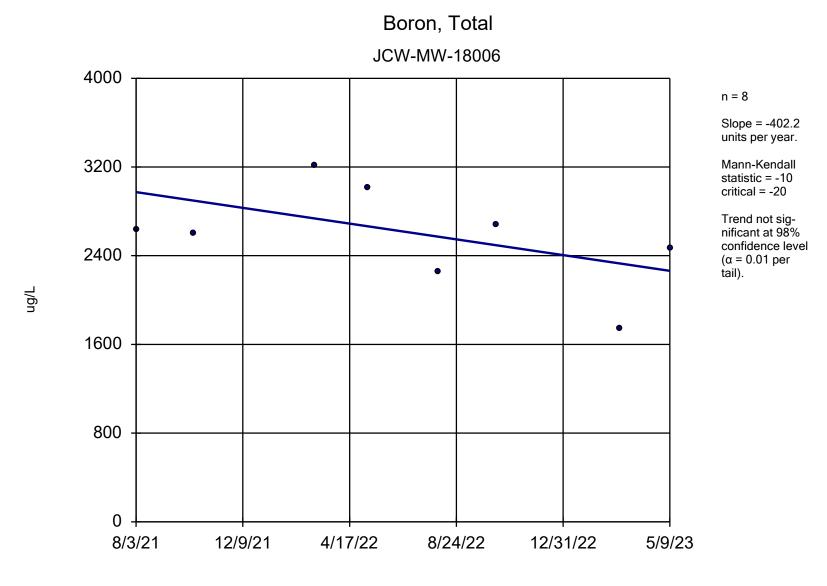
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



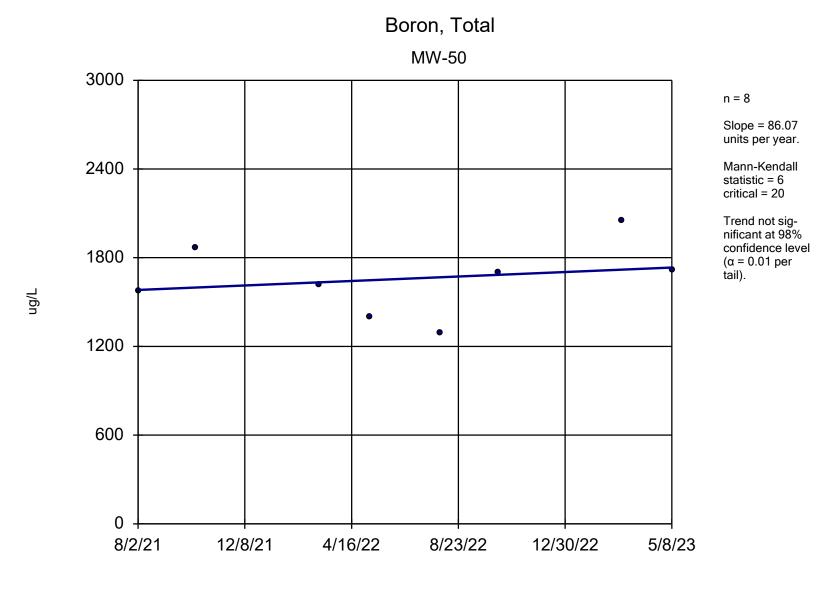
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



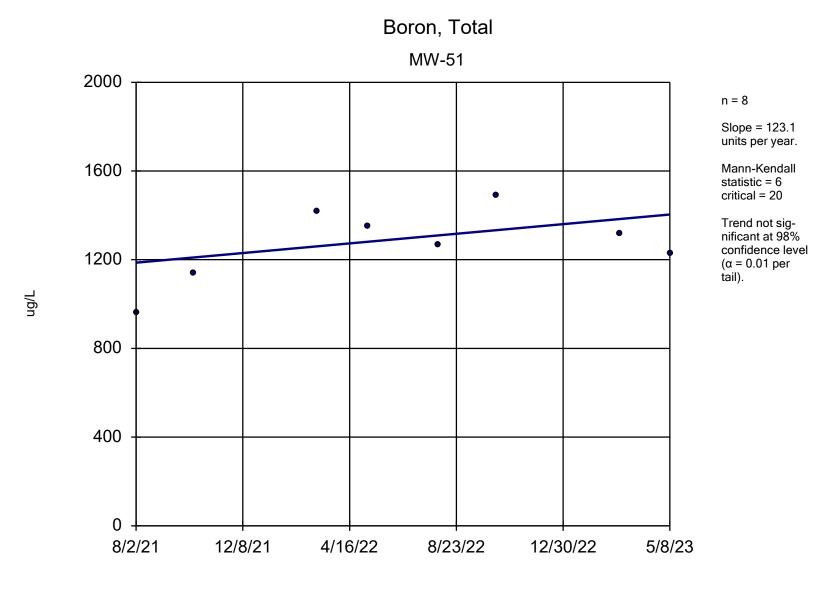
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



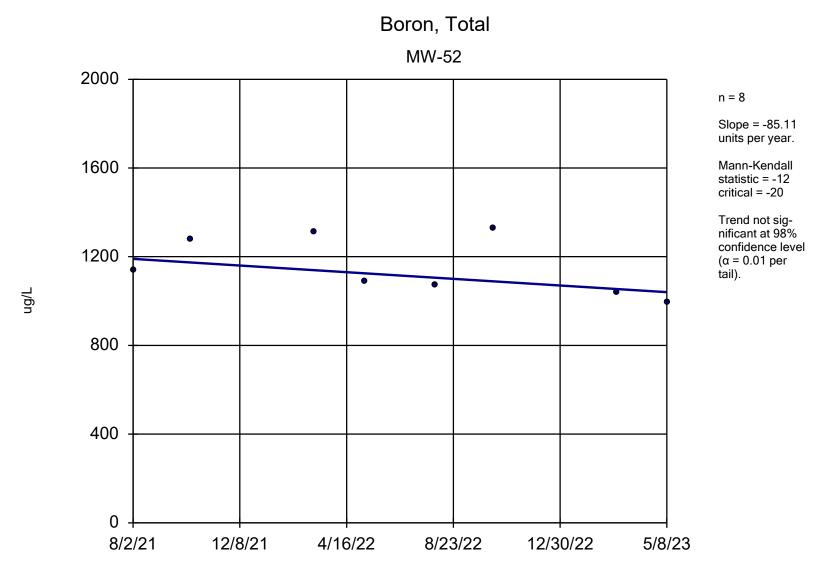
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



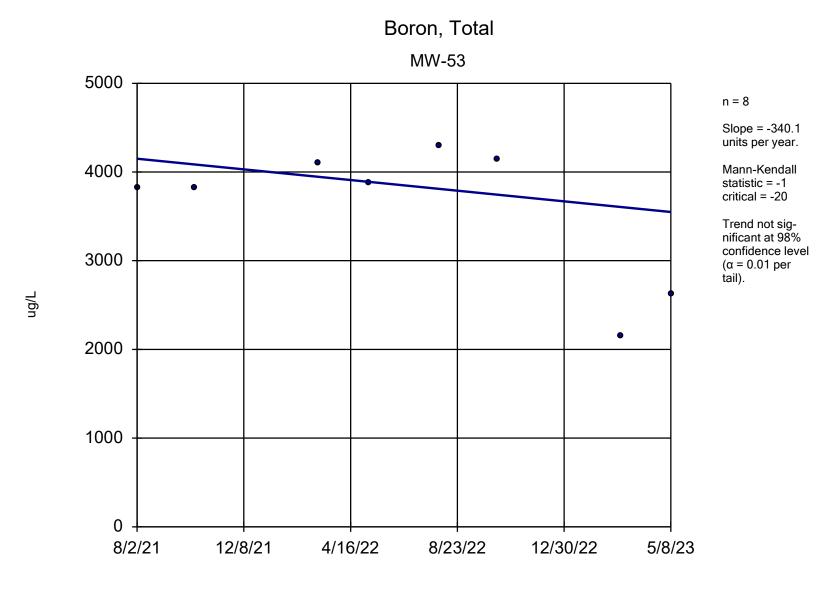
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



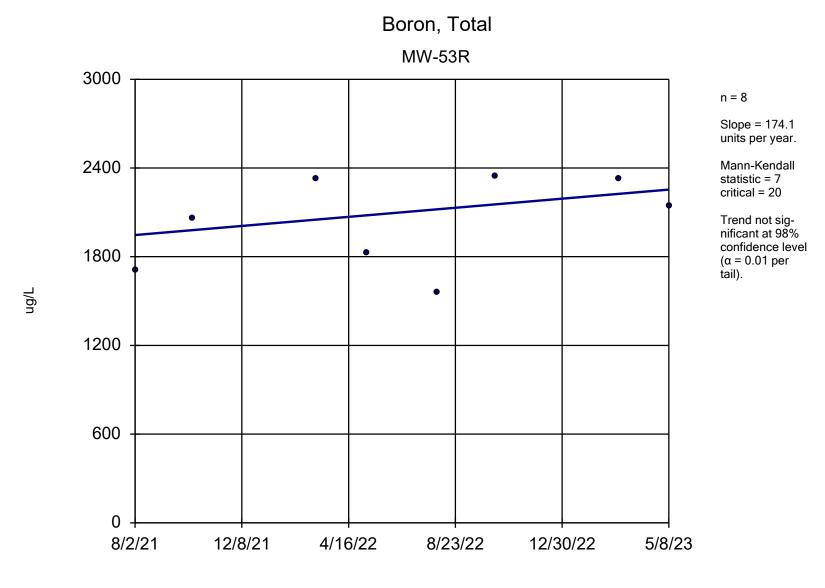
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



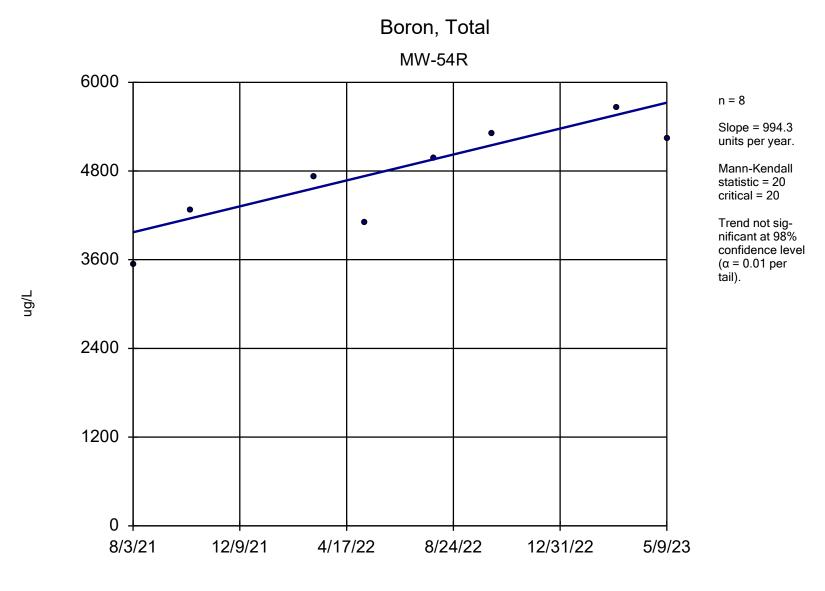
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



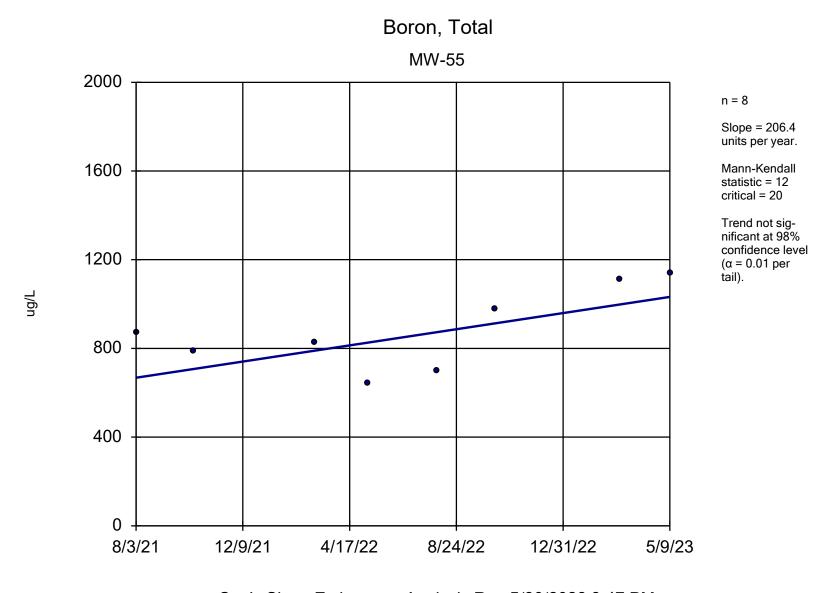
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



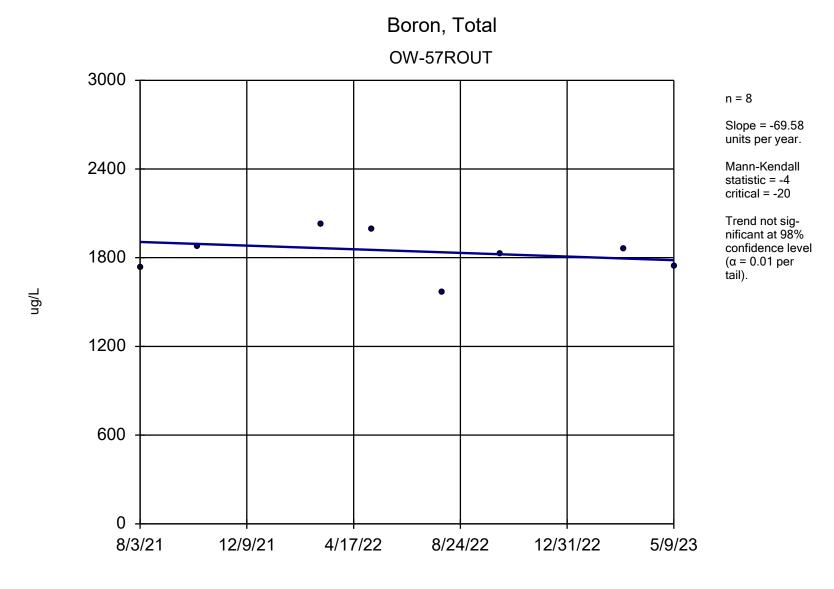
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



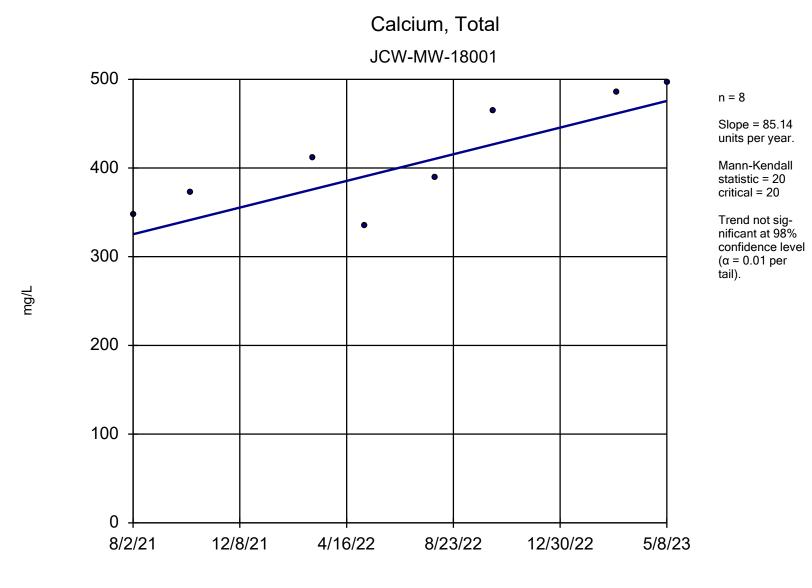
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



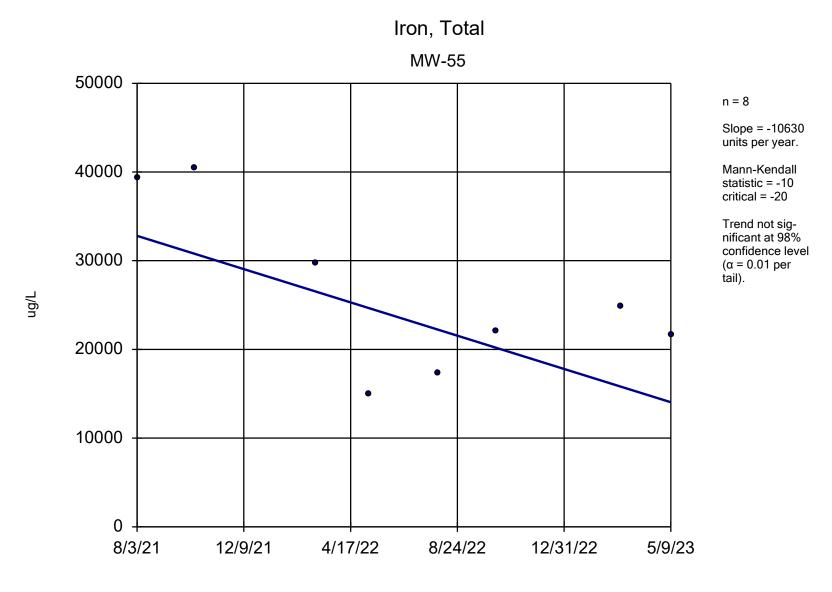
Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



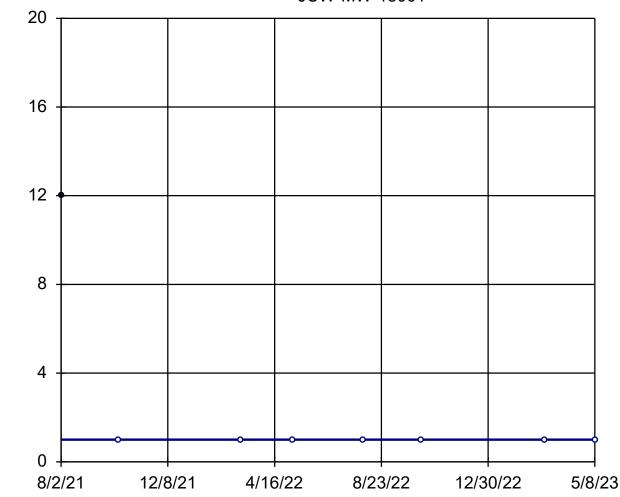
Sen's Slope Estimator Analysis Run 5/30/2023 3:48 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

ng/L

# Vanadium, Total

JCW-MW-18001



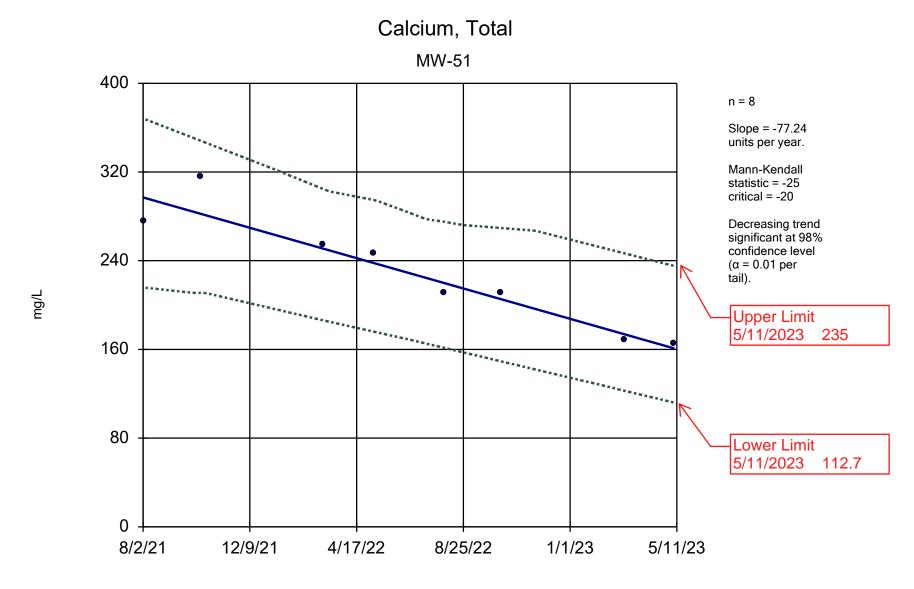
n = 8

Slope = 0 units per year.

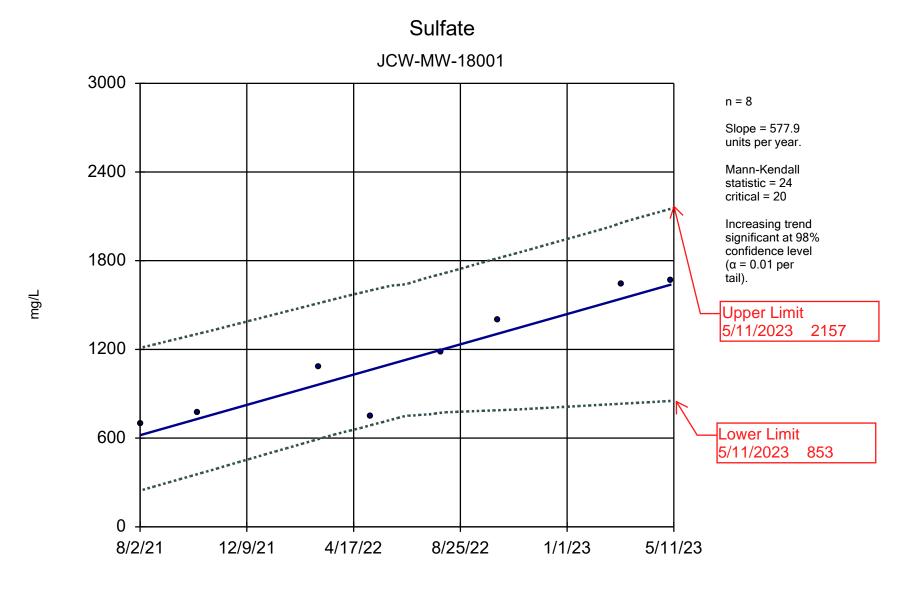
Mann-Kendall statistic = -7 critical = -20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:48 PM



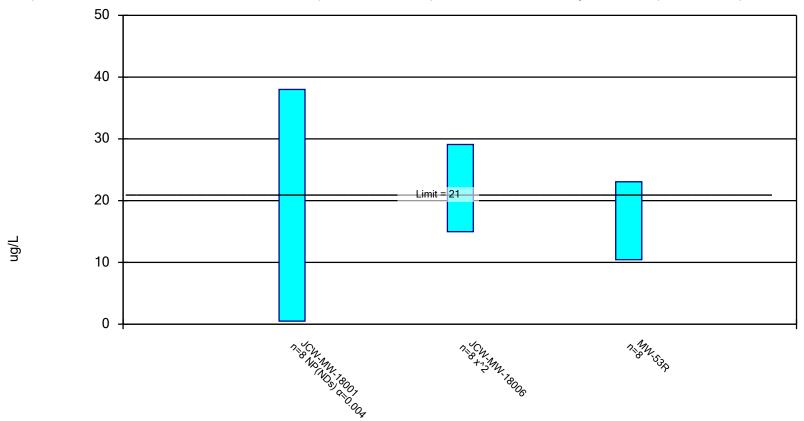
Sen's Slope and 98% Confidence Band Analysis Run 5/30/2023 3:52 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2



Sen's Slope and 98% Confidence Band Analysis Run 5/30/2023 3:54 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

## 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.



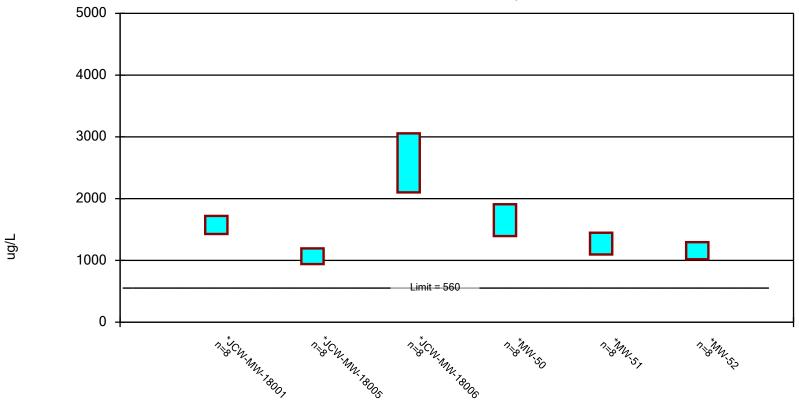
Constituent: Arsenic, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Arsenic, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-18001	JCW-MW-18006	MW-53R
8/2/2021	38		23
8/3/2021		25	
10/11/2021	1		25
10/12/2021		21	
3/7/2022	<1	33	
3/8/2022			10
5/9/2022	<1	22.5 (D)	8
8/1/2022	<1		17
8/2/2022		21	
10/10/2022	<1		20
10/11/2022		25 (D)	
3/8/2023	<1		
3/9/2023		5 (D)	17
5/8/2023	<1		14
5/9/2023		23 (D)	
Mean	5.25	21.94	16.75
Std. Dev.	13.23	7.849	5.946
Upper Lim.	38	29.08	23.05
Lower Lim.	0.5	14.98	10.45

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



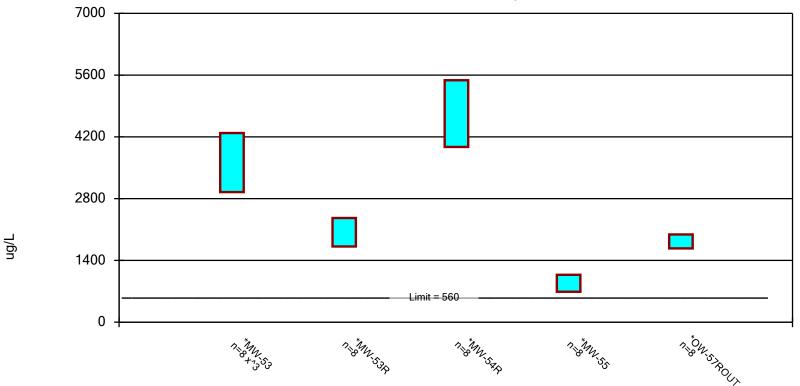
Constituent: Boron, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Boron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-18001	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51	MW-52
8/2/2021	1610			1575 (D)	960	1140
8/3/2021		1080	2640			
10/11/2021	1670			1865 (D)	1140	1280
10/12/2021		1190	2600			
3/7/2022	1670	1065 (D)	3220			
3/8/2022				1615 (D)	1420	1310
5/9/2022	1560		3010 (D)	1400 (D)	1350	1090
5/10/2022		1010				
8/1/2022	1470			1290 (D)	1270	1070
8/2/2022		981	2260			
10/10/2022	1790			1700 (D)	1490	1330
10/11/2022		1290	2685 (D)			
3/8/2023	1440			2050 (D)		
3/9/2023		930	1745 (D)		1320	1040
5/8/2023	1380			1720 (D)	1230	993
5/9/2023		992	2465 (D)			
Mean	1574	1067	2578	1652	1273	1157
Std. Dev.	137.8	119.6	450.8	242.8	166.6	131.7
Upper Lim.	1720	1194	3056	1909	1449	1296
Lower Lim.	1428	940.5	2100	1395	1096	1017

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



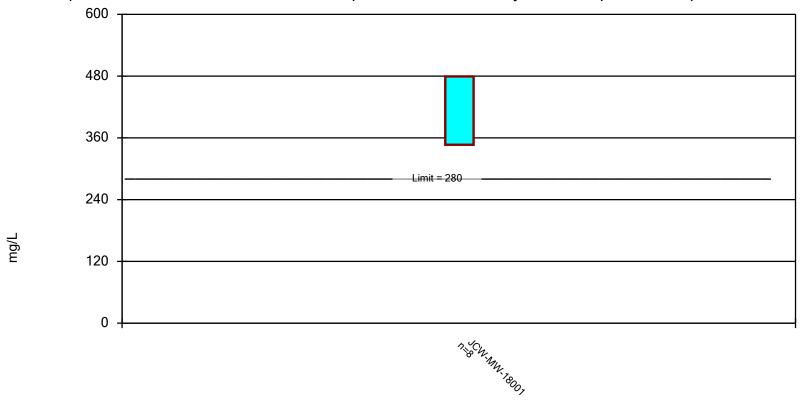
Constituent: Boron, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Boron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
8/2/2021	3820	1710			
8/3/2021			3530	873	1730
10/11/2021	3820	2060	4270		
10/12/2021				788	1880
3/7/2022				826	
3/8/2022	4100	2330			
3/9/2022			4720		2030
5/9/2022	3880	1830	4110		
5/10/2022				642	1990
8/1/2022	4300	1560	4970	698 (D)	
8/2/2022					1570
10/10/2022	4140	2340	5310	976	
10/11/2022					1830
3/9/2023	2150	2330	5660	1110	1860
5/8/2023	2620	2140			
5/9/2023			5240	1140	1740
Mean	3604	2038	4726	881.6	1829
Std. Dev.	781	305.2	712.6	181.6	148.7
Upper Lim.	4286	2361	5482	1074	1986
Lower Lim.	2947	1714	3971	689.1	1671

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



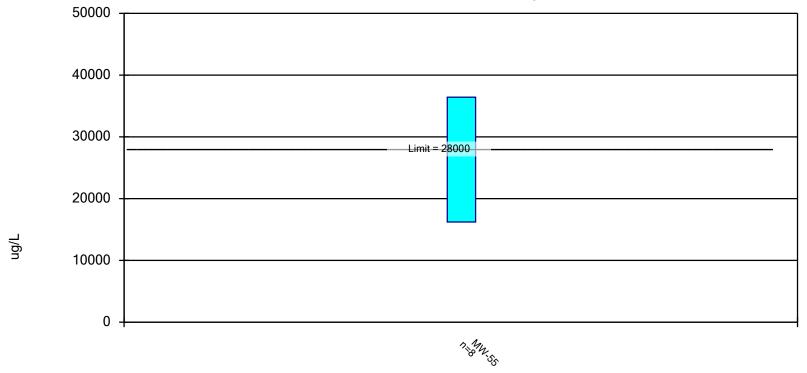
Constituent: Calcium, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Calcium, Total (mg/L) Analysis Run 5/30/2023 4:02 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-18001
8/2/2021	348
10/11/2021	373
3/7/2022	412
5/9/2022	335
8/1/2022	389
10/10/2022	465
3/8/2023	486
5/8/2023	496
Mean	413
Std. Dev.	62.57
Upper Lim.	479.3
Lower Lim.	346.7

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

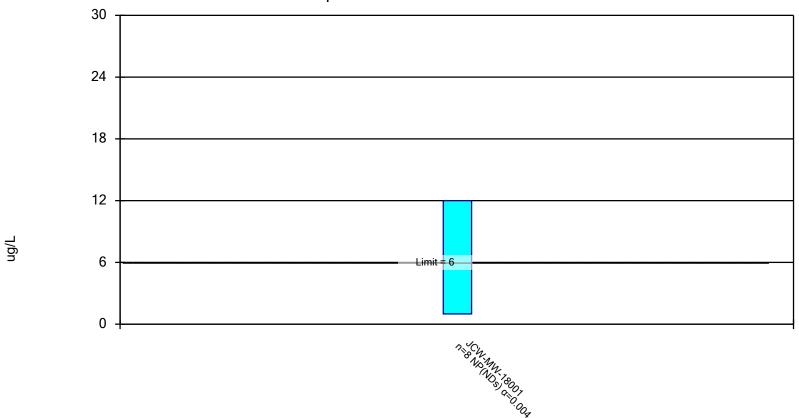


Constituent: Iron, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Iron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	MW-55
8/3/2021	39400
10/12/2021	40500
3/7/2022	29800
5/10/2022	15000
8/1/2022	17300 (D)
10/10/2022	22100
3/9/2023	24800
5/9/2023	21600
Mean	26313
Std. Dev.	9533
Upper Lim.	36417
Lower Lim.	16208

Compliance Limit is not exceeded.



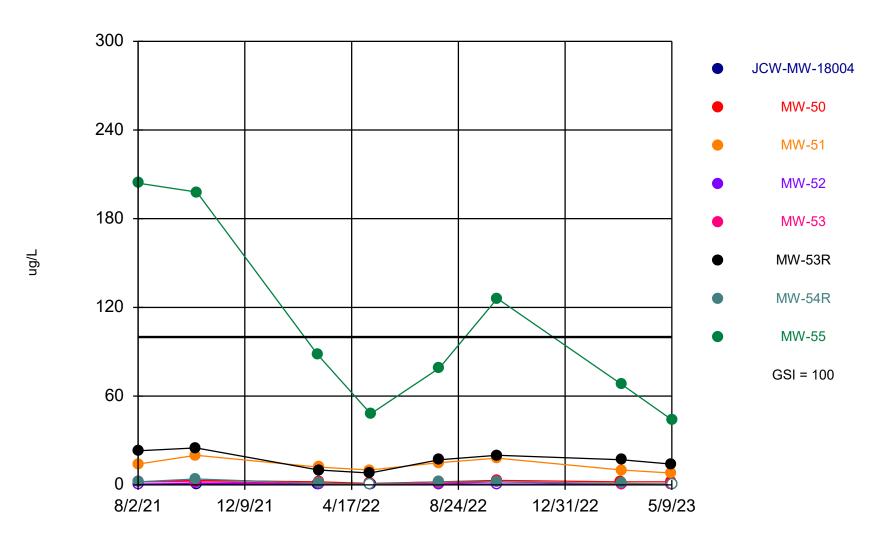
Constituent: Vanadium, Total Analysis Run 5/30/2023 4:01 PM

Constituent: Vanadium, Total (ug/L) Analysis Run 5/30/2023 4:02 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	JCW-MW-18001
8/2/2021	12
10/11/2021	<2
3/7/2022	<2
5/9/2022	<2
8/1/2022	<2
10/10/2022	<2
3/8/2023	<2
5/8/2023	<2
Mean	2.375
Std. Dev.	3.889
Upper Lim.	12
Lower Lim.	1

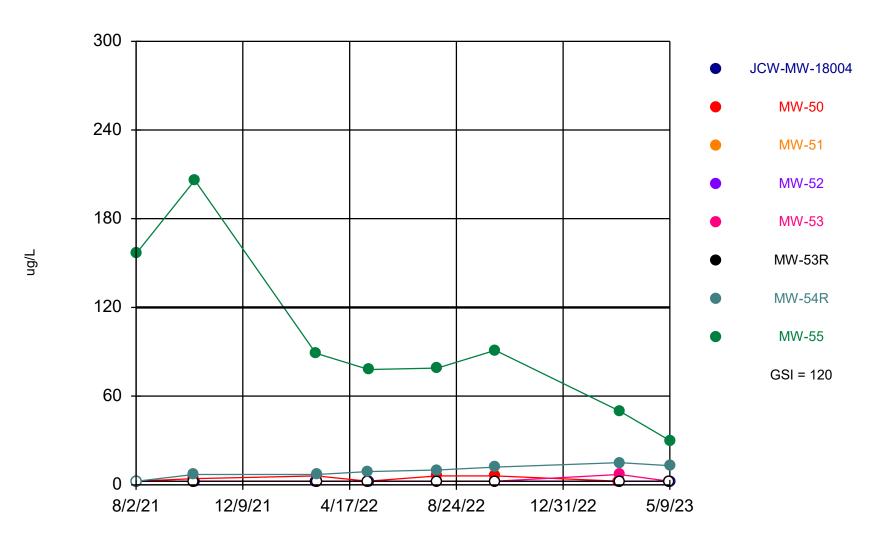
# Attachment 2 GSI Evaluation Sanitas™ Output Files

# Arsenic Comparison to GSI



Time Series Analysis Run 5/31/2023 9:56 AM

# Molybdenum Comparison to GSI



Time Series Analysis Run 5/31/2023 9:57 AM

#### **Summary Report**

Constituent: Arsenic, Total Analysis Run 5/31/2023 9:59 AM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 20 Wells = 8 Minimum Value = 0.5 Maximum Value = 204 Mean Value = 17.88 Median Value = 2 Standard Deviation = 40.48 Coefficient of Variation = 2.265 Skewness = 3.403

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
MW-50	8	0	1	3	2.125	2	0.6409	0.3016	-0.0544
MW-51	8	0	8	20	13.38	13	4.173	0.312	0.3352
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.188	1	0.7039	0.5928	0.2719
MW-53R	8	0	8	25	16.75	17	5.946	0.355	-0.115
MW-54R	8	2	0.5	4	1.625	1.5	1.157	0.7122	1.007
MW-55	8	0	44	204	106.9	83.5	63.43	0.5935	0.6822

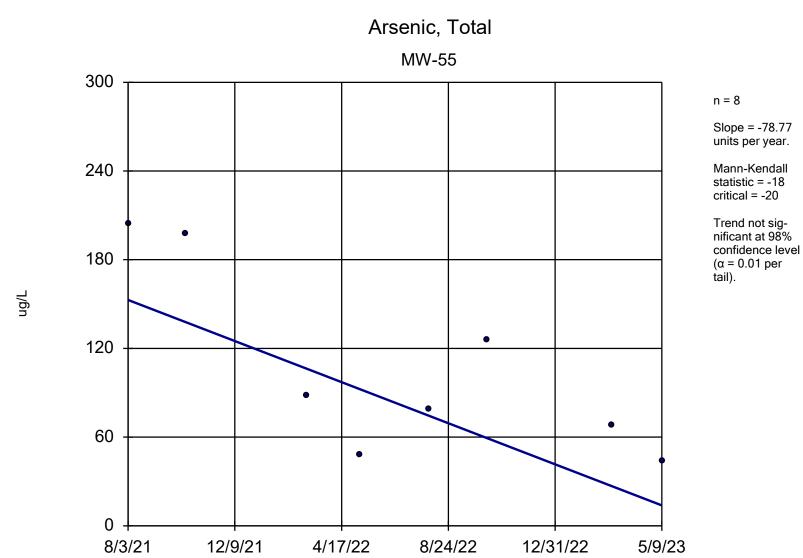
#### **Summary Report**

Constituent: Molybdenum, Total Analysis Run 5/31/2023 9:59 AM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 44 Wells = 8 Minimum Value = 2.5 Maximum Value = 206 Mean Value = 15.5 Median Value = 2.5 Standard Deviation = 36.71 Coefficient of Variation = 2.368 Skewness = 3.562

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-50	8	4	2.5	6	4.031	3.375	1.734	0.4302	0.2501
MW-51	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-52	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-53	8	7	2.5	7	3.063	2.5	1.591	0.5195	2.268
MW-53R	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-54R	8	1	2.5	15	9.438	9.5	3.977	0.4214	-0.3122
MW-55	8	0	30	206	97.5	84	57.27	0.5874	0.8605



Sen's Slope Estimator Analysis Run 6/7/2023 3:25 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

ng/L

## Molybdenum, Total

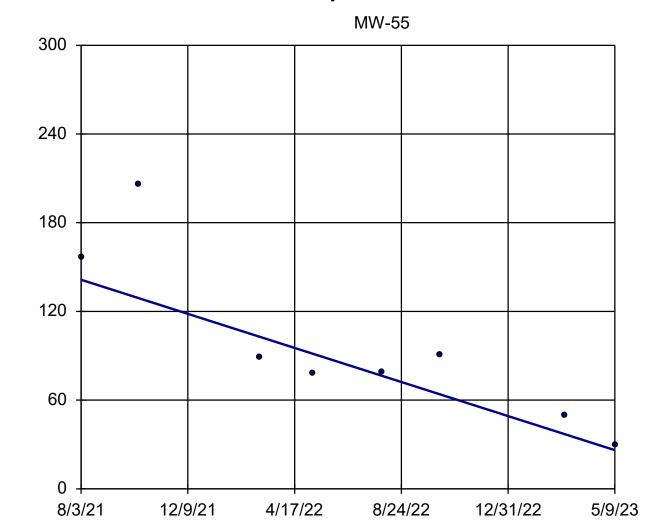
n = 8

Slope = -65.32 units per year.

Mann-Kendall statistic = -18 critical = -20

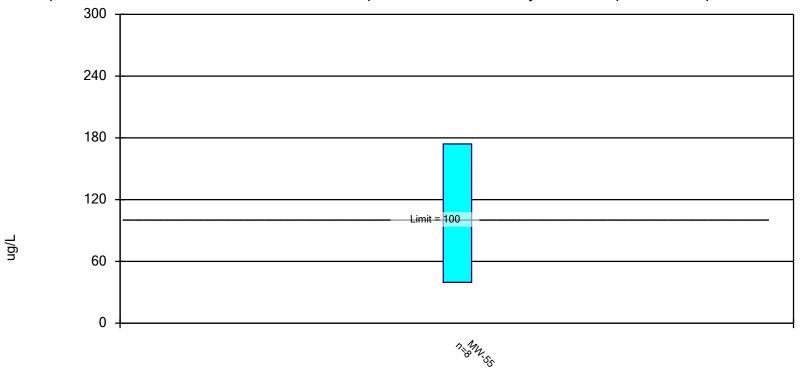
Trend not significant at 98% confidence level

 $(\alpha = 0.01 \text{ per tail}).$ 



Sen's Slope Estimator Analysis Run 6/7/2023 3:25 PM

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



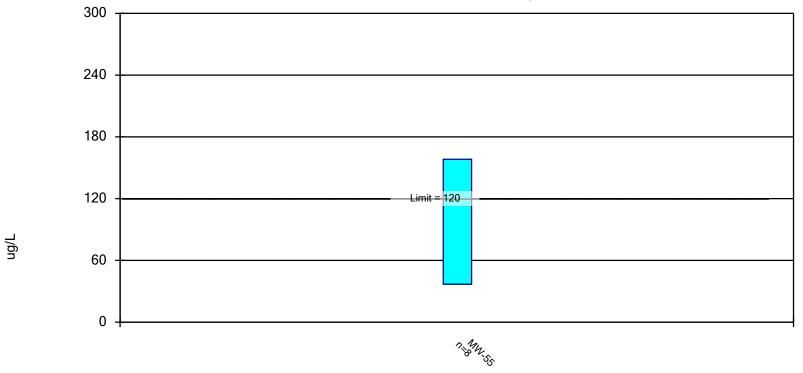
Constituent: Arsenic, Total Analysis Run 5/31/2023 10:06 AM

Constituent: Arsenic, Total (ug/L) Analysis Run 5/31/2023 10:11 AM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	MW-55
8/3/2021	204
10/12/2021	198
3/7/2022	88
5/10/2022	48
8/1/2022	79 (D)
10/10/2022	126
3/9/2023	68
5/9/2023	44
Mean	106.9
Std. Dev.	63.43
Upper Lim.	174.1
Lower Lim.	39.64

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



Constituent: Molybdenum, Total Analysis Run 5/31/2023 10:06 AM

Constituent: Molybdenum, Total (ug/L) Analysis Run 5/31/2023 10:11 AM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q2

	MW-55
8/3/2021	157
10/12/2021	206
3/7/2022	89
5/10/2022	78
8/1/2022	79 (D)
10/10/2022	91
3/9/2023	50
5/9/2023	30
Mean	97.5
Std. Dev.	57.27
Upper Lim.	158.2
Lower Lim.	36.79



# Appendix E Laboratory Analytical Report



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q2

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0404

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 05/01/2023 for the 2<sup>nd</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 05/03/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2023 DEK-JCW Background Wells

**Date Received:** 5/3/2023 **Chemistry Project:** 23-0404

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0404-01	MW-15002	Groundwater	05/01/2023 15:01	DEK JCW Background
23-0404-02	MW-15008	Groundwater	05/01/2023 12:40	DEK JCW Background
23-0404-03	MW-15016	Groundwater	05/01/2023 08:40	DEK JCW Background
23-0404-04	MW-15019	Groundwater	05/01/2023 13:43	DEK JCW Background
23-0404-05	DUP-Background	Groundwater	05/01/2023 00:00	DEK JCW Background
23-0404-06	FB- Background	Water	05/01/2023 12:40	DEK JCW Background



Report Date:

05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15002
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-01
 Collect Time:
 03:01 PM

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	IIGIX III-IV 10	tai wictai.		Aliquot #: 23-0	404-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	63		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	48400		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	1		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	729		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	5950		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	834		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	72000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	404-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	404-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	64500		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	14900		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-01-C03-A01	Analyst: LMC
				· · · · · · · · · · · · · · · · · · ·		
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking



Report Date:

05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15008
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-02
 Collect Time:
 12:40 PM

Matrix: Groundwater

Parameter(s) Antimony	Result	Flag				
Antimony		i iag	Units	RL	Analysis Date	Tracking
Anumony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	71		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	107		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	108000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	17900		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	24		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	15400		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	2		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	3180		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	163000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	5		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	404-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	404-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	259000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	10500		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-02-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking

Report Date:

05/19/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15016
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-03
 Collect Time:
 08:40 AM

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Apper				Aliquot #: 23-0	404-03-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	2		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	58		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	347		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	175000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	1970		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	64		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	23900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	6		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	10300		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	84800		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	404-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-03-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	253000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-03-C03-A01	Analyst: LMC
- ()	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Result	i iag	Ullits	111	Allalysis Date	Hacking

Report Date:

05/19/23



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Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

 Field Sample ID:
 MW-15019
 Collect Date:
 05/01/2023

 Lab Sample ID:
 23-0404-04
 Collect Time:
 01:43 PM

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	404-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	317		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	211		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	159000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21500		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	13		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	35900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1770		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	200000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	404-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	302000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	94200		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-04-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07
	23-	0404 Page	8 of 13			



Sample Site: **DEK JCW Background** Laboratory Project: **23-0404** 

Field Sample ID: **DUP-Background** 

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Lab Sample ID: 23-0404-05
Matrix: Groundwater

Collect Date: 05/01/2023 Collect Time: 12:00 AM

Report Date:

05/19/23

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	404-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	326		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	207		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	157000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21700		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	12		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	36400		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1800		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	203000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	404-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analys	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	404-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	304000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	93300		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	404-05-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07
	23-	-0404 Page 9	9 of 13			





**Report Date:** 05/19/23

Sample Site: **DEK JCW Background** 

Field Sample ID: **FB- Background**Lab Sample ID: 23-0404-06

Matrix: Water

Laboratory Project: 23-0404

Collect Date: 05/01/2023 Collect Time: 12:40 PM

Metals by EPA 6020B: CCI	R Rule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	)404-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Barium	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND	ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Iron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	ND	ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, To	otal, Aqueous		Aliquot #: 23-0	404-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	05/16/2023	AB23-0516-03



Report Date:

05/19/23



Data Qualifiers Exception Summary

No exceptions occurred.

CONSUMERS ENERGY Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inspection Date: 5.04.23		Inspection Rv. 1 mo		
Sample Origin/Project Name: Q2-202	3 JCh	-DEK Buckgramo	Wells	
Shipment Delivered By: Enter the type of s	hipment car	rier.		
Pony FedEx			Airb	orne
Other/Hand Carry (whom)	me 5. 4	.7 2		
Tracking Number: 3,917 807	6 0844	Shipping Form Atta	iched: Yes _x	No
Other/Hand Carry (whom)  Tracking Number: 3,911 75  Shipping Containers: Enter the type and no	imber of shi	pping containers received.		
Cooler Cardboard Bo			Envelope	e/Mailer
Loose/Unpackaged Containers		Other		
Condition of Shipment: Enter the as-receiv	ed condition	n of the shipment container.		
Damaged Shipment Observed: Non	ė	Dented	Leal	cino
Other				5
			. San	
Shipment Security: Enter if any of the ship				
Shipping Containers Received: Ope	ened	Sealed	-	
Enclosed Documents: Enter the type of doc	uments enc	osed with the shipment.		
CoC Work Request		Air Data Sheet	Other	
Temperature of Containers: Measure the te	emperature o	of several sample containers.		
As-Received Temperature Range	4-2.3	Samples Received on	Ice: Yes X	[o
M&TE # and Expiration	5.25.	12		
			40.7	
Number and Type of Containers: Enter the	e total numb	er of sample containers rece	erved.	
Container Type Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	_		_	-
Quart/Liter (g/p)	_	-	-	-
9-oz (amber glass jar)	_			_
2-oz (amber glass)	_			-
				-
125 mL (plastic) 11				
24 mL vial (glass)			_	-
24 mL vial (glass)	$\equiv$		$\equiv$	

# **CHAIN OF CUSTODY**



### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 1 of

	PLING SITE / CU				PROJECT NUMBER:	SAP CC or WC	)#:							A	NAI	YSI	S RE	QUE	STED		OA DEOLUDENGENE.
Q2-2	023 JCW-DEK	Background W	ells		23-0404	REQUESTER:	Harc	old R	legis	ster			=	(Atta	ch Li	st if N	fore S	space i	is Need	ied)	QA REQUIREMENT:
SAM	PLING TEAM:			1	TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ ST	ANDARD OTF	HER_														□ NPDES  ⊠ TNI
SEN	D REPORT TO:	Caleb Batts			email:	phone:															□ ISO 17025
	COPY TO:	Harold Regis	ster		MATRIX CODES:  GW = Groundwater OX = Other	r		CC	NT.	AIN	ERS			1							☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludg W = Water / Aqueous Liquid A = Air			P	RES	ERV	VAT	IVE	als	1							☐ INTERNAL INFO
	LAB	SAMPLE COL	LECTION	XI	S = Soil / General Solid WP = Wip	e eral Waste	AL#						Metals	ns							□ OTHER
S	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOTAL #	None	HNO	NaOH	HCI	MeOF	Total	Anions	TDS						REMARKS
	23-0404-01	5-1-27	1501	GW	MW-15002		3	2	1				x	x	x						
178	-02	5-1-23	1240	GW	MW-15008		3	2	1				x	x	x						
	-03	5-2-23	0840	GW	MW-15016		3	2	1				x	х	x						
	-04	5-1-27	1343	GW	MW-15019		3	2	1				x	x	x						
	-05	5-1-23	,	GW	DUP-Background		3	2	1			1	x	x	x						
	-06	5-1-23	1240	W	FB- Background		1						x								
																			П		
										V											
	NOUISHED BY:	Thy	Ī		-2-23/1600	RECEIVED BY:						,		ММІ							
RELI	NOVISHED BY:	Fel EX	J		5-03-28 10:20	RECEIVED BY:	£ 12						100					3 °C			#:_ 27723 ue Date: _ 5-25-23

# **ANALYTICAL REPORT**

## PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Generated 7/5/2023 11:48:36 AM Revision 2

### JOB DESCRIPTION

Karn/Weadock CCR DEK JCW Background Wells

# **JOB NUMBER**

240-184759-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203

# **Eurofins Cleveland**

### **Job Notes**

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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### **Authorization**

7/5/2023 11:48:36 AM

Authorized for release by Denise Heckler, Project Manager II Denise.Heckler@et.eurofinsus.com Designee for Kris Brooks, Project Manager II Kris.Brooks@et.eurofinsus.com (330)966-9790

nuse DHeckler

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### **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-184759-1

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

#### **Qualifiers**

Rad
Qualifier

G	The Sample MDC is greater than the requested RL.
	B 81 1 0 0 1 1 1 0 0 0 0

J Result is less than the sample detection limit.

**Qualifier Description** 

#### **Glossary**

Abbreviation	These commonly	used abbreviations ma	y or may not be	present in this report.
Appleviation	These commonly	useu abbieviations ma	y or may not be	present in tins 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
CFU Colony Forming Unit
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)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
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)

TNTC Too Numerous To Count

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#### **Case Narrative**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

**Laboratory: Eurofins Cleveland** 

Narrative

Job Narrative 240-184759-1

#### Comments

A revised report was provided on July 5, 2023. The sample ID was corrected: DUP-BACKGROUND. The sampling date was corrected: MW-15016.

#### Receipt

The samples were received on 5/5/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.3° C.

#### **RAD**

Method 903.0: Radium-226 batch 611074: 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.

Method 904.0: Radium-228 batch 611088: The detection goal was not met for the following sample. Sample was prepped at a reduced volume due to the presence of matrix interferences: MW-15008 (240-184759-2). Analytical results are reported with the detection limit achieved.

Method 904.0: Radium-228 batch 611088: The detection goal was not met for the following sample. The samples and batch QC were prepped at full volume. Matrix interferences are suspected because the method blank achieved the detection goal demonstrating acceptable sample preparation and instrument performance: MW-15016 (240-184759-3). Analytical results are reported with the detection limit achieved

Method 904.0: Radium-228 batch 611088: 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.

Method PrecSep\_0: Radium-228 Prep Batch 160-611088: The following samples were prepared at a reduced aliquot due to Matrix: MW-15008 (240-184759-2), MW-15019 (240-184759-4) and DUP-BACKGROUND (240-184759-5). A laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep\_0: Radium-228 Prep Batch 160-611088: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Radium-226 Prep Batch 160-611074: The following samples were prepared at a reduced aliquot due to Matrix: MW-15008 (240-184759-2), MW-15019 (240-184759-4) and DUP-BACKGROUND (240-184759-5). A laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep STD: Radium-226 Prep Batch 160-611074: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). 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.

Job ID: 240-184759-1

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### **Method Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
PrecSep 0	Preparation, Precipitate Separation	None	EET SL

#### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Job ID: 240-184759-1

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### **Sample Summary**

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-184759-1	MW-15002	Water	05/01/23 15:01	05/05/23 08:00
240-184759-2	MW-15008	Water	05/01/23 12:40	05/05/23 08:00
240-184759-3	MW-15016	Water	05/02/23 08:40	05/05/23 08:00
240-184759-4	MW-15019	Water	05/01/23 13:43	05/05/23 08:00
240-184759-5	DUP-BACKGROUND	Water	05/01/23 00:00	05/05/23 08:00
240-184759-6	FR-BACKGROUND	Water	05/01/23 12:40	05/05/23 08:00

Job ID: 240-184759-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-1

ab Sample ID. 240-104/ 59-1

Matrix: Water

Job ID: 240-184759-1

<b>Client Sample</b>	ID:	MW-15002
<b>Date Collected: 0</b>	5/01	/23 15:01

Date Received: 05/05/23 08:00

Method: EPA 903	.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.115	U	0.115	0.115	1.00	0.183	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.0		30 - 110					05/11/23 12:08	06/08/23 06:47	

		-228 (GFP	•							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0854	U	0.301	0.301	1.00	0.547	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.0		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	87.4		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.200	U	0.322	0.322	5.00	0.547	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

Client Sample ID: MW-15008

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-2

Matrix: Water

Job ID: 240-184759-1

Date Collected: 05/01/23 12:40 Date Received: 05/05/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.102	U	0.147	0.147	1.00	0.249	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.4		30 - 110					05/11/23 12:08	06/08/23 06:47	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.286	UG	0.658	0.658	1.00	1.16	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.4		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	61.5		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	ium-226 an	d Radiun	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.388	U	0.674	0.674	5.00	1.16	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

**Client Sample ID: MW-15016** 

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-3

Matrix: Water

Job ID: 240-184759-1

Date Collected: 05/02/23 08:40 Date Received: 05/05/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
		·	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0671	U	0.0783	0.0785	1.00	0.127	pCi/L	05/11/23 12:08	06/08/23 06:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.2		30 - 110					05/11/23 12:08	06/08/23 06:49	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.201	UG	0.523	0.523	1.00	1.01	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.2		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	59.3		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiun	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.134	U	0.529	0.529	5.00	1.01	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

**Client Sample ID: MW-15019** 

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-4

Matrix: Water

Job ID: 240-184759-1

Date Collected: 05/01/23 13:43 Date Received: 05/05/23 08:00

Method: EPA 903.0	- Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.134	0.137	1.00	0.137	pCi/L	05/11/23 12:08	06/08/23 08:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.1		30 - 110					05/11/23 12:08	06/08/23 08:21	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
		o 115	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.483	U	0.529	0.530	1.00	0.859	pCi/L	05/11/23 12:51	06/01/23 12:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.1		30 - 110					05/11/23 12:51	06/01/23 12:40	1
Y Carrier	65.7		30 - 110					05/11/23 12:51	06/01/23 12:40	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.792	U	0.546	0.547	5.00	0.859	pCi/L		06/08/23 14:39	1

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Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-5

**Matrix: Water** 

Job ID: 240-184759-1

Client Sample	ID: DUP-B	ACKGROUND
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Date Collected: 05/01/23 00:00 Date Received: 05/05/23 08:00

Method: EPA 903.	.0 - Radium	-226 (GFP	C)							
		·	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.393		0.140	0.144	1.00	0.123	pCi/L	05/11/23 12:08	06/08/23 08:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:08	06/08/23 08:22	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.588	U	0.553	0.556	1.00	0.883	pCi/L	05/11/23 12:51	06/01/23 12:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					05/11/23 12:51	06/01/23 12:41	1
Y Carrier	71.1		30 - 110					05/11/23 12:51	06/01/23 12:41	1

Method: TAL-STL F	Ra226_Ra2	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	0.981		0.570	0.574	5.00	0.883	pCi/L		06/08/23 14:39	1

Client: TRC Environmental Corporation.

**Client Sample ID: FB-BACKGROUND** 

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-6

Matrix: Water

Job ID: 240-184759-1

Date Collected: 05/01/23 12:40 Date Received: 05/05/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0163	U	0.0448	0.0449	1.00	0.109	pCi/L	05/11/23 12:08	06/08/23 08:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.4		30 - 110					05/11/23 12:08	06/08/23 08:22	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.242	U	0.351	0.352	1.00	0.593	pCi/L	05/11/23 12:51	06/01/23 12:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.4		30 - 110					05/11/23 12:51	06/01/23 12:41	1
Y Carrier	81.2		30 - 110					05/11/23 12:51	06/01/23 12:41	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.226	U	0.354	0.355	5.00	0.593	pCi/L		06/08/23 14:39	1

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### **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-184759-1	MW-15002	80.0	
240-184759-2	MW-15008	76.4	
240-184759-3	MW-15016	85.2	
240-184759-4	MW-15019	86.1	
240-184759-5	DUP-BACKGROUND	95.4	
240-184759-6	FB-BACKGROUND	85.4	
LCS 160-611074/2-A	Lab Control Sample	96.1	
LCSD 160-611074/3-A	Lab Control Sample Dup	81.0	
MB 160-611074/1-A	Method Blank	93.4	
Tracer/Carrier Legenc	I		

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-184759-1	MW-15002	80.0	87.4	
240-184759-2	MW-15008	76.4	61.5	
240-184759-3	MW-15016	85.2	59.3	
240-184759-4	MW-15019	86.1	65.7	
240-184759-5	DUP-BACKGROUND	95.4	71.1	
240-184759-6	FB-BACKGROUND	85.4	81.2	
LCS 160-611088/2-A	Lab Control Sample	96.1	78.7	
LCSD 160-611088/3-A	Lab Control Sample Dup	81.0	62.1	
MB 160-611088/1-A	Method Blank	93.4	79.2	

Ba = Ba Carrier

Y = Y Carrier

**Eurofins Cleveland** 

Job ID: 240-184759-1

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

#### Method: 903.0 - Radium-226 (GFPC)

Client: TRC Environmental Corporation.

Lab Sample ID: MB 160-611074/1-A

Count

**Matrix: Water** 

Analysis Batch: 615046

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 611074

MB MB Uncert. Uncert. **MDC** Unit Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL Prepared Analyzed Dil Fac Radium-226 0.1185 0.0822 0.0829 1.00 0.113 pCi/L 05/11/23 12:08 06/08/23 06:45

Total

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 93.4 30 - 110 05/11/23 12:08 06/08/23 06:45

Client Sample ID: Lab Control Sample

Prep Batch: 611074

**Matrix: Water** Prep Type: Total/NA Analysis Batch: 615046 Total

LCS LCS %Rec **Spike** Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL %Rec Limits MDC Unit Radium-226 11.3 9.514 1.02 1.00 0.110 pCi/L 84 75 - 113

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 96.1 30 - 110

Lab Sample ID: LCS 160-611074/2-A

Lab Sample ID: LCSD 160-611074/3-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

**Analysis Batch: 615046** 

Prep Type: Total/NA

Prep Batch: 611074

Total LCSD LCSD %Rec **RER** Spike Uncert. %Rec Added  $(2\sigma + / -)$ RL **MDC** Unit Limits Analyte Result Qual RER Limit Radium-226 11.3 1.12 1.00 0.131 pCi/L 92 75 - 113 0.42 10.42

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 81.0 30 - 110

#### Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-611088/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 614160** Prep Batch: 611088

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed Radium-228 Ū 0.333 1.00 0.512 pCi/L 05/11/23 12:51 06/01/23 12:31 0.4069 0.335

MB MB Carrier %Yield Qualifier Limits Dil Fac Prepared Analyzed Ba Carrier 93.4 30 - 110 05/11/23 12:51 06/01/23 12:31 30 - 110 Y Carrier 79.2 05/11/23 12:51 06/01/23 12:31

**Eurofins Cleveland** 

### **QC Sample Results**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

### Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-611088/2-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

**Analysis Batch: 614160** 

**Spike** 

Added

8.15

Prep Type: Total/NA

Prep Batch: 611088

Total LCS LCS %Rec Spike Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL**MDC** Unit %Rec Limits Radium-228 8.15 9.437 1.30 1.00 0.530 pCi/L 116 75 - 125

LCSD LCSD

Result Qual

8.686

LCS LCS

%Yield Qualifier Carrier Limits Ba Carrier 96.1 30 - 110 Y Carrier 78.7 30 - 110

**Client Sample ID: Lab Control Sample Dup** 

107

Prep Type: Total/NA

Prep Batch: 611088

Lab Sample ID: LCSD 160-611088/3-A **Matrix: Water** 

Analyte

Radium-228

**Analysis Batch: 614159** 

Total

1.67

1.00

Uncert. %Rec **RER** %Rec Limits RL **MDC** Unit  $(2\sigma + / -)$ 

1.09 pCi/L

Limit RER 75 - 125 0.25

LCSD LCSD

Carrier %Yield Qualifier Limits Ba Carrier 30 - 110 81.0 30 - 110 Y Carrier 62.1

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Job ID: 240-184759-1

#### Rac

#### Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184759-1	MW-15002	Total/NA	Water	PrecSep STD	
240-184759-2	MW-15008	Total/NA	Water	PrecSep STD	
240-184759-3	MW-15016	Total/NA	Water	PrecSep STD	
240-184759-4	MW-15019	Total/NA	Water	PrecSep STD	
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep STD	
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep STD	
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

#### Prep Batch: 611088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184759-1	MW-15002	Total/NA	Water	PrecSep_0	
240-184759-2	MW-15008	Total/NA	Water	PrecSep_0	
240-184759-3	MW-15016	Total/NA	Water	PrecSep_0	
240-184759-4	MW-15019	Total/NA	Water	PrecSep_0	
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep_0	
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep_0	
MB 160-611088/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-611088/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-611088/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep 0	

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#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: MW-15002

Date Collected: 05/01/23 15:01 Date Received: 05/05/23 08:00 Lab Sample ID: 240-184759-1

**Matrix: Water** 

Job ID: 240-184759-1

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:47
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: MW-15008

Date Collected: 05/01/23 12:40 Date Received: 05/05/23 08:00

Lab Sample ID: 240-184759-2 **Matrix: Water** 

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:47
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Lab Sample ID: 240-184759-3 Client Sample ID: MW-15016

Date Collected: 05/02/23 08:40

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 06:49
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Lab Sample ID: 240-184759-4 Client Sample ID: MW-15019

Date Collected: 05/01/23 13:43 Date Received: 05/05/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:21
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:40
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Matrix: Water** 

**Matrix: Water** 

#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Lab Sample ID: 240-184759-5

**Client Sample ID: DUP-BACKGROUND** Date Collected: 05/01/23 00:00

**Matrix: Water** 

Job ID: 240-184759-1

Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:41
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Client Sample ID: FB-BACKGROUND** Lab Sample ID: 240-184759-6

Date Collected: 05/01/23 12:40 **Matrix: Water** 

Date Received: 05/05/23 08:00

Γ	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 08:22
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:41
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

**Laboratory References:** 

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK JCW Background Wells

### **Laboratory: Eurofins St. Louis**

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	<b>Identification Number</b>	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-11-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-23
MI - RadChem Recognition	State	9005	06-30-23
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-23
New Jersey	NELAP	MO002	06-30-23
New Mexico	State	MO00054	06-30-23
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-23
Texas	NELAP	T104704193	07-31-23
US Fish & Wildlife	US Federal Programs	058448	07-31-23
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

Job ID: 240-184759-1

 $<sup>^{\</sup>star} \ \text{Accreditation/Certification renewal pending - accreditation/certification considered valid}.$ 

**Eurofins Cleveland** 

	Sampler			II ab PM				Carrier Tracking No(s)		COC No.	
Client Information				Brool	Brooks, Kris M					240-107203-33282.1	
Client Contact Jacob Krenz	Phone			E-Mail Kris E	3rooks@	E-Mail Kris. Brooks@et.eurofinsus.com	us.com	State of Ongin:		Page 1 of 1	
Company: TRC Environmental Corporation.			DISMA				Analysis	Analysis Requested		Job #:	
Address 1540 Eisenhower Place	Due Date Requested:	ted:								≥	Hexane
City. Ann Arbor	TAT Requested (days):	days):			15						ne NaO2
State, Zip. MI, 48108-7080	Compliance Project:	A Yes	Δ No		N. W.				311	D - Nitric Acid O - Na2SO3 E - NaHSO4 R - Na2S2O	2045 2503 25203
Phone. 734-971-7080(Tel) 734-971-9022(Fax)	PO# TBD				(0						S - H2SO4 T - TSP Dodecahydrate
Email: JKrenz@trccompanies.com	** OM									1 - Ice V - MCAA J - DI Water W - pH 4-5	etone SAA
Project Name Karn/Weadock CCR Background Well	Project #: 24024154				10 80						Y - Trizma Z - other (specify)
Site	\$SOW#				A) as					Other:	
Sample Identification	Sample Date	Sample Time	Sample Type (C≈comp,	Matrix (w-water, B-sold, O-westeld).	Field Filtered S Perform MS/M 903.0, Re226Re	onsbinsts - 0.406	240-1847		Tetal Number	Special Instructions/Note:	ions/Note:
		X	(0)	on Code:	\$	٥	59 (		X		V
MW-15002	5-1-23	1051	ڻ	Water	√ X	×	Chair				
MW-15008	5-1-23	1240	9	Water	×	×	n of C				
MW-15016	5-2-23	0420	5	Water	N N	×	usto				
MW-15019	5-1-33	1343	5	Water	NNX	*	dy				
DUP-Background	5-1-23		S	Water	X X X	×					
EQ-Backgroud				Water		1			la.		
FB-Buckground	5-1-33	つかで	S	Water	N	×					
						$\parallel$					
Possible Hazard Identification					Samp	le Disposa	I ( A fee may I	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	s are retaine	ed longer than 1 mont	(h)
ested: 1, II, III, IV, Other (specify)			Sacionalical		Specie	al Instructions/QC	Special Instructions/QC Requirements	Disposal by Lab	Archive For		Months
Empty Kit Relinquished by:		Date:			Time:			Method of Shipment	ant:		
Relinquished by	Date String 33	LIHI/		Company	8	Received by	ae	Date	1/23	14/7 Company	any KY
Reinquished by:	Date/Time S/4/23	3/1/18		Company EA14		AG DO	\	Designation Designation	553	13 SOD CONTRACTOR	Jar
	Dater ime:			Company	ž	ceived by:	0	V Date/Time	ime	Сотралу	any
Custody Seals Intact: Custody Seal No.: △ Yes △ No		Ĺ			ŏ	oler Tempera	Cooler Temperature(s) °C and Other Remarks:	er Remarks			
										Ver. (	Ver. 06/08/2021

**Environment Testing** 

💸 eurofins

Chain of Custody Record 190

Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772

**Eurofins Cleveland** 180 S. Van Buren Avenue

194769
Eurofins - Canton Sample Receipt Form/Narrative Login # : 107 13
Barberton Facility
Client Site Name Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # E Foam Bex Client Cooler Box Other
Packing material used. Bushle Wrap Foam Plastic Bag None Other  COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt
IR GUN # 22 (CF +0.0 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity  -Were the seals on the outside of the cooler(s) signed & dated?  -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  -Were tamper/custody seals intact and uncompromised?  3. Shippers' packing slip attached to the cooler(s)?  4. Did custody papers accompany the sample(s)?  5. Were the custody papers relinquished & signed in the appropriate place?  6. Was/were the person(s) who collected the samples clearly identified on the COC?  7. Did all bottles arrive in good condition (Unbroken)?  8. Could all bottle labels (ID/Date/Time) be reconciled with the COC?  9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y/N)?  10. Were correct bottle(s) used for the test(s) indicated?  11. Sufficient quantity received to perform indicated analyses?  12. Are these work share samples and all listed on the COC?  13. Were all preserved sample(s) at the correct pH upon receipt?  14. Were VOAs on the COC?  15. Were air bubbles >6 mm in any VOA vials?  16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  Ves No  Ves No  Ves No  Ves No
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No.
17. Was a LL Hg or Me Hg trip blank present? Yes No
Contacted PM Date by via Verbal Voice Mail Other
Concerning
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES
19. 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)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s) were further preserved in the laboratory.  Time preserved: Preservative(s) added/Lot number(s):
VOA Sample Preservation - Date/Time VOAs Frozen:

5/5/2023

FB-BACKGROUND

FB-BACKGROUND

240-184759-A-6

240-184759-B-6

### **Login Container Summary Report**

240-184759

Temperature readings: \_ Container **Preservative** Client Sample ID Lab ID **Container Type** Temp Added (mls) Lot # pН MW-15002 Plastic 1 liter - Nitric Acid 240-184759-A-1 <2 MW-15002 Plastic 1 liter - Nitric Acid 240-184759-B-1 <2 MW-15008 240-184759-A-2 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid MW-15008 240-184759-B-2 <2 MW-15016 240-184759-A-3 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid MW-15016 240-184759-B-3 <2 Plastic 1 liter - Nitric Acid MW-15019 240-184759-A-4 <2 MW-15019 240-184759-B-4 Plastic 1 liter - Nitric Acid <2 **DUP-BACKGROUD** 240-184759-A-5 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid **DUP-BACKGROUD** 240-184759-B-5 <2

Plastic 1 liter - Nitric Acid

Plastic 1 liter - Nitric Acid

<2

<2

Phone: 330-497-9396 Fax: 330-497-0772 180 S. Van Buren Avenue Barberton, OH 44203

Chain of Custody Record

🔅 eurofins

**Environment Testing** 

 TSP Dodecahydrate Z - other (specify) N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 V - MCAA W - pH 4-5 Y - Trizma U - Acetone Preservation Codes G - Amchlor H - Ascorbic Acid COC No: 240-167649.1 240-184759-1 Page: Page 1 of 1 C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH I · Ice J · DI Water K · EDTA L · EDA A - HCL B - NaOH Total Number of containers arrier Tracking No(s) State of Origin: Michigan **Analysis Requested** Accreditations Required (See note) E-Mail: Kris.Brooks@et.eurofinsus.com 9226Ra228\_GFPC Lab PM: Brooks, Kris M Sep\_STD Standard Target List Due Date Requested: 6/6/2023 TAT Requested (days): Project #: 24024154 SSOW#: Phone: # 0V Client Information (Sub Contract Lab) Karn/Weadock CCR Groundwater Monitoring Phone: 314-298-8566(Tel) 314-298-8757(Fax) Company: TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, Shipping/Receiving State, Zip: MO, 63045 Client Contact Earth City

Note: Since Jahoratory acrossite those one extrined to		
The control and a second of the control of the cont	s Environment lesting North Central, LLC places the ownership of method, analyte & accreding listed above for analysis/testis/matrix being analyzed, the samples must be shipped baing North Central, LLC attention immediately. If all requested accreditations are current to	abortation our subcontract laboratory or change, Eurorins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment Testing North Central, LLC aboratory or other instructions will be provided. Any changes to accreditation in the State of Origin isled above for analysis/fests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC aboratory or other instructions will be provided. Any changes to accreditation in the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately.
Possible Hazard Identification		Common results with LLC.
Unconfirmed	dupo	Sample Disposal ( A ree may be assessed if samples are retained longer than 1 month)
		Return To Client Disposal By Lab Archive Eco
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2 Specia	Requirements:
Crasto Vit Deliana de La La La		
7 Little Veillidaishea by:	Date:	

Company

Company Company Method of Shipment: Cooler Temperature(s) °C and Other Remarks: 13 Received by: Received by: eceived by Company Date/Time: taclex Custody Seal No.: Custody Seals Infact: elinquished by:

MW-15002 (240-184759-1) MW-15008 (240-184759-2) MW-15016 (240-184759-3) MW-15019 (240-184759-4)

TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at 5.0 pc/vL. TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.

5.0 pCi/L 5.0 pCi/L

× × × × ×

> × × × ×

×

Water Water Water Water Water Water

Eastern 12:40

15:01

5/1/23 5/1/23 5/1/23 5/1/23 5/1/23 5/1/23

Eastern 08:40

Eastern 13:43 Eastern Eastern

DUP-BACKGROUD (240-184759-5) -B-BACKGROUND (240-184759-6)

Eastern 12:40

S=grab) A-Air)
Preservation Code:

(W=water, S=solid, O=waste/oil, BT=Tissue,

Type (C=comp, G=grab) Sample

Sample

Sample Date

Sample Identification - Client ID (Lab ID)

0.

2

TVA protocol - Ra-226+228 action limit a

0

Special Instructions/Note:

# Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-184759-1

List Source: Eurofins St. Louis
List Number: 2
List Creation: 05/08/23 01:28 PM

Creator: Sharkey-Gonzalez, Briana L

QuestionAnswerCommentRadioactivity wasn't checked or is = background as measured by a survey meter.</td TrueThe cooler's custody seal, if present, is intact.TrueSample custody seals, if present, are intact.TrueThe cooler or samples do not appear to have been compromised or tampered with.TrueSamples were received on ice.N/ACooler Temperature is acceptable.TrueCooler Temperature is recorded.TrueCOC is present.TrueCOC is filled out in ink and legible.TrueCOC is filled out with all pertinent information.TrueIs the Field Sampler's name present on COC?True
meter. The cooler's custody seal, if present, is intact.  Sample custody seals, if present, are intact.  True The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Sample custody seals, if present, are intact.  True The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  N/A  Cooler Temperature is acceptable.  True Cooler Temperature is recorded.  True COC is present.  COC is filled out in ink and legible.  True COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
The cooler or samples do not appear to have been compromised or tampered with.  Samples were received on ice.  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.  Is the Field Sampler's name present on COC?  True
tampered with.  Samples were received on ice.  Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?
Cooler Temperature is acceptable.  Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Cooler Temperature is recorded.  COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is present.  COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is filled out in ink and legible.  COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
COC is filled out with all pertinent information.  Is the Field Sampler's name present on COC?  True
Is the Field Sampler's name present on COC?
·
There are no discrepancies between the containers received and the COC. True
Samples are received within Holding Time (excluding tests with immediate True HTs)
Sample containers have legible labels.
Containers are not broken or leaking.
Sample collection date/times are provided.
Appropriate sample containers are used.
Sample bottles are completely filled.
Sample Preservation Verified.
There is sufficient vol. for all requested analyses, incl. any requested  MS/MSDs  True
Containers requiring zero headspace have no headspace or bubble is True <6mm (1/4").
Multiphasic samples are not present.
Consultate de matematica en littina en comunacitina
Samples do not require splitting or compositing.  True

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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q2

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0406

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 05/08/2023 for the 2<sup>nd</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 03/10/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2023 Weadock Porewater Wells

**Date Received:** 5/10/2023 **Chemistry Project:** 23-0406

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0406-01	JCW-MW-18001	Groundwater	05/08/2023 06:50	JCW Solid Waste Disposal Area, Porewater
23-0406-02	JCW-MW-18004	Groundwater	05/09/2023 07:39	JCW Solid Waste Disposal Area, Porewater
23-0406-03	JCW-MW-18005	Groundwater	05/09/2023 09:54	JCW Solid Waste Disposal Area, Porewater
23-0406-04	JCW-MW-18006	Groundwater	05/09/2023 11:48	JCW Solid Waste Disposal Area, Porewater
23-0406-05	MW-50	Groundwater	05/08/2023 08:13	JCW Solid Waste Disposal Area, Porewater
23-0406-06	MW-51	Groundwater	05/08/2023 09:20	JCW Solid Waste Disposal Area, Porewater
23-0406-07	MW-52	Groundwater	05/08/2023 10:30	JCW Solid Waste Disposal Area, Porewater
23-0406-08	MW-53	Groundwater	05/08/2023 11:25	JCW Solid Waste Disposal Area, Porewater
23-0406-09	MW-53R	Groundwater	05/08/2023 13:00	JCW Solid Waste Disposal Area, Porewater
23-0406-10	MW-54R	Groundwater	05/09/2023 06:55	JCW Solid Waste Disposal Area, Porewater
23-0406-11	MW-55	Groundwater	05/09/2023 08:45	JCW Solid Waste Disposal Area, Porewater
23-0406-12	OW-57ROUT	Groundwater	05/09/2023 10:52	JCW Solid Waste Disposal Area, Porewater
23-0406-13	MW-58	Groundwater	05/09/2023 12:50	JCW Solid Waste Disposal Area, Porewater
23-0406-14	DUP-JCW-LF-01	Groundwater	05/08/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0406-15	DUP-JCW-LF-02	Groundwater	05/09/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0406-16	JCW-MW-18001 MS	Groundwater	05/09/2023 06:50	JCW Solid Waste Disposal Area, Porewater
23-0406-17	JCW-MW-18001 MSD	Groundwater	05/09/2023 06:50	JCW Solid Waste Disposal Area, Porewater
23-0406-18	FB-01	Water	05/09/2023 13:10	JCW Solid Waste Disposal Area, Porewater
23-0406-19	EB-01	Water	05/09/2023 13:10	JCW Solid Waste Disposal Area, Porewater



05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-01
 Collect Time:
 06:50 AM

Metals by EPA 6020B: CCR Rule Appe				Aliquot #: 23-0	406-01-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	50		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	1380		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	496000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	3		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	1180		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	83		ug/L	10.0	05/11/2023	AB23-0511-04
Magnesium	134000		ug/L	1000.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Potassium	16800		ug/L	100.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Sodium	220000		ug/L	1000.0	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	406-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F, S	504, Aqu	ieous	Aliquot #: 23-0	406-01-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	51100		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	1670000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-01-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



**Report Date:** 05/19/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-01
 Collect Time:
 06:50 AM

Alkalinity by SM 2320B		Aliquot #: 23-0	Analyst: DLS		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	734000	ug/L	10000.0	05/16/2023	AB23-0516-11
Alkalinity Bicarbonate	724000	ug/L	10000.0	05/16/2023	AB23-0516-11
Alkalinity Carbonate	ND	ug/L	10000.0	05/16/2023	AB23-0516-11

Report Date:

05/19/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 JCW-MW-18004
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-02
 Collect Time:
 07:39 AM

Metals by EPA 6020B: CCR Rule	Appendix III-IV 10	idi Wetals	- zp	Aliquot #: 23-0	406-02-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	28		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	227		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	265000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	2		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	67		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	42		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aq	ueous			Aliquot #: 23-0	406-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule A	nalyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	16800		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	722000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 254	0C			Aliquot #: 23-0	406-02-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1530		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 JCW-MW-18005
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-03
 Collect Time:
 09:54 AM

Metals by EPA 6020B: CCR Rule App	enaix III-IV 10	tai wetais	s ⊨xp	Aliquot #: 23-0	406-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	2		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	105		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	992		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	258000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	676		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	33		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	5		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	9		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	406-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	406-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	22300		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	422000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-03-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1190		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 JCW-MW-18006
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-04
 Collect Time:
 11:48 AM

Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	tal Metal	s Exp	Aliquot #: 23-0	406-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	23		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	464		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	2450		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	118000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	6890		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	45		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	4		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	1		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	2		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total,	Aqueous			Aliquot #: 23-0	406-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule	e Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	73600		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	34200		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2	2540C			Aliquot #: 23-0	406-04-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	734		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-50
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-05
 Collect Time:
 08:13 AM

Metals by EPA 6020B: CCR Rule	Appendix III-IV 10	itai wietais i	=xh	Aliquot #: 23-0	406-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Arsenic	2	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Barium	114	u	ıg/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Boron	1720	u	ıg/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND	u	ıg/L	0.2	05/11/2023	AB23-0511-04
Calcium	142000	u	ıg/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND	u	ıg/L	6.0	05/11/2023	AB23-0511-04
Copper	ND	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Iron	755	u	ıg/L	20.0	05/11/2023	AB23-0511-04
Lead	ND	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Lithium	55	u	ıg/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND	u	ıg/L	5.0	05/11/2023	AB23-0511-04
Nickel	3	u	ıg/L	2.0	05/11/2023	AB23-0511-04
Selenium	1	u	ıg/L	1.0	05/11/2023	AB23-0511-04
Silver	ND	u	ıg/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND	u	ıg/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND	u	ıg/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND	u	ıg/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Ac	ueous			Aliquot #: 23-0	406-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	u	ıg/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule A	nalyte List, Cl, F,	SO4, Aque	ous	Aliquot #: 23-0	406-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	31500	u	ıg/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ıg/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	314000	u	ıg/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 254	10C			Aliquot #: 23-0	406-05-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	878	n	ng/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-51
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-06
 Collect Time:
 09:20 AM

Metals by EPA 6020B: CCR Rule	Appendix III-IV TO	tai wetais Ex	кр	Aliquot #: 23-0	406-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag U	Inits	RL	Analysis Date	Tracking
Antimony	ND	ug/	/L	1.0	05/11/2023	AB23-0511-04
Arsenic	8	ug/	/L	1.0	05/11/2023	AB23-0511-04
Barium	180	ug/	/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND	ug/	/L	1.0	05/11/2023	AB23-0511-04
Boron	1230	ug	/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND	ug/	/L	0.2	05/11/2023	AB23-0511-04
Calcium	166000	ug/	/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND	ug/	/L	6.0	05/11/2023	AB23-0511-04
Copper	1	ug/	/L	1.0	05/11/2023	AB23-0511-04
Iron	450	ug/	/L	20.0	05/11/2023	AB23-0511-04
Lead	ND	ug/	/L	1.0	05/11/2023	AB23-0511-04
Lithium	40	ug	/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND	ug/	/L	5.0	05/11/2023	AB23-0511-04
Nickel	3	ug/	/L	2.0	05/11/2023	AB23-0511-04
Selenium	1	ug/	/L	1.0	05/11/2023	AB23-0511-04
Silver	ND	ug/	/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND	ug/	/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND	ug/	/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND	ug,	/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, A	queous			Aliquot #: 23-0	406-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag U	Inits	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	ug,	/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqueo	us	Aliquot #: 23-0	406-06-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag U	Inits	RL	Analysis Date	Tracking
Chloride	99900	ug	/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND	ug,		1000.0	05/12/2023	AB23-0511-22
Sulfate	356000	ug,		1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 25	40C			Aliquot #: 23-0	406-06-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag U	Inits	RL	Analysis Date	Tracking
Total Dissolved Solids	1240	mg	g/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-52
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-07
 Collect Time:
 10:30 AM

Metals by EPA 6020B: CCR Rule Appe	maix III-IV 10	tai wetais		Aliquot #: 23-0	406-07-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	95		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	993		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	217000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	1		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	2720		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	23		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	406-07-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	406-07-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	32400		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	581000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-07-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1430		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-53
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-08
 Collect Time:
 11:25 AM

Metals by EPA 6020B: CCR Rule Appe	maix III-IV 10	tai wetais		Aliquot #: 23-0	406-08-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	272		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	2620		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	104000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	569		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	34		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	406-08-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-08-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	56500		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	50800		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-08-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	613		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-53R
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-09
 Collect Time:
 01:00 PM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai wetals	s ⊨xp	Aliquot #: 23-0	406-09-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	14		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	174		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	2140		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	202000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	1		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	1410		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	56		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	1		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	406-09-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	406-09-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	30000		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	185000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-09-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1060		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-54R
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-10
 Collect Time:
 06:55 AM

Metals by EPA 6020B: CCR Rule Appe	HIGIX III-IV 10	idi Metals	- zp	Aliquot #: 23-0	406-10-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	98		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	5240		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	163000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	1		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	74		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	65		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	13		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	1		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	IS			Aliquot #: 23-0	406-10-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	406-10-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	46500		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	67200		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-10-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	759		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-55
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-11
 Collect Time:
 08:45 AM

Metals by EPA 6020B: CCR Rule Appe	naix III-IV 10	tai Metais	s Exp	Aliquot #: 23-0	406-11-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	44		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	267		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	1140		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	165000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	21600		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	24		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	30		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	5		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot #: 23-0	406-11-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	406-11-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Chloride	16900		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	208000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-11-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	929		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

Field Sample ID: OW-57ROUT Collect Date: 05/09/2023
Lab Sample ID: 23-0406-12 Collect Time: 10:52 AM

Metals by EPA 6020B: CCR Rule App	enaix III-IV 10	tai wetals	s ⊨xp	Aliquot #: 23-0	406-12-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	72		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	1740		ug/L	20.0	AB23-0511-04	
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	117000		ug/L	AB23-0511-04		
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	AB23-0511-04		
Copper	1		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	78		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	AB23-0511-04		
Lithium	23		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	6		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	15		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	406-12-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	rte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-12-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	64200		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate 80500			ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-12-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	743		mg/L	10.0	05/10/2023	AB23-0510-08

Report Date:

05/19/23



# **Laboratory Services**

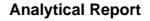
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 MW-58
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-13
 Collect Time:
 12:50 PM

Metals by EPA 6020B: CCR Rule Appe	indix III-IV 10	tai wetals	- xp	Aliquot #: 23-0	406-13-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	2		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	124		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	87		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	118000		ug/L	AB23-0511-04		
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	13600		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	05/11/2023	AB23-0511-04	
Lithium	20		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	3		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	3		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	406-13-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-13-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	472000		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	19000		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-13-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	109		mg/L	10.0	05/10/2023	AB23-0510-08



05/19/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 DUP-JCW-LF-01
 Collect Date:
 05/08/2023

 Lab Sample ID:
 23-0406-14
 Collect Time:
 12:00 AM

Metals by EPA 6020B: CCR Rule Appe	naix III-IV 10	tai Metais	Exp	Aliquot #: 23-0	406-14-C01-A01	Analyst: EB		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Arsenic	2		ug/L	1.0	05/11/2023	AB23-0511-04		
Barium	87		ug/L	5.0	05/11/2023	AB23-0511-04		
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Boron	1720		ug/L	20.0	05/11/2023	AB23-0511-04		
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04		
Calcium	144000		ug/L	1000.0	05/11/2023	AB23-0511-04		
Chromium	ND		ug/L	AB23-0511-04				
Cobalt	ND		ug/L 1.0 05/11/2023 <i>A</i> ug/L 6.0 05/11/2023 <i>A</i>					
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Iron	756		ug/L	20.0	05/11/2023	AB23-0511-04		
Lead	ND		ug/L	AB23-0511-04				
Lithium	54		ug/L	10.0	05/11/2023	AB23-0511-04		
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04		
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04		
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04		
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04		
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	406-14-C01-A02	Analyst: CLE		
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking		
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03		
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-14-C02-A01	Analyst: KDR		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Chloride	31900		ug/L	1000.0	05/12/2023	AB23-0511-22		
Fluoride	e ND		ug/L	1000.0	05/12/2023	AB23-0511-22		
Sulfate	316000		ug/L	1000.0	05/12/2023	AB23-0511-22		
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-14-C03-A01	Analyst: LMC		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Total Dissolved Solids	880		mg/L	10.0	05/10/2023	AB23-0510-08		



05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 DUP-JCW-LF-02
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-15
 Collect Time:
 12:00 AM

Metals by EPA 6020B: CCR Rule App	enaix III-IV 10	tai Metais	s Exp	Aliquot #: 23-0	406-15-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Arsenic	23		ug/L	1.0	05/11/2023	AB23-0511-04
Barium	465		ug/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Boron	2480		ug/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	120000		ug/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Iron	7210		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	AB23-0511-04		
Lithium	47		ug/L	10.0	05/11/2023	AB23-0511-04
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Selenium	2		ug/L	1.0	05/11/2023	AB23-0511-04
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04
Vanadium	3		ug/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	406-15-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Analy	rte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	406-15-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Chloride	76600		ug/L 1000.0		05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	36100		ug/L	1000.0	05/12/2023	AB23-0511-22
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	406-15-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	751		mg/L	10.0	05/10/2023	AB23-0510-08



05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

JCW Solid Waste Disposal Area, Porewater (395457) Sample Site: Laboratory Project: 23-0406

Field Sample ID: JCW-MW-18001 MS

Collect Date: 05/09/2023 Lab Sample ID: 23-0406-16 Collect Time: 06:50 AM

Metals by EPA 6020B: CCR F	Rule Appendix III-IV To	tal Metals l	Exp	Aliquot #: 23-0	406-16-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	109	9	%	1.0	05/11/2023	AB23-0511-04
Arsenic	105	9	%	1.0	05/11/2023	AB23-0511-04
Barium	103	9	%	5.0	05/11/2023	AB23-0511-04
Beryllium	91	9	%	1.0	05/11/2023	AB23-0511-04
Boron	109	9	%	20.0	05/11/2023	AB23-0511-04
Cadmium	98.4	9,	%	0.2	05/11/2023	AB23-0511-04
Calcium	109	9	%	1000.0	05/11/2023	AB23-0511-04
Chromium	94	9	%	1.0	05/11/2023	AB23-0511-04
Cobalt	90	9	%	6.0	05/11/2023	AB23-0511-04
Copper	90	9	%	1.0	05/11/2023	AB23-0511-04
Iron	91	9	%	20.0	05/11/2023	AB23-0511-04
Lead	89	9	%	1.0 05/11/2023		AB23-0511-04
Lithium	89	9	%	10.0	05/11/2023	AB23-0511-04
Molybdenum	117	9	%	5.0	05/11/2023	AB23-0511-04
Nickel	93	9	% 2.0		05/11/2023	AB23-0511-04
Selenium	101	9	%	1.0	05/11/2023	AB23-0511-04
Silver	88.5	9	%	0.2	05/11/2023	AB23-0511-04
Thallium	91	9	%	2.0	05/11/2023	AB23-0511-04
Vanadium	102	9	%	2.0	05/11/2023	AB23-0511-04
Zinc	96	9	%	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Tota	ıl, Aqueous			Aliquot #: 23-0	406-16-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	104	9,	%	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR R	ule Analyte List, Cl, F,	SO4, Aque	ous	Aliquot #: 23-0	406-16-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	101	9	%	1000.0	05/12/2023	AB23-0511-22
Fluoride	93	9	%	1000.0	05/12/2023	AB23-0511-22
Sulfate	107	9	%	1000.0	05/12/2023	AB23-0511-22



05/19/23

23-0406



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project:

 Field Sample ID:
 JCW-MW-18001 MSD
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-17
 Collect Time:
 06:50 AM

Metals by EPA 6020B: CCR Rule	406-17-C01-A01	Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	112		%	1.0	05/11/2023	AB23-0511-04
Arsenic	104	%		1.0	05/11/2023	AB23-0511-04
Barium	107	%		5.0	05/11/2023	AB23-0511-04
Beryllium	90		%	1.0	05/11/2023	AB23-0511-04
Boron	109		%	20.0	05/17/2023	AB23-0511-04
Cadmium	100		%	0.2	05/11/2023	AB23-0511-04
Calcium	110		%	1000.0	05/11/2023	AB23-0511-04
Chromium	90		%	1.0	05/11/2023	AB23-0511-04
Cobalt	89		%	6.0	05/11/2023	AB23-0511-04
Copper	88		%	1.0	05/11/2023	AB23-0511-04
Iron	94		%	20.0	05/11/2023	AB23-0511-04
Lead	90		%	1.0	05/11/2023	AB23-0511-04
Lithium	81		%	10.0	05/11/2023	AB23-0511-04
Molybdenum	116		%	5.0	05/11/2023	AB23-0511-04
Nickel	90		%	2.0	05/11/2023	AB23-0511-04
Selenium	98		%	1.0	05/11/2023	AB23-0511-04
Silver	91.2	,	%	0.2	05/11/2023	AB23-0511-04
Thallium	91	,	%	2.0	05/11/2023	AB23-0511-04
Vanadium	94	,	%	2.0	05/11/2023	AB23-0511-04
Zinc	94		%	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, Total, A	queous			Aliquot #: 23-0	406-17-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	93.0	,	%	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aque	eous	Aliquot #: 23-0	406-17-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	101		%	1000.0	05/12/2023	AB23-0511-22
Fluoride	92		%	1000.0	05/12/2023	AB23-0511-22
Sulfate	105		%	1000.0	05/12/2023	AB23-0511-22



05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 FB-01
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-18
 Collect Time:
 01:10 PM

Matrix: Water

Metals by EPA 6020B: CCR	Rule Appendix III-IV 10	iai wetais	cxh	Aliquot #: 23-0	406-18-C01-A01	Analyst: EE		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Antimony	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Arsenic	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Barium	ND		ug/L	5.0	05/11/2023	AB23-0511-04		
Beryllium	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Boron	ND		ug/L	20.0	05/11/2023	AB23-0511-04		
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04		
Calcium	ND		ug/L	1000.0	05/11/2023	AB23-0511-04		
Chromium	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Cobalt	ND		ug/L	6.0	05/11/2023	AB23-0511-04		
Copper	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Iron	ND		ug/L	20.0	05/11/2023	AB23-0511-04		
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Lithium	ND		ug/L	10.0	05/11/2023	AB23-0511-04		
Magnesium	ND		ug/L	1000.0	05/11/2023	AB23-0511-04		
Molybdenum	ND		ug/L	5.0	05/11/2023	AB23-0511-04		
Nickel	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Potassium	ND		ug/L	100.0	05/11/2023	AB23-0511-04		
Selenium	ND		ug/L	1.0	05/11/2023	AB23-0511-04		
Silver	ND		ug/L	0.2	05/11/2023	AB23-0511-04		
Sodium	ND		ug/L	1000.0	05/11/2023	AB23-0511-04		
Thallium	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Vanadium	ND		ug/L	2.0	05/11/2023	AB23-0511-04		
Zinc	ND		ug/L	10.0	05/11/2023	AB23-0511-04		
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot #: 23-0	406-18-C01-A02	Analyst: CLE		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03		
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot #: 23-0	406-18-C02-A01	Analyst: KDF		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking		
Chloride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22		
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22		
Sulfate	ND		ug/L	1000.0	05/12/2023	AB23-0511-22		



05/19/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0406

 Field Sample ID:
 EB-01
 Collect Date:
 05/09/2023

 Lab Sample ID:
 23-0406-19
 Collect Time:
 01:10 PM

Matrix: Water

Metals by EPA 6020B: CCR	K Kule Appendix III-IV 10	tai wetais E	xp	Aliquot #: 23-0	406-19-C01-A01	Analyst: EE
Parameter(s)	Result	Flag (	Jnits	RL	Analysis Date	Tracking
Antimony	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Arsenic	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Barium	ND	ug	/L	5.0	05/11/2023	AB23-0511-04
Beryllium	ium ND		/L	1.0	05/11/2023	AB23-0511-04
Boron	ND	ug	/L	20.0	05/11/2023	AB23-0511-04
Cadmium	ND	ug	/L	0.2	05/11/2023	AB23-0511-04
Calcium	ND	ug	/L	1000.0	05/11/2023	AB23-0511-04
Chromium	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Cobalt	ND	ug	/L	6.0	05/11/2023	AB23-0511-04
Copper	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Iron	ND	ug	/L	20.0	05/11/2023	AB23-0511-04
Lead	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Lithium	ND	ug	/L	10.0	05/11/2023	AB23-0511-04
Magnesium	ND	ug	ug/L 1000.0		05/11/2023	AB23-0511-04
Molybdenum	ND	ug	ug/L 5.0		05/11/2023	AB23-0511-04
Nickel	ND	ug	/L	2.0	05/11/2023	AB23-0511-04
Potassium	ND	ug	/L	100.0	05/11/2023	AB23-0511-04
Selenium	ND	ug	/L	1.0	05/11/2023	AB23-0511-04
Silver	ND	ug	/L	0.2	05/11/2023	AB23-0511-04
Sodium	ND	ug	/L	1000.0	05/11/2023	AB23-0511-04
Thallium	ND	ug	/L	2.0	05/11/2023	AB23-0511-04
Vanadium	ND	ug	/L	2.0	05/11/2023	AB23-0511-04
Zinc	ND	ug	/L	10.0	05/11/2023	AB23-0511-04
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot #: 23-0	406-19-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Mercury	ND	ug	/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqueo	us	Aliquot #: 23-0	406-19-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Chloride	ND	ug	/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND	ug	/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	ND	ug	/L	1000.0	05/12/2023	AB23-0511-22





**Report Date:** 05/19/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

# Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

TITLE: SAMPLE LOC	G-IN – SH	HPMENT	INSPECTION FORM	1	
Project Log-In Number: 2	3 - 6406	2			
Inspection Date: 5.10.	23		Inspection By: LMC		
Sample Origin/Project Name					
Shipment Delivered By: Ente					
				Airh	orne
			S USPS_	Allo	ome
			Shipping Form At	tached: Yes	No
Shipping Containers: Enter the				A 10 - 30 - 30 - 30 - 30 - 30 - 30 - 30 -	
					***
			Custom Case		e/Mailer
Loose/Unpackaged Co	ontainers	- O. Aller	Other		
Condition of Shipment: Enter	r the as-rece	ived condition	on of the shipment container		
Damaged Shipment O	bserved: No	one 🗶	Dented	Leal	cing
Other					
Shipment Security: Enter if a	ny of the sh	ipping contai	ners were opened before rec	ceipt.	
Shipping Containers R	Received: O	pened	Sealed *		
Enclosed Documents: Enter the					
CoC_X Wo	rk Request_		Air Data Sheet	Other	
Temperature of Containers:	Measure the	temperature	of several sample container	S.	
As-Received Tempera	ture Range	3-9-5.8	Samples Received or	Ice: Yes X	io
M&TE # and Expiration					
				6.77	
Number and Type of Contain	ers: Enter	the total num	ber of sample containers rec	ceived.	
Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL of 60mL)	2	_	-		
Quart/Liter (g/p)	_	_			-
9-oz (amber glass jar)		_		_	
2-oz (amber glass)		_		_	_
125 mL (plastic)	38	_		_	-
24 mL vial (glass)	75	-		-	
500 mL (plastic)	15				-

Other\_

# **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 1 of 2

SAMPLING SITE / CU	SAMPLING SITE / CUSTOMER:  Q2-2023 Weadock Porewater Wells			PROJECT NUMBER:	SAP CC or '	WO#:							A	NAI	YSI	SREC	QUES'	TED	O / PROTURES COME
Q2-2023 Weadock P	orewater Wells	3		23-0406	REQUESTE	R: Haro	ld l	Reg	ister									Needed)	QA REQUIREMENT:
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ ST	'ANDARD ⊠ C	THER_													□ NPDES  ☑ TNI
SEND REPORT TO:	Caleb Batts			email:	phone:														□ ISO 17025
COPY TO:	Harold Regi	ster		MATRIX CODES: GW = Groundwater OX = Other			CONTAINERS				S								☐ 10 CFR 50 APP, B
	TRC			WW = Wastewater SL = Sludg W = Water / Aqueous Liquid A = Air	ge		PRESERVATIVE			IVE	tals							☐ INTERNAL INFO	
LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = Wip O = Oil WT = Gen	e eral Waste	ral Waste				A H		Total Metals	Anions		Alkalinity				□ OTHER
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOT	None	HINO	H <sub>2</sub> SC	HCI	MeOH	Tota	Ani	TDS	Alk				REMARKS
23-0406-01	5/8/53	060	GW	JCW-MW-18001		5	4	1				x	x	x	x				
-02	5/9/53	0738	GW	JCW-MW-18004		5	4	1				x	x	x					
-03	51933	0954	GW	JCW-MW-18005		5	4	1				x	x	х					
-04	5/4/53	1148	GW	JCW-MW-18006		5	4	1				x	x	x	T		П		
-05	हांशेज	0613	GW	MW-50		5	4	1		İ		x	x	x					
-06	5/8/53	000	GW	MW-51		5	4	1				x	x	х					
-07	5/8/12	1030	GW	MW-52		5	4	1				x	x	x	14				
-08	5/8/03	1135	GW	MW-53		5	4	1				x	x	x					
-09	48123	1300	GW	MW-53R		5	4	1				x	x	x					
-10	5/9/03	CUST	GW	MW-54R		5	4	1				x	x	x					
-11	5/9/03	0847	GW	MW-55		5	4	1				x	x	x					
-12	5/4/53	1050	GW	OW-57ROUT		5	4	1				x	x	x					
RELINQUISHED BY:		5/	10	123 07/5	RECEIVED BY:							Re		d on I	ice? [	Yes 5.8	□ No _°C		E#: LS 27723  Due Date: 5-25-23

# **CHAIN OF CUSTODY**



## CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 2 of 2

SAM	PLING SITE / CU	ISTOMER:			PROJECT NUMBER:	SAP CC or WO#:  REQUESTER: Harold Register  ANALYSIS REQUESTER: (Attach List if More Space is						STED									
Q2-2	023 Weadock P	orewater Wells			23-0406	REQUESTER:	Haro	ld F	Regi	ster										).	QA REQUIREMENT:
SAM	PLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ ST	ANDARD ⊠ OTH	ER_														□ NPDES  ☑ TNI
SEN	D REPORT TO:	Caleb Batts			email:	phone:															□ ISO 17025
	COPY TO:	Harold Registe	er		MATRIX CODES: GW = Groundwater OX = Other			CC	NT	AIN	ER	s								1	☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wine		PRESERVATIVE					Metals			>					☐ INTERNAL INFO	
	LAB	SAMPLE COL	LECTION	RIX			TOTAL #							Suc		Alkalinity					□ OTHER
S	AMPLE ID	DATE	TIME	MATRIX			TOT	None	HNO H <sub>2</sub> SC		NaOH HCI MeOH		Total	Anions	TDS	Alk			2		REMARKS
	23-0406-13	5/9/03	D40	GW	MW-58		5	4	į				x	x	x				30		
	-14	5/8/33	_	GW	DUP-JCW-LF-01	5	4	1				x	x	x							
	-15	5/9/53		GW	DUP-JCW-LF-02 JCW-MW-18001 MS				1				x	x	x		Щ				
	-16	5/9/0	667	GW					1				x	x							
	-17	5/4/03	042	GW	JCW-MW-18001 MSD		4	3	1				x	x							
	-18	519153	13105	w	FB-01		2	1	1				x	x							
	-19	519153	1310		EB-01		2	1	1				x	x							
								H		+	+		-	-							
								+		+	+		H								
RELI	NQUISHED BY:	)			0215	RECEIVED BY:		1	11					DMM			,				
REN	NOUISHED BY:		1	DATE/	TIME: F	RECEIVED BY:							100					s □ N 3_°C			LS 27723

# **ANALYTICAL REPORT**

# PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Generated 6/9/2023 4:58:05 PM

# **JOB DESCRIPTION**

Karn/Weadock CCR JCW Landfill

# **JOB NUMBER**

240-185122-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



# **Eurofins Cleveland**

### **Job Notes**

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

# Authorization

Generated 6/9/2023 4:58:05 PM

Authorized for release by Kris Brooks, Project Manager II Kris.Brooks@et.eurofinsus.com (330)966-9790

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## **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

### 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
CFU Colony Forming Unit
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)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent
POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
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)

TNTC Too Numerous To Count

**Eurofins Cleveland** 

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### **Case Narrative**

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-185122-1

Job ID: 240-185122-1

**Laboratory: Eurofins Cleveland** 

Narrative

Job Narrative 240-185122-1

#### Receipt

The samples were received on 5/11/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.8°C, 2.4°C and 2.6°C

### **Gas Flow Proportional Counter**

Method 903.0: Radium-226 Prep Batch 160-612687The following samples were prepared at a reduced aliquot due to Matrix: MW-55 (240-185122-11) and MW-58 (240-185122-13). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method 903.0: Radium-226 Prep Batch 160-612689Insufficient sample volume was available to perform a sample duplicate for the following samples: JCW-MW-18001 (240-185122-1), JCW-MW-18004 (240-185122-2), JCW-MW-18005 (240-185122-3), JCW-MW-18006 (240-185122-4), MW-50 (240-185122-5), MW-51 (240-185122-6), MW-52 (240-185122-7), MW-53 (240-185122-8), MW-53R (240-185122-9), MW-54R (240-185122-10), OW-57ROUT (240-185122-12), DUP-01 (240-185122-14), EB-01 (240-185122-15) and DUP #02 (240-185122-16). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 903.0: Radium-226 batch 612687Based upon client request, 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. 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.JCW-MW-18001 (240-185122-1), JCW-MW-18004 (240-185122-2), JCW-MW-18005 (240-185122-3), JCW-MW-18006 (240-185122-4), MW-50 (240-185122-5), MW-51 (240-185122-6), MW-52 (240-185122-7), MW-53 (240-185122-8), MW-53R (240-185122-9), MW-54R (240-185122-10), MW-55 (240-185122-11), OW-57ROUT (240-185122-12), MW-58 (240-185122-13), DUP-01 (240-185122-14), EB-01 (240-185122-15), DUP #02 (240-185122-16), (LCS 160-612687/2-A), (LCSD 160-612687/3-A) and (MB 160-612687/1-A)

Method 904.0: Radium-228 Prep Batch 160-612689The following samples were prepared at a reduced aliquot due to Matrix: MW-55 (240-185122-11) and MW-58 (240-185122-13). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method 904.0: Radium-228 Prep Batch 160-612689Insufficient sample volume was available to perform a sample duplicate for the following samples: JCW-MW-18001 (240-185122-1), JCW-MW-18004 (240-185122-2), JCW-MW-18005 (240-185122-3), JCW-MW-18006 (240-185122-4), MW-50 (240-185122-5), MW-51 (240-185122-6), MW-52 (240-185122-7), MW-53 (240-185122-8), MW-53R (240-185122-9), MW-54R (240-185122-10), OW-57ROUT (240-185122-12), DUP-01 (240-185122-14), EB-01 (240-185122-15) and DUP #02 (240-185122-16). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 904.0: Radium-228 prep batch 160-612689: 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.JCW-MW-18001 (240-185122-1), JCW-MW-18004 (240-185122-2), JCW-MW-18005 (240-185122-3), JCW-MW-18006 (240-185122-4), MW-50 (240-185122-5), MW-51 (240-185122-6), MW-52 (240-185122-7), MW-53 (240-185122-8), MW-53R (240-185122-9), MW-54R (240-185122-10), MW-55 (240-185122-11), OW-57ROUT (240-185122-12), MW-58 (240-185122-13), DUP-01 (240-185122-14), EB-01 (240-185122-15), DUP #02 (240-185122-16), (LCS 160-612689/2-A), (LCSD 160-612689/3-A) and (MB 160-612689/1-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### Rad

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# **Method Summary**

Client: TRC Environmental Corporation.

Job ID: 240-185122-1 Project/Site: Karn/Weadock CCR JCW Landfill

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL

### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

### Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

**Eurofins Cleveland** 

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# **Sample Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

MW-54R

MW-55

MW-58

DUP-01

**DUP #02** 

EB-01

**OW-57ROUT** 

240-185122-10

240-185122-11

240-185122-12

240-185122-13

240-185122-14

240-185122-15

240-185122-16

Lab Sample ID **Client Sample ID** Matrix Collected Received 240-185122-1 JCW-MW-18001 05/08/23 06:10 05/11/23 08:00 Water 240-185122-2 JCW-MW-18004 Water 05/09/23 07:38 05/11/23 08:00 240-185122-3 JCW-MW-18005 Water 05/09/23 09:54 05/11/23 08:00 240-185122-4 JCW-MW-18006 Water 05/09/23 11:48 05/11/23 08:00 240-185122-5 MW-50 Water 05/08/23 08:13 05/11/23 08:00 MW-51 240-185122-6 Water 05/08/23 09:20 05/11/23 08:00 240-185122-7 MW-52 Water 05/08/23 10:30 05/11/23 08:00 MW-53 240-185122-8 Water 05/08/23 11:25 05/11/23 08:00 240-185122-9 MW-53R Water 05/08/23 13:00 05/11/23 08:00

05/09/23 06:55 05/11/23 08:00

05/09/23 08:45 05/11/23 08:00

05/09/23 10:52 05/11/23 08:00

05/09/23 12:50 05/11/23 08:00

05/08/23 00:00 05/11/23 08:00

05/09/23 13:10 05/11/23 08:00

05/09/23 00:00 05/11/23 08:00

Water

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Water

Job ID: 240-185122-1

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Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18001

Date Collected: 05/08/23 06:10 Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-1

**Matrix: Water** 

Job ID: 240-185122-1

Method: EPA 903.0	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0478	U	0.0714	0.0715	1.00	0.122	pCi/L	05/22/23 16:52	06/08/23 20:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.3		30 - 110					05/22/23 16:52	06/08/23 20:08	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.144	U	0.312	0.313	1.00	0.547	pCi/L	05/22/23 16:55	06/02/23 13:17	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.3		30 - 110					05/22/23 16:55	06/02/23 13:17	1
Y Carrier	82.6		30 - 110					05/22/23 16:55	06/02/23 13:17	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.192	U	0.320	0.321	5.00	0.547	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18004

Date Collected: 05/09/23 07:38 Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-2

**Matrix: Water** 

Job ID: 240-185122-1

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.104	U	0.0872	0.0877	1.00	0.131	pCi/L	05/22/23 16:52	06/08/23 20:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		30 - 110					05/22/23 16:52	06/08/23 20:08	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.154	U	0.293	0.293	1.00	0.600	pCi/L	05/22/23 16:55	06/02/23 13:17	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		30 - 110					05/22/23 16:55	06/02/23 13:17	1
Y Carrier	81.1		30 - 110					05/22/23 16:55	06/02/23 13:17	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.0500	U	0.306	0.306	5.00	0.600	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18005

Lab Sample ID: 240-185122-3 Date Collected: 05/09/23 09:54 **Matrix: Water** Date Received: 05/11/23 08:00

- Radium	-226 (GFP	C)							
	•	Count Uncert.	Total Uncert.						
Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
0.134		0.0923	0.0931	1.00	0.129	pCi/L	05/22/23 16:52	06/08/23 20:08	1
%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
88.5		30 - 110					05/22/23 16:52	06/08/23 20:08	1
_	Result 0.134 %Yield	Result Qualifier 0.134  %Yield Qualifier	Continuous   Continuous	Count   Total   Uncert.   Uncert.   Uncert.   Uncert.	Count   Total   Uncert.   Uncert.   Uncert.   Uncert.   Uncert.   O.134   O.0923   O.0931   Count   Total   Uncert.   Count   Total   Uncert.   Uncert.   Count   Uncert.   Uncert.   Uncert.   Count   Uncert.   Uncert.   Count   Uncert.   Count   Uncert.   Count   C	Count Uncert. Uncert.   Variety   Count Uncert. Uncert.   Vicert.			
Method: EPA 90	4.0 - Radium	-228 (GFP	C)						
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			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed
Radium-228	0.197	U	0.334	0.335	1.00	0.573	pCi/L	05/22/23 16:55	06/02/23 13:18
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed
Ba Carrier	88.5		30 - 110					05/22/23 16:55	06/02/23 13:18
Y Carrier	86.7		30 - 110					05/22/23 16:55	06/02/23 13:18

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226	0.331	U	0.347	0.348	5.00	0.573	pCi/L		06/09/23 12:39	1

Job ID: 240-185122-1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18006

Lab Sample ID: 240-185122-4 Date Collected: 05/09/23 11:48 **Matrix: Water** 

Date Received: 05/11/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.337		0.121	0.124	1.00	0.124	pCi/L	05/22/23 16:52	06/08/23 20:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.5		30 - 110					05/22/23 16:52	06/08/23 20:09	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.746	<u> </u>	0.428	0.433	1.00	0.622	pCi/L	05/22/23 16:55	06/02/23 13:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.5		30 - 110					05/22/23 16:55	06/02/23 13:18	1
Y Carrier	81.1		30 - 110					05/22/23 16:55	06/02/23 13:18	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.08		0.445	0.450	5.00	0.622	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-50** Lab Sample ID: 240-185122-5 Date Collected: 05/08/23 08:13

**Matrix: Water** 

Date Received: 05/11/23 08:00

) - Radium	-226 (GFP	C)							
		Count	Total						
		Uncert.	Uncert.						
Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
0.155		0.0886	0.0897	1.00	0.110	pCi/L	05/22/23 16:52	06/08/23 20:10	1
%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
90.8		30 - 110					05/22/23 16:52	06/08/23 20:10	1
	Result 0.155	Result Qualifier  0.155  %Yield Qualifier	Continuation   Con	Count   Total   Uncert.   Uncert.   (2σ+/-)   Count   Total   Uncert.   Uncert.   Uncert.   Uncert.	Count   Total   Uncert.   Uncert.   Uncert.   Count   Uncert.   Count   Total   Uncert.   Uncert.   Uncert.     O.155   Uncert.   O.0886   O.0897   O.100   O.110   Count   Total   Uncert.   Uncert.   Uncert.     Result   Qualifier   (2σ+/-)   (2σ+/-)   RL   MDC   Unit   Prepared     0.155   0.0886   0.0897   1.00   0.110   pCi/L   05/22/23 16:52	Count   Total   Uncert.   Uncert.   Uncert.   Uncert.   Uncert.   Count   Uncert.   Uncert.   Count   Uncert.   Uncert.   Count   Uncert.   Count   Uncert.   Uncert.   Count   Unit   Prepared   Analyzed   Analyzed   O.155   O.0886   O.0897   O.110   O			

Method. Li A 30	4.0 - Radium	-220 (GFP)	<b>U</b> )							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.686		0.408	0.413	1.00	0.590	pCi/L	05/22/23 16:55	06/02/23 13:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.8		30 - 110					05/22/23 16:55	06/02/23 13:18	1
Y Carrier	80.7		30 - 110					05/22/23 16:55	06/02/23 13:18	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	nd Radiur	n-228				
	_		Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.841		0.418	0.423	5.00	0.590	pCi/L		06/09/23 12:39	1

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Client: TRC Environmental Corporation.

Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: MW-51 Lab Sample ID: 240-185122-6

Matrix: Water

Date Collected: 05/08/23 09:20 Date Received: 05/11/23 08:00

Method: EPA 903	.0 - Radium	-226 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.143		0.0942	0.0951	1.00	0.129	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					05/22/23 16:52	06/08/23 22:39	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.01		0.462	0.471	1.00	0.633	pCi/L	05/22/23 16:55	06/02/23 13:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					05/22/23 16:55	06/02/23 13:19	1
Y Carrier	83.0		30 - 110					05/22/23 16:55	06/02/23 13:19	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.15		0.472	0.481	5.00	0.633	pCi/L		06/09/23 12:39	1

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Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-52** Lab Sample ID: 240-185122-7

Date Collected: 05/08/23 10:30 **Matrix: Water** Date Received: 05/11/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.124	U	0.0902	0.0909	1.00	0.128	pCi/L	05/22/23 16:52	06/08/23 20:10	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.8		30 - 110					05/22/23 16:52	06/08/23 20:10	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.302	U	0.360	0.361	1.00	0.594	pCi/L	05/22/23 16:55	06/02/23 13:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.8		30 - 110					05/22/23 16:55	06/02/23 13:19	1
Y Carrier	82.6		30 - 110					05/22/23 16:55	06/02/23 13:19	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226	0.425	U	0.371	0.372	5.00	0.594	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-53** Lab Sample ID: 240-185122-8

Date Collected: 05/08/23 11:25 **Matrix: Water** Date Received: 05/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.198	·	0.103	0.104	1.00	0.129	pCi/L	05/22/23 16:52	06/08/23 22:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					05/22/23 16:52	06/08/23 22:36	1

	4.0 - Radium	•	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.502	U	0.350	0.353	1.00	0.518	pCi/L	05/22/23 16:55	06/02/23 13:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					05/22/23 16:55	06/02/23 13:19	1
Y Carrier	82.2		30 - 110					05/22/23 16:55	06/02/23 13:19	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.700		0.365	0.368	5.00	0.518	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-53R** 

Lab Sample ID: 240-185122-9 Date Collected: 05/08/23 13:00

**Matrix: Water** 

Date Received: 05/11/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.275		0.108	0.111	1.00	0.110	pCi/L	05/22/23 16:52	06/08/23 22:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.5		30 - 110					05/22/23 16:52	06/08/23 22:37	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count Uncert.	Total Uncert.						
			Officert.	Officert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.490		0.331	0.334	1.00	0.487	pCi/L	05/22/23 16:55	06/02/23 13:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.5		30 - 110					05/22/23 16:55	06/02/23 13:19	1
Y Carrier	85.2		30 - 110					05/22/23 16:55	06/02/23 13:19	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.765		0.348	0.352	5.00	0.487	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-54R** Lab Sample ID: 240-185122-10

**Matrix: Water** 

Date Collected: 05/09/23 06:55 Date Received: 05/11/23 08:00

Method: EPA 903.0	- Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.101	U	0.0934	0.0938	1.00	0.141	pCi/L	05/22/23 16:52	06/08/23 22:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.8		30 - 110					05/22/23 16:52	06/08/23 22:37	1

		-228 (GFP	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.00358	U	0.444	0.444	1.00	0.836	pCi/L	05/22/23 16:55	06/02/23 13:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.8		30 - 110					05/22/23 16:55	06/02/23 13:19	1
Y Carrier	74.8		30 - 110					05/22/23 16:55	06/02/23 13:19	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.105	U	0.454	0.454	5.00	0.836	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-55** Lab Sample ID: 240-185122-11

Date Collected: 05/09/23 08:45 **Matrix: Water** Date Received: 05/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.276		0.141	0.143	1.00	0.168	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	78.8		30 - 110					05/22/23 16:52	06/08/23 22:39	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.548	U	0.566	0.568	1.00	0.916	pCi/L	05/22/23 16:55	06/02/23 13:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	78.8		30 - 110					05/22/23 16:55	06/02/23 13:11	1
Y Carrier	83.4		30 - 110					05/22/23 16:55	06/02/23 13:11	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiun	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.824	U	0.583	0.586	5.00	0.916	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: OW-57ROUT** 

Lab Sample ID: 240-185122-12 Date Collected: 05/09/23 10:52

**Matrix: Water** 

Date Received: 05/11/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.149		0.0966	0.0975	1.00	0.123	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.8		30 - 110					05/22/23 16:52	06/08/23 22:39	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.428	U	0.416	0.418	1.00	0.663	pCi/L	05/22/23 16:55	06/02/23 13:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.8		30 - 110					05/22/23 16:55	06/02/23 13:11	1
Y Carrier	80.4		30 - 110					05/22/23 16:55	06/02/23 13:11	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	ium-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.578	U	0.427	0.429	5.00	0.663	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-58** Lab Sample ID: 240-185122-13

Date Collected: 05/09/23 12:50 **Matrix: Water** Date Received: 05/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.456		0.157	0.162	1.00	0.129	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.5		30 - 110					05/22/23 16:52	06/08/23 22:39	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.102	U	0.524	0.524	1.00	0.948	pCi/L	05/22/23 16:55	06/02/23 13:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.5		30 - 110					05/22/23 16:55	06/02/23 13:11	1
Y Carrier	77.0		30 - 110					05/22/23 16:55	06/02/23 13:11	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.558	U	0.547	0.548	5.00	0.948	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: DUP-01** Lab Sample ID: 240-185122-14

Date Collected: 05/08/23 00:00 **Matrix: Water** Date Received: 05/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.144	·	0.0844	0.0854	1.00	0.104	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		30 - 110					05/22/23 16:52	06/08/23 22:39	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
		•	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.490	U	0.391	0.394	1.00	0.606	pCi/L	05/22/23 16:55	06/02/23 13:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		30 - 110					05/22/23 16:55	06/02/23 13:11	1
Y Carrier	78.1		30 - 110					05/22/23 16:55	06/02/23 13:11	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	nd Radiui	m-228				
	_		Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.633		0.400	0.403	5.00	0.606	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: EB-01** Lab Sample ID: 240-185122-15 Date Collected: 05/09/23 13:10

**Matrix: Water** 

Date Received: 05/11/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0280	U	0.0661	0.0662	1.00	0.153	pCi/L	05/22/23 16:52	06/08/23 22:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.5		30 - 110					05/22/23 16:52	06/08/23 22:39	1

Method: EPA 90	4.0 - Radium	-228 (GFP	•							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.101	U	0.392	0.392	1.00	0.709	pCi/L	05/22/23 16:55	06/02/23 13:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.5		30 - 110					05/22/23 16:55	06/02/23 13:12	1
Y Carrier	84.5		30 - 110					05/22/23 16:55	06/02/23 13:12	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0730	U	0.398	0.398	5.00	0.709	pCi/L		06/09/23 12:39	1

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: DUP #02 Lab Sample ID: 240-185122-16 Date Collected: 05/09/23 00:00

**Matrix: Water** 

Date Received: 05/11/23 08:00

Method: EPA 903.0	0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0658	U	0.110	0.110	1.00	0.192	pCi/L	05/22/23 16:52	06/08/23 22:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	59.3		30 - 110					05/22/23 16:52	06/08/23 22:40	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.242	U	0.469	0.469	1.00	0.816	pCi/L	05/22/23 16:55	06/02/23 13:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	59.3		30 - 110					05/22/23 16:55	06/02/23 13:12	1
Y Carrier	84.1		30 - 110					05/22/23 16:55	06/02/23 13:12	1

Method: TAL-STL R	a226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.308	U	0.482	0.482	5.00	0.816	pCi/L		06/09/23 12:39	1

#### **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Job ID: 240-185122-1 Project/Site: Karn/Weadock CCR JCW Landfill

Method: 903.0 - Radium-226 (GFPC)

**Matrix: Water Prep Type: Total/NA** 

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-185122-1	JCW-MW-18001	95.3	
240-185122-2	JCW-MW-18004	88.3	
240-185122-3	JCW-MW-18005	88.5	
240-185122-4	JCW-MW-18006	93.5	
240-185122-5	MW-50	90.8	
240-185122-6	MW-51	88.5	
240-185122-7	MW-52	87.8	
240-185122-8	MW-53	88.8	
240-185122-9	MW-53R	92.5	
240-185122-10	MW-54R	68.8	
240-185122-11	MW-55	78.8	
240-185122-12	OW-57ROUT	70.8	
240-185122-13	MW-58	83.5	
240-185122-14	DUP-01	90.3	
240-185122-15	EB-01	69.5	
240-185122-16	DUP #02	59.3	
LCS 160-612687/2-A	Lab Control Sample	80.3	
LCSD 160-612687/3-A	Lab Control Sample Dup	83.3	
MB 160-612687/1-A	Method Blank	80.5	
Tracer/Carrier Legend	1		

Method: 904.0 - Radium-228 (GFPC)

**Matrix: Water** Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-185122-1	JCW-MW-18001	95.3	82.6	
240-185122-2	JCW-MW-18004	88.3	81.1	
240-185122-3	JCW-MW-18005	88.5	86.7	
240-185122-4	JCW-MW-18006	93.5	81.1	
240-185122-5	MW-50	90.8	80.7	
240-185122-6	MW-51	88.5	83.0	
240-185122-7	MW-52	87.8	82.6	
240-185122-8	MW-53	88.8	82.2	
240-185122-9	MW-53R	92.5	85.2	
240-185122-10	MW-54R	68.8	74.8	
240-185122-11	MW-55	78.8	83.4	
240-185122-12	OW-57ROUT	70.8	80.4	
240-185122-13	MW-58	83.5	77.0	
240-185122-14	DUP-01	90.3	78.1	
240-185122-15	EB-01	69.5	84.5	
240-185122-16	DUP #02	59.3	84.1	
LCS 160-612689/2-A	Lab Control Sample	80.3	83.4	
LCSD 160-612689/3-A	Lab Control Sample Dup	83.3	81.1	
MB 160-612689/1-A	Method Blank	80.5	82.2	

Ba = Ba Carrier

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## **Tracer/Carrier Summary**

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Y = Y Carrier

Job ID: 240-185122-1

3

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5

7

8

9

11

1

Job ID: 240-185122-1

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-612687/1-A **Matrix: Water** 

Analysis Batch: 615045

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 612687

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Analyzed Dil Fac Radium-226 0.02458 U 0.0797 0.0798 1.00 0.148 pCi/L 05/22/23 16:52 06/08/23 20:08

Total

Count

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 80.5 30 - 110 05/22/23 16:52 06/08/23 20:08

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 612687

Lab Sample ID: LCS 160-612687/2-A **Matrix: Water** 

Analysis Batch: 615045

Total LCS LCS %Rec **Spike** Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL %Rec Limits MDC Unit Radium-226 11.3 10.47 1.13 1.00 0.153 pCi/L 92 75 - 125

LCS LCS Carrier %Yield Qualifier

Limits Ba Carrier 80.3 30 - 110

Lab Sample ID: LCSD 160-612687/3-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

**Analysis Batch: 615045** 

Prep Type: Total/NA

Prep Batch: 612687

LCSD LCSD

Count

0.409

%Rec **RER** Spike Uncert. %Rec Added  $(2\sigma + / -)$ RL **MDC** Unit Limits Analyte Result Qual RER Limit Radium-226 11.3 1.13 1.00 0.153 pCi/L 93 75 - 125 0.02 10.53

Total

LCSD LCSD %Yield Qualifier

Carrier Limits Ba Carrier 83.3 30 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-612689/1-A

**Matrix: Water** 

Radium-228

**Analysis Batch: 614271** 

Client Sample ID: Method Blank

05/22/23 16:55 06/02/23 13:16

Prep Type: Total/NA Prep Batch: 612689

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed

1.00

pCi/L

0.681

Total

0.410

MB MB

0.3164

Ū

Carrier %Yield Qualifier Limits Dil Fac Prepared Analyzed Ba Carrier 80.5 30 - 110 05/22/23 16:55 06/02/23 13:16 30 - 110 Y Carrier 82.2 05/22/23 16:55 06/02/23 13:16

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#### **QC Sample Results**

Client: TRC Environmental Corporation. Job ID: 240-185122-1

Project/Site: Karn/Weadock CCR JCW Landfill

Method: 904.0 - Radium-228 (GFPC) (Continued)

8.15

9.544

Lab Sample ID: LCS 160-612689/2-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

**Analysis Batch: 614271** 

**Prep Batch: 612689** Total LCS LCS %Rec Spike Uncert. Added Result Qual  $(2\sigma + / -)$ RL**MDC** Unit %Rec Limits

1.00

0.750 pCi/L

117

75 - 125

1.40

LCS LCS %Yield Qualifier Carrier Limits Ba Carrier 80.3 30 - 110 Y Carrier 83.4 30 - 110

Lab Sample ID: LCSD 160-612689/3-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

Analyte

Radium-228

**Analysis Batch: 614271** 

**Prep Batch: 612689** Total **Spike** LCSD LCSD Uncert. %Rec **RER** %Rec Analyte Added Result Qual  $(2\sigma + / -)$ RL **MDC** Unit Limits RER Limit Radium-228 1.00 0.597 pCi/L 8.15 8.671 1.29 106 75 - 125 0.32

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 30 - 110 83.3 30 - 110 Y Carrier 81.1

Prep Type: Total/NA

Prep Type: Total/NA

## **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

#### **Prep Batch: 612687**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-185122-1	JCW-MW-18001	Total/NA	Water	PrecSep STD	
240-185122-2	JCW-MW-18004	Total/NA	Water	PrecSep STD	
240-185122-3	JCW-MW-18005	Total/NA	Water	PrecSep STD	
240-185122-4	JCW-MW-18006	Total/NA	Water	PrecSep STD	
240-185122-5	MW-50	Total/NA	Water	PrecSep STD	
240-185122-6	MW-51	Total/NA	Water	PrecSep STD	
240-185122-7	MW-52	Total/NA	Water	PrecSep STD	
240-185122-8	MW-53	Total/NA	Water	PrecSep STD	
240-185122-9	MW-53R	Total/NA	Water	PrecSep STD	
240-185122-10	MW-54R	Total/NA	Water	PrecSep STD	
240-185122-11	MW-55	Total/NA	Water	PrecSep STD	
240-185122-12	OW-57ROUT	Total/NA	Water	PrecSep STD	
240-185122-13	MW-58	Total/NA	Water	PrecSep STD	
240-185122-14	DUP-01	Total/NA	Water	PrecSep STD	
240-185122-15	EB-01	Total/NA	Water	PrecSep STD	
240-185122-16	DUP #02	Total/NA	Water	PrecSep STD	
MB 160-612687/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-612687/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-612687/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

#### **Prep Batch: 612689**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-185122-1	JCW-MW-18001	Total/NA	Water	PrecSep_0	
240-185122-2	JCW-MW-18004	Total/NA	Water	PrecSep_0	
240-185122-3	JCW-MW-18005	Total/NA	Water	PrecSep_0	
240-185122-4	JCW-MW-18006	Total/NA	Water	PrecSep_0	
240-185122-5	MW-50	Total/NA	Water	PrecSep_0	
240-185122-6	MW-51	Total/NA	Water	PrecSep_0	
240-185122-7	MW-52	Total/NA	Water	PrecSep_0	
240-185122-8	MW-53	Total/NA	Water	PrecSep_0	
240-185122-9	MW-53R	Total/NA	Water	PrecSep_0	
240-185122-10	MW-54R	Total/NA	Water	PrecSep_0	
240-185122-11	MW-55	Total/NA	Water	PrecSep_0	
240-185122-12	OW-57ROUT	Total/NA	Water	PrecSep_0	
240-185122-13	MW-58	Total/NA	Water	PrecSep_0	
240-185122-14	DUP-01	Total/NA	Water	PrecSep_0	
240-185122-15	EB-01	Total/NA	Water	PrecSep_0	
240-185122-16	DUP #02	Total/NA	Water	PrecSep_0	
MB 160-612689/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-612689/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-612689/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep 0	

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Job ID: 240-185122-1

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-185122-1

**Matrix: Water** 

Job ID: 240-185122-1

Client Sample ID: JCW-MW-18001

Date Collected: 05/08/23 06:10 Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 20:08
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:17
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Client Sample ID: JCW-MW-18004 Lab Sample ID: 240-185122-2

Date Collected: 05/09/23 07:38 **Matrix: Water** 

Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 20:08
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:17
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-3 Client Sample ID: JCW-MW-18005

Date Collected: 05/09/23 09:54

Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 20:08
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:18
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Client Sample ID: JCW-MW-18006 Lab Sample ID: 240-185122-4

Date Collected: 05/09/23 11:48 Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 20:09
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:18
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

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**Matrix: Water** 

**Matrix: Water** 

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-185122-5

**Matrix: Water** 

Job ID: 240-185122-1

Date Collected: 05/08/23 08:13 Date Received: 05/11/23 08:00

Client Sample ID: MW-50

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 20:10
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:18
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-6

**Matrix: Water** 

Date Collected: 05/08/23 09:20 Date Received: 05/11/23 08:00

**Client Sample ID: MW-51** 

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:19
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-7 **Client Sample ID: MW-52** 

Date Collected: 05/08/23 10:30 **Matrix: Water** 

Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 20:10
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:19
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-8 **Client Sample ID: MW-53 Matrix: Water** 

Date Collected: 05/08/23 11:25 Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:36
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:19
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

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**Eurofins Cleveland** 

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-185122-9

**Matrix: Water** 

Job ID: 240-185122-1

Client Sample ID: MW-53R Date Collected: 05/08/23 13:00 Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:37
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:19
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39
- Client Sam	ple ID: MW	/-54R					Lab S	Sample ID: 2

Lab Sample ID: 240-185122-10

Lab Sample ID: 240-185122-12

**Matrix: Water** 

Date Collected: 05/09/23 06:55 Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared or Analyzed 05/22/23 16:52 06/08/23 22:37
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:37
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614271	SCB	EET SL	06/02/23 13:19
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-11 **Client Sample ID: MW-55** 

**Matrix: Water** 

**Matrix: Water** 

Date Collected: 05/09/23 08:45 Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:11
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

**Client Sample ID: OW-57ROUT** 

Date Collected: 05/09/23 10:52

Date Received: 05/11/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:11
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

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Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-185122-13

**Matrix: Water** 

Job ID: 240-185122-1

Date Collected: 05/09/23 12:50 Date Received: 05/11/23 08:00

**Client Sample ID: MW-58** 

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:11
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

**Client Sample ID: DUP-01** Lab Sample ID: 240-185122-14

Date Collected: 05/08/23 00:00 **Matrix: Water** Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:11
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Lab Sample ID: 240-185122-15 **Client Sample ID: EB-01** 

Date Collected: 05/09/23 13:10 **Matrix: Water** Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	614897	FLC	EET SL	06/08/23 22:39
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:12
Total/NA	Analysis	Ra226 Ra228		1	615288	EMH	EET SL	06/09/23 12:39

Client Sample ID: DUP #02 Lab Sample ID: 240-185122-16

Date Collected: 05/09/23 00:00 Date Received: 05/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			612687	KAC	EET SL	05/22/23 16:52
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 22:40
Total/NA	Prep	PrecSep_0			612689	KAC	EET SL	05/22/23 16:55
Total/NA	Analysis	904.0		1	614273	FLC	EET SL	06/02/23 13:12
Total/NA	Analysis	Ra226_Ra228		1	615288	EMH	EET SL	06/09/23 12:39

**Laboratory References:** 

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

**Eurofins Cleveland** 

**Matrix: Water** 

## **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

#### Job ID: 240-185122-1

#### **Laboratory: Eurofins St. Louis**

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-23
MI - RadChem Recognition	State	9005	06-30-23
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-23
New Jersey	NELAP	MO002	06-30-23
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-23
Texas	NELAP	T104704193	07-31-23
US Fish & Wildlife	US Federal Programs	058448	07-31-23
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

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 $<sup>^{\</sup>star} \ \text{Accreditation/Certification renewal pending - accreditation/certification considered valid}.$ 

**Eurofins Cleveland** 

Phone: 330-497-9396 Fax: 330-497-0772 180 S. Van Buren Avenue Barberton, OH 44203

Client Information

acob Krenz

**FRC Environmental Corporation** 

1540 Eisenhower Place

Phone: 734-971-7080(Tel) 734-971-9022(Fax)

State, Zip. MI, 48108-7080

Ann Arbor

Project Name Karn/Weadock CCR JCW Lanfill

JKrenz@trccompanies.com

Skin Irritant Deliverable Requested: I, II, III, IV, Other (specify) Flammable Possible Hazard Identification Empty Kit Relinquished by Sample Identification Non-Hazard JCW-MW-18006 CW-MW-18004 ICW-MW-18005 CW-MW-18001 inquished by: MW-53R MW-54R MW-50 MW-52 MW-53 MW-51 MW-55 Page 34 of 40

Ninquished by

Custody Seal No.

Custody Seals Intact:

Δ Yes Δ No

MICHIGAN Seurofins Environment Testing	Carrier Tracking No(s): COC No 240-107205-29048.2	State of Origin Page: Page 2 of 2	Requested		A HCL N. Towarie B. NaOH N. None B. NaOH O. ASNAOZ			I - Ice J - DI Water		Other:	redmuN Isso	Special instructions/Note:					d			Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	Disposal By Lab Archive For Months	Method of Shipment:	Use Date/Times/10/33 Company E.N.			Other Demodre:
in of Custody Record	Rooks, Kris M	256	PWSID			A Yes A No			98 Or	SD (Y	Sample Type (C=comp,	Preservation Code:	C Water 2017	Water V 7	V water	SiC C Water MA TH	Water MAK			Sample Disposal ( A fee	Radiological Disc	Time:	OSIT Company C Received by M	33 Company Received by Commany		F. Colar Temparation 19
MICHIO 190	1857	505		Due Date Requested:	TAT Requested (days):		PO# 178828		Project # 24024154	SSOW#:	v v	Allilla Data Data	5/4/2			181 8137	56/23				Skin Irritant Poison B Unknown [her (specify)	Date:	Date/Time:	2/10		GOI NO.
Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772	Client Information	Client Contact: Jacob Krenz	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 JKrenz@trccompanies.com	Project Name Karn/Weadock CCR JCW Lanfill	Site	Sample Identification		OW-57ROUT	MW-58	DUP-01	EB-01	Durtor			Possible Hazard Identification	§ .	Empty Kit Relinquished by:	Relinquished by:	Relinquished by:	Custody Soals Intact   Custody Soal No	

1921
Eurofins - Canton Sample Receipt Form/Narrative Login # : 100
Barberton Facility
Client Site Name Cooler unpacked by:
Cooler Received on 5-11-23 Opened on 5-11-23 Jany Ruy 9
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # 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# 22 (CF +0.0 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity leach Yes No  Tests that are not
-Were the seals on the outside of the cooler(s) signed & dated?  Yes No NA checked for pH by
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  Yes Receiving:
-Were tamper/custody seals intact and uncompromised?  2. Shippers' making alignetic shape of the condenses?  VOAs
5. Shippers packing ship attached to the cooler(s)?
<ul> <li>5. Were the custody papers relinquished &amp; signed in the appropriate place?</li> <li>6. Was/were the person(s) who collected the samples clearly identified on the COC?</li> <li>Yes No</li> </ul>
7. Did all bottles arrive in good condition (Unbroken)?
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC?  (Yes) No
9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y/N)?
10. Were correct bottle(s) used for the test(s) indicated?  Yes No
11. Sufficient quantity received to perform indicated analyses?
12. Are these work share samples and all listed on the COC?  Yes No
If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt?  Yes No NA pH Strip Lot# HC208070
14. Were VOAs on the COC?
15. Were air bubbles >6 mm in any VOA vials? Larger than this. Yes No. (NA)
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes (No
17. Was a LL Hg or Me Hg trip blank present? Yes No
Control 1934
Contacted PM by via Verbal Voice Mail Other
Concerning
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES  additional next page  Samples processed by:
16. CHAIN OF COSTODY & SAMPLE DISCREPANCIES & additional next page Samples processed by
10 CANCELE COMPUTION
19. 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)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s) were further preserved in the laboratory.  Time preserved: Preservative(s) added/Lot number(s):
VOA Sample Preservation - Date/Time VOAs Frozen:

#### Login Container Summary Report 240-185122

185122

Temperature readings: Container Preservative Client Sample ID Container Type pН Temp Added (mls) Lot # Lab ID Plastic 1 liter - Nitric Acid JCW-MW-18001 240-185122-A-1 <2 Plastic 1 liter - Nitric Acid <2 JCW-MW-18001 240-185122-B-1 JCW-MW-18004 240-185122-A-2 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 JCW-MW-18004 240-185122-B-2 JCW-MW-18005 240-185122-A-3 Plastic 1 liter - Nitric Acid <2 JCW-MW-18005 240-185122-B-3 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 JCW-MW-18006 240-185122-A-4 JCW-MW-18006 240-185122-B-4 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid MW-50 240-185122-A-5 <2 MW-50 240-185122-B-5 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 MW-51 240-185122-A-6 MW-51 240-185122-B-6 Plastic 1 liter - Nitric Acid <2 MW-52 240-185122-A-7 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 MW-52 240-185122-B-7 Plastic 1 liter - Nitric Acid <2 MW-53 240-185122-A-8 MW-53 240-185122-B-8 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 MW-53R 240-185122-A-9 240-185122-B-9 Plastic 1 liter - Nitric Acid <2 MW-53R <2 MW-54R 240-185122-A-10 Plastic 1 liter - Nitric Acid MW-54R 240-185122-B-10 Plastic 1 liter - Nitric Acid <2 <2 Plastic 1 liter - Nitric Acid MW-55 240-185122-A-11 Plastic 1 liter - Nitric Acid <2 MW-55 240-185122-B-11 **OW-57ROUT** 240-185122-A-12 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 **OW-57ROUT** 240-185122-B-12 Plastic 1 liter - Nitric Acid <2 MW-58 240-185122-A-13 MW-58 240-185122-B-13 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 DUP-01 240-185122-A-14 DUP-01 240-185122-B-14 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid EB-01 240-185122-A-15 <2 EB-01 240-185122-B-15 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid <2 **DUP#02** 240-185122-A-16 **DUP#02** 240-185122-B-16 Plastic 1 liter - Nitric Acid <2

180 S. Van Buren Avenue

Phone: 330-497-9396 Fax: 330-497-0772 Barberton, OH 44203

Chain of Custody Record

💸 eurofins

**Environment Testing** 

#### TSP Dodecahydrate Z - other (specify) R - Na2S203 P - Na204S Q - Na2SO3 O - AsNaO2 U - Acetone W - pH 4-5 S - H2SO4 V - MCAA Preservation Codes: B · NaOH C · Zn Acetate D · Nitnc Acid E · NaHSO4 F · MeOH G · Amchlor H · Ascorbic Acid COC No: 240-167969.1 240-185122-1 Page 1 of 2 J - DI Water K - EDTA A - HCL |- Ice Total Mumber of containers Carrier Tracking No(s): State of Origin: Michigan **Analysis Requested** Accreditations Required (See note) Kris.Brooks@et.eurofinsus.com Ra226Ra228\_GFPC 04.0/PrecSep\_0 Standard Target List Lab PM: Brooks, Kris M STD Standard Target List (Wewster, Secolid, Oewaste/oil, BT=Tesue, (C=comp, Sample Type Sample AT Requested (days): Due Date Requested: 6/12/2023 Project #: 24024154 \*MOS Phone: #OM Client Information (Sub Contract Lab) Karn/Weadock CCR Groundwater Monitoring 314-298-8566(Tel) 314-298-8757(Fax) FestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, Shipping/Receiving State, Zip: MO, 63045 ent Contact Earth City

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC 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/fests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central. LLC alboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central. LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC attention immediately. Possible Hazard Identification

IVA protocol - Ra-226+228 action limit at

5.0 pCi/L

× × ×

× × × × × × × × ×

Water Water Water Water Water

Eastern 07:38 Eastern 09:54 Eastern 11:48 Eastern 08:13 Eastern 09:20 Eastern 10:30 Eastern 11:25 Eastern 13:00 Eastern

5/8/23 5/9/23 5/9/23

5/9/23 5/8/23 5/8/23 5/8/23

JCW-MW-18006 (240-185122-4) JCW-MW-18005 (240-185122-3)

MW-50 (240-185122-5) MW-51 (240-185122-6) MW-52 (240-185122-7)

ion code:

A-Ab)

G=grab)

Time

Sample Date

Sample Identification - Client ID (Lab ID)

JCW-MW-18001 (240-185122-1) JCW-MW-18004 (240-185122-2)

Page 38 of 40

TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at IVA protocol - Ra-226+228 action limit at IVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at

5.0 pCi/L 5.0 pCi/L 5.0 pC//L

> × × × × ×

× × × ×

> Water Water Water

5.0 pCi/L

NA protocol - Ra-226+228 action limit at

Special Instructions/Note:

5.0 pCt/L. TVA protocol - Ra-226+228 action limit at

5.0 pCi/L

7 24 04 N

5.0 pCi/L

× ×

5/8/23

5/8/23

MW-53R (240-185122-9)

MW-53 (240-185122-8)

Water

TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.

rossine nazaro identification		Sample Disposal ( A fee may be assessed if samples are retained innear than 1 month)	amples are retained longer than 1 mon	(4)
Unconfirmed		Return To Client Disposal By Lab	ab Ambine For	any forther
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2	Requ	D DAIDE	MORITIS
Empty Kir Relinquished by:		Time: Method of Shipment:	Shipment:	
Relingate edby:				
	さいこので	CACOL Maccandad Dy.	Date/Time: Company	pany
Refinquished by	)	0.0		
tedex	Company	MINBORNED DY LETTORIBLY - STORYS	Date/Time: Company	pany
Relinquished by:	Date/Time	)	3/16/62 0070 56	215/6
02	Company	Received by:	Date/Time: Company	Jany
Clietody Spale Intact   Clietody Spal No				
A Yes A No		Cooler Temperature(s) °C and Other Remarks:		

13

Phone: 330-497-9396 Fax: 330-497-0772

**Eurofins Cleveland** 

180 S. Van Buren Avenue

Barberton, OH 44203

Chain of Custody Record

IVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at 5.0 pc//L.
TVA protocol - Ra-226+228 action limit at 5.0 pC/IL.
TVA protocol - Ra-226+228 action limit at 5.0 pC/IL. T - TSP Dodecahydrate VA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at Special Instructions/Note: Z - other (specify) P - Na204S Q - Na2SO3 R - Na2S2O3 U - Acetone V - MCAA O - AsNaO2 S - H2SO4 W - pH 4-5 Preservation Codes G - Amchlor H - Ascorbic Acid COC No: 240-167969.2 240-185122-1 A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH Page: Page 2 of 2 J - DI Water K - EDTA 5.0 pCi/L. 5.0 pCi/L 5.0 pCi/L 5.0 pCi/L L-EDA M N N N N Total Number of containers Samer Tracking No(s): State of Origin: Michigan **Analysis Requested** Accreditations Required (See note) Kris.Brooks@et.eurofinsus.com × × × × × × × Razz6Razz8\_GFPC × × × × O Standard Target List Lab PM: Brooks, Kris M × × × × × × × Preservation Code: (W=water, S=solid, O=wasts/oli, BT=Tlesue, Water Water Water Water Water Water Water A=AF) Sample (C=comb, G=grab) Type Eastern 12:50 Sample Eastern 08:45 Eastern 10:52 Eastern Eastern Eastern Eastern 06:55 'AT Requested (days): Due Date Requested: 6/12/2023 Sample Date 5/9/23 5/9/23 5/9/23 5/9/23 5/9/23 5/8/23 5/9/23 Project #: 24024154 \*MOSS \* OM <u>#</u> Client Information (Sub Contract Lab) Kam/Weadock CCR Groundwater Monitoring Sample Identification - Client ID (Lab ID) 314-298-8566(Tel) 314-298-8757(Fax) OW-57ROUT (240-185122-12) company: FestAmerica Laboratories, Inc. MW-54R (240-185122-10) DUP #02 (240-185122-16) DUP-01 (240-185122-14) MW-55 (240-185122-11) MW-58 (240-185122-13) 13715 Rider Trail North EB-01 (240-185122-15) Shipping/Receiving State, Zip: MO, 63045 Client Contact: Project Name: Earth City mail

Note: Since abovatory accreditations are subject to change. Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratory or other instructions will be provided. Any changes to abovation ment a state of Origin listed above for analysis/sests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC. Possible Hazard Identification

Company Months Company Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon 08% 5/12/23 Date/Time: Date/Time: Method of Shipment: Disposal By Lab 文を文 Special Instructions/QC Requirements: fedex Received by: eceived by: Time: Primary Deliverable Rank: 2 Date: Deliverable Requested: I, II, III, IV, Other (specify) fedex Empty Kit Relinquished by:
Relingered by:
Relinquished by:
Relinquished by: Jnconfirmed

Date/Time

Cooler Temperature(s) °C and Other Remarks:

Received by:

Company

Date/Time:

13

Custody Seal No. Custody Seals Intact: A Yes A No

Relinquished by:

#### **Login Sample Receipt Checklist**

Client: TRC Environmental Corporation.

Job Number: 240-185122-1

Login Number: 185122 List Source: Eurofins St. Louis
List Number: 2 List Creation: 05/12/23 12:17 PM

Creator: Sharkey-Gonzalez, Briana L

Answer	Comment
True	
True	
True	
True	
N/A	
True	
N/A	
	True True True True N/A True True True True True True True True

2

4

5

6

8

10

12

13

14



# Appendix F Field Records

# TRC

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NUMBER:	514403.0000.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	5/8/53 5 (col) <sup>23</sup> -5/1/2023 TO ,5/40/2023
PURPOSE OF FIELDWORK:	Second Quarter HMP Sampling Event
WORK PERFORMED BY:	Javier Jasso

SIGNED 5 (11)33

CHECKED BY S-11-23

DATE



#### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com DATE:	5/8/58	TIME ARRIVED:
PROJECT NUMBER:				TIME LEFT: 1330
				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
		WEATHI	ER .	
TEMPERATURE: W	γ °F WIND:	15 to 1 MPH	VISIBILIT	Y: OUR COURT
	wo	ORK / SAMPLING	PERFORMED	
Jan Mu 18	100 /ms 2m	50, JUW	ou 18001, Ma	N-50 Dup#01
Mw- 51, Mu	)- 52,53,5	3R		w-50 Dup+01
,		<b>e</b> .		
		getton	y Supplies	
	1			
PROB	BLEMS ENCOUNTERE	D	CORRECTIVI	E ACTION TAKEN
			· · · · · · · · · · · · · · · · · · ·	
		0011111110	4.7.0.1	
NAME	REPRESENTING	COMMUNIC	SUBJECT / COMM	FNTS
Darby Litz	TRC	PM - Updates	CODDECT / CONNIN	
Caleb Batts	Consumers	Site Contact	<u>.</u>	· · · · · · · · · · · · · · · · · · ·
	INVESTION	GATION DERIVED	O WASTE SUMMARY	
WASTE MATRIX	QUANTITY	1	COMMENTS	
Groundwater	NM	To Ground		
	111-2		10	D/ (C-11-17
	<u> </u>	DATE		5-11-23
SIGNED	<b></b> .	DATE	CHECKED BY	DATE

REVISED 04/2019



## **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com DAT	E: 5	1913	TIME ARRIVED: 050			
PROJECT NUMBER:	514403.0000.0	0000 AUT	HOR:	Javier Jasso	TIME LEFT: 13 20			
WEATHER								
TEMPERATURE: Lle	EMPERATURE: UCO °F WIND: 10 MPH VISIBILITY: 000 COL							
		ORK / SAMPLIN						
Mw. 54R, Jcw. mw. 18004, Mw. 55, Jcw. mw. 18005 Ow. 57Rout, Jcwmw. 18006, Dyo #2, nw. 58, FB#01, CB#01								
Ow- 57Rc	out Jow -1	160	OQ	1040 #21	nu-56,			
EB#01,0	CB#0							
PROE	BLEMS ENCOUNTERE	D	-	CORRECTIV	E ACTION TAKEN			
	-				<u> </u>			
<u> </u>								
NAME	REPRESENTING	COMMUN	IICATI	SUBJECT / COMM	ENTS			
Darby Litz	TRC	PM - Update		30BJECT / COIVIIV	ENIS			
Caleb Batts	Consumers	Site Contact						
		one contact						
	INVESTIG	GATION DERIV	'ED W	ASTE SUMMARY				
WASTE MATRIX	QUANTITY			COMMENTS				
Groundwater	NM	To Ground						
				,				
	1.1.3			110	<i>7</i> / <i>7</i> / <i>7</i> / <i>7</i> / <i>7</i> / <i>7</i> / <i>7</i> / <i>7</i> /			
	5 4117			H	Ky 541-23			
SIGNED	-	DATE		CHECKED BY	DATE			



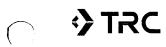
#### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC Weadock LF: 2023 GW Co						
PROJECT NO.:	514403.0000.0000	SAMPLER NAME: Javier Jasso					
WATER LEVEL MEASU	REMENTS COLLECTED WITH:						
HER	ON DIPPER-T	TRC A2					
NAME AND MODEL OF IN	STRUMENT	SERIAL NUMBER (IF APPLICABLE)					
PRODUCT LEVEL MEA	SUREMENTS COLLECTED WITH	l:					
	NA	NA					
NAME AND MODEL OF IN	STRUMENT	SERIAL NUMBER (IF APPLICABLE)					
DEPTH TO BOTTOM O	WELL MEASUREMENTS COLL	ECTED WITH:					
HER	ON DIPPER-T	TRC A2					
NAME AND MODEL OF IN	STRUMENT	SERIAL NUMBER (IF APPLICABLE)					
PURGING METHOD							
PERIS	STALTIC PUMP	TRC A2					
NAME AND MODEL OF PU	IMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)					
SAMPLING METHOD							
PERI	STALTIC PUMP	TRC A2					
NAME AND MODEL OF PU	JMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)					
GEOTECH	DISPOSABLE FILTER	0.45 MICRON					
NAME AND MODEL OF FI	TERATION DEVICE	FILTER TYPE AND SIZE					
DEDICA <sup>-</sup>	FED POLY TUBING	LOW-FLOW SAMPLING EVENT					
TUBING TYPE							
PURGE WATER DISPO	SAL METHOD						
✓ GROUND	DRUM POTW	☐ POLYTANK ☐ OTHER					
DECONTAMINATION A	ND FIELD BLANK WATER SOUR	CE					
STO	DRE BOUGHT	LABORATORY PROVIDED					
POTABLE WATER SOURCE	DE .	DI WATER SOURCE					
	11/12	1 0 0 -					
SIGNIED	<u> </u>	5-11-23					
SIGNED	DATE	CHECKED BY DATE					
REVISED 04/2019		$\bigvee$					



#### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance			MODEL: YSI Pro DSS			SAMPLER: JJ	
PROJECT NO.:	514403.0000.0000		SERIAL#: RENTAL		DATE: 5 /8 (5')			
PH CALIBRATION CHECK					SP	ECIFIC CONDL	ICTIVITY CALIE	BRATION CHECK
(LOT #): 26 H 764 (EXP. DATE): 6 / 34 POST-CAL, READING/STANDAR		CAL. RANGE	TIME		(EXP. DATE):	READING 1493	TEMPERATURI	CAL. TIME
700 17W	400, 40L	WITHIN	2000			1309	20.5	E-WITHIN CACL
1	/ /	WITHIN RANGE		-	()	/	70.0	WITHIN
1	1	WITHIN RANGE				1		WITHIN
1	1	WITHIN RANGE				1		WITHIN RANGE
OR	P CALIBRATION CHECK					D.O. CAL	IBRATION CHE	CK
CAL. READING (LOT #): 226-/00350	TEMPERATURE	CAL.	T11.45		CAL	. READING	TEMPERATURI	CAL
(EXP. DATE): 7(5)  POST-CAL. READING / STANDAR	, ,	RANGE	TIME		POST-CAL RE	ADING /SATURATED AIF	(°CELSIUS)	RANGE TIME
223 1223	19.0	WiTHIN RANGE	-60C	, !		71885	20.0	WITHIN OWE
1	1 10	WITHIN	سير	2		1	50.	WITHIN
1		WITHIN RANGE		1		1		WITHIN
1		WITHIN RANGE		1		1		WITHIN
TURB	DITY CALIBRATION CHE	СК					COMMENTS	
CALIBRATIO	N READING (NTU)			] [	AUTOC	AL SOLUTION	✓ STANDAR	D SOLUTION (S)
(LOT #): A 1 0073	(LOT #): (EXP. DATE):	CAL. RANGE	TIME		(LOT #): (EXP. DATE):			AND EXPIRATION DATES
POST-CAL. READING / STANDAR	D POST-CAL. READING / STANDARD				CALIBRAT	ED PARAMETERS	CALIBRA*	TION RANGES (1)
0 10	1	WITHIN RANGE	Yore	].		ρΗ	pH: +/- 0.2 \$	S.U.
100 / 100	1	WITHIN	now			COND	COND: +/- 1% (	OF CAL. STANDARD
1	1	WITHIN RANGE				ORP	ORP: +/- 25 m	ıV
	/	WITHIN RANGE				D.O.	D.O.: VARIES	
	NOTES			1		TURB	TURB: +/- 5% (	OF CAL. STANDARD
								ANGES ARE SPECIFIC TO E WATER QUALITY METER
PROBLEMS ENCOUNTERED						CORRECT	IVE ACTIONS	
SIGNED	5 (41)3	DATE	-	1	CHEC	AL IKEI BY	My	5-11-23



# WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance			MODEL: YSI Pro DSS		SAMPLER: JJ			
PROJECT NO.:	514403.0000.0000		SERIAL#: RENTAL		DATE: 5/9/23				
PH CALIBRATION CHECK  PH 7 -				]	_	ECIFIC CONDU READING	TEMPERATUR	_	HECK
(LOT #) SELL TO Y (EXP. DATE): CLY POST-CAL. READING / STANDARD	(LOT #): 26 1 306 (EXP. DATE): 404 POST-CAL. READING/STANDARD	CAL. RANGE	TIME		(LOT#): 2 (EXP. DATE)	64149	(°CELSIUS)	CAL. RANGE	TIME
700 /70L	400 1400	WITHIN RANGE	050		1309	(11309	21	WITHIN RANGE	Ofte
	,	RANGE WITHIN				,		RANGE WITHIN	
		RANGE WITHIN				1		RANGE WITHIN	
/ ODB	CALIBRATION CHECK	RANGE				/ D.O. CAL	 IBRATION CH	☐ RANGE	
CAL. READING	TEMPERATURE	l		1	CAI	READING	TEMPERATUR		
(LOT #) 3) 6/00356 (EXP. DATE): 7(33	(°CELSIUS)	CAL. RANGE	TIME		O/ 11	. KENDING	(°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD				ļ		EADING /SATURATED AIR			
223 1203	<u></u> )0	WITHIN	ysa		8.8	718.81	20,0		054
/		WITHIN RANGE				1		☐ WITHIN RANGE	
1.		☐ WITHIN RANGE				1		☐ WITHIN RANGE	
1		WITHIN RANGE				1		WITHIN RANGE	
TURBIDITY CALIBRATION CHECK			1	COMMENTS					
	READING (NTU)			]	☐ AUTO	CAL SOLUTION	✓ STANDA	RD SOLUTION	(S)
(LOT #): (OO) (EXP. DATE): 7/3	(LOT #): (EXP. DATE):	CAL. RANGE	TIME		(LOT #): (EXP. DATE	):	LIST LOT NUMBER UNDER CA	S AND EXPIRATI	
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	1			CALIBRA	TED PARAMETERS	CALIBRA	ATION RANGES (	1)
C) / C	1	WITHIN	03	w		рН	pH: +/- 0.2	S.U.	
100/10	1	WITHIN RANGE	050	<b>J</b>		COND	COND: +/- 1%	OF CAL. STAN	IDARD
1	1	☐ WITHIN RANGE				ORP	ORP: +/- 25	mV	
1	1	WITHIN RANGE				D.O.	D.O.: VARIE	S	
	NOTES			_		TURB	TURB: +/- 5%	OF CAL. STAN	IDARD
				-			(1) CALIBRATION I THE MODEL OF TH		
PROBLEMS ENCOUNTERED						CORRECTI	VE ACTIONS		
1000									
SIGNED	5 11117	DATE			СНЕ	CKED BY		5-11-2	DATE



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 5 (1/23
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

				<del></del>		
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW-MW-18001	des	TOC	(69)	23.75	NA	NM
JCW-MW-18004	0723	тос	1223	14.72	NA	NM
JCW-MW-18005	6741	TOC	6.77	14.28	NA	NM
JCW-MW-18006	0884	TOC	1239	236Z	NA ·	NM
JCW-OW-18001	0638	тос	(e.5)	202	NA	NM
JCW-OW-18002	6643	TOC	968	19.73	NA	NM
JCW-OW-18003	66c4	TOC	7.65	18.60	NA	ММ
JCW-OW-18004	6724	TOC	595	1485	NA	NM
JCW-OW-18006	0603	TOC	6.43	2347	NA	NM
LH-103R	12711	TOC	22.26	33.44	NA	NM
LH-104	0)20	TOC	7.40	14.00	NA	NM
JCW-MW-20		TOC			NANA	NM_
MW-50	હિંધી ઇ	тос	13.51	19.40	NA	NM
MW-51	cler	тос	14.37	20.00	NA	NM
MW-52	0493	TOC	1498	19.74	NA	NM
MW-53	67W	TOC	13:79	18.18	NA	NM.
MW-53R	0704	TOC	14.40	16.80	NA	NM
MW-54R	0717	TOC	13.71	17.20	NA	NM
MW-55	0734	TOC	14.03	14.38	NA	NM
MW-58	6523	TOC	5.27	1828	NA	NM
OW-51	obly	TOC	9.41	17.28	NA	NM
OW-53	0701	TOC	6.53	(8,00	NA	NM
OW-54	0719	тос	5.80	16.48	NA	NM
OW-55	ひつろく	TOC	(0-10	18.47	NA	NM
OW-56	0744	TOC	5.70	Dwm	NA	NM
	000					

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 5 III 5 DATE

CHECKED Thy

5-11-23

DATE



### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 5 (1193
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

	PROJECT NUMBER:	514403.000	00.0000		AUTHOR: Javier Jasso					
	WELL LOCATION TIME		REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION			
	OW-56R	6747	TOC	570	Dum	NA	NM			
	OW-57 IN	0757	TOC	5.38	2014	NA	NM			
	OW-57R IN	0750	TOC	5-53	19. lea	NA	NM			
	OW-57 OUT	075	TOC	(0-0	19.48	NA	NM			
	OW-57R OUT	0750	TOC	9.60 5	20-)0	NA	NM			
	JCW-MW-15007	6607	TOC	3.24	8.75	NA	NM			
	JCW-MW-15009	della	TOC	870	1300	NA	NM			
	JCW-MW-15010	cary	TOC	17.19	19.57	NA	NM			
	JCW-MW-15028	0610	TOC	6.95	25,6	NA	NM			
	MW-15002	0834	тос	6.41	16.88	NA	NM			
	MW-15008	0817	тос	4.31	17.00	NA	NM			
	MW-15016	0838	тос	3.21	8.10	NA	NM			
	MW-15019	0829	тос	5-21	1681	NA	NM			
	ATW C1	desi	)	666	37.07					
	Jan-Marsod	dest		5.53	DWM					
	Jow mu 15034			1470	Dum					
	mu-14 R	0716		1404	19.85					
	JOU MU-15031	0728		15.44	Dwm					
5cm -	MW 20	0143		5.86	pun					
5cm-	MW-19	060		8.33	2083					
	MW-1502C			5.60	17.17					
	Mu ·114B	0674		4.59	3270					
	MW- 15024	0696		5.74	17,17					
	MW-15018	0631		(e.78)	9.94					
	Jammiscol	0835	V	8.88	Dwm	V	<b>V</b>			

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED SIGNED DATE

CHECKED /

5-11-23

DATE

REVISED 04/2019

### 3TRC

PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED CHECKED								
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ JK DATE: S-1-23 BY: HS DATES/10/23								
SAMPLEID: MW-15003 WELL	DIAMETER: 2" 4" 6" OTHER								
WELL MATERIAL: 7 PVC SS IRON	GALVANIZED STEEL OTHER								
SAMPLE TYPE: 📝 GW 🗌 WW 📋 SW 📗	] DI LEACHATE OTHER								
PURGING TIME: 14/14 DATE: 5-1-									
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	PH: $7.20$ SU CONDUCTIVITY: $4/3.7$ umhos/cm ORP: $-20.3$ mV DO: $0.42$ mg/L								
DEPTH TO WATER: 6,50 T/ PVC	TURBIDITY: 3.13 NTU								
DEPTH TO BOTTOM: T/ PVC	DEPTH TO BOTTOM: T/ PVC X NONE SLIGHT MODERATE VERY								
WELL VOLUME: NA LITERS GALLO	ONS TEMPERATURE: 1.0 °C OTHER:								
VOLUME REMOVED: 4     LITERS   GALL	ONS COLOR: Clear ODOR: None								
COLOR: det wi ive backers ODOR: non	FILTRATE (0.45 um) YES NO								
TURBIDITY	FILTRATE COLOR: FILTRATE ODOR:								
□ NONE □ SLIGHT ☑ MODERATE □ VE	ERY QC SAMPLE: MS/MSD DUP-								
DISPOSAL METHOD: GROUND DRUM OTHE	R COMMENTS:								
TIME PURGE PH CONDUCTIVITY ORP (ML/MIN) (SU) (umhos/cm) (mV)	LEVEL PURGE VOLUME								
1 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									
1421 200 7.31 357.3 -39.7									
1426 200 7.29 353,2 -4,8									
1431 200 778 363.2 -55.0									
1436 200 7.26 364.5 -58.									
1441 200 7,24 377, 3 -62	the state of the s								
1446 200 7.23 396.2 -67.5									
1451 200 7.21 405.7 - 72.5									
1456 200 7.21 407.6 -76.5	0.48 7.25 8.1 6.85 8								
1501 200 7.20 413.3 - 80.3	0,48 3.13 9.0 6.55 9								
	EN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:								
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10	D.O.: +/- 0.3 TURB: +/- 10 % or = 10 TEMP.: +/-</td								
BOTTLES FILLED PRESERVATIVE CODES A - NON	E B-HNO3 C-H2SO4 D-NaOH E-HCL F								
NUMBER SIZE TYPE PRESERVATIVE FIL	TERED NUMBER SIZE TYPE PRESERVATIVE FILTERED								
1 125ms Plastic B Y	/ ☑ N □ Y □ N								
1 125ml 1 A DY	/								
1 250mb   A 1	( ဩ΄ N □ N □ N □ N □ N □ N □ N □ N □ N □ N								
2 14 5 6	Y ∐ N □ Y □ N								
	Y □ N □ Y □ N								
SHIPPING METHOD: Fedex DATE SHIP	PPED: 5-2-23 AIRBILL NUMBER:								
COC NUMBER: SIGNATUR									

### 3 TRC

PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED CHECKED								
PROJECT NUMBER: 514404.0000.0000 BY: A	W. JJ. (K. DATE:5-1-27 BY: 15 DATE:5/10/23								
SAMPLE ID: MW- SCHOLISCHE WELL DIAMET	ER: 🔽 2" 🔲 4" 🔲 6" 🔲 OTHER								
WELL MATERIAL: PVC SS IRON GALVA	NIZED STEEL OTHER								
SAMPLE TYPE:	SAMPLE TYPE:								
PURGING TIME: 1312 DATE: 5-1-23	SAMPLE TIME: 1343 DATE: 5-1-23								
PURGE PUMP PERISTALTIC PUMP METHOD: DAMED	PH: 6.56 SU CONDUCTIVITY: 1457 umhos/cm								
□ BAILER	ORP: <u>94.3</u> mV DO: <u>-0.44</u> mg/L								
DEPTH TO WATER: 5.22 T/ PVC	TURBIDITY: 3.47 NTU								
DEPTH TO BOTTOM: 16.39 T/ PVC	NONE SLIGHT MODERATE VERY								
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 8.1 °C OTHER:								
VOLUME REMOVED:	COLOR: Chew ODOR: Autre								
COLOR: Clear ODOR: Mone	FILTRATE (0.45 um) YES ANO								
TURBIDITY  NONE SLIGHT MODERATE VERY	FILTRATE COLOR: FILTRATE ODOR: QC SAMPLE: MS/MSD DUP- Backson in								
DISPOSAL METHOD: GROUND DRUM OTHER	COMMENTS:								
DIPCE	WATER CUMULATIVE								
TIME RATE PH CONDUCTIVITY ORP	D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME								
and the same of th	mg/L) (NTU) (°C) (FEET) (GAL OR L)								
1313 200 6.67 1483 -51.8	2.61 8.57 9.0 5:25 INITIAL								
1318 200 6.59 1474 -69.8 6	0.51 3.84 8.4 5.25 1								
1727 200 6.58 1468 -78.0 6	,50 7,71 7.2 5.25 4								
1328 200 6.57 1462 - 87.0 0	SI 2.54 8.1 5.25 3								
1337 200 6.57 1462 -42.0 0	,50 2,94 8.1 5,25 4								
1338 200 6,57 1455 -47.8 0									
	49 3.47 8.1 5.25 6								
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SU	CCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:								
pH: +/- <b>0.1</b> COND.: +/- <b>3</b> % ORP: +/- <b>10</b> D.O	.: +/- 0.3 TURB: +/- 10 % or = 10 TEMP.: +/-</td								
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								
2 125 PLANTE B Y XI									
2 DSAL A DY KIN	Y 🔲 N								
2 FOURL A DY MA	YN								
	□ Y □ N								
	Y								
SHIPPING METHOD: Fecheix DATE SHIPPED:	5-2-23 AIRBILL NUMBER:								
COC NUMBER: SIGNATURE:	46 DATE SIGNED: 5-9-23								
	<del>/ `                                   </del>								

### :>TRC

PROJECT N	IAME:	CEC Ka	arn LF: 2023 (		PR	EPARED		CHECKED			
PROJECT N	UMBER:	514404	.0000.0000		BY; A'	N, JJ	K) DATE:5.)	-27	BY: H	15	DATE: 5/10/2
	WELL DIAMETER: 2" 4" 6" OTHER  VELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER  SAMPLE TYPE: GW WW SW DI LEACHATE OTHER										
PURGI	NG	TIME: ئ	153 DA	TE: 5-2	-33	S	AMPLE	TIME:	0340	) DA	ΛΤΕ:ζ'- ( <b>)</b> - <b>()</b> )
PURGE METHOD:	_	PUMP 1	PERISTALTIC F	PUMP		PH: (2, 34 SU CONDUCTIVITY: 914 umhos/cm ORP: 43,4 mV DO: (2),37 mg/L					
DEPTH TO V	NATER: _	3.18	T/ PVC			TURBIDITY: 101 NTU					
	DEPTH TO BOTTOM: 1,76 T/ PVC							GHT 7		DERATE	☐ VERY
WELL VOLU	···	NA [	LITERS	GALLO					°C OTH		
VOLUME RE			LITERS	GALLO		COLO	R: <u>(                                   </u>		odo s ☑		None
COLOR:	<u>elv</u>			OR: <u></u>	griv,	1	1	∐ YE	*		
NONE	SLIC		BIDITY MODERATE	□ VEI	₹Y		TE COLOR: 🚅 MPLE: 🔲 MS	/MSD		TRATE ODO	JR:
7			ID DRUM				1ENTS:				
LIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)		D.O. mg/L)	TURBIDITY (NTU)	TEMP	ERATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
	200	7.03	666	-6.6		.50	(0.1)	8.	0	3,22	INITIAL
		6.90	722	5.44	-	.37	5.14		0	3.22	į.
	200	6.88	804 100	7.1		.38	5.16		.0	3,32	2
1 .	200	6.89	857	-11.7		37	4.86	•	0	3.22	3
1 , -	200	6.89	869	-17.4			4.50	.Š.		3, 3,3	4
		at a test of the ex-				37			**		5
	200	6.89	387	-29,1		37	3.04		0	3.42	The second secon
16		6.89	848				3.07		$\mathcal{O}_{i}$	3 22	6
1 -	200			-42.1		37			.	3.22	7
03.40	200	6,89	914	-43.9	Ø	.17	3.01	7	. 1	7, 22	8
NO <sup>-</sup> pH: +/- 0	).1 (	COND.: +/-	3 % ORP	: +/-, 10	D.O.	CESSI	/E READINGS 3 TURB: +/-		ITHIN THE	10	TEMP.: +/-
BOTTLES	FILLED		ATIVE CODES			- HNO3	<del></del>	1	- NaOH	E - H	
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILT	ERED	NUM	BER SIZE	T	/PE P!	RESERVAT	
t t	175m6	الأدر يجها فر	ß	□ Υ	N .						
ı	125mL		A		N						
i	250.nl	ن ش	A		ĭ⊈ N						
1.	16	1.	B	∐ Y ∏ Y	⊠ N □ N						
CL HEDDING !	METHOD	F. 6					7 m 7	Λ	IRBILL NUI	MRED:	
SHIPPING I		ريدي والمراج	-	ATE SHIPF SIGNATURE	-	10	2-23	_	ATE SIGNI	-	5-9-23
L				// // // / / // // // // // // // // //	7	/=	- 27	<del>-</del>		······	



PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED	CHECKED					
PROJECT NUMBER: 514404.0000.0000 B	Y: AW, JJ JK DATES 1-7	BY: -5 DATE: 5/10/2.					
SAMPLE ID: MIV - 15008 WELL DI	AMETER: 2" 4" 6"	OTHER					
WELL MATERIAL:  PVC SS IRON G	ALVANIZED STEEL	OTHER					
SAMPLE TYPE: GW WW SW D	LEACHATE	OTHER					
PURGING TIME: 1212 DATE: \$4-2		ME: 12.40 DATE: 5-1-23					
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	PH: <u>(3.61</u> SU ORP: <u>~106;3</u> mV	CONDUCTIVITY: 103-2 umhos/cm					
DEPTH TO WATER: 4.70 T/ PVC		TURBIDITY: 4.27 NTU					
DEPTH TO BOTTOM: T/ PVC	NONE SLIGH	ı					
WELL VOLUME: NA LITERS GALLON							
VOLUME REMOVED: X LITERS GALLON		ODOR: Acate					
COLOR: <u>Clear</u> ODOR: AND	FILTRATE (0.45 um)	YES 🔀 NO					
TURBIDITY	FILTRATE COLOR:	FILTRATE ODOR:					
NONE SLIGHT MODERATE VERY	dR vi						
DISPOSAL METHOD: GROUND DRUM OTHER	COMMENTS: F/3	checked					
TIME PURGE PH CONDUCTIVITY ORP	D.O. TURBIDITY T	EMPERATURE WATER CUMULATIVE LEVEL PURGE VOLUME					
(ML/MIN) (SU) (umhos/cm) (mV)	( mg/L) (NTU)	(°C) (FEET) (GAL OR L)					
1215 200 643 945 -67.3	0.55 15.45	9.2 4.32 INITIAL					
1220 200 6.69 978 -75.7	0.08 12.80	7.4 4.32					
1225 we 4566 998 -94.7	0.10 9.31	9.1 4.22					
1230 200 6.63 1019 -102.7	0.22 991	9,0 4.32 3					
1-275 200 6.62 1029 -106.0	0.22 9.54	9.0 4.32 4					
1240 300 6.61 1032 -106.3	0.22 8.87	4.0 4.32 5					
		·					
NOTE: STABILIZATION TEST IS COMPLETE WHEN	3 SUCCESSIVE READINGS ARI	E WITHIN THE FOLLOWING LIMITS:					
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10	D.O.: +/- <b>0.3</b> TURB: +/- <b>10</b>						
BOTTLES FILLED PRESERVATIVE CODES A - NONE	B - HNO3 C - H2SO4	D - NaOH E - HCL F					
NUMBER SIZE TYPE PRESERVATIVE FILTE		TYPE PRESERVATIVE FILTERED					
1 125.76 Photic B Y	WN Date	J □Y⊠N					
1 125mL 1 A - Y	N N	□ Y □ N					
1 Sount A DYI	<b>₩</b> N	☐ Y ☐ N					
A 16 V B OY	Q N F€	☐ Y					
Y	□ N	YN					
SHIPPING METHOD: FEGELS DATE SHIPPE	:D: 5-2-27	AIRBILL NUMBER:					
COC NUMBER: SIGNATURE:	Le The	DATE SIGNED: 5-9-23					
	7						

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PROJECT	NAME:	CEC V	Veadock LF:	2023 GW C		PREPARED CHECKED				KED	
PROJECT	NUMBER	R: 51440	3.0000.0000	E	3Y:	JJ	DATES	ارکی ا	3Y: 2	K	DATE: 5-11-23
WELL MAT	WELL DIAMETER:  2" 4" 6" OTHER  WELL MATERIAL:  PVC SS IRON GALVANIZED STEEL OTHER  SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER										
PURG	SING	TIME	70 [	ATE: 5 (8/	12	S	AMPLE	TIME:	7 W	DA	TEZ/(2/)3
PURGE METHOD	):	PUMP BAILER	PERISTALTIC		<u>)                                    </u>	PH:	<u>ر ۲۲</u> s	·	NDUCTIV	ITY: 3 4	56 umhos/cm
DEPTH TO			T/ PVC			TURBIC	•	1 NTU			
DEPTH TO	воттом:	<u> 23) (</u>	T/ PVC			[] <del>]</del> NON		GHT		DERATE	VERY
WELL VOL		NA .	LITERS	GALLON						HER:	- 10 6
VOLUME F			LITERS	☐ GALLON		COLOR			ODO		onp
COLOR:		mwn!		DOR: <u>NO N</u>			TE (0.45 um)	∐ YES		_NO	
L			BIDITY	E#1 ven			E COLOR:	/MADD	FIL	TRATE ODO	R:
	□ NONE     □ SLIGHT     □ MODERATE     □ LVERY     QC SAMPLE;     □ MS/MSD     □ DUP-										
DISPUSAL		. ☑ GROUI	ND   DRUM	1   OTHER		COIVIIVII	ENTO.			1	
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVIT (umhos/cm)	Y ORP (mV)		D.O. .mg/L)	TURBIDITY (NTU)		RATURE C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
6(a)X	200	المن	(627	293		285	750	11. 8		1673	INITIAL
15015		6.66	3426			308	17.5	Į,	-	16.80	
Gezu		6.70				64	12.5	(1.	4	1640	J
7600		6.70	ろそろじ	-160.		36	9-7	11.	<b>&gt;</b>	1680	3
obulo		Corc	3 441	-189.		779	70	11.	3	1680	φ
delle	The second of the contract of the second of	4.71	3 456	-190		ا کرز	7.0	il.		1680	2
061		(e.71	3458			76	4.9	(1.	)	1680	4
pH: +/-	0.1	COND.: +/-		P: +/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	SIZE	TYPE	PRESERVA	<del>-</del>		HNO3	C - H2SO4	Т	NaOH	E - HC	
NUMBER		I	AVESERVA			NUMBE	ER SIZE	TYP		RESERVATI	
<del>       </del>	125	quis	A.		UN UN			ļ		***********************	
ر العالي العالي	250 12 T 137 1C	PI PI PI	<b>B</b> B	□ Y   □ Y   □ Y							Y   N   N   N   N   N   N   N   N   N
SHIPPING	METHOD:	lab Dre	1 270 gs	DATE SHIPPE	D:	5-10	-27	AIR	BILL NUM	BER:	
COC NUMI	BER:	a transmissioner ( ) are deal had had not		SIGNATURE:		7		DAT	E SIGNÉ	Ē (1/[	53

<b>&lt;&gt;</b>	Γ₹	C
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PROJECT	NAME:	CEC V	Veadock LF: 2	023 GW C	PR	EPARED		С	HECKED	
PROJECT	NUMBEF	R: 514400	3.0000.0000	BY:	JJ	DATE:<	chi) BY	15K	DATE:5-11-J	13
SAMPLE	ID: JC4	J-04	-1800	WELL DIAM	ΛΕΤΕR: ✓	2" 4"	6" C	THER		
WELL MAT	ERIAL:	☑ PVC	ss 🗆	IRON GAI	LVANIZED S	STEEL	□ c	THER		
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE	☐ C	THER	DANG AND MERCHANIST CONTRACTOR AND ADMINISTRATION OF THE SECTION OF T	
PUR	GING	TIME: 07	109) 01	ATE:5/8/03	S	AMPLE	TIME:	2733	DATE: 5 (8/)	13
PURGE	7		PERISTALTIC		PH:			DUCTIVITY:	(7 63 umhos	s/cm
METHOD	D: 🗆	BAILER			ORP:	-1690 m	V DO:	0),	_ mg/L	
DEPTH TO	WATER:	4.51	T/ PVC		TURBI	DITY: 5-9	1 NTU	COLOR OF THE STATE	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
DEPTH TO	воттом:	20)(	T/ PVC		<b>/</b> ₩0		GHT [	MODERA	ATE VERY	,
WELL VOL	UME:	NA	LITERS	GALLONS	TEMPE	RATURE:	<u>1.9</u> °0	OTHER:		
VOLUME F	REMOVED:	5	X LITERS	GALLONS	COLO	R: CLOCY		ODOR:	nor	
COLOR:	c	louly	OE	OR:100 L	_ FILTRA	TE (0.45 um)	YES	Ø NO		11 P. P. P. P. P. P. P. P. P. P. P. P. P.
			BIDITY		FILTRA	TE COLOR:		_ FILTRAT	E ODOR:	
NONE	SLI	GНТ [ <b>Д</b> ]	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP	)	
DISPOSAL	METHOD:	☑ GROU	ND DRUM	OTHER	COMM	IENTS:				
TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPER		TER CUMULATIV	
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C		EVEL PURGE VOLU EET) (GAL OR L	
706	204	7.20	916 F	-117.5	10.0	17.1	(0)		(9 INITIAL	
0713		6271	1767	-160.0	1.08	5.9	9.7	and the second second		a na tra ng tat ignantan
0716		660	1756	-163.5	053	5.	9.8		lec 2	
1773		6.00 6.70	1784	-100		5. \	9.9		w 3	
			1 7 3 1				9.4			
5778		(2,70	1753	-168.5		(e-c		CONTRACTOR OF THE PARTY OF THE	لهن كل	arrent de la companie
0733		6.70	1783	-169.0	0,2 %	5.9	9.0	7 (4)	60 5	
- produce management as a superior	/									
,										
		animal calculation in the Person Street	gale anguna e e e e e e e e e e e e e e e e e e e	no des pubblico seculos resolves actor con transa seja sistem à que sequence t	au politica de la composición della composición	and about and a large a to all owner house has appears to refer				
NO	OTE: STAB	LIZATION	TEST IS COMP	LETE WHEN 3 S	SUCCESSIV	'E READINGS	ARE WITH	N THE FOLL	OWING LIMITS:	
pH: +/-	0.1	COND.: +/-	3 % ORP	: +/- <b>10</b>	0.O.: +/- <b>0.3</b>	TURB: +/-	10 %	or = <b 10	TEMP.: +/-	
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - N	aOH I	E- HCL F	_
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERE	D NUME	BER SIZE	TYPE	PRESE	RVATIVE FILTER	≀ED
2	125	glasi	A	□Y G	N				□ Y □	П
l	250	101	1	□Y □	N	***************************************		on community of the second of the contract of		N
	161	21	A		N					JN
1	17	わし	R		N			** A SECONDARIA DE LA CONTRACTION DE LA CONTRACT		JN
`\u00f3-	16-	pi	- A		N					JN
SHIPPING	METHOD:	lab Do	off D	ATE SHIPPED:	<u> </u>	0-23	AIRBI	LL NUMBER		
COC NUM	mara ana ara beneri iro de en cocypa paga p			IGNATURE:		V - J	·	SIGNED:7	1/1/62	
COC NOW	DEIX.				<del></del>		.	5	1141)2	
					7	)				

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PROJECT N	IAME:	CEC W	Veadock LF: 2	2023 GW C	PR	EPARED		CH	HECKED	
PROJECT N	IUMBER	: 514403	3.0000.0000	BY	: JJ	DATE: S	ulya BY	. 2K	DATE:S-II-	27
SAMPLE ID: MW50 WELL DIAMETER: 2" 4" 6" OTHER										
WELL MATERIAL:										
SAMPLE TYP	SAMPLE TYPE:   GW WW SW DI LEACHATE OTHER									
PURGII	NG	TIME: U	143 0	ATE:5/8/3	) s	AMPLE	TIME:	913	DATE: 5(86	73
PURGE	V	PUMP	PERISTALTIC	· · · · · · · · · · · · · · · · · · ·	PH:	7.34 s	U COND	UCTÍVITY: _	( <u>) 3                                   </u>	os/cm
METHOD:		BAILER			ORP:	- <u>134.5</u> "	以 DO:	<u>036</u>	mg/L	
DEPTH TO V	VATER: \	<u> 351</u>	T/ PVC		TURBI		NTU			
DEPTH TO B	DEPTH TO BOTTOM: 1 PVC									
WELL VOLUM		ΝA	LITERS	GALLONS	TEMPE		) <u>.</u>	OTHER:		
VOLUME RE	MOVED:	<u> </u>	LITERS	GALLONS	COLO	R: Clea	<u>V</u>	ODOR:	nony	
COLOR:		Checy	OI	DOR: <u>10 14</u>	FILTRA	TE (0.45 um)	YES	□ NO	· · · · · · · · · · · · · · · · · · ·	ate make \$111 feature
		TUR	BIDITY		FILTRA	TE COLOR:		FILTRATE		
NONE	SLIC		MODERATE	☐ VERY			/MSD	DUP-	401	
DISPOSAL M	/IETHOD:	✓ GROUN	ND DRUM	OTHER	COMM	IENTS:				
) IIN/II— I	PURGE	PH	CONDUCTIVITY	Y ORP	D.O.	TURBIDITY	TEMPERA	TURE WAT		
1 !	RATE ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	LEV ) (FE	/EL PURGE VOL ET) (GAL OR	
	000	7.53	794	-70.	9.5	12	10.			
6746	<b>2</b> [	7)(4	1512	-84-0	1.5	(p.)	10.0	· · · · · · · · · · · · · · · · · · ·		***************************************
6753		526	1239	-104.0	1.06	5.3	9. 9		and the state of t	erec expectivo e tempe to
0758	CANCELLO CONTRACTOR OF THE CON	7,74	1224	-122-5	0.79	46	(0.0		40 30 34 30	
		777								
0803		13)	1 293	-138.5	050	4,4	10.0		UT U	****
0,000		7.34	1776	-139.0	649	44	(0.0		27.0	***
0613		7.14	1231	_139.3	036	4.7	10.	0 13	4 600	
- C-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-MARK-VICE-M			And in the second state of the second control or second control or the second control or			CALL A VARIABLE AND ASSESSMENT AND ASSESSMENT ASSESSMEN				v a 100,0000 - 1 4780
					*					
	į									
NOT	E: STABI	LIZATION 1	TEST IS COME	PLETE WHEN 3	SUCCESSIV	E READINGS	ARE WITHII	N THE FOLL	OWING LIMITS:	
pH: +/- <b>0.</b>	.1 (	OND.: +/-	3 % ORF	P: +/- 10	D.O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> %	or = <b 10	TEMP.: +/-	
BOTTLES F	FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - Na	aOH E	- HCL F	
NUMBER	SIZE	TYPE	PRESERVAT	TIVE FILTER	ED NUMB	ER SIZE	TYPE	PRESER	RVATIVE FILTER	RED
7-1	) i	alas V	MA		HN					□N
	250	DI	JA		HN		<b></b>			
	3		Λ.		I N			THE REPORT OF THE PROPERTY OF THE PERSON OF		□ N
	137	51	<u>τ</u>		] N					
	7()7	177	<u> </u>		N V		ļ			
1	<u>し</u>	71	<u> </u>		- 1		1			N
SHIPPING M	ETHOD:	196 De	wp off	OATE SHIPPED:	<u> 5-10</u>	-23	AIRBII	LL NUMBER:	To an annual value of the same to the same	
COC NUMBE	ER:	~		SIGNATURE:		\	DATE	SIGNED:	1463	
-						1			-	-

### **⇔** TRC

PROJECT N	PROJECT NAME: CEC Weadock LF: 2023 GW C PREPARED CHECKED										
PROJECT N	NUMBEF	R: 51440	3.0000.000	0	BY:	JJ	DATES	ムウ	BY:	<b>3</b> K	DATE: 5-11-23
WELL MATE	WELL DIAMETER:										
PURGI	ING	TIME: D	050	DATES 18	/23	S	AMPLE	TIME:	092	$\mathcal{O}$	ATE: 5 (8/32)
PURGE METHOD:		PUMP BAILER	PERISTAL	<del></del>	<u>v</u>		.~~	SU CO	ONDUCTIV	/ITY: <u>17</u>	
DEPTH TO V	WATER:	14.37	T/ PVC			TURBII	DITY: <u><b>5.</b> </u>	<u>1</u> nt	U		
DEPTH TO E	воттом:	20.CL	T/ PVC			П иог		IGHT	мс	DERATE	☐ VERY
WELL VOLU	ME:	NA	LITERS			TEMPE		1.2	_°C OT	HER: _	
VOLUME RE	EMOVED:	3	LITERS	☐ GALLO	NS ———	COLOF	R: <u>elee</u>	<u>~</u>			nony
COLOR:		Jonk	<del>}</del>	ODOR: MO	Ų_	FILTRA	TE (0.45 um)	☐ YE	s 🏗	NO	
			BIDITY				TE COLOR:		FIL	TRATE OD	OR:
NONE			MODERAT			ļ ·		S/MSD		DUP-	
DISPOSAL N	METHOD:	✓ GROU	ND DR	UM   OTHER	₹	сомм	ENTS:				
TIME	PURGE RATE	PH	CONDUCTIV	/ITY ORP		D.O.	TURBIDITY	TEMP	ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/ci			mg/L)	(NTU)	ļ	(°C)	(FEET)	(GAL OR L)
06901	00	7.74	163	T - 90.	0 8	、じ	70.0	ic	0.9	1414	INITIAL
1780		7.46	1693	1-125.0	Sa	, Y	(3.2	9	. 3	14.20	. ``
0900		7.40	172	-135	21.	. [	7.1	9	9	1430	
0905		237	174			364	(o.(	9.	٠ ک	1430	les
0910	7	7.34	175	3 -158.		630	5.4	9.	٦.	14)0	2
0915		7.33	175			>35	5.4	9.	<u>ي</u>	1480	7 2.5
6936		7.33	176	2	anne management	34	54	<u>-</u>	· 9	1430	HAV
0.0							e a concerne a servició de arbitración de cincidad cincidad de made dalara en	† <u>-</u>			
	. November of the street common to						and the second section of the Second		*****************************	-	
			de agreement to ord agreement to one design.	A MIRADO TO STATEMENT OF THE STATEMENT O			THE MARKET PRINCIPLE AND REPORT TO THE PRINCIPLE AND ADDRESS OF THE PRINCIPLE.		perior Armedyscher prochespier dis verticoles		
NOT pH: +/- 0.	.1 (	COND.: +/-	3 % C	MPLETE WHEN PRP: +/- 10 ES A - NONE	D.O.	CESSIV: +/- 0.3	E READINGS TURB: +/ C - H2SO	- 10 %	THIN THE or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
NUMBER	SIZE	TYPE	PRESER\		ERED	NUMB	<del></del>	1		RESERVAT	
	250	1	A		U/N						
	117	DI DI	1 7		N	-				magnetic extraor and the among the control of the	
	135		A		PN	+				an ang an at the language and the langua	
2	<u> </u>  _	ات 19	B	Y	N N						Y
CHIDDING	METUOD.	1 1	λ	DATE SHIPP		e-	10-23		DELL MILL	MDED.	1 - 1 1
SHIPPING M	na mad i bidi d'Affrica di Affrica di La Company	145	Drop off			~~ <u>~</u>	<u> </u>	=	RBILL NUI		//>
COC NUMBE	ER:			SIGNATURE:				_ DA	TE SIGNI	ED: 5/1	(D)
									,		

## <u> → TRC</u>

PROJECT NUMBER: 514403.000.0000   BY: JJ DATE (\( \( \) \)   BY: TK DATE \( -1 - 2 \)	PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED
WELL MATERIAL:   PVC   SS	PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATE Stuly 3	BY: 5K DATE:5-11-23
PURGING TIME: 09.5	THE RESIDENCE OF THE PROPERTY		
PURGE	SAMPLE TYPE:	LEACHATE	] OTHER
PURGE	PURGING TIME: 095 DATE: 5/8/33	SAMPLE TIME:	10:30 DATES 103
DEPTH TO BOTTOM:   9, 79 T/ PVC	PURGE PUMP PERISTALTIC PUMP METHOD: BAILER	PH: 6 SU CO	TO THE MADE WHILE AND ALL OF ME TO ALCOHOMOUS CONTINUES IN THE PROPERTY OF THE
WELL VOLUME:   NA	DEPTH TO WATER: 14.98 T/ PVC	\ \	·u
VOLUME REMOVED: 3.	<u>DEPTH TO BOTTOM:</u> 1 9. 79 т/ PVC	——————————————————————————————————————	☐ MODERATE ☐ VERY
COLOR			
NONE     SLIGHT     MODERATE     VERY     VERY     VERY       VERY	VOZOME I LEMOVES.	color: <u>Cov</u>	
NONE	color: doudy odornow	FILTRATE (0.45 um) YE	s PNO
TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL (CMUNITAL LEVEL) (MINIMIN) (SU) (IMMOS/CM) (MY) (MY) (NTU) (TO) (FEET) (GALORI)  1 - 1 - 1 - 1			
TIME   RATE   PH   CONDUCTIVITY   ORP   D.D.   IURBIDITY   IEMMERATURE   LEVEL   PURGE VOLUME (GS C   D D   7.79   B.2 C   -10 i. \( \tau \)   CO \( \tau \)   7.79   B.2 C   -10 i. \( \tau \)   7.8   3.7   12.3   14.7   INITIAL   (GALORL)   (DO \( \tau \)   7.79   B.2 C   -13.2 \( \tau \)   1.88.5   0.40   (v.2.4   q.2.7   14.60   )   (DO \( \tau \)   1.70   1.138.5   0.40   (v.2.4   q.4.4   14.60   )   (DO \( \tau \)   1.70   1.138.5   0.40   (v.2.4   q.4.4   14.60   )   (DO \( \tau \)   1.70   1.138.5   0.41   (v.2.4   q.4.4   14.60   )   (DO \( \tau \)   1.70   1.138.5   0.41   (v.2.4   q.4.4   14.60   )   (DO \( \tau \)   1.70   1.138.5   0.41   (v.2.4   q.4.4   q.4.4   14.60   )   (DO \( \tau \)   1.70   1.138.5   (DO \( \tau \)   1.70   (DO \( \tau \)   1.70   (DO \( \tau \)   1.70   1.70   1.70   (DO \( \tau \)   1.70   (DO \( \tau \)   1.70   (DO \( \tau \)   1.70   (DO \( \ta	DISPOSALMETHOD: GROUND DRUM OTHER	COMMENTS:	
O   O   O   O   O   O   O   O   O   O	TIME   RATE   PH   CONDUCTIVITY   ORP		PERATURE LEVEL PURGE VOLUME
	C C tare C C		
			AND REAL PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF T
1020		and the same of th	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  ph: +/- 0.1			
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  ph: +/- 0.1			and a control of the
PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   Or = 10   TEMP.: +/-    </td <td></td> <td></td> <td></td>			
PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   Or = 10   TEMP.: +/-    </td <td></td> <td></td> <td></td>			
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED    250   21			
230   21   A   Y   N     Y   N     Y   N     Y   N     Y   N     Y   N     Y   N     Y   N     Y   N     Y   N     Y   N   Y   N   N	BOTTLES FILLED PRESERVATIVE CODES A - NONE	B - HNO3 C - H2SO4 D	- NaOH
I 17 PI A Y DN Y N Y N Y N Y N Y N Y N Y N Y N Y	NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE TY	PE PRESERVATIVE FILTERED
SHIPPING METHOD: Lab Drop off DATE SHIPPED: 5-10-23 AIRBILL NUMBER:	1 250 P1 A DY	N	□ Y □ N
SHIPPING METHOD: Lab Drop off DATE SHIPPED: 5-10-23  AIRBILL NUMBER:	1 125 PI A - Y Q	N	☐ Y ☐ N
SHIPPING METHOD: lab Drop off DATE SHIPPED: 5-10-23 AIRBILL NUMBER:		N	☐ Y ☐ N
	The second secon	<b>Y</b>	
	SHIPPING METHOD: lab hop off DATE SHIPPED:	5-10-23 AI	RBILL NUMBER:
	CONTROL OF THE PROPERTY OF THE		ATE SIGNED: 5/1/13

<b>&lt;&gt;</b>	TR	C
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PROJECT	NAME:	CEC V	Veadock LF: 20	023 GW C	PR	EPARED			CHEC	KED
PROJECT	NUMBER	R: 51440	3.0000.0000	BY:	JJ	DATES (u	(52)	BY: 5	ik_	DATE: <b>5-11-23</b>
SAMPLE	ID:MU	<del>۶. 5</del> .	3	WELL DIAM	/IETER: 🗸	2"	6" 🗌	OTHER		
WELL MAT	ERIAL:	✓ PVC	ss 🗆	IRON 🗌 GAI	VANIZED S	STEEL		OTHER		ega report and in amount and a "years" of the manufacture of the state of the state of
SAMPLE T	YPE:	☑ GW	□ww □	SW 🗌 DI		LEACHATE		OTHER	The same of the sa	the second first account of the committee of the second of
PUR	GING	TIME: ( (	O O DA	TE: 5/8/2=	3 s	AMPLE	TIME:	1125		TES 8/3
PURGE PUMP PERISTALTIC PUMP  METHOD:  BAILER ORP: 1743 mV DO: 033 mg/L  BOOK PORT OF THE PUMP OF THE P										
DEPTH TO		(3.79	T/ PVC		TURBI		NTU	J		
DEPTH TO	воттом:	18.18			_ D NO		GHT	MOE	DERATE	☐ VERY
WELL VOL		NA	LITERS	GALLONS	TEMPE	RATURE: 9	<u> </u>	°С ОТН		
VOLUME F			LITERS	GALLONS	COLO	R CLOCK			DR: NO	n $\varphi$
COLOR:		(ver	OD	OR:VYOIY	_ FILTRA	TE (0.45 um)	YES	s <b>#</b>	NO	
			BIDITY	<b>—</b>		TE COLOR:			RATE ODO	R:
NONE		GHT _	MODERATE	U VERY			/MSD		DUP-	
DISPOSAL	METHOD:	☑ GROUI	ND DRUM	OTHER	СОММ	ENTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPI	ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)		(°C)	(FEET)	(GAL OR L)
NOO	100	774	38 V	-84.5	વ.૯	69	11.	3	1357	INITIAL
1105		7.55	954	=1360	37	Calp	9,	(	1361	· 1
1110		7.45	972	-1560	084	4.5	9	(	13.65	١
1111	and the second s	7.42	996	-173.1	049	4.3	9.	i	1361	1.0
1170		7.41	1006	-174.5	039	4.7	9,	ľ	1365	3
11)5	************	7.41	1614	- 174.3	633	4. 2	9.	ſ	1365	2.5
1. a. V (managa) (1. a., 1. ) (man, 1. a.)	NE COMP TO SERVICE STATE OF THE PROPERTY OF TH		angagi-approximation of a distribution law and an activities and an activities and an activities and activities activities and activities activities and activities activities and activities activities activities and activities a	دور درو رود رود ۱۹۵۰ فیلم پیدارت ادارت از ۱۹۵۶ فیلم ۱۹۵۰ فیلم این این این ۱۹۵۰ فیلم ۱۹۸۱ فیلم ۱۹۸۱ فیلم ۱۹۸۱ فیلم	Mark profession and annual annual and annual	a tot till der efter den gip it den er er er epekt och det promj er ekselver e		nerenn sed den er big bridgert men gerigen betallen.	To the common temperature of the state of the common state of the	
						er yan gabhagh ashmur dhi se'nna bhhirin shann nas a				Serger of Europe and recovery device force conductor currency and communicated
E LORDE Y STOREGORDO, EFRICATION IN PARTI.		orani dalah kalandara dan Pate Muru busun		er variable erekt kont i fan út i senet ritte ha út i en en út i varia		POWER OF A BANKAN BANK AND REAL PROPERTY OF THE WASH		BOTTOM A TRAINING A B SINGE A ANGLE AND SO WAT	AND DESCRIPTION OF THE PERSON OF THE PERSON	
	<i>l</i>			and the second s		The state of the s				
	OTE: OTAB	LIZATION	TECT IC COMPI	ETE MUEN 2	I COECON	E DEADINGS	DE MI	FI IIAI TI IE F		C L IBRITO
pH: +/-		COND.: +/-	TEST IS COMPL 3 % ORP:		0.0.: +/- 0.3			or =</td <td>-</td> <td>TEMP.: +/-</td>	-	TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE	D NUMB	ER SIZE	TYF	PE PR	ESERVATI	VE FILTERED
J	250	١٩	A	□ Y	N			and the second second		□ Y □ N
1	125	PI	A		N					□Y □N
1	155	p (	В		N					□Y □N
C.	16	Pl	B		N			an al Armiter and American	TOTAL TERMINAL STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET,	□Y □N
			The same and appropriate the same of the s		N		1		ann ige og page den gig a menterete skrive en te de	□Y □N
SHIPPING	METHOD:	lah h	mp off DA	ATE SHIPPED:	5-10	)~1 Z	AIF	RBILL NUM	BER:	
COC NUM		1-(2 (2)		GNATURE:		, <u>, , , , , , , , , , , , , , , , , , </u>		TE SIGNEI	<del></del>	1/1/2
L	JLI \.			ONTONE.			DA	I L SIGNE	5+	4187
					7	/				

Y IRL	<b>&gt;</b> T	TR	C
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PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATE ( lu() 7	BY: JK DATE: 5-11-27
SAMPLE ID: MW 532 WELL DIAM	ETER: 🗸 2" 🗌 4" 🗍 6" 🗌	OTHER
WELL MATERIAL: PVC SS IRON GAL	VANIZED STEEL	OTHER
SAMPLE TYPE:	LEACHATE	OTHER
PURGING TIME: (\ \ \ \ \ \ \ \ DATE: 5 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		1300 DATE 5/8/33
PURGE PUMP PERISTALTIC PUMP METHOD: BAILER	PH: 6 SU CC	DNDUCTIVITY: 1590 umhos/cm or 019 mg/L
DEPTH TO WATER: 14 PVC	TURBIDITY: 60 NT	
DEPTH TO BOTTOM COMPANY T/ PVC	MONE SLIGHT	MODERATE VERY
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 4	_°C OTHER:
VOLUME REMOVED: Ot LITERS GALLONS	COLOR: COLOR	ODOR: NON Q
COLOR: BRUN ODOR: MONY	FILTRATE (0.45 um) YE	s pho
TURBIDITY	FILTRATE COLOR:	FILTRATE ODOR:
□ NONE □ SLIGHT □ MODERATE □ VERY	QC SAMPLE: MS/MSD	DUP
DISPOSAL METHOD: GROUND DRUM OTHER	COMMENTS:	t.
TIME PURGE PH CONDUCTIVITY ORP	D.O. TURBIDITY TEMP	PERATURE WATER CUMULATIVE
RATE GONDON (ML/MIN) (SU) (umhos/cm) (mV)	1	(°C) . (FEET) (GAL OR L)
115 100 704 1773 -1023		1393 INITIAL
		2.5 1403 .5
	programme and the second secon	
	and an entrance and an arrangement and arrangement and arrangement and arrangement and arrangement and arrangement are	***
1310 6.851710 -1380		1403 1.5
1215 6.841 690 - 1350		· [ 1403 2
120 4.841643 -1395	Compression and the Compression of the Compression	· L 1403 2.2
1021 4.64 1420 .1450	038 64 9	1.5 1403 3
1230 684 1611 -144.5	631 16 g	4 1403 3.5
1235 684 1610 -149.5	024 12.0 9	.3 1403 4
1240 4.64 1460 - 150 7	525 9.8 9	, 4 1403 4,5
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 S	·	THIN THE FOLLOWING LIMITS:
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.	O.: +/- <b>0.3</b> TURB: +/- <b>10</b> %	or = <b 10 TEMP.: +/-
BOTTLES FILLED PRESERVATIVE CODES A - NONE	B - HNO3 C - H2SO4 D -	- NaOH
NUMBER SIZE TYPE PRESERVATIVE FILTEREI	1	PE PRESERVATIVE FILTERED
1 250 PI A DY A	N	
1 13 T DI A DYD	N	□Y □N
	N	
5 IL p.1 B	N	TY N
	N	
SHIPPING METHOD: lab Brop off DATE SHIPPED:	<u>5-10-23</u> AII	RBILL NUMBER:
COC NUMBER: SIGNATURE:	DA DA	ATE SIGNED: ( ) /// )
		9, 19



### WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Weadock LF: 2023 GW Co		PREI	PARED		CHEC	KED
PROJECT NUMBER:	514403.0000.0000	BY:	JJ	DATE THU 13	BY:	3k	DATE: \$-11-23

SAMPLE ID: MW-538

	4.6	<del>~ /</del>	-30 (C						
TIME	PURGE RATE	PH	CONDUCTIVITY		D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
30.5-	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
17AK	w	(46) Y		-153.5	6,50	9.3	9.4	1403	.5
ひっか		from a company on a service of the	1596	-154,5	099	8.0	914	(W3	5. \
1775	}	684		-1540	020	8.0	9.4	1403	6
130 <i>0</i>	C No. 10 c No. 10 c Am	6.64	1590	-154.0	019	8.0	9.4	1403	65
monocolds & charging money as an acceptance	o la manda anno ann agustan e care como como como de Annião an				ar a V . DV 107 Today ( To a today and the	The second secon	production of the production of the production of	2. Chay an Minimize (Mayoropel Longayous	Make you hashing a through the deal of the section
			AND STREET, AND AND AND AND AND AND AND AND AND AND	Mary Marie and Proceedings to the College Association of the College Association (College Ass		ng a distributa y ng yar a il hangaji ni ng ya ji ji a jidhajiya ng mg		* ***** *** *************	
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and the state of t				The state of the s		THE STATE OF THE S	and the state of t	1887 (np. 18 - 18 ) (18 ) (18 ) (18 ) (18 ) (18 ) (18 ) (18 )	d helped to the residence which are exhibited the bostonic manufacture con-
representation or representation and a section of section and sect					ļ	COLUMN TO THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT ASSESSMENT OF THE COLUMN ASSESSMENT ASSESS	e complètue de colo, salva historia (ante su completa de la Colonia (ante su completa de la Co	A Com. A has A 1980 common a service service	there we must write with a weight to the comment of the com-
The state of the s	THE STATE OF STATE OF THE STATE OF THE STATE OF		1 1 V 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ell filo filo komi bildilikka a dovelakom voo kormoon	<u> </u>	pillenine months announced about the deep announce is a series			
	A COMMITTED TO SERVICE AND A S					PROPERTY OF THE PROPERTY OF TH			The state of the s
the state of the s	and the second s			o Time that and retrieved out to be the construction and their models	<b></b>	atarappo arrar a rusant s puerturno respectant		***************************************	****
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	THE TAX THE TEST IN THE SERVE THAN THE SERVENCE			ann Sant Amaria - Ing Calabi I, ay ca gan consist a say p con		man in control of the	THE CONTRACT OF THE RESIDENCE AND THE CONTRACT OF THE CONTRACT		n in the top of the comment of the c
tidenmelia gas e de le stippette son es i adde				endelskirk () e mer fælls klosse folklingsbakkeren symbol. Hanna i	e dans regeneración de como e construcción en	erroritarense og ere ett ett av av av dett ett ett ett ett ett ett ett ett et	And SECURI SERVICE AND AND AND ADDRESS OF THE PROPERTY OF THE	James a Mallado No Victorio Angeletanos	
in and become the administration of a provided	* share he con comment who our medition	a sarahar rena repuerant nasarar re		and the second of the second o		Bard calebra i de 1900 and d'Americano d'Art (1111 a Bhaillean ) ann a sean			
AND VICE PARTY AND AND ALLERS	TO STATE OF THE PARTY OF THE PA		Table Total Child Shirt Mar (1998 N. 17) Allegan (1997 ) . San June (1997 )		<u> </u>	L-1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1			
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and and distribution of the second state of a consequence of the	erian i Albird occumentamento con alternar ar			and the Self Add of the Self Self Self Self Self Self Self Sel					
*							A CONTRACT OF THE STATE OF THE		THE RESIDENCE AND ADDRESS OF THE PROPERTY OF T
- Makes Shipaga at the Francisco State			Topone at a ring series (AR), then is a three land on the property (age).	Saucherman um afficient, i de la matrica amou — reconsul	and place of the district of the AM and AM and AM assessment.			and the first of the second second second	
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	100 Mary 100				and the commence of the commence of			\$100,000 to 1,000 to 100 to 100,000,000,000,000,000,000,000,000,000	Political part of the rate of the control of the second of
PARTICIPANT STREET, NO. 1110	TOTAL BUT NAME AND A DESCRIPTION OF STREET	A serie a conservation of the series of the			The state of the s	A STATE OF THE STA		COMMERCIAL CONTRACTOR	PARTITION OF PERMITING WATER AND A MOUNT AND AND A LOCAL TO THE ARE
Amount committed and a charles of							Market Service Control of Control		
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							<u> </u>		

<u> 5/11/7</u>3

**REVISED 04/2019** 

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PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED					
PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATE: CILLIN	BY: 312 DATE:5-11-23					
SAMPLE ID: WELL DIAMET	ER: 🗸 2" 🗌 4" 📗 6" 📗	OTHER					
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVA	NIZED STEEL	OTHER					
SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI	LEACHATE	OTHER					
PURGING TIME OCO (O DATE: \$\\ 9\(\partial\)3	SAMPLE TIME:						
PURGE PUMP PERISTALTIC PUMP		ONDUCTIVITY: (314 umhos/cm) D: 058 mg/L					
BAILER	······································						
DEPTH TO WATER: ( 3. ) \ T/ PVC	TURBIDITY: 4 NT						
<u>ФЕРТН ТО ВОТТОМ:(``) О Т</u> / РVС	NONE SLIGHT	☐ MODERATE ☐ VERY					
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 78	°C OTHER:					
VOLUME REMOVED: C LITERS GALLONS	COLOR: CLOCK	ODOR: NOKO					
COLOR: BROWN ODOR: MOLY	FILTRATE (0.45 um) YE	s Ano					
TURBIDITY	FILTRATE COLOR:	FILTRATE ODOR:					
NONE SLIGHT MODERATE VERY  DISPOSAL METHOD: GROUND DRUM OTHER	QC SAMPLE: MS/MSD COMMENTS:	∐ DUP					
	TOOMINE TOO	L MATER L CHANNETTY					
TIME PURGE PH CONDUCTIVITY ORP		PERATURE WATER CUMULATIVE PURGE VOLUME					
	(mg/L) (NTU)	(°C) (FEET) (GAL OR L)					
	3.0 360 dy	188 / 300 (188 - 1880 - 190 - 18 - 1880 - 190 - 1880 - 1880 - 1880 - 1880 - 1880 - 1880 - 1880 - 1880 - 1880 -					
6017 688 1203 -91.1	(3 73 8	. 1 (37)					
60 1206 703 6	1.40 189 7.	9 1375 2					
	1.6 10:7 7	9 1370 3					
CO20 600 1210 -65 1	9 8.0 7	8 1371 4					
1635 687 1211 -90.0 1	.2 7.9 7.	G 1375 5					
The state of the s	091 6-9 7.	9 1371 6					
DUNT   4.87 1214 -115.3	564 6.7 7.	.9 1375 7					
0630 16.671214-1160	559 6.4 7.						
0454 6671214-1160 6	58 G.Y 7.	e 7379 G					
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUC		THIN THE FOLLOWING LIMITS:					
pH: +/- <b>0.1</b> COND:: +/- <b>3</b> % OR <b>P</b> : +/- <b>10</b> D.O.	: +/- <b>0.3</b> TURB: +/- <b>10</b> %	or = <b 10 TEMP.: +/-					
BOTTLES FILLED PRESERVATIVE CODES A - NONE B	- HNO3 C - H2SO4 D	- NaOH E - HCL F					
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE TY	PRESERVATIVE FILTERED					
1 250 DI A DY AN		□ Y □ N					
NOV PI A DY DIN	The second secon						
1 1)5 PI B DY DN							
SHIPPING METHOD: Lab Nop of DATE SHIPPED: 5-10-23 AIRBILL NUMBER:							
COC NUMBER: SIGNATURE:	D	ATE SIGNED: 7/11/2					
		91 <del>111 /</del>					

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PROJECT NAME: CEC Weadock LF: 2023 GW C	1.0	PRE	PARED			CHECI	KED
PROJECT NUMBER: 514403.0000.0000	3Y:	JJ	DATE:	417	BY: 3	K	DATE:4 5-11-23
SAMPLE ID: JOW- MW- 16004 WELL DI	IAMETE	ER: ✓ :	2" 4"	6"	OTHER		
WELL MATERIAL:  PVC SS IRON C	SALVAN	NIZED ST	ΓEEL		OTHER		
SAMPLE TYPE:	DI .		EACHATE		OTHER		
PURGING TIME: 07 6 DATE: 5 4 5	)2,				ن) 3 <sup>4</sup>		TE:5/9/23
PURGE PUMP PERISTALTIC PUMP  METHOD: BAILER	,*	PH: <b>(</b>		U CO V DO:		TY: <b>16.1</b> 7 mg/	***************************************
DEPTH TO WATER: 12-43 T/ PVC		TURBIC		<u>7</u> мті	_		
<u>ФЕРТН ТО ВОТТОМ. Ч~ЭЭ</u> Т/ РVС		A-MON	·····	GHT		DERATE	☐ VERY
WELL VOLUME: NA LITERS GALLON VOLUME REMOVED: 7 FLITERS GALLON		TEMPER	(1) (2)	10	°C OTH		M()
		COLOR			ODC	1,00	10
			TE (0.45 um)	∐ YES	·····	n, o samanorni e sa samanen menten e	
TURBIDITY  NONE SLIGHT MODERATE VER			E COLOR:	/MSD		DUP-	R:
DISPOSAL METHOD: GROUND DRUM OTHER		COMME					
DURCE	1	T				WATER	CUMULATIVE
TIME   RATE   PH   CONDUCTIVITY   ORP		0.0.	TURBIDITY		ERATURE	LEVEL	PURGE VOLUME
(ML/MIN) (SU) (umhos/cm) (mV)	+	mg/L)	AC)	9.	ري <b>ر</b> (ۍ)	(FEET)	(GAL OR L) INITIAL
						The company of the contract of	7
		.9	5. \		.7	1531	
5738 684 1807 -27.0	and a second or the second or	7.7	(0.0		9	(3,5)	
0733 664 1814 272	1	18	<u>5</u> .8	9.		1270	1, X
0738 684 1814 -26.5	7	? >	5.7	9.	C	1365	3
			and the state of t		* 1 * MA 197/MA AN (MA ) AN (MA ) - MA (MA ) - MA (MA )	energy and the second of the s	-2,1
			The same section and the same of the same			a a a a a a a a a a a a a a a a a a a	
			opia dia gangsi desemples salah selah dan menenjakan dan seja		naditi onat samo atria caappo automos		edit succionate essenti successivo esta essenti organizatione essenti organizatione essenti del compositore e
			amazana k self amazalok didak 17 Melek 180'en f. e endek alke endekenda			man (1880) N. N. N. N. N. N. N. N. N. N. N. N. N.	
							<u></u>
NOTE: STABILIZATION TEST IS COMPLETE WHEN							
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10		+/- 0.3	TURB: +/-		or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
BOTTLES FILLED PRESERVATIVE CODES A - NONE		HNO3	C - H2SO4	r	NaOH	E - HC	
NUMBER SIZE TYPE PRESERVATIVE FILTE		NUMBE	R SIZE	TYF	PE PR	ESERVATI	
	₹\n						
	<del>f</del> ∐N					1 - P - 4-43 - 4-7 - 17-48-347-3464-3453 -	
	₽ ¥			ļ		MET PART OF A MARK A STREET PROPERTY TO A CONSTRUCTION	
2 1L PI B	N		***	<b> </b>			
	N			<u></u>			☐Y ☐N
SHIPPING METHOD: Lab Drop off DATE SHIPPEI	D:	5-10	-23	AIR	RBILL NUM	BER:	
COC NUMBER: SIGNATURE:				DA	TE SIGN	P///L	λ
		$\sqrt{}$		-1		<del>, , , ,</del>	

	<b>;</b> }	TRC
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PROJECT	NAME:	CEC V	Veadock LF: 2	2023 GW C	PR	EPARED		CHE	ECKED
PROJEC1	NUMBER	R: 514403	3.0000.0000	BY:	JJ	DATE: دالا	እን BY:	3K	DATE: \$-11 -23
SAMPLE WELL MAT		) 55 ☑ pvc	ss	WELL DIAN	METER: 🗸			HER	andre and the state of the stat
SAMPLE T	YPE:	☑ GW	□ww	SW 🗌 DI		LEACHATE	O1	HER	
PUR	SING	SQ:amit	( C)	ATE: 5/4/23	, s	AMPLE	TIME: 🔿	845	DATE: 5/9/3
PURGE METHOD	. =	PUMP BAILER	PERISTALTIC	PUMP	PH: ORP:	<u>e-94    s</u> - <u>150 ·                                   </u>		169 169 169	mg/L umhos/cm
	WATER:		T/ PVC		TURBI		NTU		(Berkilde Britanisse), in die finden verschift in Landrick (in Landrick). De fild einer Wille (Fild.)
DEPTH TO	ВОТТОМ:	<u>16.38</u>	/T/ PVC		Ø₩0	NE 🗌 SLI	GНТ ☐	] MODERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	GALLONS	TEMPE	RATURE:	<u>v</u> _ <u>v</u>	OTHER:	
VOLUME	REMOVED:	<u> </u>	X LITERS	GALLONS	COLO	R:	W	ODOR:	2010
COLOR:		$3\omega\omega$	$\sim$ 0	DOR: MON	_ FILTRA	TE (0.45 um)	YES	NO NO	
□ NONE	SLI		BIDITY MODERATE	VERY		TE COLOR:	/MSD	FILTRATE O	DOR:
DISPOSAI	. METHOD:	✓ GROUN	ND DRUM	OTHER	COMM	IENTS:			
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVIT	ORP (mV)	D.O. ( mg/L)	TURBIDITY (NTU)	TEMPERA	TURE WATE	L PURGE VOLUME
(8V)	300	724	(C)	95.V	<b>60.7</b>	220	10.0	- <u>-</u>	
80 V	30 P	694	1415	-150.5		54	9, (		
0690	A AT THE PARTY OF	12GL	1417	- 1510	060	25	9.5		MODEL COME TO SERVICE AND A SE
66)7		6.45	1421	1470	640	10.0	9.1	_   ^	
0630	ore were the reserve of the second second	694		-148.	031	8.9	9.6	re savaner - e san 1 (1870 - 18 fin 18 fines in 1800 -	AND A RESIDENCE OF THE PROPERTY OF THE PROPERT
0 & 3 <sup>C</sup>		694	1421	-150	026	7.3	9.6	138	The same of a grade in particular constraints of the same to the first best for a constant for a constant and a constant of the same of th
obili		694	1421	- 150 5	632	7. 1	9.6	1386	. 6
0845		694	1471	-150-1	0)1	7.1	9.6	138	υ <b>ラ</b>
- major spirit (f. projektoring) sempejalnica (mps. er er		on to bijer planskerim diviga þein næ ejæþ	ang ang an interdigence and agree by the least of an interdigence and a green part			W. 7	THE STREET, ST	Challenge, a pro-handing on the contract of th	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1									
BOTTLE	S FILLED	PRESERV	ATIVE CODES	, ,	B - HNO3	C - H2SO4	D - Na	OH E-	HCL F
NUMBER		TYPE	PRESERVAT	IVE FILTERE	D NUMB	ER SIZE	TYPE	PRESERV	ATIVE FILTERED
	250	ρl	A		` <u></u>			NATIONAL PROPERTY OF A STANDARD CONTRACT OF A	
(	135	19	1 A		N				
2	الْـا	91	745		ļ <del></del>		Action 10 to the confidence of		□ Y □ N □ Y □ N
SHIPPING	METHOD:	lab Dr	rop off	ATE SHIPPED:	5-10	o-23	AIRBIL	L NUMBER:	
COC NUM	BER:		S	SIGNATURE:		<u> </u>	DATE	SIGNED: 5	1/1/3
								<del></del>	. 0

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PURGING TIME: OQ 1	PROJECT NAME:	CEC Weadock L	F: 2023 GW C	PR	EPARED			CHEC	KED
WELL MATERIAL:	PROJECT NUMBER	R: 514403.0000.000	00 BY:	JJ	DATECIN	57	BA: 2	الا	DATE: <b>511-23</b>
SAMPLE TYPE:	SAMPLE ID: Y W	-mw 1800	WELL DIAM	ΛETER: ✓	2"	6" 🗌	OTHER		
PURGING TIME: O { 1	WELL MATERIAL:	✓ PVC SS	☐ IRON ☐ GAL	VANIZED S	STEEL		OTHER		-7/A007-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
PURGE	SAMPLE TYPE:	☑ GW □ WW	SW DI		LEACHATE		OTHER		345 SAN SAN SAN SAN SAN SAN SAN SAN SAN SAN
METHOD:   BAILER	PURGING	TIME: 0914	DATE: 5/4/3		_	TIME:	09		J
DEPTH TO BOTTOM	101102	,,,,	TIC PUMP	procedure and the second second				50	
WELL VOLUME	DEPTH TO WATER:	8.3) T/ PVC		TURBI	DITY: <u>[[]</u>	$\supseteq$ NTU		AT JOSEPH TO THE SEASON AND AND AND AND AND AND AND AND AND AN	The Control of the Control of States and Con
VOLUME REMOVED:	<b>DEPTH TO BOTTOM</b>	(6.08) T/ PVC		ON D	NE SLI	GHT	□ мо	DERATE	☐ VERY
COLOR	WELL VOLUME:	NA LITERS	GALLONS	TEMPE	RATURE: (C	). <u>)</u>	C OTI	HER:	
TURBIDITY	VOLUME REMOVED	: 🖳 🗷 LITERS	GALLONS	COLO	R: (\)	QU	OD	OR: <u>n</u>	016
NONE	COLOR:	rown	ODOR: no no	FILTRA	TE (0.45 um)	YES		NO	
DISPOSAL METHOD:	- I NONE - O		- H.v-nv				FIL		PR:
TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL (WINCHMANN) (SU) ((umhos/cm) (mV) (mg/L) (NTU) (C) (FEET) (FEET) (GALORL) (GALORL) (MINCHMANN) (SU) ((umhos/cm) (mV) (mg/L) (NTU) (CC) (FEET) (GALORL) (GALOR) (GALORL) (GALORL) (GALORL) (GALORL) (GALORL) (GALORL) (GALORL)						MSD		DUP	
Note: Stabilization test is complete when 3 successive readings are within the following limits:   Ph. H. O.   Cond.   F.   F.   Cond.   F.   F.		.[♥] GROUND [] DR	OW COTHER	- COIVIIV	IEN 15:				
Sq   Y   O   7 2 Y   U   S   - W   2   Q   D   W   W   C   S   S   INITIAL     Sq   Y	RATE	l '						LEVEL	PURGE VOLUME
Comparison   Com		<del>                                     </del>	<u> </u>	_	2			1	
CQ34			rational control of the control of t						
6939   6.7   16 10   -74.6   06   10   10   10   25   20   3   3   3   4   6.7   1537   -100.0   046   147   10.3   9.9   2.5   0.3   9.9   2.5   0.3   9.9   2.5   0.3   9.9   2.5   0.3   9.9   2.5   0.3   9.9   2.5   0.3   9.9   2.5   0.3   10.0   0.3   0.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   0.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   0.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   10.0   0.3   0.0   0.0   0.0   0.3   10.0   0.0   0.0   0.0   0.0   0.0   0.0				· · · · · · · · · · · · · · · · · · ·					
0934	0929		er er enne erre for er rann menne men er eller er er i en en en en en en en en en en en en en	-			1974 P. P. C.	the same of the sa	
O944	0934	675 159	9-900	046	25	10.	Ş	9.83	)
0944	0934	6.76 153	7 1000	046	(4,7)	10	٠ ٦	9.92	2.5
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1	· · · · · · · · · · · · · · · · · · ·	6.76 1510	1 -115.5	035	10.0	10	·Q	10.0	3
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1	0949	6.76 153	0 - 116.0	031	10.0	10.	. `Q	1000	3. (
PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or = 10   TEMP.: +/-    </td <td>0954</td> <td>6.75 155</td> <td>35-1165</td> <td>030</td> <td>10.0</td> <td>10</td> <td>. )</td> <td>1005</td> <td>4</td>	0954	6.75 155	35-1165	030	10.0	10	. )	1005	4
PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or = 10   TEMP.: +/-    </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
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 OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE PRESERVATIVE FILTERED OF NUMBER SIZE TYPE OF NU	NOTE: STAB	ILIZATION TEST IS CO	MPLETE WHEN 3 S	UCCESSIV	E READINGS A	RE WIT	HIN THE	FOLLOWIN	G LIMITS:
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED    2 to	pH: +/- <b>0.1</b>	COND.: +/- 3 % C	DRP: +/- <b>10</b> D	.O.: +/- <b>0.3</b>	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
2 TO   P   A   Y   D   N   Y	BOTTLES FILLED	PRESERVATIVE COD	ES A - NONE	B - HNO3	C - H2SO4	D -	NaOH	E - HC	L F
( )) \( \begin{align*} align*	NUMBER SIZE	TYPE PRESER\		,	ER SIZE	TYP	E PF	RESERVATI	VE FILTERED
( 1); 2 B	CONTRACTOR OF THE STATE OF THE					ļ		andre a receiver y and makes y a respect or received a subdistance	
SHIPPING METHOD: Mb Dop of Date Shipped: S-10-23  AIRBILL NUMBER:		171 17	<u> </u>	N	Notice and security and security and a security	ļ		e angle observation in the state of the Stat	
SHIPPING METHOD: Mb Drop of DATE SHIPPED: S-10-23 AIRBILL NUMBER:		0 6		ļ		ļ			
SHIPPING METHOD: 105 DOP OF DATE SHIPPED: 5-10-23 AIRBILL NUMBER:	1 2 116	p(   B)		<del> </del>					
	CHIRDING METHOD	10 L N - 00			0.2		DILL ATTE	ADED:	
SIGNATURE: DATE SIGNED 1	or handed to be a first a replacement operator of the second control of the contr	the mob off	The half for each beauty accounts before the temporal account of the relationship of the desired	5-10	-25			7/: 7	
	COC NUMBER:		SIGNATURE:	$\Rightarrow$		DAT	LE. RIGNE	P( ) 2	

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PROJECT NAME:	CEC Weadock LF:	2023 GW C	PREPARED		CHECKED
PROJECT NUMBE	R: 514403.0000.0000	BY:	JJ DATE زر /لذ	りり BY: 5	K DATE: 5-11-27
SAMPLE ID:	3-57 ROUT	WELL DIAMET	ER: 🗸 2" 🗌 4" 📗	6" OTHER	
WELL MATERIAL:	☑ PVC ☐ SS ☐	] IRON 🔲 GALVA	NIZED STEEL	OTHER	
SAMPLE TYPE:	☑ GW ☐ WW ☐	SW DI	LEACHATE	OTHER	er allende gelen i hand som i mangger van de kritiske kritiske film film film en verske kritiske kritiske film
PURGING	TIME: (03 > D	ATE:5/9/3		TIME: (O)	DATE: 5 9 53
METHOD:	PUMP PERISTALTIC BAILER	PUMP	ORP: 7/07 3m		TY: 1353 umhos/cm
DEPTH TO WATER:			TURBIDITY: 5.9	NTU	
<b>DEPTH TO BOTTOM</b>			ANONE SLIC	CA A SERVICE CONTRACTOR OF THE PROPERTY OF THE PARTY OF	DERATE VERY
WELL VOLUME:	NA LITERS	GALLONS		(· > °C OTH	IER:
VOLUME REMOVED		GALLONS	COLOR: CLOCK	ODO	
COLOR:(	164 0	DOR: <u>NON</u>	FILTRATE (0.45 um)	YES D	NO
	TURBIDITY	_	FILTRATE COLOR:		TRATE ODOR:
NONE SL		☐ VERY	QC SAMPLE: MS/	MSD	DUP-
DISPOSAL METHOD	: GROUND DRUM	I OTHER	COMMENTS:		
TIME PURGE RATE	PH CONDUCTIVITY	ORP	D.O. TURBIDITY	TEMPERATURE	WATER CUMULATIVE LEVEL PURGE VOLUME
(ML/MIN)	(SU) (umhos/cm)	<u> </u>	mg/L) (NTU)	(°C)	(FEET) (GAL OR L)
(03,9100	7.90 56 3	-96.1 9	1.6 10.3	16.3	953 INITIAL
1037	7081254	130.0 3	1-6 7.0	114	1001
1047	20 1 1252	114.8	.8 6.0	(13	1170 1
1047	7051253		17 GO	11.3	1179 1.5
053	7.051253	-117.3 1	.4 5-9	112	1277 2
				na desidan desida menden espera en espera en espera	-7:8-
					-3-
ACTIVITY OF THE PROPERTY OF TH		The second section of the second section of the second section of the second section of the second section of the second section section section section section section section section section section section section sec	AND THE PROPERTY OF THE PROPER	PATER PATER OF THE SERVICE SER	C 10000 00 00 00 00 00 00 00 00 00 00 00
				near Eastelle o cor dheath adam an ann an an an	And the state of t
		1			A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A
NOTE: STAR	ILIZATION TEST IS COSS	DI ETE WILEN 2 823	CESSIVE DEADINGS A	DE WITHIN THE	EOLLOWING LIMITS:
	ILIZATION TEST IS COMF COND.: +/- 3 % ORF		: +/- 0.3 TURB: +/-		
BOTTLES FILLED	PRESERVATIVE CODES	A - NONE B -	- HNO3 C - H2SO4	D - NaOH	E- HCL F
NUMBER SIZE	TYPE PRESERVAT		NUMBER SIZE	TYPE PR	RESERVATIVE FILTERED
( 250	21 A	□Y #N	and the state of t	SALANDI, SALANDI SA	
( 497	01 /		AND AND ADDRESS AN		
761 1	101 B	□Y Q N		andrew Monday of State Monday Superior Monday Superior State Superior State Superior State Superior State St	□Y □N
2 16	PI B	Y I N		***********************************	□Y □ N
		N C			□Y □N
SHIPPING METHOD:	lab brop off [	OATE SHIPPED:	5-10-23	AIRBILL NUM	IBER:
COC NUMBER:		SIGNATURE:		DATE SIGNE	D: [11/13]
		(	7		

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PROJECT	NAME:	CEC V	Veadock LF: 2	023 GW C	PF	REPARED			CHEC	KED
PROJECT	NUMBER	R: 51440	3.0000.0000	ВҮ	': JJ	DATE:	uliz B	A: 2	K	DATE: 5-11-23
SAMPLE	ID: VU	)- mu	18006	WELL DIA	METER:	2" 4"	6" 🔲 (	OTHER		
WELL MAT		✓ PVC	ss		ALVANIZED	STEEL		OTHER	e en aparte en en en en en en en en en en en en en	
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗌 DI		] LEACHATE		OTHER		THE STATE OF THE S
PUR	GING	TIME: //	<b>9</b> 3 0/	ATE: 5 91	)3	SAMPLE	TIME: ( (	460	1	TE: 5 9 53
PURGE METHOD	· —	PUMP BAILER	PERISTALTIC	PUMP	PH: ORP:		SU CON	DUCTIV	17: 12°	umhos/cm
DEPTH TO	WATER:	1239	T/ PVC		TURE	BIDITY: 4-4	NTU	e quest primero de la reconstrucción de la constitución de la constitu	Mitheuton him of spiritary comments on george the	ar in gada China ((Course in New York) pour palme e pri art a (s) phone ( ) phone de la laga.
DEPTH TO	воттом:	2363	T/ PVC		<u>-</u>		IGHT	□ моі	DERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	GALLONS	TEMP	ERATURE: 🗘	<u>.4                                    </u>	ОТН	IER:	TO ME TO LONG A MANUAL WAS A COMMENT OF THE COMMENT
VOLUME F	REMOVED:	ζ	LITERS	GALLONS		DR: <u>Clw</u>	$\checkmark$	ODO	DR: 🕰	
COLOR:		100 6	<u>/ (                                   </u>	OR: <b>100</b>	FILTR	ATE (0.45 um)	YES		-0 <b>4</b> -	
			BIDITY		FILTR	ATE COLOR:			TRATE ODC	
NONE	<b>∏</b> SLI	GHT 🗌	MODERATE	☐ VERY	QC S	AMPLE: MS	S/MSD	, <del>  </del>	DUP#	- <del>2</del>
DISPOSAL	METHOD:	☑ GROU	ND DRUM	OTHER	COM	MENTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O.	TURBIDITY (NTU)	TEMPER		WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1103	200	728	se 1	-130.5	1	30.0	14.		いつづろ	INITIAL
(126)		4.44	1217	-151.5		8.4	12.		1290	
1 1		6.44		~157.	023	and professional and a second professional and a second profession and a second professional and		7	1290	2
(133		run mannen erkulanna erkele				The second secon	13.	]	Interior the same in the same of	mentioner and participation continues and a
1134	a a residente de la companya de la companya de la companya de la companya de la companya de la companya de la c	4.90		-160.			().		1240	3
1193		696	1246	-160			1),	CHARLES IN THE RESIDENCE.	1290	1 4
1190		6.46	125)	-160	030	6.4	13.	-1	1240	
			***************************************							-6
	- /									
				A Principle of Control		The second secon		AND THE PERSON OF THE PERSON		And an experience of the state
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1										
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	1 D-N	aOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVAT	VE FILTER	ED NUM	BER SIZE	TYPE	PF	RESERVATI	
2	250	PI	A	□ Y. <b>4</b>	1 N					☐Y ☐N
ーシ	121	D(	A		ÌΝ	P. Haddel P. of Arland San San San San San San San San San San	The same of the same and the sa		and the second second control of the second	□ Y □ N
2	125	PI	ig i		(N	CONTROL OF THE CONTRO				
ű	IL	10/	P	□ Y Œ		redain file (some Color of the Color of Indianantical Color of India	\		THE PERSON IN COMMENT OF THE PARTY AND THE	□Y □N
	<u> </u>	1	Characteristics and a Colored Color of the C		] N	MATTER CO. S. A.	<u> </u>		ta ayının iye gaların yaşayının adınının ka	
SHIPPING	METHOD:	lab Dro	off D	ATE SHIPPED:	5-10	27	AIRB	ILL NUM	BER:	
COC NUM	BER:		A STATE OF THE PARTY OF THE PAR	GNATURE:		***************************************	DATE	SIGNE	D: —7	1//2
					-	)			<u>S</u> †	11-18-2
						//				

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PROJECT	ΓNAME:	CEC V	Veadock LF:	2023 GW C		PRI	EPARED			CHEC	KED
PROJECT	Γ NUMBER	₹: 51440	3.0000.0000		BY:	JJ	DATE	いろ	BY: 3	K	DATE:5-11-23
~ ** **********************************	ID: MU					ER: 🗸		6"	OTHER		
WELL MAT		✓ PVC		] IRON [	****	NIZED S			OTHER	- The state of the	al a vinda vinna a men da analasa a a a a a a a a a a a a a a a a a
SAMPLE T		☑ GW	w _	」SW □	DI		LEACHATE		OTHER	<u>-                                    </u>	
<b></b>	GING	C/:BMIT		•	133		AMPLE 7.00 s		1250		TE:5/9/33
PURGE METHOI		PUMP BAILER	PERISTALTIC	PUMP				iU CC iV DO	ONDUCTIV	тү: <u>14<b>3</b></u> ф <sub>mg</sub>	designation of the second seco
DEPTH TO		<u>2.9.</u>	T/ PVC	<del></del>		TURBII		<u> </u>			
	BOTTOM:	<u></u>				DINON		GHT		DERATE	☐ VERY
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# CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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QA REQUIREMENT: ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO REMARKS Cal. Due Date: 5-25-23 □ ISO 17025 M&TE #: LS 27723 □ OTHER □ NPDES Page\_ INT 🛭 ANALYSIS REQUESTED (Attach List if More Space is Needed) Received on Ice? If Yes INo ပွ Temperature: 3.4-5.8 Alkalinity × COMMENTS: × LDS × × × × × × × × × × × **snoinA** × × × × × × × × × × × × Total Metals × × × × 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 Other PRESERVATIVE MeOH CONTAINERS HCI ИаОН REQUESTER: Harold Register †OS<sup>7</sup>H fONH , --эпоИ 4 4 4 4 4 4 4 4 4 # TATOT 'n S S 'n 'n 'n 'n 'n ☐ STANDARD 図OTHER SAP CC or WO#: RECEINED BY: RECEIVED BY: phone: FIELD SAMPLE ID / LOCATION A = Air WP = Wipe WT = General WasteOX = Other SL = Sludge ☐ 3 DAYS TURNAROUND TIME REQUIRED: GW = Groundwater
WW = Wastewater
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23-0406 Page 27 of 28

# CHAIN OF CUSTODY

**Consumers Energy**Count on Us<sup>a</sup>

# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

Page 2 of 2

QA REQUIREMENT: ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO REMARKS □ ISO 17025 □ OTHER □ NPDES INT ⊠ ANALYSIS REQUESTED (Attach List if More Space is Needed) Alkalinity LDS × × **snoinA** × × × × × × × Total Metals × × × MeOH Other PRESERVATIVE CONTAINERS HCI HOUN REQUESTER: Harold Register <sup>t</sup>OS<sup>7</sup>H <sup>ғ</sup>ОNН Уоле 4 n n # JATOT c d Ś ☐ 3 DAYS ☐ STANDARD ☒ OTHER SAP CC or WO#: phone: FIELD SAMPLE ID / LOCATION A = Air WP = Wipe WT = General Waste OX = Other\_\_\_ SL = Sludge\_\_ TURNAROUND TIME REQUIRED: JCW-MW-18001 MSD MATRIX CODES:

GW = Groundwater

WW = Watewater

W = Water / Aqueous Liquid

S = Soil / General Solid

O = Oil JCW-MW-18001 MS 23-0406 DUP-JCW-LF-02 DUP-JCW-LF-01 □24 HR □ 48 HR PROJECT NUMBER: MW-58 FB-01 EB-01 email: ĞΜ Ğ₩ ĞΨ Ğ₩ ďΜ XIATAM ≽ ≽ 13/10 200 3 5770 TIME いなり SAMPLE COLLECTION 1 Harold Register Q2-2023 Weadock Porewater Wells 563 5/9/53 **६५**५३ 5/9/3 5/9/5> 5/8/23 Caleb Batts 51963 DATE SAMPLING SITE / CUSTOMER: TRC SEND REPORT TO: SAMPLING TEAM: -16 -17 -18 -19 23-0406-13 -14 -15 SAMPLE ID COPY TO:

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23-0406 Page 28 of 28

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# Appendix G Alternate Source Demonstration Supporting Information



### A CMS Energy Company

Date: July 21, 2023

To: Operating Record

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

RE: Alternate Source Demonstration Professional Engineer Certification, §257.94(e)2

JC Weadock Landfill CCR Unit

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

I hereby certify that the alternative source demonstration presented within this Fourth Quarter 2021 Hydrogeological Monitoring Report for the JC Weadock Landfill CCR unit has been prepared to meet the requirements of Title 40 CFR §257.94(e)2 of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.94(e)2.

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July 21, 2023

Date of Certification

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

Name

6201056266

Professional Engineer Certification Number

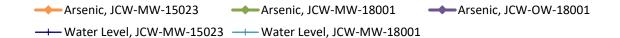


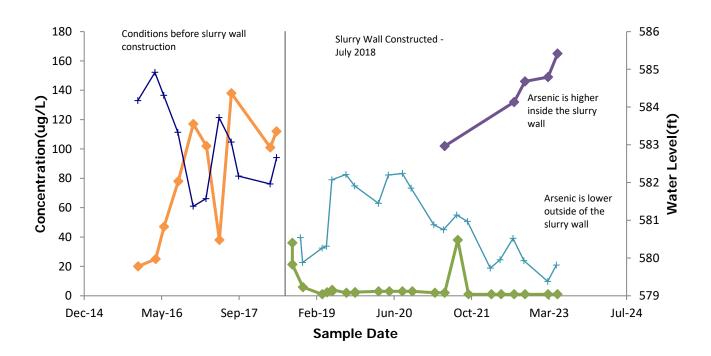
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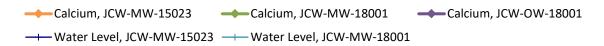
### References

TRC (July 2023). <u>2023 Semiannual Groundwater Monitoring Report/Second Quarter 2023</u> <u>Hydrogeological Monitoring Report, JC Weadock Landfill Solid Waste Disposal Area,</u> Essexville, Michigan

Figure G1: Time Series Plots for JCW-MW-18001 ASD







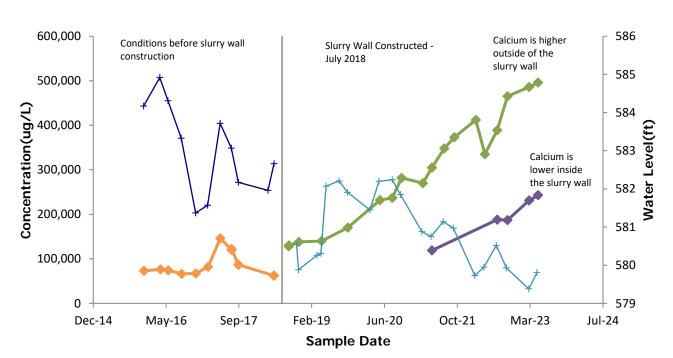
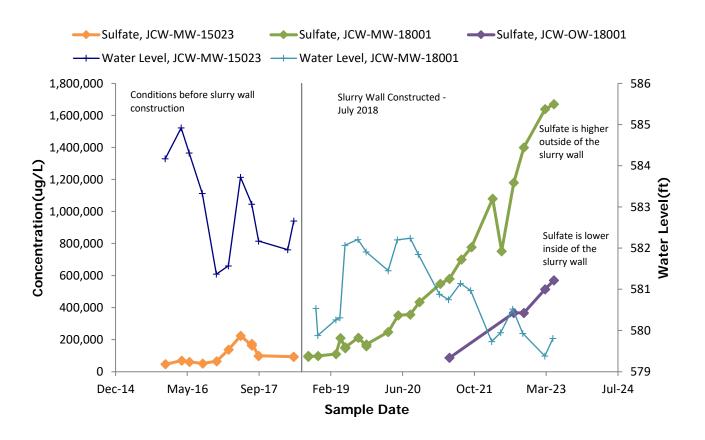


Figure G1: Time Series Plots for JCW-MW-18001 ASD



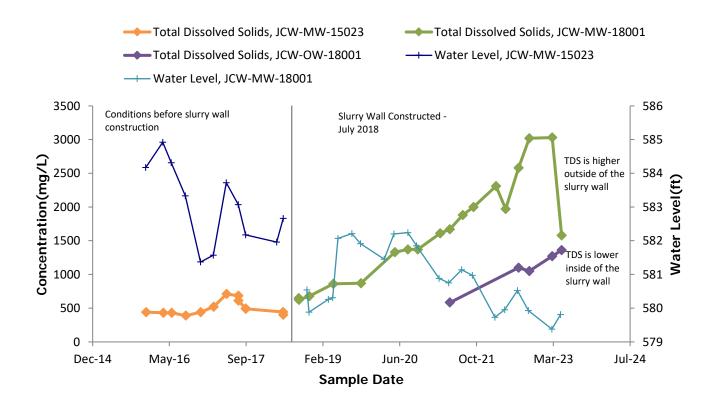
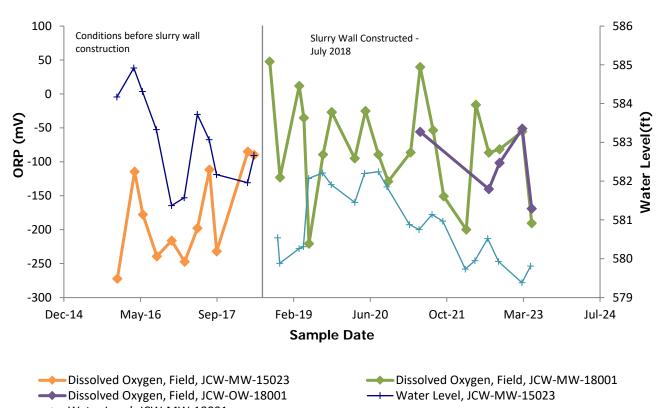


Figure G1: Time Series Plots for JCW-MW-18001 ASD

Oxidation Reduction Potential, Field, JCW-MW-15023
Oxidation Reduction Potential, Field, JCW-MW-18001
Water Level, JCW-MW-18001

Water Level, JCW-MW-18001



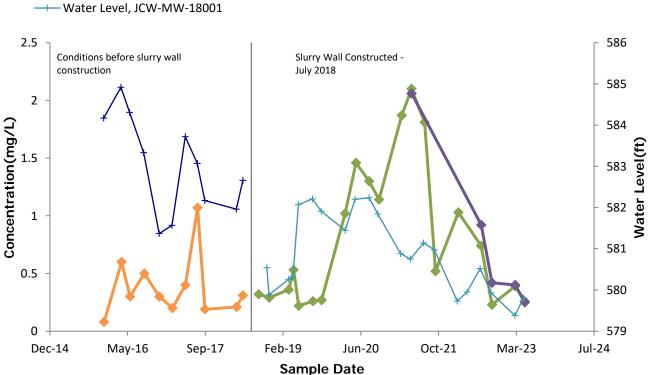
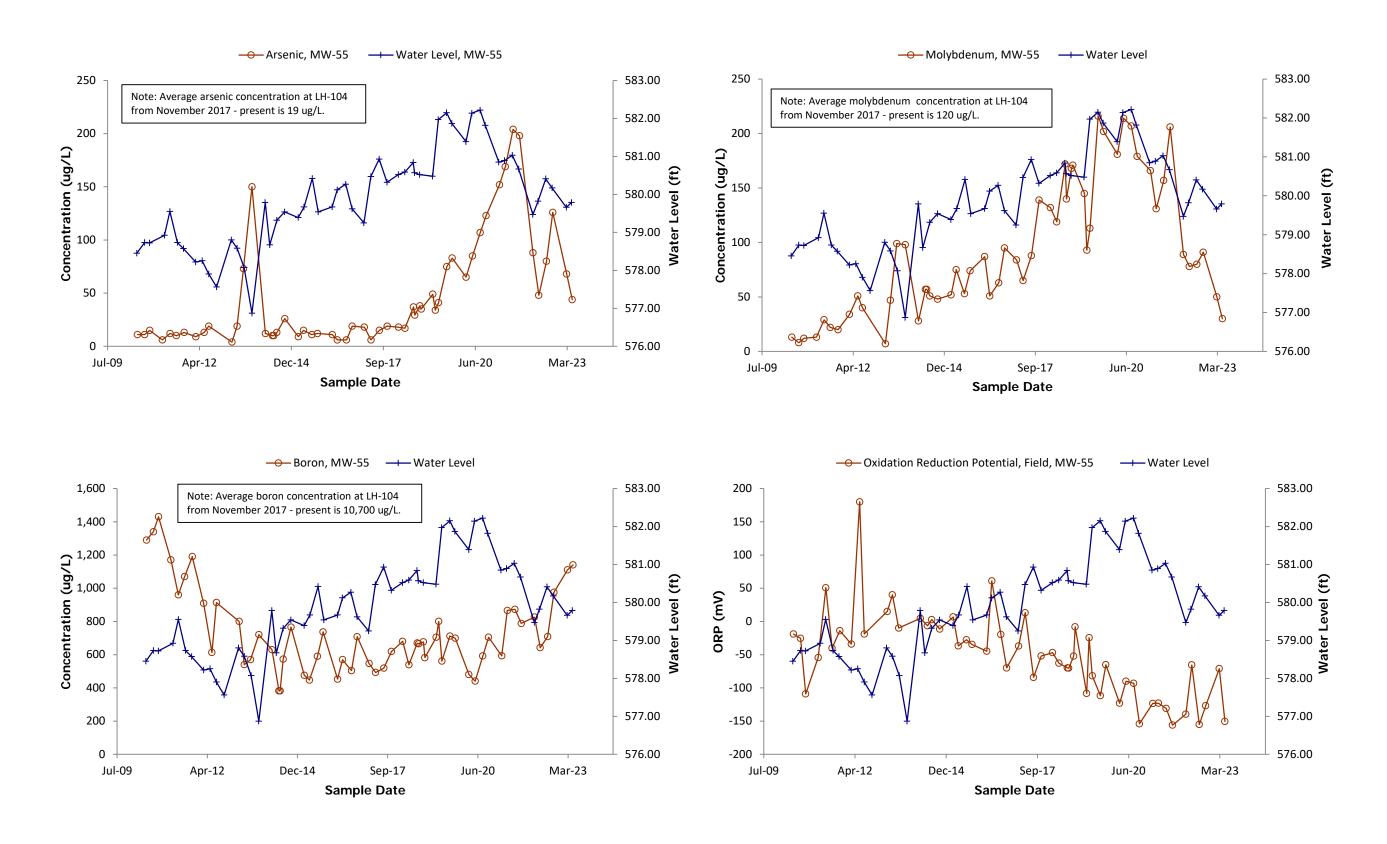
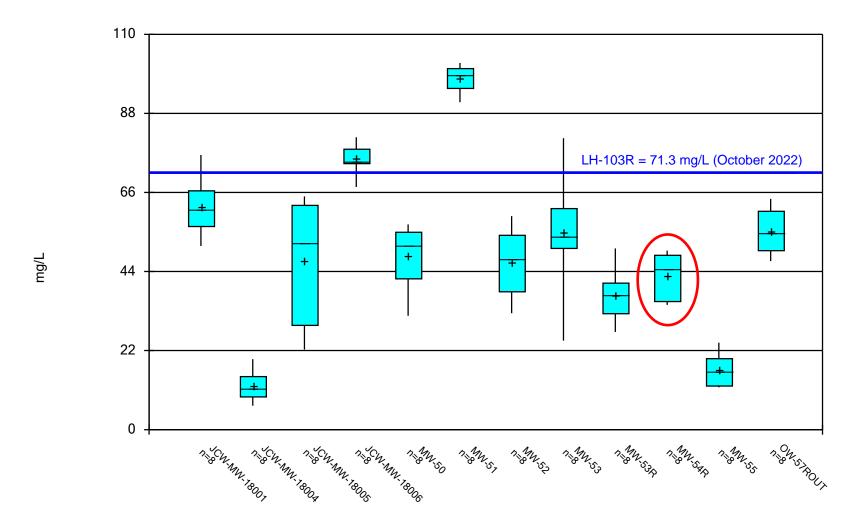


Figure G2: Time Series Plots for MW-55 ASD



### Chloride



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# 2023 Third Quarter Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

**Essexville, Michigan** 

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#### 1.0 Introduction

Consumers Energy implemented a comprehensive compliance monitoring plan documented in the *Revised Hydrogeological Monitoring Plan* (Natural Resource Technology, 2010) for the JC Weadock Solid Waste Disposal Area required by Special License Condition 20.b in Solid Waste Disposal Area Operating License No. 9233 issued on October 15, 2009. Since that time, 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) imposing groundwater monitoring and corrective action requirements that apply to the landfill (Weadock Landfill). Michigan amended Part 115 of the Natural Resources and Environmental Protection Act (NREPA) PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management) to provide a basis for establishing a groundwater monitoring system and initiating detection and assessment monitoring to conform requirements for any licensed coal ash impoundment or landfill after December 28, 2018 with Part 115 amendments and the CCR Rule.

On January 15, 2021, Consumers Energy submitted the *Landfill Hydrogeological Monitoring Plan, JC Weadock Power Plant, Essexville, Michigan* (Weadock Landfill HMP), which includes components for Detection Monitoring and Assessment Monitoring, as well as Groundwater Surface Water Interface (GSI) Compliance Monitoring, to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115 and the CCR Rule. The Weadock Landfill HMP (TRC, February 2021) was revised per EGLE comments, submitted, and approved by EGLE on February 19, 2021 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021.

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

This Third Quarter 2023 JC Weadock Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash landfill. 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 (MDEQ) – Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 Format for Solid Waste Disposal Facility Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the approved Weadock Landfill HMP that was approved by the EGLE on February 19, 2021. The Weadock Landfill HMP is compliant with Public Act No. 640 of 2018 (PA 640) to amend the NREPA, also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

#### 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the third quarter 2023 at the JC Weadock Solid Waste Disposal Area located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). This JC Weadock Disposal Area is currently authorized under a permit (Groundwater Discharge Authorization GWE-0005) issued pursuant to Part 31 to



discharge to the unusable aquifer directly underlying the solid waste that vents almost immediately to the Saginaw River and Saginaw Bay.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule. Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report JC Weadock Power Plant Bottom Ash Pond CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JCW-MW-15011, JCW-MW-15012, JCW-MW-15023; and
- Field pH at JCW-MW-15023 (high).

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 notice to the Department on January 14, 2019 that arsenic was detected at statistically significant levels above the federal groundwater protection standards (GWPS) established pursuant to §257.95(h) in one monitoring well at the JC Weadock Landfill (JCW-MW-15023), which was located downgradient of a 1,600 linear foot vent within the slurry wall enclosing the historical fly ash disposal area. The vent was designed to direct groundwater flow beneath the landfill to the discharge channel immediately upgradient from the National Pollutant Discharge Elimination System (NPDES) external outfall to prevent water from building up within the facility. In July 2018, this vent was closed (Golder, 2018) and the engineering improvement was approved the by the Department (MDEQ, 2018). As a part of the vent closure, monitoring wells JCW-MW-15011, JCW-MW-15012, and JCW-MW-15023 were decommissioned by overdrilling, removing the well material, and sealing the borehole to allow for the slurry wall construction as discussed in the 2018 Annual Groundwater Monitoring Report for the JC Weadock Landfill CCR Unit (TRC, 2019a). Consumers Energy installed an additional nine monitoring wells in August 2018 to supplement the preexisting Michigan Part 115 compliance groundwater well network and provide appropriate coverage for the collection of groundwater levels and water quality data along the perimeter of the Weadock Landfill, as discussed in the Weadock Landfill HMP. Closing the vent and completely encircling the Weadock Landfill with a soil-bentonite slurry wall has demonstrated reduced groundwater flux around the entire perimeter of the landfill.

In March 2019, Consumers Energy submitted a Response Action Plan (Consumers, 2019), which identified interim response activities taken or to be taken to control possible sources of contamination. Consumers Energy further evaluated arsenic in groundwater at the Weadock Landfill as part of the nature and extent analysis and outlined potential remedies in the Assessment of Corrective Measures (TRC, 2019b), which was initiated on April 14, 2019 and completed on September 11, 2019, and focused on materials management with an emphasis on improving source control through the closure plan.

Compliance monitoring is being implemented under the Weadock Landfill HMP dated February 2021 and approved by the EGLE on February 19, 2021. Groundwater data collected in accordance with the Weadock Landfill HMP are used to:



- Assess background groundwater quality for the purposes of establishing and updating GWPS (HMP Section 7.1 Background Determination)
- Perform detection monitoring to assess whether a new release has occurred during operation of the landfill (i.e. statistically significant increase (SSI) over background) (HMP Section 7.2 Detection Monitoring)
- Perform assessment monitoring to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. statistically significant level over the GWPS) (HMP Section 7.3 Assessment Monitoring)
- Assess compliance with the GSI pathway (HMP Section 7.4)

Consumers Energy also continues 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. Assessment monitoring data collected in accordance with the CCR Rule is used to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (*i.e.* statistically significant level over the Appendix IV GWPS).

#### 1.3 Site Overview

The JC Weadock Solid Waste Disposal Area is located within the former JC Weadock Power Plant (Site), located south of the DE Karn Power Plant, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). In addition to the disposal area, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 continued to operate through April 15, 2016.

#### 1.4 Geology/Hydrogeology

The majority of Weadock Landfill area is comprised of surficial CCR and sand fill, as described in the Weadock Landfill HMP. USGS topographic maps and aerial photographs dating back to 1950, in addition to field descriptions of subsurface soil at the Site, indicate that the Site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10-30 feet below ground surface (ft bgs) overlying a clay till which is observed at depth ranging from 25-75 ft bgs. A sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well-graded sand present at depths ranging from 10 to 20 ft bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the landfill perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.



The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the Site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs.

The Weadock Landfill is bounded by several surface water features (Figures 1 and 2): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in this water bearing zone is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay.



### 2.0 Leachate Monitoring

The leachate monitoring program consists of an annual laboratory leachate sampling program (Q1) and an annual field leachate sampling program (Q4) per the Weadock Landfill HMP. This program was instituted to maintain the facility under the applicable portions of Part 115, Rule 311 – Leaching tests to evaluate potential for groundwater contamination at unlined industrial waste landfills. Specifically, Subrule (3) states that waste that is disposed of in an industrial waste landfill shall be retested to evaluate potential for groundwater contamination annually or on a more frequent schedule as specified by the solid waste control agency. The Weadock Landfill HMP includes laboratory leachate testing, which consists of four dry-handled Coal Combustion Residual (CCR) samples collected under normal plant operating conditions during the active life of the landfill. There are no leachate data to report this quarter.

Additional support for evaluating the potential for groundwater contamination at the unlined industrial waste landfill includes the field leachate monitoring program conducted during the fourth quarter of each year. This program consists of an annual sampling collection from two (2) leachate headwells; LH-103R and LH-104. This program was implemented to determine constituents in the leachate as measured under actual conditions in the field and to assess which constituents have the potential to exceed applicable criteria at the compliance well locations.



#### 3.0 Groundwater Monitoring

#### 3.1 Monitoring Well Network

The groundwater monitoring system presented in the HMP has been established in accordance with R 299.4906 and the CCR Rule §257.91 and consists of 16 monitoring wells (four background monitoring wells and 12 downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well network has been designed to provide appropriate coverage for water level and water quality data collection along the perimeter of the landfill. The monitoring well locations are shown on Figure 2. Monitoring well specifications and purpose (i.e. static water level monitoring, groundwater quality monitoring, or GSI monitoring) are included in Table 1.

The Weadock Landfill HMP groundwater monitoring system consists of the following:

- **Background Groundwater Quality:** Four monitoring wells located southwest of the Weadock Landfill provide data on background groundwater quality that has not been affected by the CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019) and are used to establish groundwater protection standards (GWPSs) for the landfill:
  - MW-15002 MW-15008 MW-15016 MW-15019
- **Downgradient Groundwater Quality:** The twelve downgradient monitoring wells, located on the outside of the perimeter slurry wall include:

– JCW-MW-18001 – JCW-MW-18004 – JCW-MW-18005 – JCW-MW-18006

- MW-50 - MW-51 - MW-52 - MW-53

MW-53R
 MW-54R
 MW-55
 OW-57R Out

■ Groundwater-Surface Water Interface (GSI) Monitoring: Monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the monitoring program to meet the requirements of Part 31. Locations and alignments were established in the Phase II Groundwater Discharge Evaluation, Figure: Appendix K (Natural Resource Technology, 2005) as a baseline for monitoring future results. These monitoring wells are screened across the water table of the uppermost aquifer and will serve as GSI monitoring wells to determine compliance with generic GSI criteria or site-specific mixing zone-based criteria as appropriate. The eight GSI compliance monitoring wells include:

- MW-50 - MW-51 - MW-52 - MW-53

MW-53R
 MW-54R
 MW-55
 JCW-MW-18004

■ **Static Water Level Measurement Only:** Eleven monitoring wells, located on the inside of the perimeter slurry wall, at paired locations with several of the downgradient monitoring wells include:

JCW-OW-18001 – JCW-OW-18002 – JCW-MW-18003 – JCW-MW-18004

- JCW-MW-18005 - JCW-MW-18006 - MW-20 - OW-51

- OW-53 - OW-54 - OW-55 - OW-56R

- OW-57R IN - OW-61 - OW-63



#### 3.2 July 2023 Monitoring Event

In accordance with the Weadock Landfill HMP, TRC conducted the third quarter 2023 monitoring event for the Weadock Landfill by collecting water levels on July 24, 2023, and collecting groundwater samples on July 24 through 31, 2023. Samples that were collected during this event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan for analysis of total metals and inorganic parameters. Quarterly monitoring constituents include:

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Ass Constitu	_
Boron	Antimony	Lithium
Calcium	Arsenic	Mercury
Chloride	Barium	Molybdenum
Fluoride	Beryllium	Nickel
Iron	Cadmium	Selenium
рН	Chromium, total	Silver
Sulfate	Cobalt	Thallium
Total Dissolved Solids (TDS)	Copper	Vanadium
	Fluoride	Zinc
	Lead	

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity. Analytical results from the monitoring event are included in the attached laboratory reports (Appendix E).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the Weadock Landfill HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix F).

Groundwater samples were collected using a peristaltic pump. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Groundwater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of two field blanks, one equipment blank, three field duplicates (MW-15008, JCW-MW-18006, and MW-50), and one field matrix spike/matrix



spike duplicate samples collected at JCW-MW-18001.

#### 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The laboratory data were found to be complete and usable for the purposes of the Weadock Landfill HMP. The data quality reviews for the JC Weadock Disposal Area network wells are summarized in Appendix B.

#### 3.3 Groundwater Flow Rate and Direction

Potentiometric monitoring initiated in the unusable aquifer beneath the facility includes static water level data collected for development of water table contours and evaluation of the potential for discharge from the facility. The monitoring under this section will be conducted quarterly until closure, as approved by the Director, and semiannually during the 30-year post-closure period. Monitoring will continue until the end of post closure (30 years) or as otherwise approved by the Director.

The measurements for top of casing (TOC) and quarterly recorded depth to water (DTW) with corresponding calculated static water level (SWL) is tabulated and presented in Table 1. A potentiometric surface map is provided as Figure 3.

Groundwater elevations measured at the Site in July 2023 are generally within the range of 579 to 594 feet above mean sea level (ft NAVD88). Groundwater elevations in monitoring wells located adjacent to Saginaw Bay and adjoining surface water bodies are typically encountered at a similar or slightly higher elevation relative to surrounding surface water features measured by the NOAA gauging station. A time-series plot included in Appendix A compares the groundwater elevation of MW-50, MW-51, MW-52, MW-53, MW-54R, JCW-MW-18004, and MW-55 to the nearby NOAA staff gauge. Water levels in wells adjacent to surface water bodies (e.g. Saginaw Bay, Tacey Drain) closely mirror the surface water elevation. Such conditions would result in a minimal gradient to potentially a reverse gradient (i.e., toward the landfill) between the well and the drain which would result in minimal to zero mass flux to the drain (Appendix A: Table A1).

The groundwater monitoring system is structured such that there are eleven monitoring well pairs used to evaluate the hydraulic gradient and potential for water flux across the slurry wall. Static water level observations from the paired wells are shown on time series charts in Appendix A. The static water level elevations inside of the Weadock Landfill perimeter slurry wall are generally significantly different (>3 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairings inside and outside of the constructed slurry wall. As such, the water level elevations indicate that the slurry wall is performing as designed. The general flow direction observed within the confinement of the slurry wall is similar to that identified in previous monitoring rounds. Due to the potential for radial flow, the downgradient wells are appropriately positioned to detect the presence of detection or assessment parameters that could potentially migrate from the Weadock Landfill. As shown on Figure 3 and in Appendix A, the static water level outside of the slurry wall is lower than the static water level inside of the wall; therefore, the potential



groundwater flux across the slurry wall was calculated and included in Table A2 of Appendix A.

#### 3.4 Groundwater Analytical Data and Relevant Screening Criteria

Groundwater analytical data are evaluated in accordance with the Weadock Landfill HMP to determine the effectiveness of landfill structural and operational enhancement measures on the quality and quantity of groundwater flow beneath the footprint of the facility (Section 3.4.1 Detection Monitoring and Section 3.4.2 Assessment Monitoring). Additionally, analytical results for these wells are being evaluated in support of GSI compliance. GSI criteria only apply to the designated compliance point as specified in Section 3.4.3 below; however, analytical results and data trends in groundwater collected from the perimeter dike wells are evaluated to identify potential GSI compliance issues. Data are evaluated by using a combination of screening against relevant criteria, as well as utilizing statistical analyses.

Analytical results from the third quarter 2023 monitoring event are included in the attached laboratory report (Appendix E). Groundwater analytical data from the third quarter 2023 monitoring event are summarized in Table 3 (background monitoring wells) and Table 4 (Weadock Landfill Monitoring Wells), as well as the associated Part 201 generic GSI and site-specific mixing-zone GSI criteria. Field data are summarized in Table 2.

Mixing-zone criteria for arsenic, boron, and selenium are provided for the Karn-Weadock complex in the mixing zone determination, dated December 23, 2015 (MDEQ, 2015). As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. All data are screened against GSI criteria; however, compliance with GSI criteria is determined at select monitoring locations as noted in Section 3.4.3 below.

The mixing zone determination included both final acute values (FAV) and final chronic values (FCV). If a concentration of a constituent at a groundwater well exceeds the acute criteria, and the exceedances are upgradient of the GSI compliance monitoring wells, Consumers Energy must demonstrate that data from all of the compliance monitoring wells are, and will be, in compliance with acute mixing zone-based GSI criteria for those parameters. Averaging of groundwater data is not allowed for comparison to generic GSI or acute mixing zone-based GSI criteria. Acute mixing zoned-based or generic GSI criteria may not be exceeded in any individual GSI compliance monitoring well. If a concentration of a constituent at a well exceeds the chronic criterion, compliance can be demonstrated on a mass-flux basis. The facility can choose to demonstrate compliance by evaluating the total chronic loading based upon the contribution from each compliance well with respect to the total flux observed in the mixing zone.

Table 6 provides a summary of the statistically significant increases or exceedances over the most recent four quarters in accordance with the EGLE-prescribed format; only well/constituent pairs that exceed the relevant GSI criteria (within the last four quarters) are included.



#### 3.4.1 Detection Monitoring

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. The potentiometric analysis, as discussed in Section 3.3, demonstrates that the slurry wall is performing as designed.

In addition to the comparison of analytical data to relevant screening criteria (Table 4), statistical trend analyses are used to evaluate groundwater quality each quarter. Consumers Energy manages and evaluates its groundwater data using Sanitas<sup>TM</sup> Statistical Software. Consumers Energy conducts intrawell trend analyses to examine data for a given well over time to determine if changes in water quality are occurring that may be associated with the landfill and to identify potential GSI compliance issues. Specifically, the Mann-Kendall test for trend was performed at a significance level ( $\alpha$ ) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant.

Appendix C includes a table summarizing the results of the trend tests as well as the Sanitas<sup>™</sup> output summary statistics and graphs. Data are stable or declining for the majority of the well/constituent pairs, with the following exceptions:

- The previously observed increasing trend for boron at MW-54R continued in Q3 2023.
- A new unconfirmed increasing trend of boron at MW-55 was observed in Q3 2023.
- The previously observed increasing trend for calcium at JCW-MW-18001 continued in Q3 2023.
- A new unconfirmed increasing trend for iron at JCW-MW-18001 was observed in Q3 2023.
- The previously observed increasing trend for sulfate at JCW-MW-18001 continued in Q3 2023.

Although increasing trends for detection monitoring constituents were observed, individual constituent trends provide a *potential indication* that there may be a release coming from the monitored unit. When these indicator trends are evaluated with other co-monitored conditions and parameters at the Weadock Landfill, the increasing trends for detection monitoring constituents do not appear to be a result of a new release from operation of the landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Several of these newly observed trends, such as those observed for calcium and sulfate are likely a result of localized geochemical changes influenced by changes in lake levels rather than a change in flux from the landfill and will continue to be evaluated. The increasing trends of calcium and sulfate in JCW-MW-18001 are attributed to localized changes in geochemistry proximal to each well, rather than a change in flux from the landfill, as discussed further in Section 3.5.



Consumers is further evaluating possible causes of the increasing boron concentrations at several porewater compliance monitoring wells. Previous studies (NRT, 2005) documented boron at significantly elevated concentrations at the Karn-Weadock Power Generating Complex. Boron was also identified at SSI background levels in the 2017 *Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit* (TRC, 2018) and was one of the detection monitoring constituents that triggered the initiation of the assessment monitoring program. Statistical significance above the GWPS established for boron has been noted for these monitoring wells per the Part 115 groundwater monitoring program requirements, as discussed in Section 3.4.2.2. Continued monitoring and assessment for potential future actions is warranted at this time; however, observed concentrations of boron in each of the monitoring wells are less than the relevant Part 115 compliance standard - the GSI pathway standard (Section 3.4.3).

#### 3.4.2 Assessment Monitoring Data Evaluation

Assessment monitoring is continuing at the Weadock Landfill in accordance with the Weadock Landfill HMP and §257.95. The assessment monitoring data were statistically evaluated in accordance with the procedures in the Weadock Landfill HMP. The statistical evaluation details are provided in Appendix D. A summary of the confidence interval evaluation is provided in Table 5.

#### 3.4.2.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess constituent concentrations present in groundwater as a result of CCR unit operations by statistically comparing concentrations in the downgradient wells to each of the respective GWPSs for each detection and assessment monitoring constituent. The calculation of the GWPSs in accordance with the Weadock Landfill HMP is documented in the *Groundwater Protection Standards* technical memorandum included as Appendix H of the *First Quarter 2021 Hydrogeological Monitoring Report* (TRC, April 2021). The Federal CCR Rule requires establishment of GWPSs for assessment monitoring (Appendix IV) constituents only. Part 115 requires establishment of GWPSs for both detection and assessment monitoring constituents.

#### 3.4.2.2 Data Comparison to Groundwater Protection Standards

Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*, *Unified Guidance* (Unified Guidance) (USEPA, 2009) and the Weadock Landfill HMP, 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.

**Detection Monitoring Constituents (Part 115):** The third quarter 2023 statistical evaluation indicates that boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001 were present at statistically significant levels above the GWPS. Boron was one of the Appendix III SSIs that originally triggered assessment monitoring. Boron concentrations have been consistently above the GWPS but less than the chronic-based mixing zone-based GSI criterion of 44,000 ug/L within the Weadock Landfill monitoring well network



since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate was present at JCW-MW-18001 at statistically significant levels above the GWPS for the first time in second quarter 2023 due to increasing concentrations. Consumers is asserting an ASD for the increases in calcium and sulfate at JCW-MW-18001, as detailed in Section 3.5.1.

The GWPSs for boron, calcium, and sulfate were established based on background concentrations observed in wells unaffected by the Weadock Landfill or Weadock Bottom Ash Pond. Detection monitoring (i.e., Appendix III) constituents do not have associated health-based criteria and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. Overall, data continue to demonstrate compliance with the applicable GSI criteria, as discussed in Section 3.4.3.

Assessment Monitoring Constituents (Part 115 and Federal CCR): Based on the third quarter 2023 statistical evaluation, there are no assessment monitoring constituents present at statistically significant levels above the GWPSs within the Weadock Landfill groundwater monitoring system. Although concentrations of arsenic and molybdenum at MW-55 observed during individual sampling events are above the GWPS, the elevated concentrations of those constituents are not a result of a release from the Weadock Landfill, as detailed in Section 3.5. The head differential of 7.94 feet between OW-55 inside the slurry wall and MW-55 outside of the slurry wall also suggests that the integrity of the slurry wall is maintained and groundwater flow from the landfill to the south is impeded by the low permeability of the slurry wall. Groundwater conditions at MW-55 will continue to be monitored.

#### 3.4.3 GSI Compliance Monitoring

The GSI monitoring program consists of the eight monitoring points located along the surface water features:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

Third quarter 2023 data from the GSI monitoring points are tabulated in Table 4. Consistent with the Weadock Landfill HMP, confidence limits were established for the following GSI monitoring program constituents:

■ Boron ■ Iron

■ pH ■ Sulfate

■ Arsenic ■ Chromium

■ Lithium ■ Molybdenum

■ Selenium ■ Vanadium

The confidence interval calculations are provided in Appendix D. The confidence interval test compares the lower confidence limit to the GSI. Overall, data continue to demonstrate compliance with the applicable GSI criteria.



**Boron:** The assessment monitoring statistical evaluation found that boron was present at statistically significant levels above the GWPS at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT. Boron is a detection monitoring (i.e. Appendix III) constituent and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. All observations of boron are less than the recommended mixing-zone based GSI value specified in Table 3 of the *Implementation of a Mixing Zone Request, Consumers Energy DE Karn/JC Weadock Complex* (MDEQ, 2015) (Appendix D: Table 2).

Arsenic and Molybdenum at MW-55: Concentrations of arsenic and molybdenum at MW-55 have at times exceeded the GSI criteria on a direct comparison to the fixed limit basis (Appendix D: Table 2). The July 2023 sampling event results show that both arsenic and molybdenum concentrations are below applicable GSI criteria. The statistical evaluation presented in Appendix D shows that the lower confidence limits of the arsenic and molybdenum data over the past 8 events do not exceed the GSI criteria. Additionally, water levels in MW-55 closely mirror the surface water elevation measured at the NOAA gauging station, which indicates there is a minimal outward gradient to a potentially, modest reverse gradient (i.e., toward the landfill) between the monitoring well and the drain, resulting in a minimal to zero mass flux to the drain (Appendix A).

#### 3.5 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed below:

- Calcium and sulfate in monitoring well JCW-MW-18001; and
- Arsenic and molybdenum in monitoring well MW-55.

The groundwater conditions do not conclusively indicate a release from the unit for several reasons as detailed below. The Professional Engineer Certification Statement is included in Appendix G.

#### 3.5.1 Monitoring Well JCW-MW-18001: Calcium and Sulfate

Although confirmed increasing trends were observed at JCW-MW-18001 for calcium and sulfate (through Q3 2023), these trends are not indicative of a new release from the landfill. Calcium and sulfate are two of several constituents that contribute to the overall TDS concentration and increasing calcium and sulfate concentrations could result in an increase in TDS as well. Although, TDS concentrations are not currently exhibiting a statistically significant upward trend, TDS concentrations have been increasing in past events and the data are discussed as part of this ASD. Increases of calcium, sulfate, and TDS concentrations at JCW-MW-18001 are attributed to changes occurring outside of the slurry wall as a result of changing water levels, rather than a change in flux from the landfill; therefore, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for these constituents. The following lines of evidence as well as additional time series charts included in Appendix G support this ASD:

■ The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill (Appendix A).



- Concentration data also support that the slurry wall is effective in reducing the flux of groundwater from the landfill, based on the following observations (Appendix G1):
  - JCW-MW-18001 was installed after the 1,600 linear foot gap in the landfill perimeter slurry wall was closed, as discussed in Section 1.2. Prior to the slurry wall expansion in July 2018, monitoring well JCW-MW-15023 was located within the gap of the slurry wall and was sampled between December 2015 and May 2018 as a part of the original Federal CCR program monitoring well network. The groundwater quality data collected from JCW-MW-15023 shows that groundwater in contact with CCR managed within the landfill was high in arsenic, and low in sulfate, calcium, and TDS (Appendix G1).
  - To accommodate the July 2018 slurry wall expansion, JCW-MW-15023 was decommissioned. Once slurry wall construction was completed, JCW-MW-18001 was installed within 10-ft of the location of the former JCW-MW-15023 well, on the discharge channel side of the slurry wall. Additionally, an observation well, JCW-OW-18001, was installed on the landfill side of the slurry wall to monitor water levels to assess the effectiveness of the hydraulic control. Both JCW-MW-18001 (outside) and JCW-OW-18001 (inside) have been sampled recently to assess concentration trends.
    - Concentrations of arsenic are much higher inside of the slurry wall, within the landfill, while arsenic concentration remain low on the outside of the landfill.
    - Concentrations of sulfate, calcium, and TDS are much lower on the inside of the slurry wall and are higher outside of the slurry wall.
- These combined lines of evidence support that increasing concentrations of calcium, sulfate, and TDS are not a result of a change in flux from the landfill and instead are a result of changing groundwater conditions on the outside of the slurry wall.

#### 3.5.2 Monitoring Well MW-55: Arsenic and Molybdenum

Additionally, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for arsenic and molybdenum at MW-55 indicating elevated levels of constituents at that location are not related to materials management of the Weadock Landfill (2021 Annual Groundwater Monitoring and Corrective Action Report; TRC, January 2022). The basis for this ASD is summarized below and updated time series plots in support of this ASD are included in Appendix G (Figure G2).

Data collected from the 2018 investigation as well as data collected during routine sampling events for Part 115 and Federal CCR groundwater compliance show the following:

- **Distinct Chemistry from Leachate** The leachate chemistry from a monitoring well screened at the base of the ash fill (LH-104) is distinctly different from the groundwater chemistry near MW-55 and the temporary monitoring wells installed by TRC in the investigation area, as illustrated Appendix G of the 2019 Annual Groundwater Monitoring and Corrective Action Report (TRC, January 2020). Additionally, concentrations of arsenic and molybdenum are generally much lower, and concentrations of boron are much higher within the landfill (LH-104) than outside of the landfill at MW-55 (Figure G2).
- Conservative Tracer Boron is a metalloid known to be present in coal ash and can be used as a conservative tracer in groundwater. Concentrations of boron in Leachate Headwell LH-104 (10,800 ug/L in October 2022) are significantly higher than concentrations observed at any of the other locations sampled as a part of this monitoring program.



- Additionally, recently observed boron concentrations at MW-55 are similar to or lower than historical concentrations, which further supports that the water quality at MW-55 is not directly affected by groundwater migrating from the landfill.
- Reducing Conditions and Groundwater Head Levels Water levels observed at MW-55, as shown in Appendices A and G, increased over 4-ft between 2010 and 2020. The oxidation-reduction potential (ORP) at MW-55 has generally decreased (i.e., is more reducing) since 2010. The lowering of ORP over time as a result of increased water levels has changed the geochemical conditions in the vicinity of MW-55 and has resulted in increased solubility of arsenic and molybdenum. Since 2021, water levels have been generally decreasing, resulting in a slight increase in ORP (i.e., is less reducing) and decreases in concentrations of both arsenic and molybdenum, which further illustrates the relationship between groundwater elevations, redox state, and concentration of arsenic and molybdenum in groundwater.



#### 4.0 Conclusions and Recommendations

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. Evaluation of the third quarter 2023 data demonstrate that the slurry wall is functioning as designed.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule, as discussed in the 2022 Annual Groundwater Monitoring and Corrective Action Report, due to observed groundwater concentrations that are indicative of impact from past landfill operations. Evaluation of the third quarter 2023 data in accordance with the Weadock Landfill HMP demonstrate that boron, calcium, and sulfate are present at concentrations above the GWPSs. Boron, calcium, and sulfate are detection monitoring (i.e., Appendix III) constituents that do not have associated health-based criteria and there is not a complete drinking water pathway onsite. As such, the relevant Part 115 compliance pathway is the GSI pathway. The statistical evaluation in third quarter 2023 found that no constituents were present at statistically significant levels above applicable GSI criteria.

Therefore, Consumers Energy will continue with the detection and assessment monitoring as required by the CCR rule as well as the monitoring program relative to the implementation of the site-specific mixing zone authorization at the Weadock Landfill unit in conformance with the JC Weadock Landfill HMP. The fourth quarter monitoring event for is scheduled for October 2023.



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Table 1

# Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	тос		Scree	n In	terval	July 2	24, 2023
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Ele	evat (ft)	ion	Depth to Water	Groundwater Elevation
						(ft BTOC)	(ft)
Background Monitorii	ng Wells						
MW-15002	587.71	Sand	580.9	to	570.9	7.15	580.56
MW-15008	585.36	Sand with clay	578.7	to	568.7	4.63	580.73
MW-15016	586.49	Sand	581.2	to	578.2	4.62	581.87
MW-15019	586.17	Sand and Sand/Clay	579.5	to	569.5	5.56	580.61
MW-58						5.58	580.86
Bottom Ash Pond: Do	wngradient Monito	oring Wells					
JCW-MW-15007	587.40	Sand	582.7	to	579.2	3.78	583.62
JCW-MW-15009	589.64	Sand	581.9	to	576.9	8.65	580.99
JCW-MW-15010	597.76	Sand	579.7	to	578.2	17.03	580.73
JCW-MW-15028	589.64	Sand	567.7	to	564.7	7.60	582.04
Landfill: Downgradier	nt Monitoring Wells	s (outside slurry wall)					
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3	to	573.3	16.68	580.05
JCW-MW-18004	593.04	Sandy Clay	583.9	to	578.9	12.05	580.99
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0	to	575.0	8.43	582.46
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8	to	577.8	13.13	587.59
MW-50	593.36	Sand	577.8	to	574.8	13.38	579.98
MW-51	594.29	Sand and Clay	577.8	to	574.8	14.23	580.06
MW-52	594.90	Sand	579.3	to	576.3	14.87	580.03
MW-53	593.68	Sand and Clay	579.1	to	576.1	13.68	580.00
MW-53R	594.25	Sand and Clay	580.4	to	575.4	14.20	580.05
MW-54R	593.89	Clay and Sand	581.3	to	576.3	13.60	580.29
MW-55	593.82	Sand	581.5	to	578.5	13.85	579.97
OW-57R OUT	591.00	Sandy Clay	577.0	to	572.0	9.68	581.32
Landfill: Static Water	Level Only (inside	slurry wall)					
JCW-OW-18001	595.84	Fly Ash and Sand	581.1	to	576.1	6.80	589.04
JCW-OW-18002	593.63	Sand	578.9	to	573.9	10.60	583.03
JCW-OW-18003	593.99	Sand and Clay	580.5	to	575.5	8.50	585.49
JCW-OW-18004	594.19	Sandy Clay	584.6	to	579.6	7.30	586.89
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9	to	577.9	7.90	592.71
MW-20	592.73	NR	~581.1	to	~578.1	6.44	586.29
OW-51	593.62	Clay and Sand	578.9	to	575.9	9.34	584.28
OW-53	593.64	Clay and Sand	579.0	to	576.0	7.78	585.86
OW-54	594.10	Clay and Sand	580.0	to	577.0	7.88	586.22
OW-55	594.67	Clay (or Sand and Clay)	580.9	to	577.9	6.76	587.91
OW-56R	592.01	Ash and Sand	577.5	to	572.5	6.05	585.96
OW-57R IN	590.86	Sandy Clay	575.7	to	570.7	5.95	584.91
OW-61	602.15	Ash and Sand	588.0	to	585.0	8.35	593.80
Landfill: Leachate Hea	adwells						
LH-103R	612.70	Fly Ash	30.2	to	33.2	22.80	589.90
LH-104	596.56	Fly Ash	8.0	to	11.0	9.00	587.56

#### Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

### Summary of Field Parameters JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Background							
MW-15002	7/26/2023	0.80	-56.8	6.6	5,346	15.5	5.4
MW-15008	7/24/2023	0.90	-55.5	6.5	1,340	14.9	0.6
MW-15016	7/26/2023	0.90	-83.9	6.8	1,559	19.3	6.0
MW-15019	7/24/2023	0.90	-61.4	6.6	1,636	14.7	4.9
Weadock Landfill							
JCW-MW-18001	7/26/2023	0.28	-61.0	6.8	4,120	16.2	10.0
JCW-MW-18004	7/31/2023	6.60	50.3	6.8	1,364	16.9	3.0
JCW-MW-18005	7/31/2023	1.30	28.3	6.8	1,245	15.4	4.5
JCW-MW-18006	7/31/2023	1.30	-25.0	6.9	1,049	15.1	4.1
MW-50	7/26/2023	0.23	-80.5	7.4	1,620	17.2	10.0
MW-51	7/26/2023	0.40	-26.3	7.4	1,765	15.3	10.0
MW-52	7/31/2023	1.35	13.5	6.6	1,548	13.8	4.9
MW-53	7/31/2023	1.25	-60.5	7.1	1,049	13.8	2.8
MW-53R	7/31/2023	1.32	23.2	6.7	1,350	13.3	4.5
MW-54R	7/31/2023	2.00	22.0	6.8	1,017	14.0	3.5
MW-55	7/31/2023	1.20	-81.0	6.9	1,136	15.5	3.3
OW-57ROUT	7/31/2023	1.40	39.5	6.9	1,133	15.8	2.8

#### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

## Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	7/26/2023	7/24/2023	7/26/2023	7/24/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^		Backç	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	146	149	572	275
Calcium	mg/L	NC	NC	NC	500EE	221	123	240	174
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	1,940	333	191	339
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	2.16	19	138	105
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	2,100	526	660	671
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	6.6	6.5	6.8	6.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	< 1	< 1	19	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	651	85	104	362
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	2	2	1	1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	23	23	73	15
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Selenium	ug/L	50	50	50	5.0	< 1	< 1	< 1	1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	13,500	20,800	15,100	23,500
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	2	< 1	1	1
Nickel	ug/L	NC	100	100	120	7	2	10	4
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	10	6	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	18	< 10	< 10	< 10

#### Notes:

- ug/L micrograms per liter; mg/L milligrams per liter.
- pCi/L picocuries per liter; SU standard units; pH is a field parameter.
- 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 21, 2020.
- \*\* 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
- hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan
- Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for
- surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported. **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.

#### Summary of Groundwater Sampling Results (Analytical)

### JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

						LOSCAVIII	e, michigan						
							Sample Location:	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
							Sample Date:	7/26/2023	7/31/2023	7/31/2023	7/31/2023	7/26/2023	7/26/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient	Downgradient/ GSI	Downgradient	Downgradient	Downgradient/ GSI	Downgradient/ GSI
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4.000	44.000	69.000	1,470	310	1.170	2.100	1,720	1.180
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	555	229	202	126	188	162
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	58.9	14.2	44.1	73	37.4	97
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	1,770	478	216	39.4	392	308
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	3,530	1,220	1,000	765	1,100	1,100
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.78	6.81	6.75	6.87	7.38	7.38
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	< 1	< 1	18	3	10
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	49	30	76	354	114	141
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	2
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	102	50	33	36	58	40
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	50	50	50	5.0	55	120	2	2	2	2	1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5(2)			_	_								
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	NC	NC	2,790	24	171	6,910	1,960	1,290
Copper	ug/L	1,000**	1,000E	1,000E	20	NC	NC	2	2	2	< 1	2	3
Nickel	ug/L	NC	100	100	120	NC	NC	41	< 2	8	< 2	2	4
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	2	< 2	< 2	3	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000E	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

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

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

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 21, 2020.

\*\* - 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is

to the Great Lakes or connecting waters per footnote (FF)
# - 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.

E - Criterion is the aesthetic drinking water value per footnote {E}.

EE - Criterion is based on the total dissolved solids GSI value per footnote (EE).

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported. 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.

#### Summary of Groundwater Sampling Results (Analytical)

### JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

						Essexviii	c, micriigan						
							Sample Location:	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
							Sample Date:	7/31/2023	7/31/2023	7/31/2023	7/31/2023	7/31/2023	7/31/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,030	4,370	2,190	6,170	1,290	1,750
Calcium	mg/L	NC	NC	NC	500 <sup>EE</sup>	NC	NC	247	146	220	162	150	124
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	31.5	80.3	34.6	48.5	18.5	53.7
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>€</sup>	250 <sup>E</sup>	500EE	NC	NC	569	7.39	217	73.8	129	79
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	1,520	792	1,150	761	827	762
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.6	7.1	6.71	6.84	6.91	6.9
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	< 1	1	17	< 1	75	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	99	692	144	106	240	72
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	<1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	27	44	62	75	27	24
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	< 5	15	33	6
Selenium	ug/L	50	50	50	5.0	55	120	< 1	2	2	1	1	1
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	15(2)												
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	NC	NC	6,720	1,390	1,180	111	21,900	30
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000E	20	NC	NC	2	< 1	1	6	< 1	1
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	< 2	< 2	22	13
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

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

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

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.

NC - no criteria; -- - not analyzed.

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\*\* - 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is

to the Great Lakes or connecting waters per footnote (FF)
# - 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.

E - Criterion is the aesthetic drinking water value per footnote {E}.

EE - Criterion is based on the total dissolved solids GSI value per footnote (EE).

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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.

## Summary of Confidence Interval Evaluation: July 2023 JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Assessment Mo	Assessment Monitoring Statistical Evaluation																							
Constituent	Units	GWPS	MW	<b>/-50</b>	MV	<i>l</i> -51	MV	<i>l</i> -52	MV	V-53	MW	-53R	MW	-54R	MW	<i>l</i> -55	OW-57	'R OUT	JCW-M\	W-18001	JCW-M\	N-18005	JCW-M\	W-18006
Constituent	Units	GWF3	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron <sup>(1)</sup>	ug/L	560	1,400	1,900	1,200	1,400	990	1,300	3,000	4,400	1,800	2,400	4,300	5,800	690	1,200	1,700	2,000	1,400	1,700	950	1,200	2,000	3,000
Calcium	mg/L	280		1	98	190											1		390	640				
Sulfate	mg/L	780																	1,200	2,200				
Arsenic	ug/L	21									10	22			(2)	(2)							13	29
Molybdenum	ug/L	73		1											(2)	(2)	1							
Iron	ug/L	28,000													16,000	33,000								

GSI Statistical Evaluation										
Constituent	Units	GSI	MW-55							
Constituent	Office Gol		LCL	UCL						
Arsenic	ug/L	100	45	140						
Molybdenum	ug/L	120	32	140						

#### Notes:

ug/L - micrograms per Liter

mg/L - milligrams per Liter

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

GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated April 23, 2021

GSI - Groundwater Surface Water Interface Criteria; GSI criteria is the generic Michigan Part 201 GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

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

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

1,300	Indicates a statistically significant exceedance of the GWPS (detection monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the GWPS (assessment monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the applicable GSI criterion. An exceedance occurs when the LCL is greater than the criterion.

- (1) Boron concentrations were confirmed as a statistically significant increase (SSI) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).
- (2) The concentrations of arsenic and molybdenum at MW-55 are not a result of a release from the unit, as detailed in the Alternate Source Demonstration (TRC, January 2022); therefore, confidence intervals were not calculated for comparison to GWPSs.

# EGLE Exceedance Summary Table JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

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

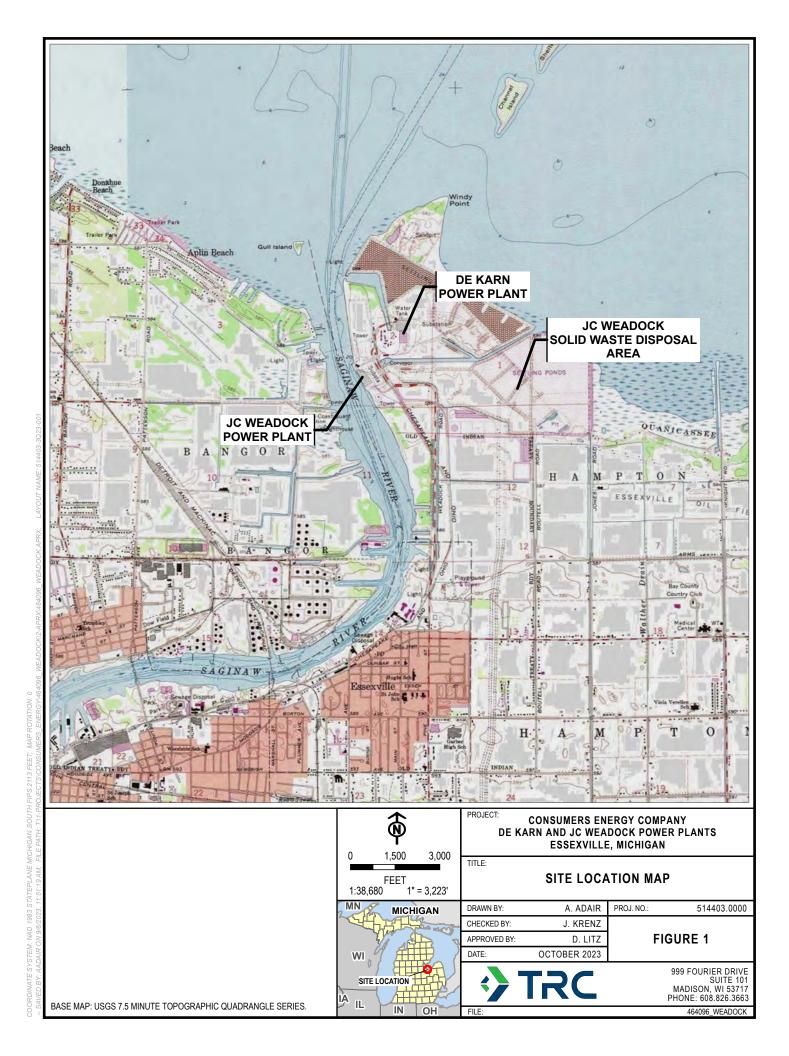
Data is in	(X) ug/L	or	
	( ) mg/L		
unless otherw	ise stated		

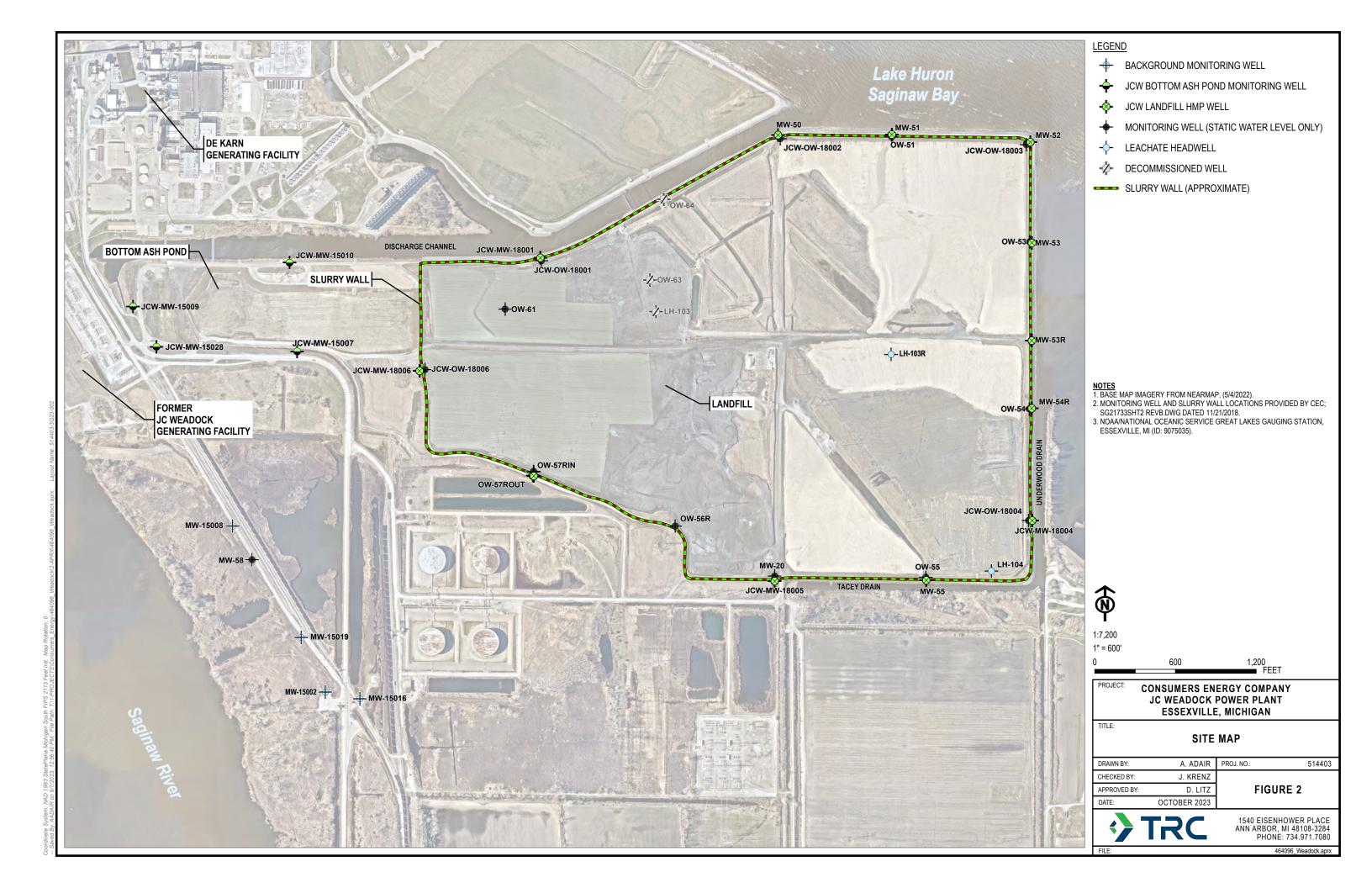
Facility: JC Weadock - WDS# 395457

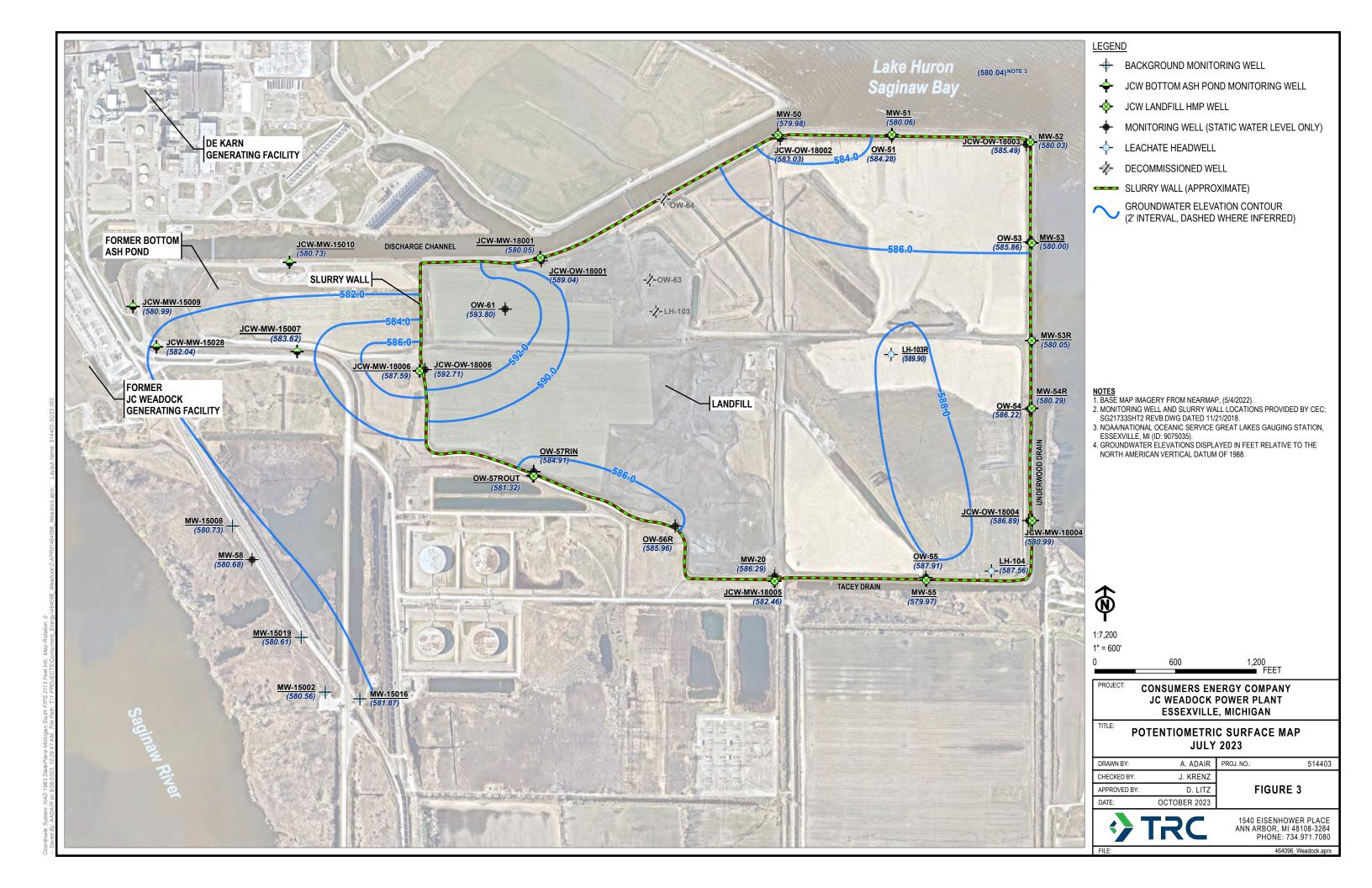
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	3 Qtr. 2023 ( <b>bold</b> >201)	2 Qtr. 2023 ( <b>bold</b> >201)	1 Qtr. 2023 ( <b>bold</b> >201)	4 Qtr. 2022 ( <b>bold</b> >201)				
	No Exceedances at Compliance Locations											



### **Figures**









# Appendix A Static Water Level Evaluation

#### Table A1

Static Water Levels for Select Perimeter Dike Monitoring Wells and NOAA Staff Gauge JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Well Location	Date Measured	Groundwater Water Elevation (GWE) (ft)	Saginaw Bay Surface Water Elevation (SWE) (ft)	Elevation Difference (GWE- SWE) <sup>(1)</sup>	
MW-50	7/24/2023	579.98		-0.06	
MW-51	7/24/2023	580.06		0.02	
MW-52	7/24/2023	580.03		-0.01	
MW-53	7/24/2023	580.00	580.04	-0.04	
MW-53R	7/24/2023	580.05	360.04	0.01	
MW-54R	7/24/2023	580.29		0.25	
MW-55	7/24/2023	579.97		-0.07	
JCW-MW-18004	7/24/2023	580.99		0.95	
Average:		580.17		<u> </u>	

#### Notes:

Elevation in feet above North American Vertical Datum 1988 (NAVD 88)

TOC: top of well casing

ft BTOC: feet below top of well casing

(1) Positive elevation difference indicates flow toward the surface water body.

#### Table A2

#### Slurry Wall Gradient and Flux

#### JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Discharge Channel	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
JCW-OW-18001	589.04		22.4	4.02E-01	2.00	2.88	1,010		0.40	2,904	7.61E-02	0.57	208
JCW-MW-18001		580.05			3.75			2.30E-08	0.40	2,904	7.01E-02	0.57	200
JCW-OW-18002	583.03		28.9	1.06E-01	4.00	4.25	970	2.30L-00	0.11	4,123	2.84E-02	0.21	78
MW-50		579.98			4.50				0.11	7,120	2.072 02	0.21	7.0
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-51 MW-51	584.28	580.06	14.4	2.93E-01	4.00 4.76	4.38	1,850		0.29	8,103	1.55E-01	1.16	423
JCW-OW-18003	585.49	300.00	33.9	1.61E-01	3.50	3.87	740						
MW-52	303.43	580.03	33.3	1.012-01	4.24	3.07	740	2.30E-08	0.16	2,864	3.01E-02	0.23	82
OW-53	585.86		20.1	2.91E-01	1.25	1.70	730		0.29	1,245	2.36E-02	0.18	64
MW-53		580.00			2.16				0.29	1,245	2.30E-02	0.10	04
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Non-Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-54	586.22	,	21.2	2.79E-01	2.00	2.25	510		0.28	1.148	2.005.02	0.16	57
MW-54R		580.29			2.50				0.28	1,148	2.09E-02	0.16	5/
JCW-OW-18004	586.89		26.6	2.22E-01	8.00	4.55	820		0.22	3.727	5.39E-02	0.40	147
JCW-MW-18004		580.99			1.09			2.30E-08	0.22	3,121	5.39E-02	0.40	147
OW-55	587.91		24	3.32E-01	2.00	1.99	1,220	∠.30⊑-00	0.33	2,422	5.23E-02	0.39	143
MW-55		579.97			1.97				0.55	2,722	J.2JL-02	0.59	143
MW-20	586.29		40.9	9.36E-02	1.50	1.38	1,120		0.09	1,540	9.40E-03	0.07	26
JCW-MW-18005		582.46			1.25				0.00	1,540	5.40L-05	0.01	20

Calculated Groundwater Discharge from JC Weadock (gal per day) 3.36

> 0.45 (cubic ft per day) (cubic ft per min) 3.1E-04

Calculated Groundwater Discharge from JC Weadock (gal per yr) 1,228 164 (cubic ft per yr)

Calculated Groundwater Discharge from JC Weadock (gal per year per linear foot of dike)

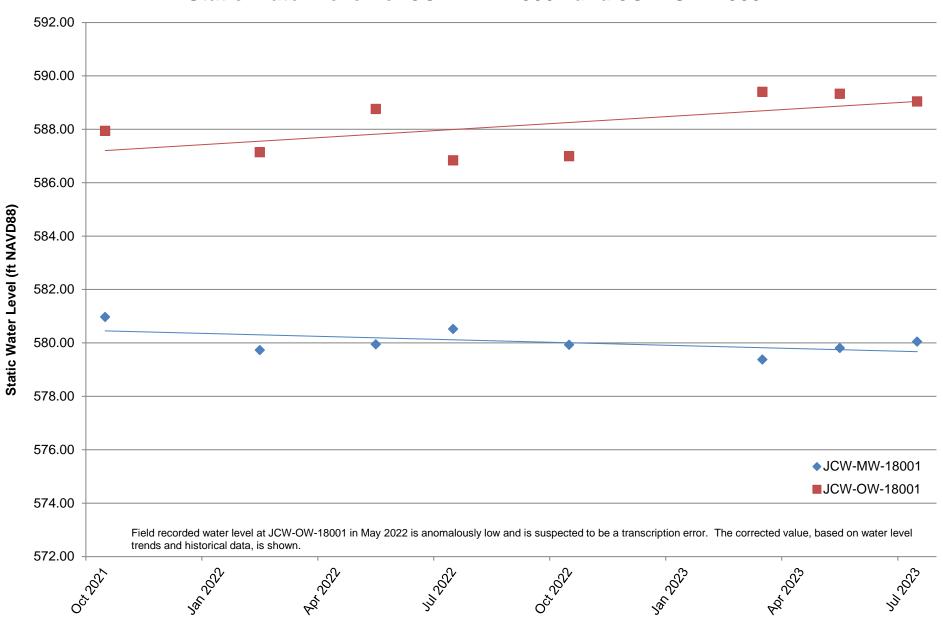
0.14 (cubic feet per year per linear foot of dike) 1.83E-02

Water level data collected on July 24, 2023 are shown by yellow cells:

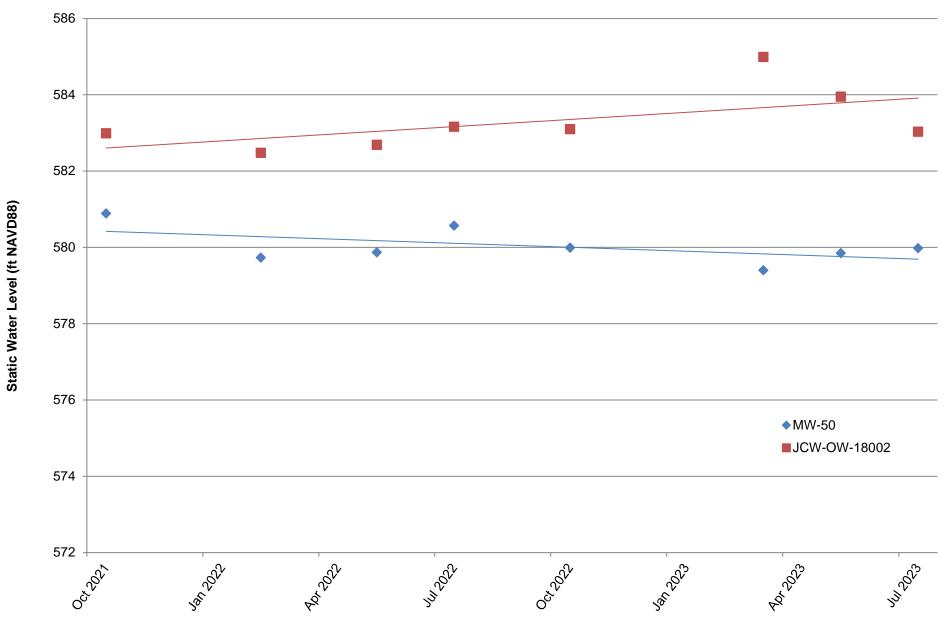
- 1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
- 2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above the top of the sand unit, or the measured saturated thickness of the sand unit if the SWL is below the top of the sand unit.
- 3. Hydraulic conductivity taken as harmonic mean of laboratory tests done on in-place slurry wall from NTH Certified Quality Assurance Report, Appendix E, April 24, 2009
- 4. Arithmetic average used to develop geometric properties of each section/zone (e.g. discharge channel, adjacent, and non-adjacent)
- 5. If Obs well SWL < MW SWL calculated flow will be zero.

SWL = Static Water Level; Obs Well = Observation Well; MW= Monitoring Well; ft NAVD 88 = feet above North American Vertical Datum 1988 ft/ft = feet per foot; cm/sec = centimeters per second; ft<sup>2</sup> = square feet; ft<sup>3</sup>/day = cubic feet per day; Gal/day = gallons per day; Gal/yr = gallons per year i = hydraulic gradient; K = hydraulic conductivity;  $x_{wells}$  = distance between well pairs

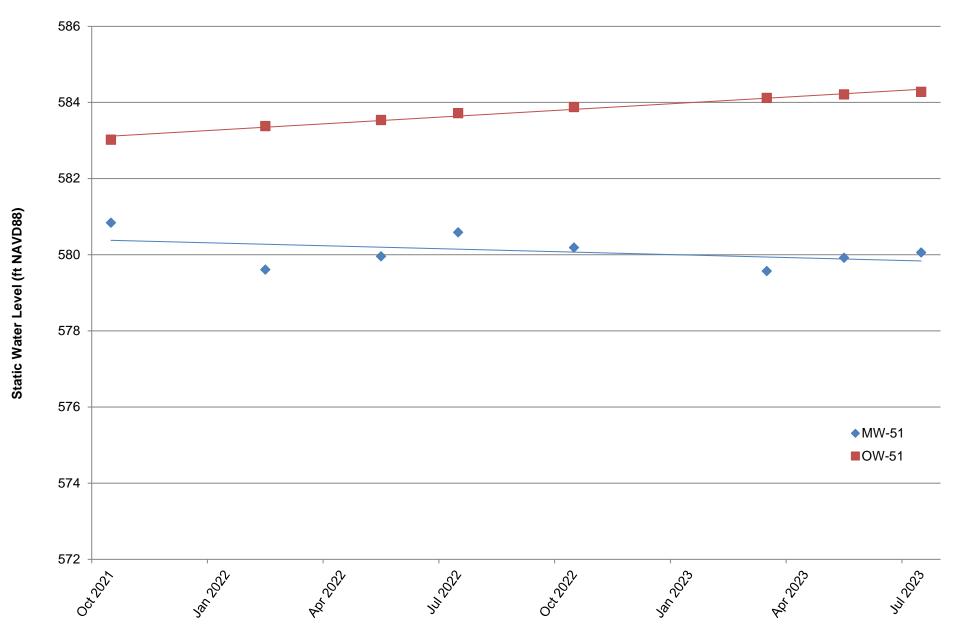
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



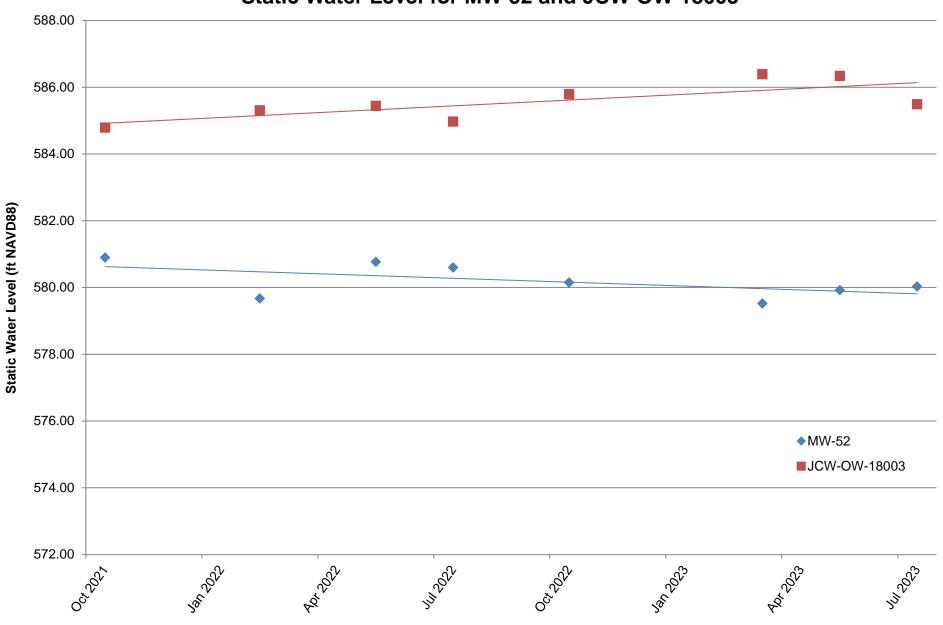
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



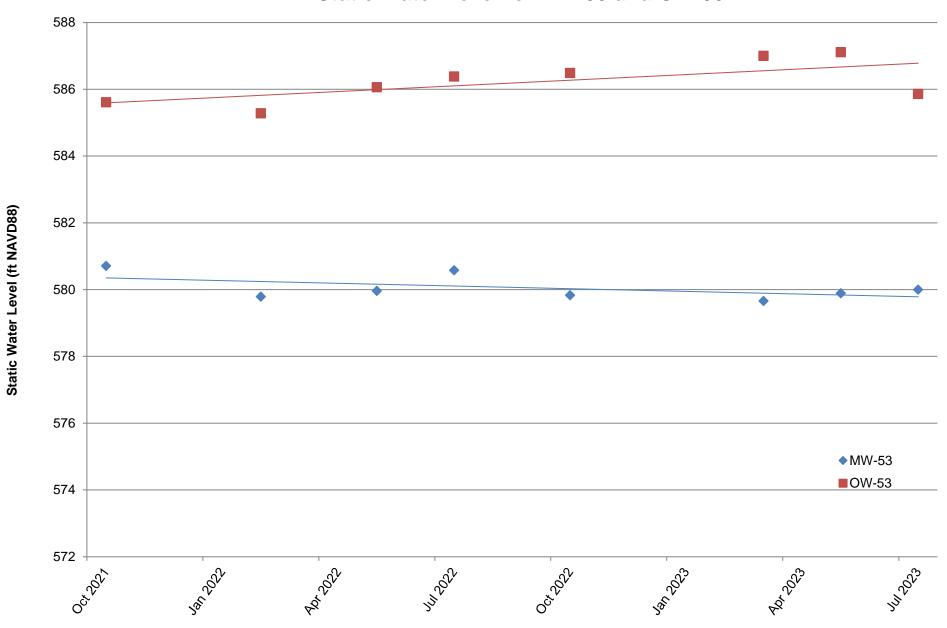
Appendix A
Static Water Level for MW-51 and OW-51



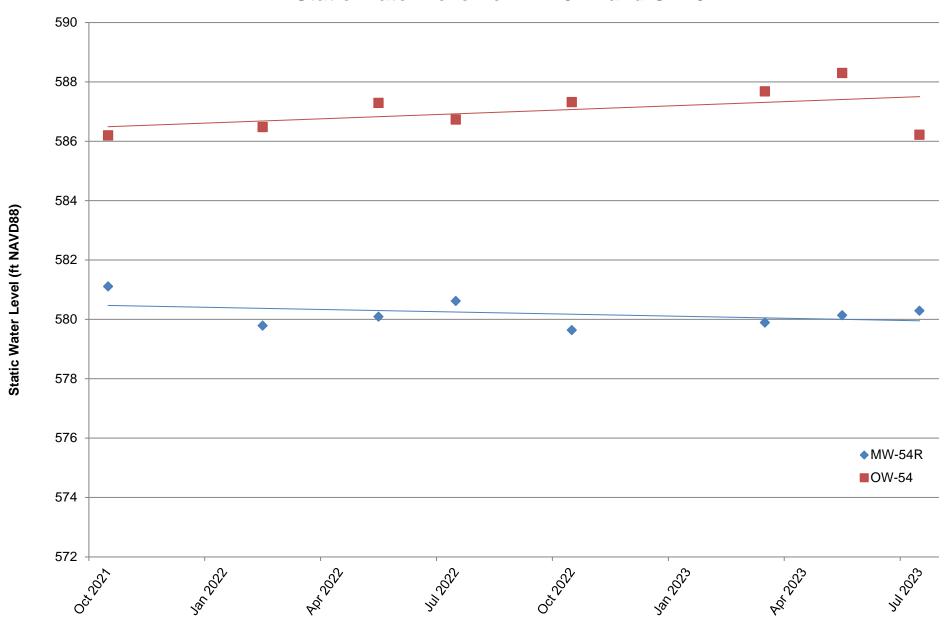
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



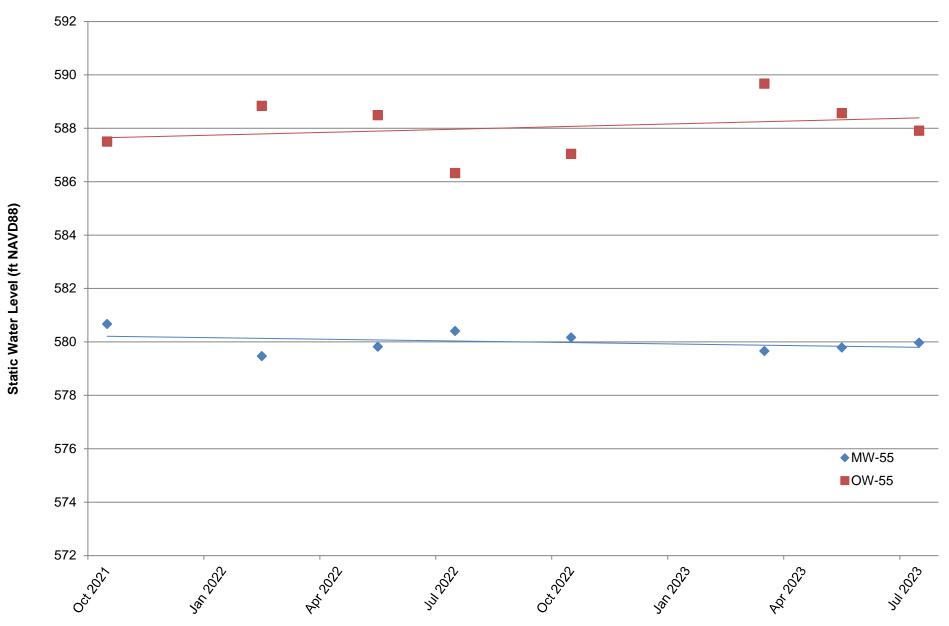
Appendix A
Static Water Level for MW-53 and OW-53



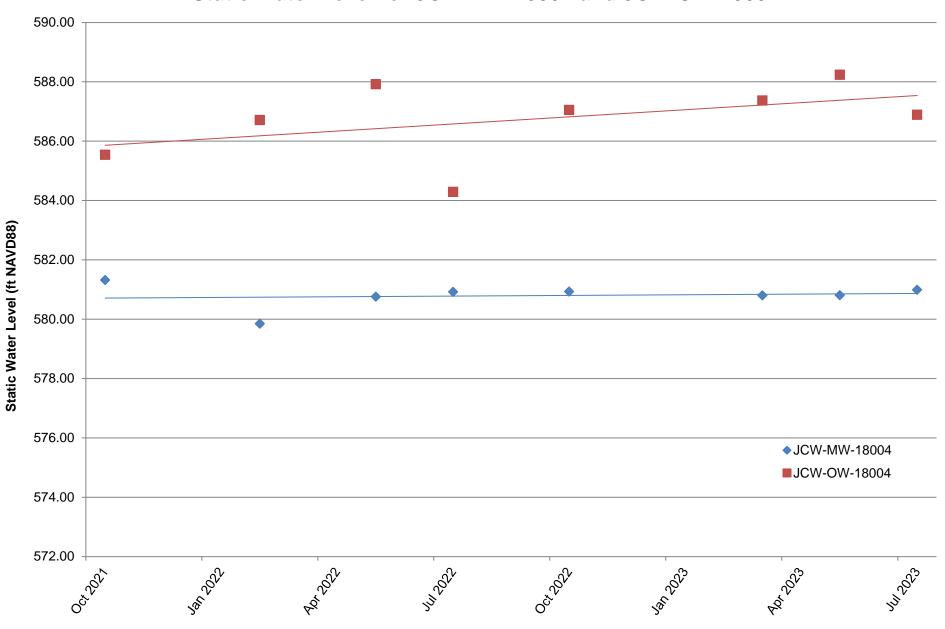
Appendix A
Static Water Level for MW-54R and OW-54



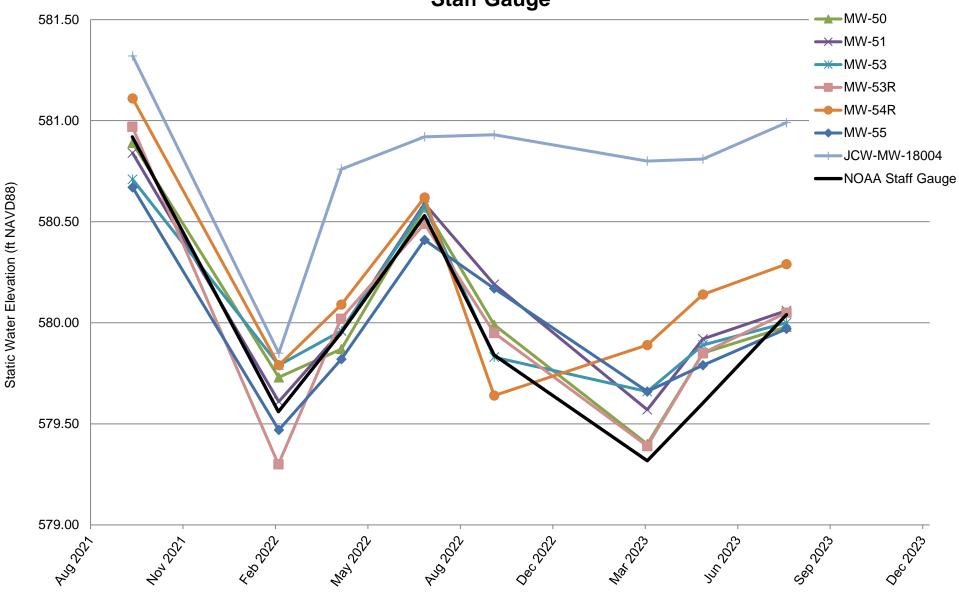
Appendix A
Static Water Level for MW-55 and OW-55



Appendix A
Static Water Level for JCW-MW-18004 and JCW-OW-18004



Appendix A
Static Water Elevations for Select Perimeter Dike Monitoring Wells and NOAA
Staff Gauge





# Appendix B Data Quality Review

# Laboratory Data Quality Review Groundwater Monitoring Event July 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0721.

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

■ MW-15002

■ MW-15008

MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method		
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0		
Total Dissolved Solids (TDS)	SM 2540C		
Total Metals	SW-846 6020B/7470A		

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium 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**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- The field duplicate pair samples were DUP-Background and MW-15008; all criteria between the parent and duplicate samples were within the QC limits with the following exception:
  - The results for chromium were <5x the RL and the absolute difference was equal to the RL. Therefore, the positive results for chromium in all groundwater samples in this data set should be considered estimated, as summarized in the attached table, Attachment A
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

# Attachment A

Summary of Data Non-Conformances for Groundwater Analytical Data JCW/DEK Background Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15002	7/26/2023		
MW-15008	7/24/2023		
MW-15016	7/26/2023	Chromium	Field duplicate variability (absolute difference equal to reporting limit); potential uncertainty exists for the listed results.
MW-15019	7/24/2023		
DUP-Background	7/24/2023		

# Laboratory Data Quality Review Groundwater Monitoring Event July 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and/or alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0723.

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

	JCW-MW-18001		JCW-MW-18004	•	JCW-MW-18005
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■ JCW-MW-18006	■ MW-50	■ MW-51
■ MW-52	■ MW-53	■ MW-53R
■ MW-54R	■ MW-55	■ MW-58

OW-57R OUT

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

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the 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**

- One field blank (FB-01) and one equipment blank (EB-01) were collected. Target analytes were not detected in these blank samples with the following exception.
  - Chromium was detected at 2 μg/L in the field blank (FB-01). The positive result for chromium in sample MW-51 is a potential false positive as summarized in the attached table, Attachment A.
- MS and MSD analyses were performed on sample JCW-MW-18001 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-JCW-LF-02/JCW-MW-18006 and DUP-JCW-LF-01/MW-50; all criteria between the parent and duplicate samples were within the QC limits.

3

Laboratory duplicate analyses were not performed on a sample from this data set.

# Attachment A

Summary of Data Non-Conformances for Porewater Analytical Data JCW Landfill Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-51	7/26/2023	Chromium	Field blank contamination



# **Appendix C Detection Monitoring Statistical Trend Tests**

## Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility Third Quarter 2023 Data from October 2021 to July 2023

Porewater Monitoring Points									
PARAMETER JCW-MW-18001 JCW-MW-18004 JCW-MW-18005 JCW-MW-18006 MW-50 MW-51									
Boron <sup>(1)</sup>	0	0	0	0	0	0			
Calcium	↑ <sup>ASD</sup>	0	0	0	0	<b>↓</b>			
Chloride	0	0	0	0	0	0			
Fluoride	O*	O*	O*	O*	O*	O*			
Iron	<b>↑</b> *	0	<b>↓</b>	0	0	0			
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0			
Sulfate	↑ <sup>ASD</sup>	0	0	0	0	<u></u>			
Total Dissolved Solids	0	0	0	0	0	$\downarrow$			

### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

↑ = Upward trend, confirmed

= Downward trend, continuous

↓\* = Downward trend, new

↑ ASD = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

## Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility Third Quarter 2023 Data from October 2021 to July 2023

Porewater Monitoring Points								
PARAMETER         MW-52         MW-53         MW-53R         MW-54R         MW-55         OW-57R								
Boron <sup>(1)</sup>	0	0	0	<b>↑</b>	<b>^*</b>	0		
Calcium	0	0	0	0	0	0		
Chloride	$\downarrow$	0	0	0	0	0		
Fluoride	O*	O*	O*	O*	O*	O*		
Iron	0	0	0	0	0	0		
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0		
Sulfate	0	0	0	0	0	0		
Total Dissolved Solids	0	0	0	0	0	0		

### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

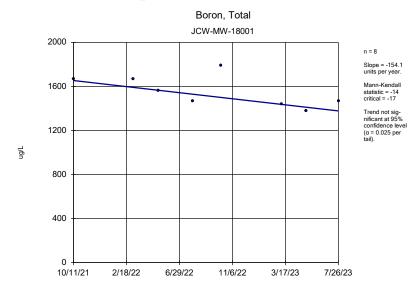
= Upward trend, confirmed

= Downward trend, continuous

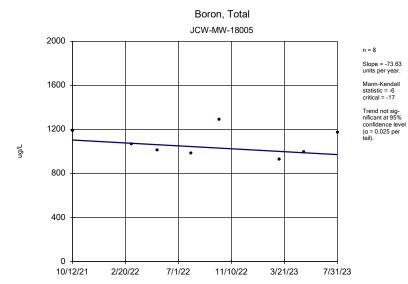
\* = Downward trend, new

ASD = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023).

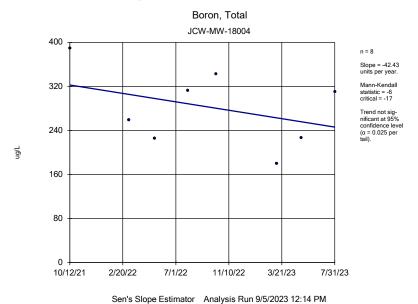
(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).



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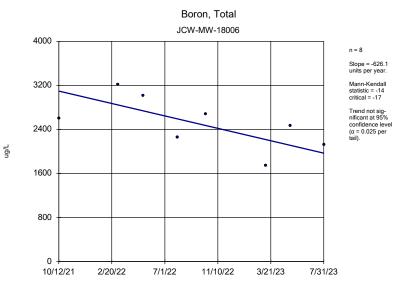


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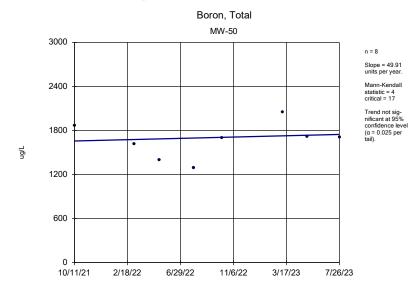


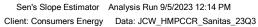
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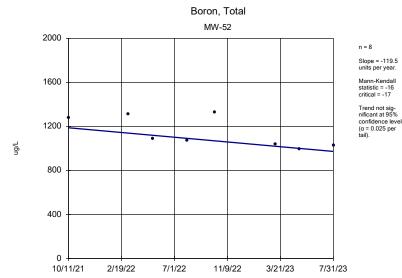


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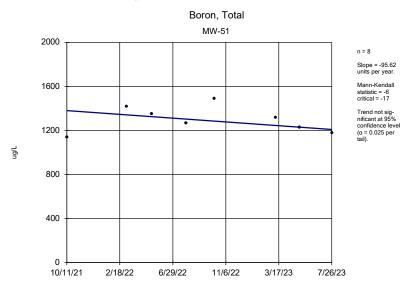


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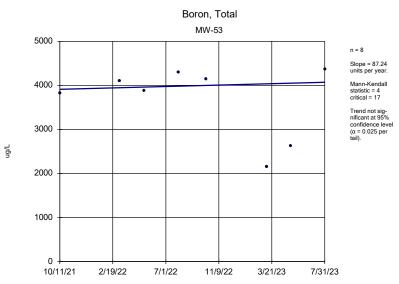
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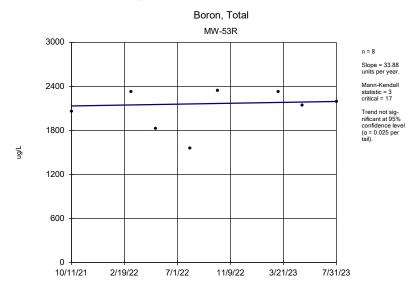


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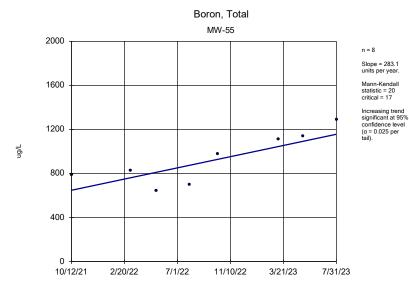
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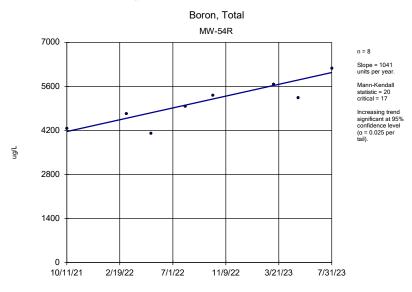
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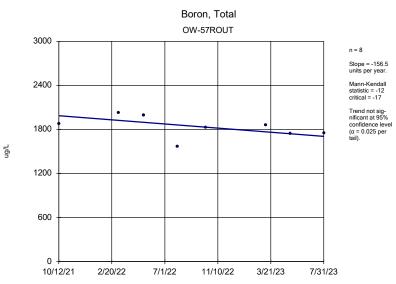


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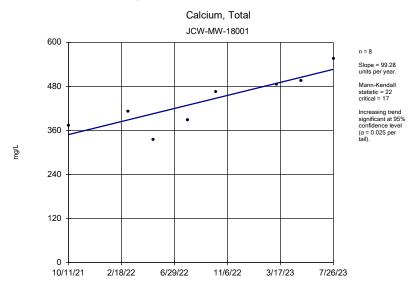
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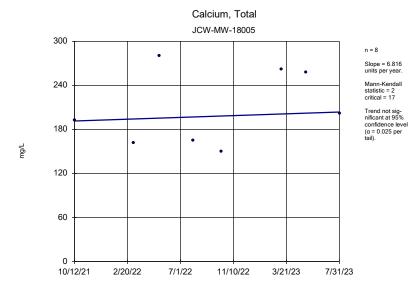


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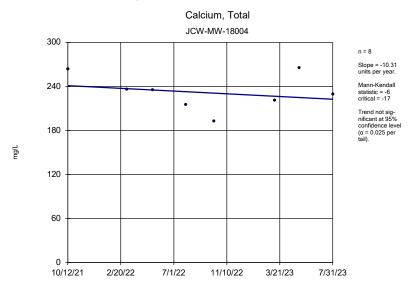
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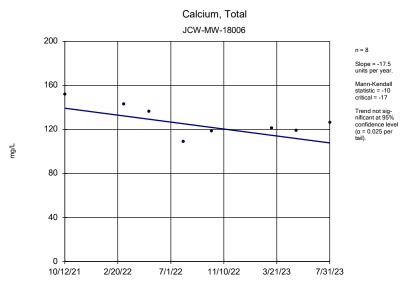
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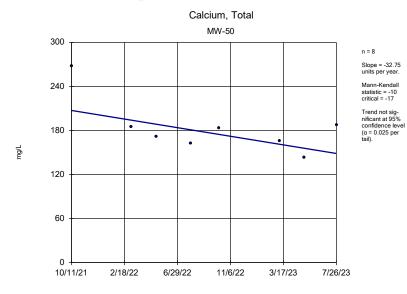


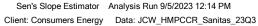
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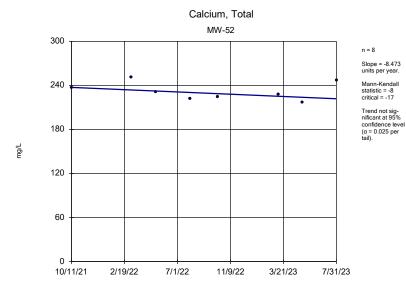


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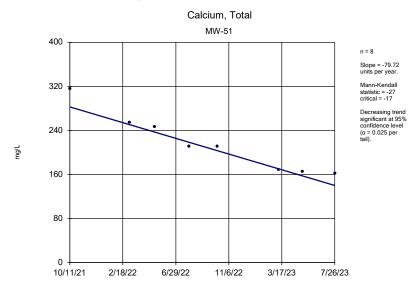




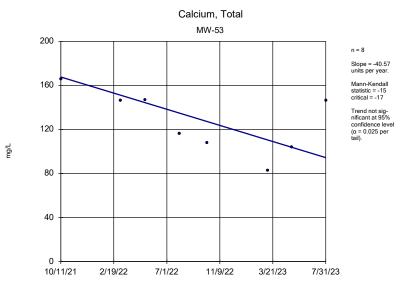


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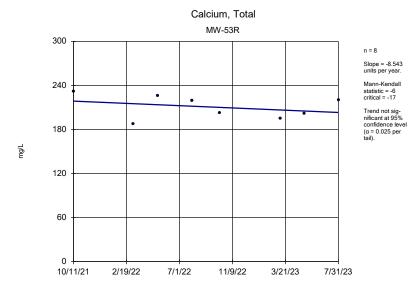


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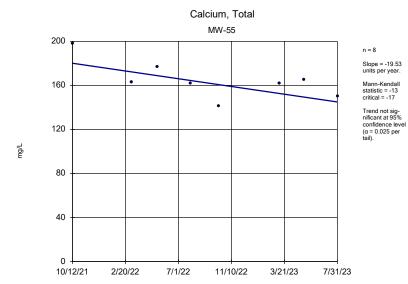


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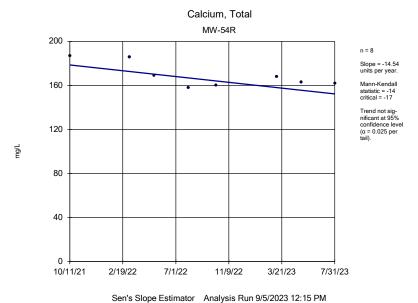


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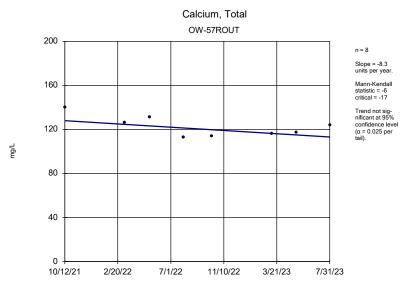


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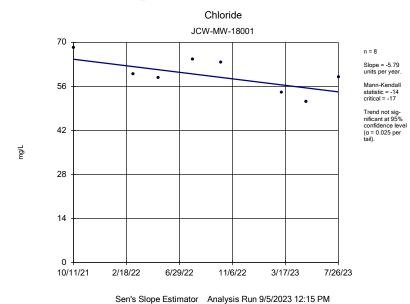
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10/12/21

2/20/22



Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

Chloride

# JCW-MW-18005 n = 8 Slope = -12.22 units per year. Mann-Kendall statistic = -16 critical = -17 Trend not significant at 95% confidence level (a = 0.025 per tail).

7/1/22

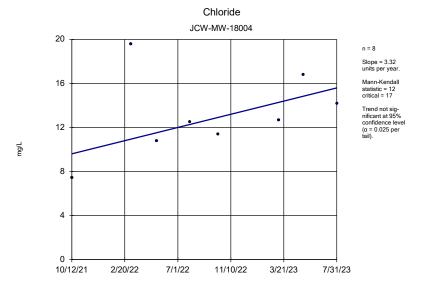
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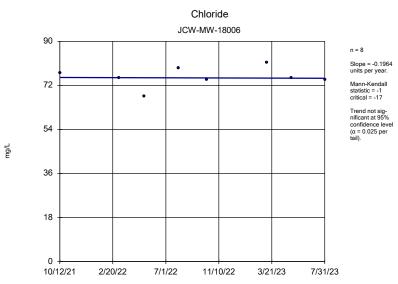
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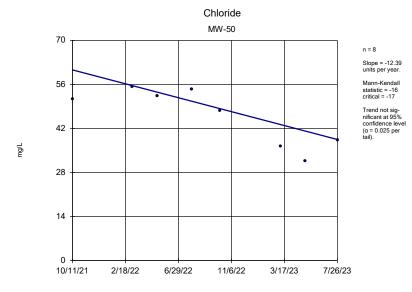
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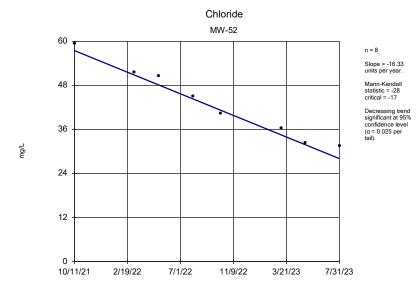
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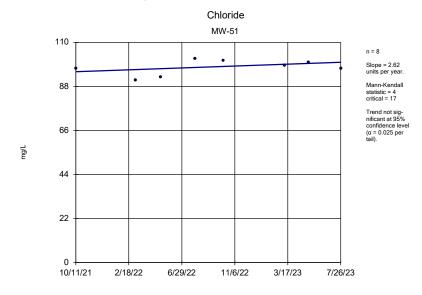


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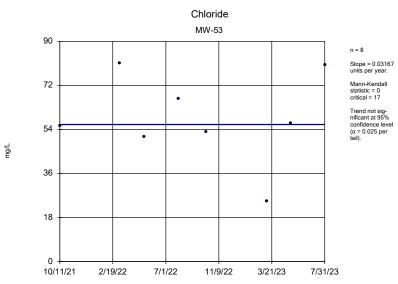


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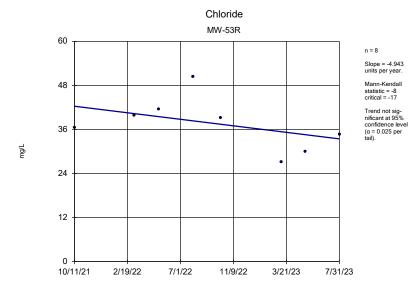
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10/12/21

2/20/22



Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM
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Chloride

# MW-55 n = 8 Slope = 2.66 units per year. Mann-Kendall statistic = 7 critical = 17 Trend not significant at 95% confidence level (a = 0.025 per tail).

7/1/22

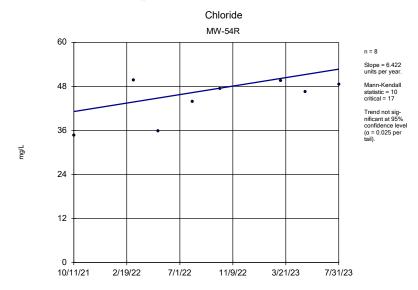
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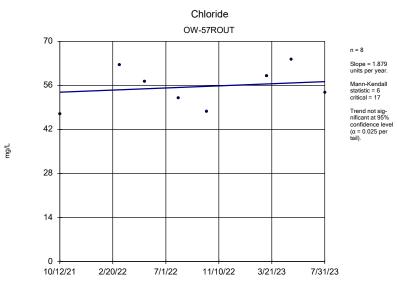
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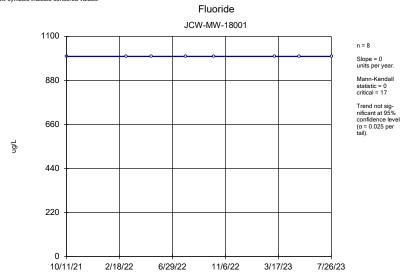


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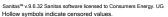


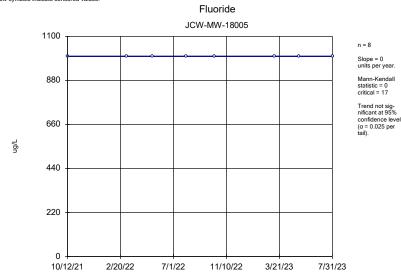
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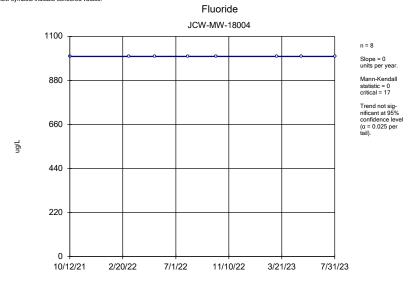
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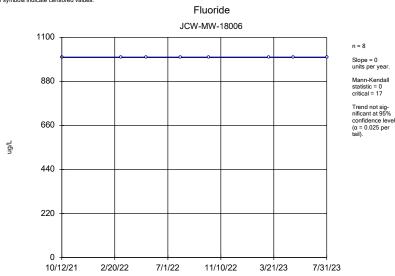
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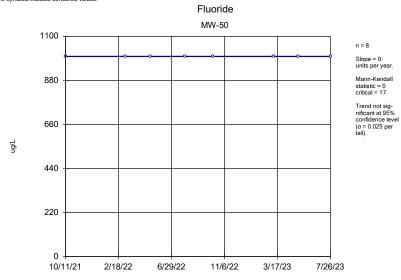
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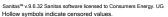


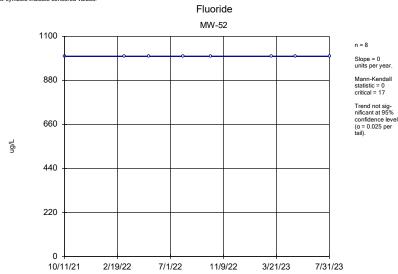
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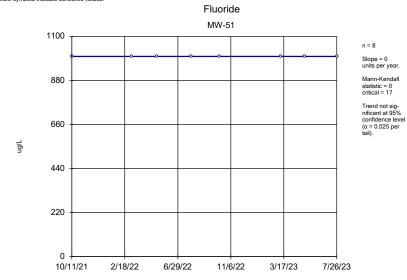




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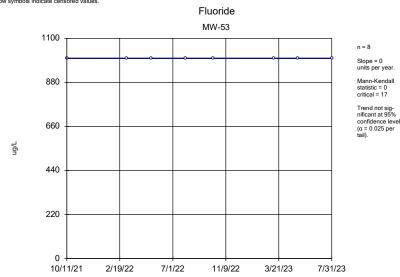
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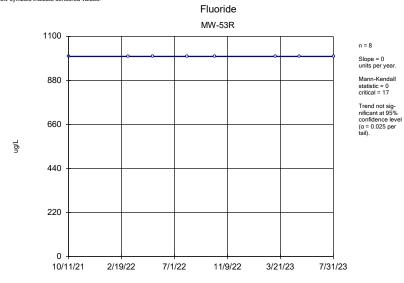
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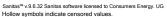
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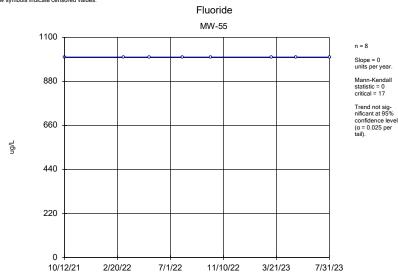
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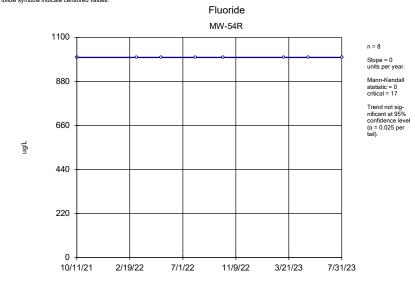




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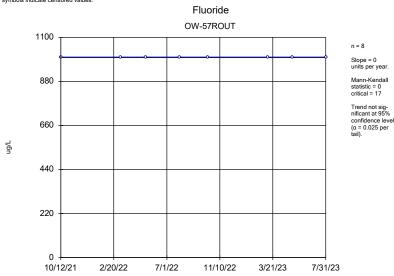
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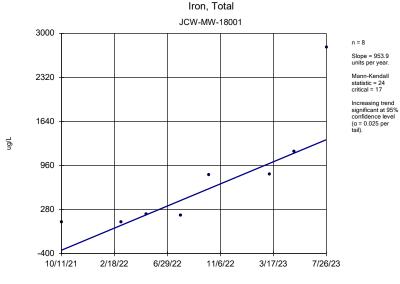
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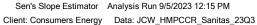
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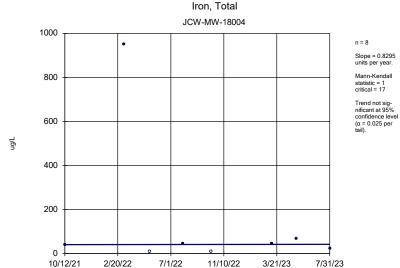
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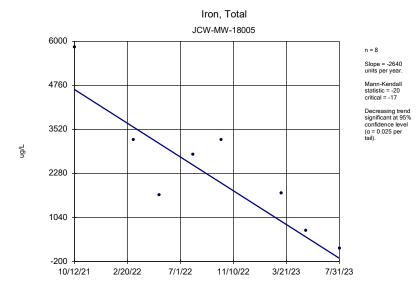
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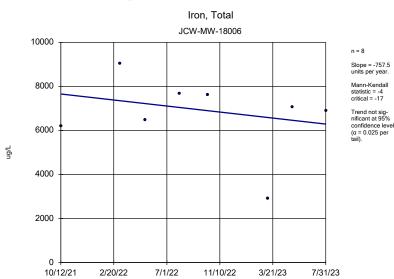




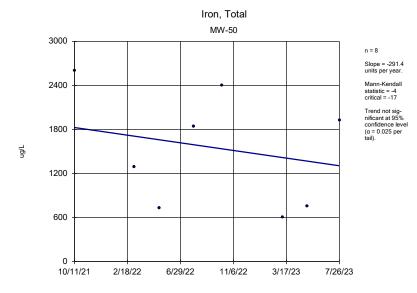
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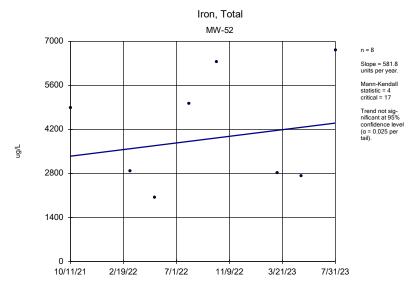
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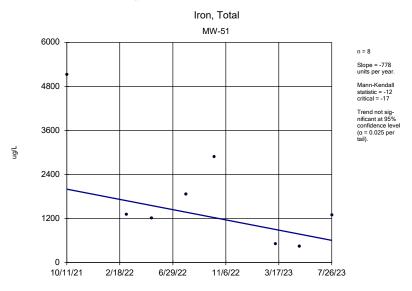


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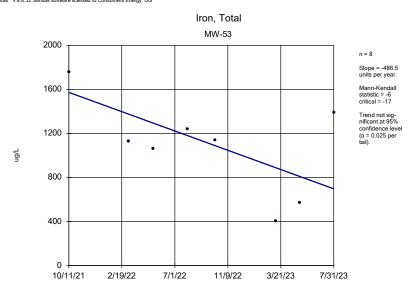
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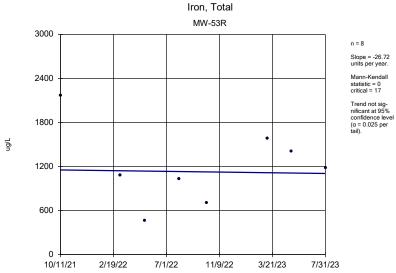


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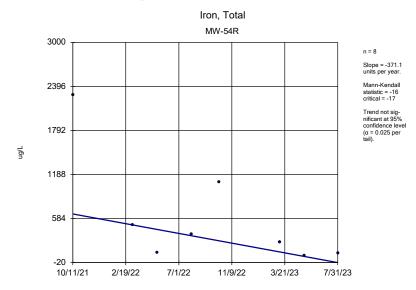
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### Iron, Total MW-55 50000 Slope = -5308 units per year. Mann-Kendall 40000 statistic = -6 critical = -17 Trend not sig-nificant at 95% confidence level 30000 (α = 0.025 per tail). ng/L 20000 10000 10/12/21 2/20/22 7/1/22 11/10/22 3/21/23 7/31/23

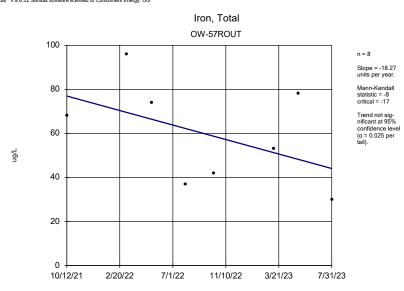
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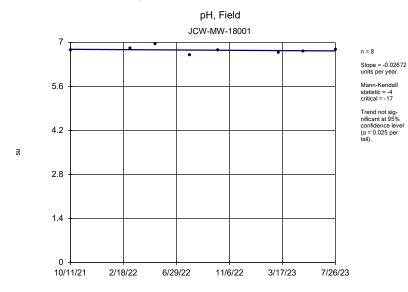
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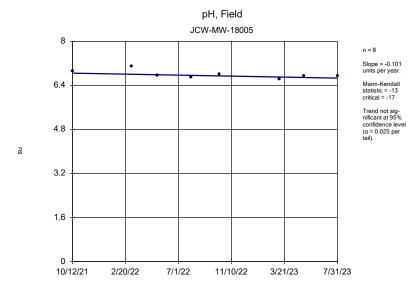


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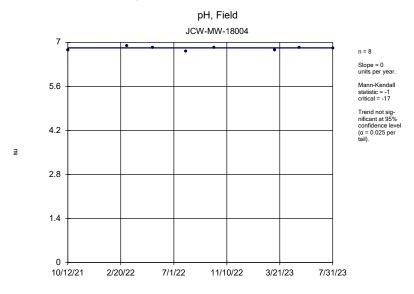


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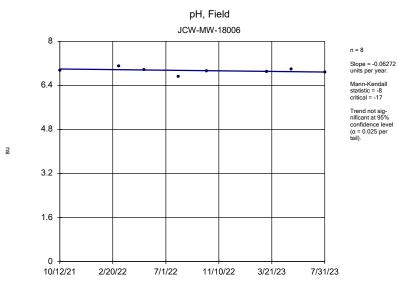
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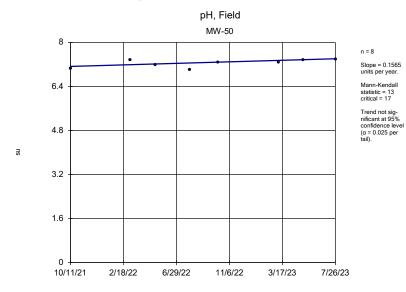


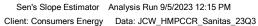
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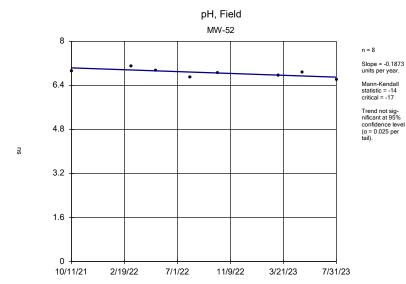
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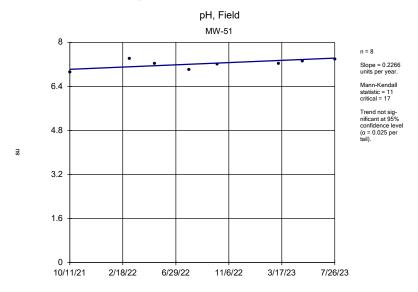






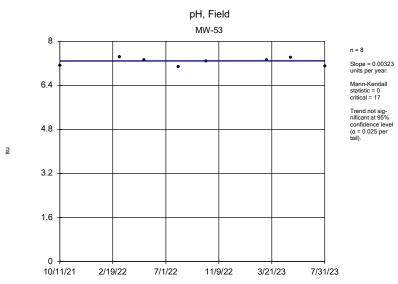
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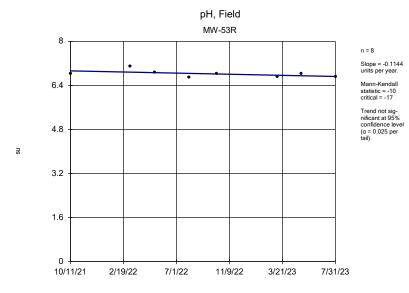


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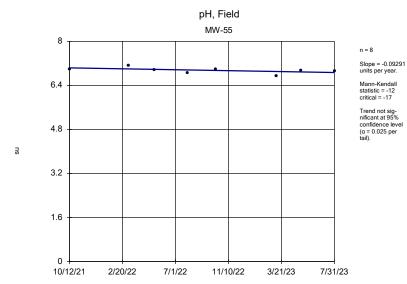
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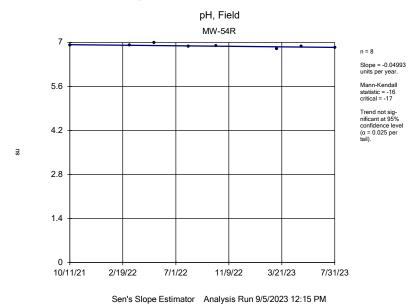


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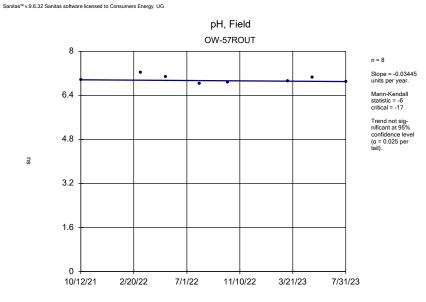


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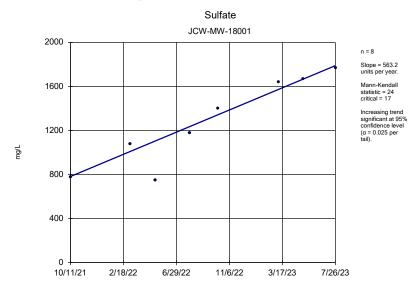
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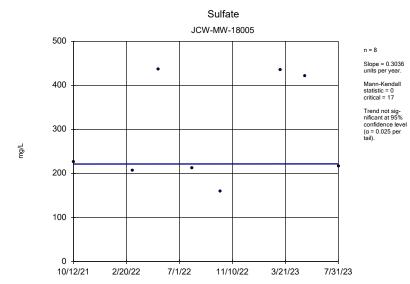
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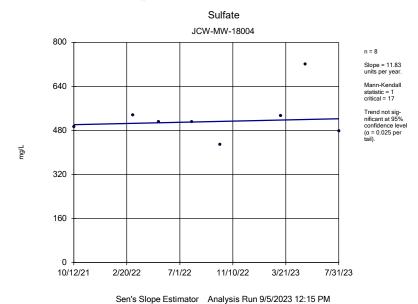
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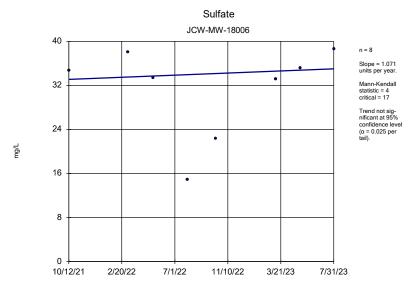
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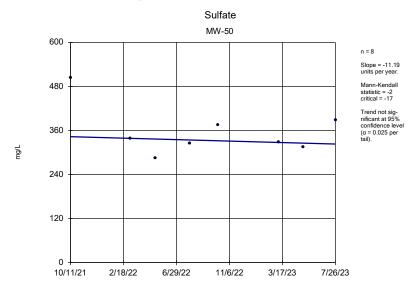


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10/11/21

2/19/22



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Sulfate

# MW-52 700 • • Slope = -24.17 units per year. Mann-Kendall statistic = 7 critical = -17 Trend not significant at 95% confidence level (α = 0.025 per tail).

7/1/22

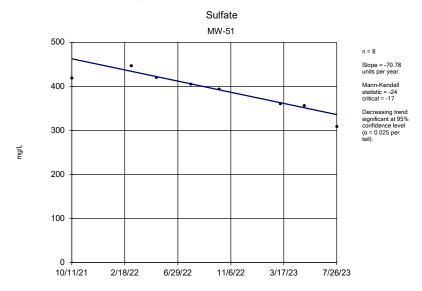
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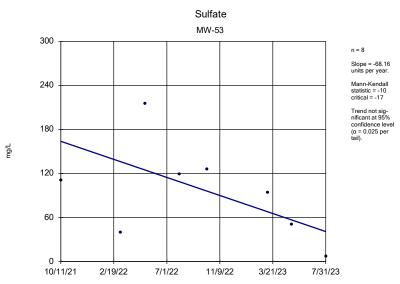
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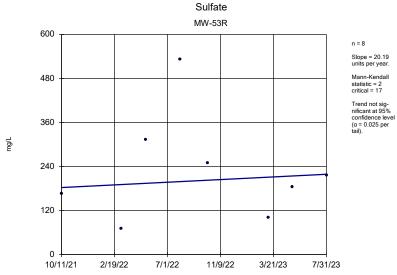


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#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG Sulfate MW-55 300 Slope = 26.45 units per year. Mann-Kendall 240 statistic = 4 critical = 17 Trend not sig-nificant at 95% confidence level 180 (α = 0.025 per tail). 120 60

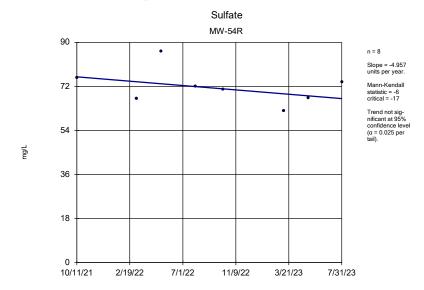
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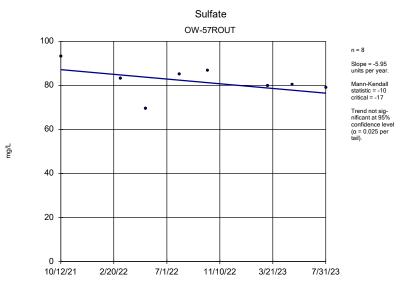
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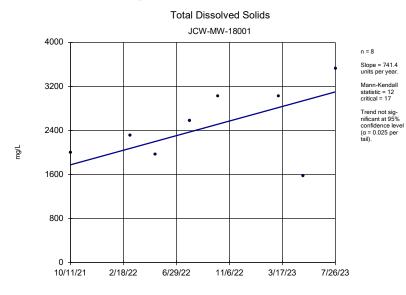


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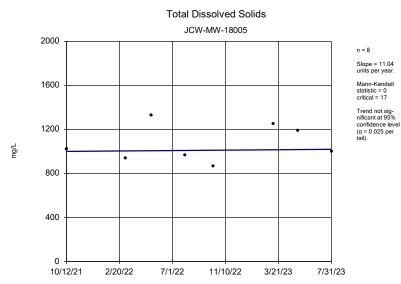


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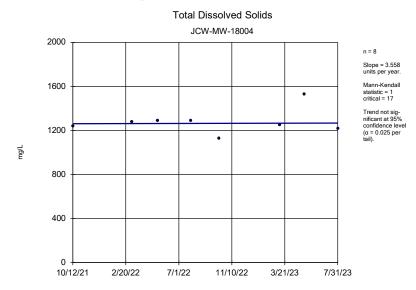


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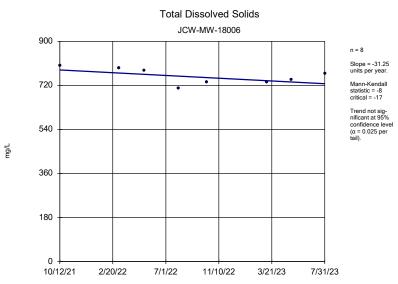
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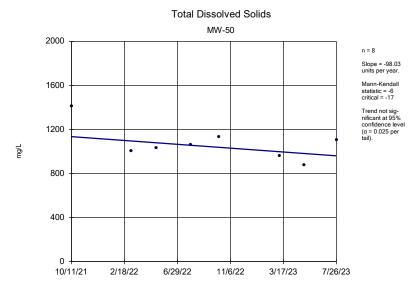
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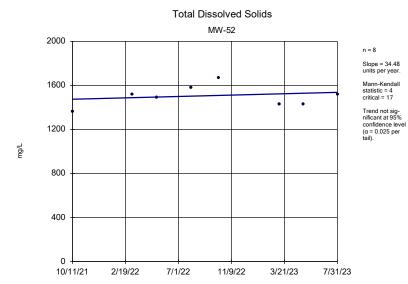


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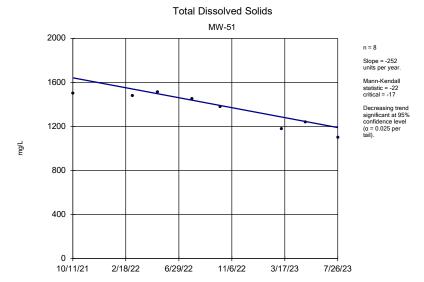


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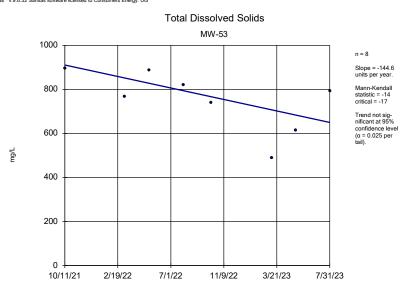
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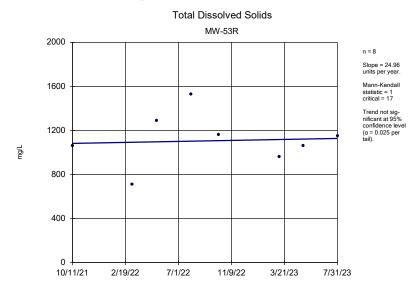
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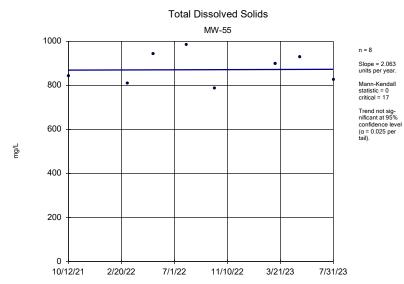


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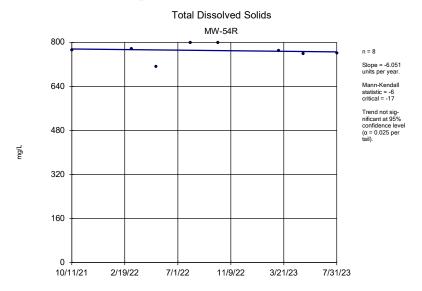


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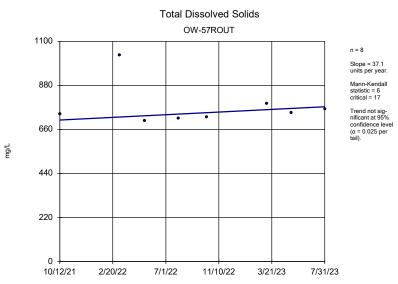
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## Appendix D Assessment Monitoring and GSI Statistical Evaluation



**Date:** October 16, 2023

**To:** J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

**Project No.:** 514403.0000 Phase 002, Task 002

**Subject:** Assessment Monitoring and GSI Statistical Evaluation of the Third Quarter 2023

Sampling Event

JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), arsenic was present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019.

Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule¹ at the JC Weadock Power Plant Landfill and quarterly groundwater monitoring in accordance with the February 2021 Landfill Hydrogeological Monitoring Plan (HMP). The third quarter 2023 monitoring event was conducted on July 26 and 31, 2023. In accordance with §257.95 and the HMP, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix III and Appendix IV constituents, and additional Michigan Part 115 (as amended by PA 640) Section 11511a(3) and Section 11519b(2) constituents, are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h) and Part 115, as detailed in the April 23, 2021 Groundwater Protection Standards technical memorandum, which was also included in the First Quarter 2021 Hydrogeological Monitoring Report². In accordance with the HMP, groundwater monitoring data from the designated groundwater-surface water (GSI) monitoring wells must be also compared to the GSI criteria to determine whether or not the GSI monitoring constituents are detected at statistically significant levels above the GSI criteria.

The evaluation of the initial semiannual assessment monitoring event data (April and May 2018) indicated that arsenic was present at statistically significant levels above the GWPS at one of the three former downgradient wells. The three downgradient wells were located within a vent (e.g., opening) of the perimeter soil/bentonite slurry wall to assess the quality of groundwater passing the waste

<sup>&</sup>lt;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).

<sup>&</sup>lt;sup>2</sup> TRC. 2021. First Quarter 2021 Hydrogeological Monitoring Report – JC Weadock Solid Waste Disposal Area, Essexville, Michigan. Prepared for Consumers Energy Company. April.

boundary. As discussed in detail below, in July 2018, the vent in the perimeter soil/bentonite slurry wall was closed and the slurry wall is now continuous along the entire perimeter of the Weadock Landfill.

As a result of the change in groundwater flow conditions, the groundwater monitoring system was revised, as documented in the HMP. The monitoring well network now consists of twelve (12) downgradient monitoring wells and eight (8) GSI monitoring wells.

The statistical evaluation of the third quarter 2023 assessment monitoring event data indicates that the following constituents are present at statistically significant levels above the GWPSs in downgradient monitoring wells at the Weadock Landfill:

Constituent	GWPS	#Downgradient Wells Exceeded
Boron	560 μg/L	11 of 12
Calcium	280 mg/L	1 of 12
Sulfate	780 mg/L	1 of 12

Corrective action has been triggered as a result of data collected during the initial assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and execute the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria.

#### **Statistical Evaluation Procedures**

Following each quarterly sampling event, compliance well data for the Weadock Landfill are evaluated in accordance with the Assessment Monitoring Statistical Data Evaluation and GSI Data Evaluation procedures in the HMP. The assessment monitoring and GSI monitoring programs were developed to evaluate concentrations of constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs or GSI criteria). To evaluate whether or not a criterion exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given monitoring event compared to the applicable criterion 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 3, the preferred method for comparisons to a fixed standard is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample 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 the 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 criterion. If the confidence interval straddles the criterion (i.e. the lower confidence level is below the criterion, but

<sup>&</sup>lt;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.

the upper confidence level is above), the statistical test result indicates that there is insufficient confidence that the measured concentrations are different from the criterion 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 Part 115, 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 constituent, the concentrations for each well were first compared directly to the GWPS, as shown on Table 1, or the GSI criteria, as shown on Table 2. Parameter-well combinations that included a direct exceedance of the criteria within the most recent two years of sampling events (eight quarterly sampling events, October 2021 through July 2023) were retained for further analysis. Data collected under the previous HMP is used where available.

Groundwater data were evaluated utilizing Sanitas<sup>TM</sup> statistical software. Sanitas<sup>TM</sup> is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas<sup>TM</sup> 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 for each parameter with a direct exceedance using a per test<sup>4</sup> 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<sup>TM</sup> 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.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the assessment and GSI monitoring programs. Initially, the results were observed visually for potential trends. No outliers were identified in the data set.

The Sanitas<sup>™</sup> software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. The tests were run with a

<sup>&</sup>lt;sup>4</sup> Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

per-test significance of  $\alpha$  = 0.01. Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

The Sanitas<sup>™</sup> software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes data transformations, as appropriate.

#### **Assessment Monitoring Statistical Evaluation**

The assessment monitoring statistical evaluation is performed on the downgradient monitoring wells in accordance with the HMP. The downgradient monitoring wells include:

■ JCW-MW-18001 ■ JCW-MW-18004 ■ JCW-MW-18005 ■ JCW-MW-18006

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ OW-57R Out

The concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Constituent-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events were retained for further analysis (Attachment 1). Direct comparison GWPS exceedances include the following constituent well combinations:

- Boron in MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, OW-57R OUT, JCW-MW-18001, JCW-MW-18005, and JCW-MW-18006;
- Calcium in MW-51 and JCW-MW-18001;
- Sulfate in JCW-MW-18001;
- Arsenic in MW-53R, MW-55, and JCW-MW-18006;
- Molybdenum in MW-55;
- Iron in MW-55.

The purpose of assessment monitoring is to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. GWPS). As detailed in the *Alternate Source Demonstration* (TRC, December 2019), the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit; therefore, comparison of these concentrations to the GWPS is not appropriate and assessment monitoring confidence intervals were not calculated.

The software outputs for the assessment monitoring data evaluation 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. Visual trends were apparent in multiple wells for arsenic, boron, calcium, and sulfate. These data sets were tested further in Sanitas™ utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test to test for significance of the trend at the 98% confidence level. The trend tests show that the trends for calcium at MW-51 and sulfate at JCW-MW-18001 are statistically significant (Attachment 1). The trends are causing the confidence intervals to widen. Calculating a confidence interval around a trending data set incorporates not only variability present naturally in the underlying dataset, but also incorporates variability due to the trend itself. Based on the observed trends, confidence bands were selected as a more appropriate assessment for calcium at JCW-MW-18001 and MW-51 and sulfate at JCW-MW-18001. Confidence bands are selected by the Unified Guidance as the appropriate method for calculating confidence intervals on trending data. A confidence band calculates upper and lower

confidence limits at each point along the trend to reduce variability and create a narrower confidence interval.

The Sanitas<sup>™</sup> software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-53R, MW-54R, MW-55, and OW-57R OUT
	Arsenic at JCW-MW-18006 and MW-53R
	Iron at MW-55
Normalized by power transformation	Boron at MW-53 (X^3)
Non-Parametric (normality)	Boron at MW-52
Not Applicable – confidence bands used	Calcium at JCW-MW-18001 and MW-51 Sulfate at JCW-MW-18001

The confidence bands and interval tests compare the lower confidence limit to the GWPS. Arsenic concentrations at JCW-MW-18006 were previously considered statistically significant; however, the lower confidence limit has been at or below the GWPS since the second quarter 2021. Calcium concentrations at MW-51 were previously considered statistically significant; however, calcium concentrations are generally decreasing and the lower confidence limit has been below the GWPS since the first quarter 2022. Concentration trends will continue to be monitored. Statistically significant exceedances of the GWPS were noted for boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001. Boron concentrations have been consistently above the GWPS since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate at JCW-MW-18001 was a confirmed GWPS exceedance in second quarter 2023 resulting from increases in sulfate concentrations. As noted in the Alternate Source Demonstration (Second Quarter 2022 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, July 2023), multiple lines of evidence indicate that the increase in sulfate concentration is not a result of a change in flux from the landfill and is instead the result of changing groundwater conditions outside the slurry wall. Corrective action has been triggered for the site as a result of data collected during the initial May 2018 assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

#### **GSI Statistical Evaluation**

Eight monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the GSI monitoring program to meet the requirements of Part 31:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

The concentrations from each well were first compared directly to the GSI criteria, as shown on Table 2. Constituent-well combinations that included a direct exceedance of the GSI criteria within the past eight monitoring events were retained for further analysis (Attachment 2). Direct comparison GSI criteria exceedances include the following constituent well combinations:

- Arsenic in MW-55; and
- Molybdenum in MW-55.

The purpose of the GSI statistical evaluation is to assess compliance with the GSI pathway. Although the *Alternate Source Demonstration* supports that the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit, these concentrations still affect compliance with the GSI pathway. Therefore, it is appropriate to calculate confidence limits for arsenic and molybdenum at MW-55 for comparison to the GSI criteria.

The software outputs for the assessment monitoring data evaluation are included in Attachment 2 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 2.

The Sanitas<sup>™</sup> 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 distributions are as follows:

Distribution	Constituent-Well Combinations
Normalized by square root transformation	Arsenic at MW-55 Molybdenum at MW-55

The confidence interval tests compare the lower confidence limit to the GSI. The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria. Arsenic and molybdenum concentrations at MW-55 were previously considered statistically significant; however, the arsenic and molybdenum concentrations decreased in 2022 and 2023. The lower confidence limits for arsenic and molybdenum continued to be below the GWPS in third quarter 2023.

#### **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Table 2 Comparison of Groundwater Sampling Results to GSI

Attachment 1 Assessment Monitoring Sanitas™ Output Files

Attachment 2 GSI Evaluation Sanitas™ Output Files

#### **Tables**

								2000///										
		Sample Location:			<u>-</u>		·		·	MW	V-50							
		Sample Date:	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023	5/8/2023	5/8/2023	7/26/2023	7/26/2023
Constituent	Unit	GWPS																
Appendix III <sup>(1)</sup>				Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720	1,720	1,690
Calcium	mg/L	280	274	261	186	185	169	175	161	164	186	181	152		142	144	188	187
Chloride	mg/L	2,300	51.0	51.7	54.9	55.6	53.3	51.6	54.2	54.9	47.7	47.6	35.9	36.7	31.5	31.9	37.4	39.1
Fluoride	ug/L	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
Sulfate	mg/L	780	496	512	346	330	285	286	324	325	376	376	341	315	314	316	392	385
Total Dissolved Solids	mg/L	4,700	1,440	1,380	999	1,010	1,020	1,050	1,080	1,040	1,120	1,150	939	984	878	880	1,100	1,110
pH, Field	SU	6.5 - 8.5	7.1		7.4		7.2		7.0		7.3		7.3		7.4		7.4	
Appendix IV <sup>(1)</sup>																		
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	3	3	2	2	1	1	2	2	3	3	2	2	2	2	3	3
Barium	ug/L	2,000	102	89	115	117	86	86	90	94	106	108	89	92	114	87	114	113
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	93	68	77	77	69	66	64	61	62	62	65	65	55	54	58	59
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.215	0.243			< 0.310	< 0.287			0.158	0.343	-		0.155	0.144		
Radium-228	pCi/L	NA	1.15	1.22			< 0.493	0.648	-		1.14	1.37	-		0.686	< 0.606		
Radium-226/228	pCi/L	5.0	1.21	1.46			0.518	0.904			1.30	1.72	-		0.841	0.633		
Selenium	ug/L	50	4	4	2	2	2	2	2	2	2	2	1	1	1	2	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	s <sup>(2)</sup>																	
Iron	ug/L	28,000	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756	1,960	1,900
Copper	ug/L	1,000	1	< 1	< 1	< 1	1	1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	2	2
Nickel	ug/L	100	16	11	< 2	19	< 2	6	6	7	4	7	< 2	< 2	3	< 2	2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyze

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

		Sample Location:	on: MW-51								
			40/44/0004	0/0/0000	F /0 /0000	1	1	0/0/0000	F/0/0000	7/00/0000	
		Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/26/2023	
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>											
Boron	ug/L	560	1,140	1,420	1,350	1,270	1,490	1,320	1,230	1,180	
Calcium	mg/L	280	316	255	247	211	211	169	166	162	
Chloride	mg/L	2,300	97.1	91.1	92.8	102	101	98.4	99.9	97	
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	780	418	446	420	404	394	360	356	308	
Total Dissolved Solids	mg/L	4,700	1,500	1,480	1,510	1,450	1,380	1,180	1,240	1,100	
pH, Field	SU	6.5 - 8.5	6.9	7.4	7.2	7.0	7.2	7.2	7.3	7.4	
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Arsenic	ug/L	21	20	12	10	15	18	10	8	10	
Barium	ug/L	2,000	197	198	150	169	188	178	180	141	
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium	ug/L	100	< 1	< 1	1	< 1	< 1	< 1	< 1	2	
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Lithium	ug/L	180	64	58	56	53	50	46	40	40	
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	
Radium-226	pCi/L	NA	0.451	1	< 0.423		< 0.397		0.143		
Radium-228	pCi/L	NA	2.01	-	< 0.494		2.19		1.01		
Radium-226/228	pCi/L	5.0	2.46	-	0.576		2.51		1.15		
Selenium	ug/L	50	3	3	2	2	1	2	1	< 1	
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	5,130	1,310	1,210	1,860	2,880	514	450	1,290	
Copper	ug/L	1,000	1	< 1	2	< 1	1	< 1	1	3	
Nickel	ug/L	100	18	< 2	< 2	6	4	< 2	3	4	
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018
Section 11511a(3)(c) and 11519b(2) additional detection monitoring
constituents (iron) and assessment monitoring constituents
(copper, nickel, silver, vanadium, and zinc) are reported.

October 2023

		Sample Location:			T	MV	V-52		T	1
		Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,280	1,310	1,090	1,070	1,330	1,040	993	1,030
Calcium	mg/L	280	237	251	231	222	224	228	217	247
Chloride	mg/L	2,300	59.4	51.6	50.5	45.1	40.4	36.3	32.4	31.5
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	110	654	591	663	603	581	581	569
Total Dissolved Solids	mg/L	4,700	1,360	1,520	1,490	1,580	1,670	1,430	1,430	1,520
pH, Field	SU	6.5 - 8.5	6.9	7.1	7.0	6.7	6.9	6.8	6.9	6.6
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	152	170	107	118	122	102	95	99
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	31	27	25	29	26	27	23	27
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	< 0.274	-	< 0.489		0.205	-	< 0.128	
Radium-228	pCi/L	NA	0.778	-	< 0.532		< 0.694	-	< 0.594	
Radium-226/228	pCi/L	5.0	1.03		0.875		0.805		< 0.594	
Selenium	ug/L	50	3	2	2	2	2	1	< 1	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters (2	2)									
Iron	ug/L	28,000	4,880	2,870	2,030	5,020	6,340	2,820	2,720	6,720
Copper	ug/L	1,000	1	1	2	2	2	1	1	2
Nickel	ug/L	100	14	< 2	< 2	5	3	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

			-							
		Sample Location:			ı		V-53		ı	Г
		Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	3,820	4,100	3,880	4,300	4,140	2,150	2,620	4,370
Calcium	mg/L	280	166	146	147	116	108	82.5	104	146
Chloride	mg/L	2,300	55.5	81.1	50.9	66.5	53	24.8	56.5	80.3
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	111	39.5	215	119	126	93.6	50.8	7.39
Total Dissolved Solids	mg/L	4,700	896	768	886	820	740	489	613	792
pH, Field	SU	6.5 - 8.5	7.1	7.4	7.3	7.1	7.3	7.3	7.4	7.1
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	1	< 1	1	2	< 1	< 1	1
Barium	ug/L	2,000	212	401	356	313	285	202	272	692
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	53	48	41	42	38	33	34	44
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	7	< 5	< 5
Radium-226	pCi/L	NA	0.399		0.406		0.269		0.198	
Radium-228	pCi/L	NA	0.979		< 0.518		1.15		< 0.518	
Radium-226/228	pCi/L	5.0	1.38		0.824		1.42		0.700	
Selenium	ug/L	50	< 1	3	1	3	1	11	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters (2	2)									
Iron	ug/L	28,000	1,760	1,130	1,060	1,240	1,140	403	569	1,390
Copper	ug/L	1,000	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	10	< 2	< 2	4	2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

				ESSCAVIII	ie, iviichigan					
		Sample Location:				MW	-53R			
		Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	2,060	2,330	1,830	1,560	2,340	2,330	2,140	2,190
Calcium	mg/L	280	232	188	226	219	203	195	202	220
Chloride	mg/L	2,300	36.6	39.9	41.6	50.4	39.2	27.2	30	34.6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	166	71.7	314	533	250	101	185	217
Total Dissolved Solids	mg/L	4,700	1,060	709	1,290	1,530	1,160	960	1,060	1,150
pH, Field	SU	6.5 - 8.5	6.8	7.1	6.9	6.7	6.8	6.7	6.8	6.7
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	25	10	8	17	20	17	14	17
Barium	ug/L	2,000	189	203	147	97	118	179	174	144
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	57	56	61	70	63	59	56	62
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.344		< 0.325		0.239		0.275	
Radium-228	pCi/L	NA	1.05		< 0.480		0.967		0.490	
Radium-226/228	pCi/L	5.0	1.40		< 0.480		1.21		0.765	
Selenium	ug/L	50	3	2	2	2	2	1	1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,170	1,080	460	1,030	702	1,580	1,410	1,180
Copper	ug/L	1,000	< 1	2	2	2	1	1	1	1
Nickel	ug/L	100	2	< 2	< 2	5	3	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018
Section 11511a(3)(c) and 11519b(2) additional detection monitoring
constituents (iron) and assessment monitoring constituents
(copper, nickel, silver, vanadium, and zinc) are reported.

October 2023

				2000/11	ie, iviiciligali					
		Sample Location:				MW	-54R			
		Sample Date:	10/11/2021	3/9/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	4,270	4,720	4,110	4,970	5,310	5,660	5,240	6,170
Calcium	mg/L	280	187	186	169	158	160	168	163	162
Chloride	mg/L	2,300	34.7	49.8	35.8	43.9	47.4	49.6	46.5	48.5
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	75.7	67.1	86.3	72.1	70.9	62	67.2	73.8
Total Dissolved Solids	mg/L	4,700	772	776	712	800	799	770	759	761
pH, Field	SU	6.5 - 8.5	6.9	6.9	7.0	6.9	6.9	6.8	6.9	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	4	1	< 1	2	2	1	< 1	< 1
Barium	ug/L	2,000	129	154	111	109	123	126	98	106
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	59	74	64	74	74	71	65	75
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	7	7	9	10	12	15	13	15
Radium-226	pCi/L	NA	< 0.231		< 0.347		0.208		< 0.141	
Radium-228	pCi/L	NA	0.759		< 0.552		1.31		< 0.836	
Radium-226/228	pCi/L	5.0	0.965		< 0.552		1.52		< 0.836	
Selenium	ug/L	50	2	2	2	1	2	1	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,280	496	121	367	1,090	262	74	111
Copper	ug/L	1,000	< 1	1	1	1	1	2	1	6
Nickel	ug/L	100	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					Essexville, ivilchilg	u.,					
		Sample Location:					MW-55				
		Sample Date:	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>							Field Dup				
Boron	ug/L	560	788	826	642	709	687	976	1,110	1,140	1,290
Calcium	mg/L	280	198	163	177	159	165	141	162	165	150
Chloride	mg/L	2,300	16.5	20.2	11.8	11.8	11.8	12.5	24.2	16.9	18.5
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	80.7	35.4	249	248	245	108	94.6	208	129
Total Dissolved Solids	mg/L	4,700	844	808	942	930	1,040	786	898	929	827
pH, Field	SU	6.5 - 8.5	7.0	7.1	7.0	6.9		7.0	6.8	6.9	6.9
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	198	88	48	80	78	126	68	44	75
Barium	ug/L	2,000	330	299	222	232	231	223	287	267	240
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	34	28	24	29	28	30	27	24	27
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	206	89	78	80	78	91	50	30	33
Radium-226	pCi/L	NA	0.467		< 0.478			0.365		0.276	
Radium-228	pCi/L	NA	1.10		< 0.646			0.966		< 0.916	
Radium-226/228	pCi/L	5.0	1.56		0.696			1.33		< 0.916	
Selenium	ug/L	50	2	1	3	3	4	< 1	3	< 1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	40,500	29,800	15,000	18,000	16,600	22,100	24,800	21,600	21,900
Copper	ug/L	1,000	< 1	< 1	1	< 1	1	1	< 1	< 1	< 1
Nickel	ug/L	100	8	4	3	6	6	4	4	5	22
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

				2000///	ie, iviiciligati					
		Sample Location:				OW-57	R OUT			
		Sample Date:	10/12/2021	3/9/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,880	2,030	1,990	1,570	1,830	1,860	1,740	1,750
Calcium	mg/L	280	140	126	131	113	114	116	117	124
Chloride	mg/L	2,300	46.9	62.5	57.3	52.0	47.6	59	64.2	53.7
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	93.1	83.1	69.4	85.0	86.8	79.7	80.5	79
Total Dissolved Solids	mg/L	4,700	737	1,030	702	714	722	790	743	762
pH, Field	SU	6.5 - 8.5	7.0	7.2	7.1	6.8	6.9	6.9	7.1	6.9
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	75	85	79	67	75	75	72	72
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	1	2	1	< 1	4	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	21	26	27	23	22	26	23	24
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	9	8	7	7	8	6	6	6
Radium-226	pCi/L	NA	< 0.227		< 0.440		0.199		0.149	
Radium-228	pCi/L	NA	1.12		< 0.539		< 0.711	-	< 0.663	
Radium-226/228	pCi/L	5.0	1.26		< 0.539		0.870		< 0.663	
Selenium	ug/L	50	2	1	3	1	2	2	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	68	96	74	37	42	53	78	30
Copper	ug/L	1,000	1	2	2	1	2	1	1	1
Nickel	ug/L	100	12	17	14	17	16	15	15	13
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

				2000/11	ie, iviiciligali					
		Sample Location:				JCW-M	W-18001			
		Sample Date:	10/11/2021	3/7/2022	5/9/2022	8/1/2022	10/10/2022	3/8/2023	5/8/2023	7/26/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,670	1,670	1,560	1,470	1,790	1,440	1,380	1,470
Calcium	mg/L	280	373	412	335	389	465	486	496	555
Chloride	mg/L	2,300	68.3	60.0	58.8	64.6	63.6	54.2	51.1	58.9
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	777	1,080	752	1,180	1,400	1,640	1,670	1,770
Total Dissolved Solids	mg/L	4,700	2,000	2,310	1,970	2,580	3,020	3,030	1,580	3,530
pH, Field	SU	6.5 - 8.5	6.8	6.8	7.0	6.6	6.8	6.7	6.7	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	184	129	80	61	66	47	50	49
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	103	87	76	95	97	91	83	102
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.337		< 0.327		< 0.142		< 0.122	
Radium-228	pCi/L	NA	1.05		0.494		0.852		< 0.547	
Radium-226/228	pCi/L	5.0	1.39		0.586		0.893		< 0.547	
Selenium	ug/L	50	3	2	2	3	1	2	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	91	86	210	196	818	830	1,180	2,790
Copper	ug/L	1,000	2	2	3	2	3	2	3	2
Nickel	ug/L	100	20	6	8	14	15	< 2	< 2	41
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018
Section 11511a(3)(c) and 11519b(2) additional detection monitoring
constituents (iron) and assessment monitoring constituents
(copper, nickel, silver, vanadium, and zinc) are reported.

October 2023

		Sample Location:				ICW M	W-18004			
			10/10/0001	0/=/0000	=/40/0000			0/0/000	= /0 /0000	
		Sample Date:	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	389	259	226	313	343	180	227	310
Calcium	mg/L	280	264	236	235	215	193	221	265	229
Chloride	mg/L	2,300	7.45	19.6	10.8	12.5	11.4	12.7	16.8	14.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	493	537	512	512	428	533	722	478
Total Dissolved Solids	mg/L	4,700	1,240	1,280	1,290	1,290	1,130	1,250	1,530	1,220
pH, Field	SU	6.5 - 8.5	6.8	6.9	6.8	6.7	6.8	6.8	6.8	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	41	32	26	31	37	24	28	30
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	63	34	42	51	46	39	42	50
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.182		< 0.417		< 0.135		< 0.131	
Radium-228	pCi/L	NA	0.796		0.790		< 0.742		< 0.600	
Radium-226/228	pCi/L	5.0	0.978		0.910		< 0.742		< 0.600	
Selenium	ug/L	50	3	2	2	1	1	11	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	39	952	< 20	45	< 20	46	67	24
Copper	ug/L	1,000	2	1	2	2	2	1	2	2
Nickel	ug/L	100	16	4	< 2	2	5	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018
Section 11511a(3)(c) and 11519b(2) additional detection monitoring
constituents (iron) and assessment monitoring constituents
(copper, nickel, silver, vanadium, and zinc) are reported.

October 2023

					Essexville, iviicnig	an					
		Sample Location:					JCW-MW-1800	5			
		Sample Date:	10/12/2021	3/7/2022	3/7/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>					Field Dup						
Boron	ug/L	560	1,190	1,030	1,100	1,010	981	1,290	930	992	1,170
Calcium	mg/L	280	193	159	164	280	165	150	262	258	202
Chloride	mg/L	2,300	63.6	61.7	60.7	32.6	50.9	53.9	25.4	22.3	44.1
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	227	204	211	437	213	160	435	422	216
Total Dissolved Solids	mg/L	4,700	1,020	942	934	1,330	967	868	1,250	1,190	1,000
pH, Field	SU	6.5 - 8.5	6.9	7.1		6.8	6.7	6.8	6.6	6.8	6.8
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	9	5	5	5	4	5	4	2	< 1
Barium	ug/L	2,000	124	108	110	110	71	80	115	105	76
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	39	32	30	33	32	32	36	33	33
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	5	5	6	< 5	5	6	5	< 5
Radium-226	pCi/L	NA	< 0.262			< 0.414		0.193		0.134	
Radium-228	pCi/L	NA	0.984	-		< 0.521		< 0.800		< 0.573	
Radium-226/228	pCi/L	5.0	1.16			0.622		< 0.800		< 0.573	
Selenium	ug/L	50	4	3	3	2	< 1	2	3	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	5,840	3,300	3,170	1,680	2,810	3,220	1,720	676	171
Copper	ug/L	1,000	1	< 1	< 1	2	< 1	< 1	1	< 1	2
Nickel	ug/L	100	22	10	25	< 2	9	11	< 2	9	8
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

 $\mbox{\bf Bold}$  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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards

JC Weadock Landfill – Hydrogeological Monitoring Program

Essexville, Michigan

							Essexville, iviicilių	,u							
		Sample Location:				_			JCW-MW-1800	6					
		Sample Date:	10/12/2021	3/7/2022	5/9/2022	5/9/2022	8/2/2022	10/11/2022	10/11/2022	3/9/2023	3/9/2023	5/9/2023	5/9/2023	7/31/2023	7/31/2023
Constituent	Unit	GWPS													
Appendix III <sup>(1)</sup>						Field Dup			Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	2,600	3,220	2,990	3,030	2,260	2,720	2,650	1,730	1,760	2,450	2,480	2,100	2,140
Calcium	mg/L	280	152	143	136	136	109	118	119	121	121	118	120	126	126
Chloride	mg/L	2,300	77.0	75.0	67.3	67.7	79.0	74.2	74.7	79.9	82.8	73.6	76.6	73	75.9
Fluoride	ug/L	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	780	34.7	38.1	32.8	34.0	14.9	21.6	23.0	32.5	33.9	34.2	36.1	39.4	37.9
Total Dissolved Solids	mg/L	4,700	802	792	788	772	709	720	746	715	753	734	751	765	770
pH, Field	SU	6.5 - 8.5	7.0	7.1	7.0		6.7	6.9		6.9		7.0		6.9	
Appendix IV <sup>(1)</sup>															
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	21	33	22	23	21	25	25	5	5	23	23	18	19
Barium	ug/L	2,000	351	665	514	509	452	480	499	232	238	464	465	354	346
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	47	63	56	57	52	52	52	21	23	45	47	36	36
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA	0.268		< 0.416			0.516	0.259			0.337	< 0.192		
Radium-228	pCi/L	NA	0.872	-	< 0.518			< 0.609	0.869			0.746	< 0.816		
Radium-226/228	pCi/L	5.0	1.14	-	0.690			0.999	1.13			1.08	< 0.816		
Selenium	ug/L	50	4	2	< 1	1	< 1	1	1	2	2	1	2	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)														
Iron	ug/L	28,000	6,200	9,040	6,600	6,360	7,670	7,620	7,630	2,930	2,910	6,890	7,210	6,910	6,860
Copper	ug/L	1,000	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	10	6	< 2	< 2	5	5	6	< 2	< 2	4	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	2	4	3	3	3	3	4	< 2	2	2	3	3	3
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					Sample Location:								MV	<i>l</i> -50							
					Sample Date:	10/11/2021	10/11/2021	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023	5/8/2023	5/8/2023	7/26/2023	7/26/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**																
Appendix III <sup>(1)</sup>							Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	4,000	44,000	69,000	44,000	1,830	1,900	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720	1,720	1,690
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	496	512	346	330	285	286	324	325	376	376	341	315	314	316	392	385
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1		7.4		7.2		7.0		7.3		7.3		7.4		7.4	
Appendix IV <sup>(1)</sup>																					
Arsenic	ug/L	10	100	680	100	3	3	2	2	1	1	2	2	3	3	2	2	2	2	3	3
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	93	68	77	77	69	66	64	61	62	62	65	65	55	54	58	59
Molybdenum	ug/L	120	NC	NC	120	< 5	6	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	4	4	2	2	2	2	2	2	2	2	1	1	1	2	1	1
MI Part 115 Parame	ters <sup>(2)</sup>																				
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,500	2,710	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756	1,960	1,900
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- <sup>H</sup> Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	V-51			
					Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/26/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,140	1,420	1,350	1,270	1,490	1,320	1,230	1,180
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	418	446	420	404	394	360	356	308
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	7.4	7.2	7.0	7.2	7.2	7.3	7.4
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	20	12	10	15	18	10	8	10
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	1	< 1	< 1	< 1	< 1	2
Lithium	ug/L	440	NC	NC	440	64	58	56	53	50	46	40	40
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	3	2	2	1	2	1	< 1
MI Part 115 Paramet	ers <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	5,130	1,310	1,210	1,860	2,880	514	450	1,290
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	V-52			
					Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,280	1,310	1,090	1,070	1,330	1,040	993	1,030
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	110	654	591	663	603	581	581	569
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	7.1	7.0	6.7	6.9	6.8	6.9	6.6
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	31	27	25	29	26	27	23	27
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	2	2	2	2	1	< 1	< 1
MI Part 115 Paramet	ers <sup>(2)</sup>	_									_		
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	4,880	2,870	2,030	5,020	6,340	2,820	2,720	6,720
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MV	V-53			
					Sample Date:		3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	3,820	4,100	3,880	4,300	4,140	2,150	2,620	4,370
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	111	39.5	215	119	126	93.6	50.8	7.39
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.4	7.3	7.1	7.3	7.3	7.4	7.1
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	2	1	< 1	1	2	< 1	< 1	1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	53	48	41	42	38	33	34	44
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	7	< 5	< 5
Selenium	ug/L	5.0	55	120	55	< 1	3	1	3	1	1	2	2
MI Part 115 Paramet	ers <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,760	1,130	1,060	1,240	1,140	403	569	1,390
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	'-53R			
					Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	2,060	2,330	1,830	1,560	2,340	2,330	2,140	2,190
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	166	71.7	314	533	250	101	185	217
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	7.1	6.9	6.7	6.8	6.7	6.8	6.7
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	25	10	8	17	20	17	14	17
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	57	56	61	70	63	59	56	62
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	2	2	2	2	1	1	2
MI Part 115 Paramet	ers <sup>(2)</sup>	<u> </u>			<u>.                                      </u>								
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,170	1,080	460	1,030	702	1,580	1,410	1,180
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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					Sample Location:				MW	-54R			
					Sample Date:	10/11/2021	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	4,270	4,720	4,110	4,970	5,310	5,660	5,240	6,170
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	75.7	67.1	86.3	72.1	70.9	62	67.2	73.8
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	6.9	7.0	6.9	6.9	6.8	6.9	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	4	1	< 1	2	2	1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	59	74	64	74	74	71	65	75
Molybdenum	ug/L	120	NC	NC	120	7	7	9	10	12	15	13	15
Selenium	ug/L	5.0	55	120	55	2	2	2	1	2	1	1	1
MI Part 115 Paramet	ers <sup>(2)</sup>												
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,280	496	121	367	1,090	262	74	111
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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l <del></del>														
					Sample Location:					MW-55				
					Sample Date:	10/12/2021	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**									
Appendix III <sup>(1)</sup>										Field Dup				
Boron	ug/L	4,000	44,000	69,000	44,000	788	826	642	709	687	976	1,110	1,140	1,290
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	80.7	35.4	249	248	245	108	94.6	208	129
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.0	7.1	7.0	6.9		7.0	6.8	6.9	6.9
Appendix IV <sup>(1)</sup>														
Arsenic	ug/L	10	100	680	100	198	88	48	80	78	126	68	44	75
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	34	28	24	29	28	30	27	24	27
Molybdenum	ug/L	120	NC	NC	120	206	89	78	80	78	91	50	30	33
Selenium	ug/L	5.0	55	120	55	2	1	3	3	4	< 1	3	< 1	1
MI Part 115 Parame	ters <sup>(2)</sup>						•		•					
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	40,500	29,800	15,000	18,000	16,600	22,100	24,800	21,600	21,900
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- <sup>H</sup> Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

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- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

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Essexville, Michigan

					Sample Location:				JCW-M	W-18004			
					Sample Date:	10/12/2021	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	389	259	226	313	343	180	227	310
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	493	537	512	512	428	533	722	478
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.8	6.9	6.8	6.7	6.8	6.8	6.8	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	63	34	42	51	46	39	42	50
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	2	2	1	1	11	2	2
MI Part 115 Paramet	ters <sup>(2)</sup>	•											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	39	952	< 20	45	< 20	46	67	24
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

- -- not analyzed.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.
- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- \*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

- All metals were analyzed as total unless otherwise specified.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

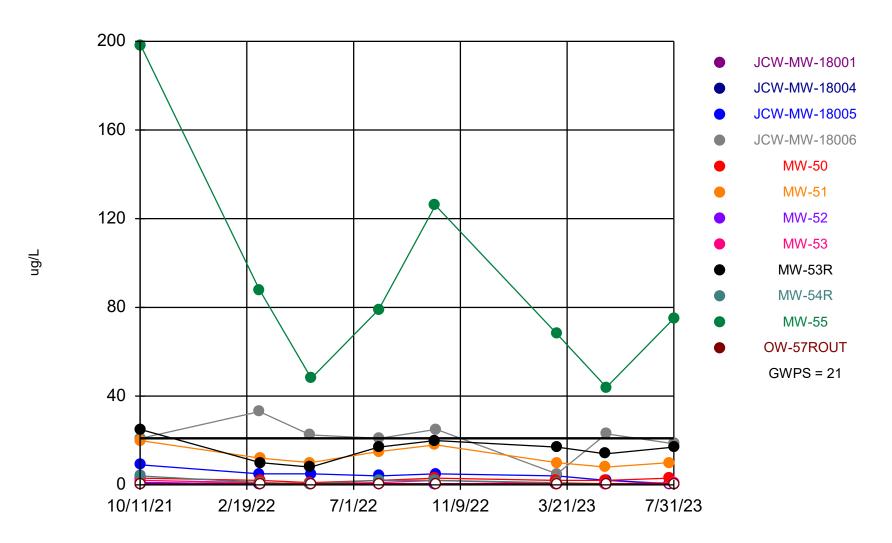
assessment monitoring constituents (vanadium and zinc) are reported.

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#### Attachment 1 Assessment Monitoring Sanitas™ Output Files

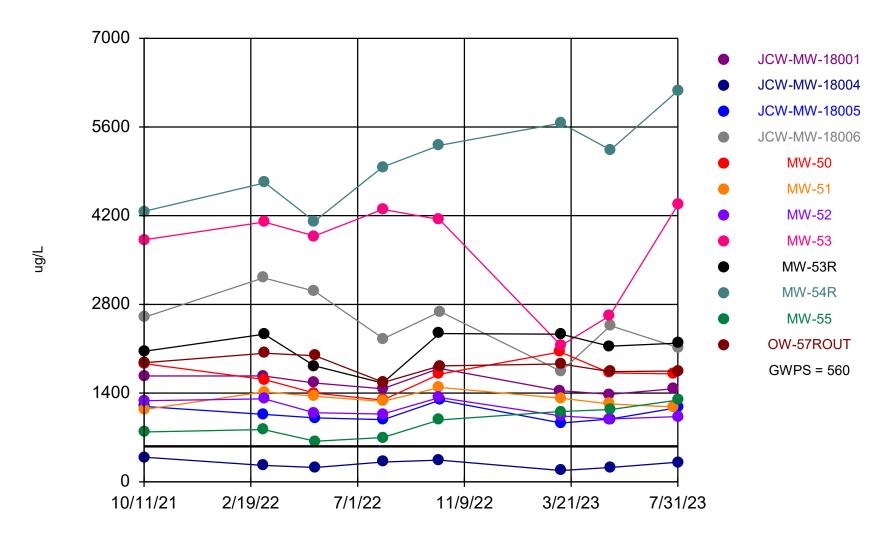
#### Arsenic Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:49 PM

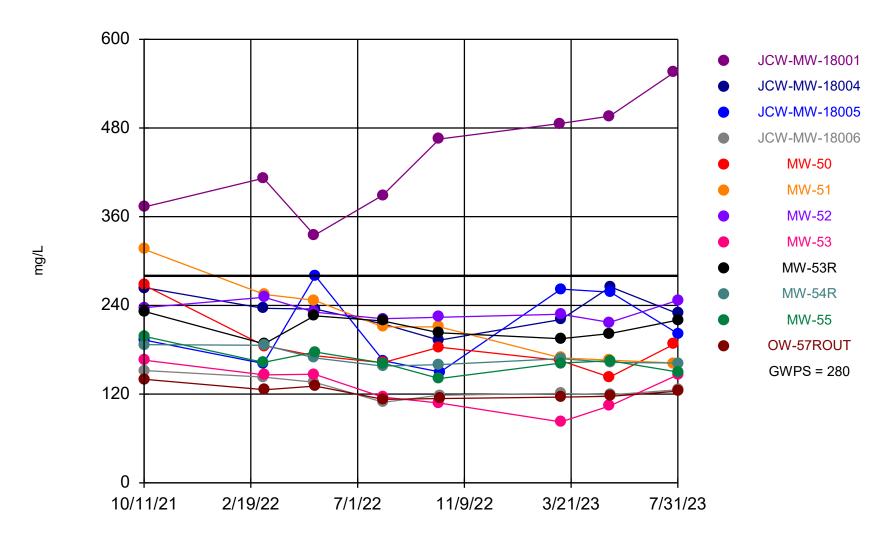
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

# Boron Comparison to GWPS



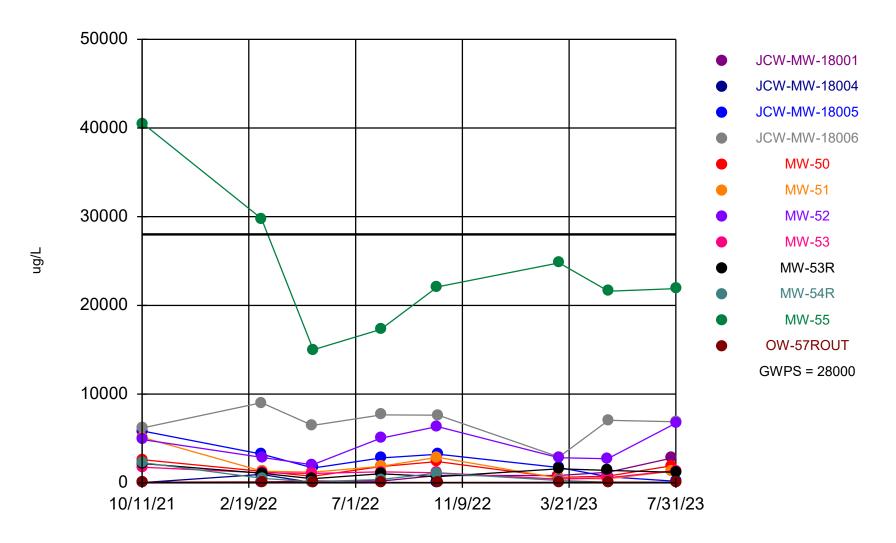
Time Series Analysis Run 9/5/2023 12:50 PM

# Calcium Comparison to GWPS



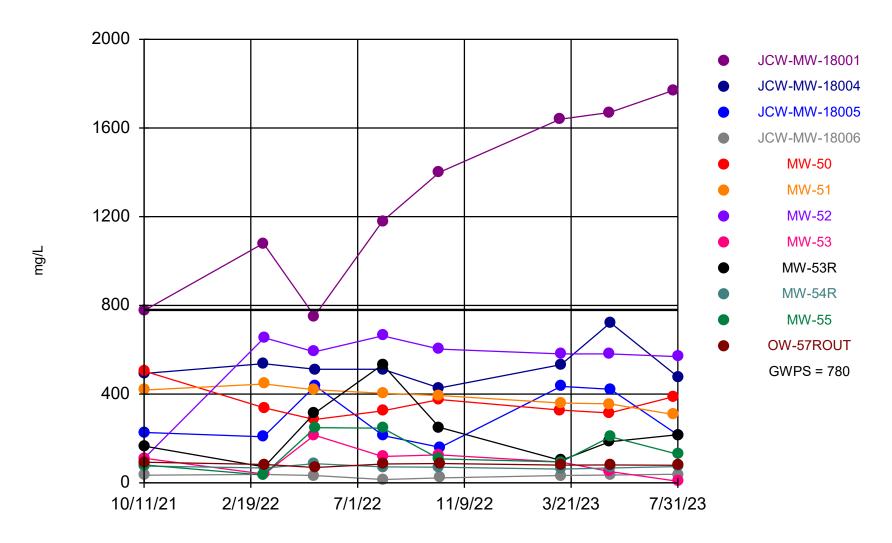
Time Series Analysis Run 9/5/2023 12:51 PM

# Iron Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:52 PM

# Sulfate Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:53 PM

Constituent: Arsenic, Total Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 37 Wells = 12 Minimum Value = 0.5 Maximum Value = 198 Mean Value = 12.66 Median Value = 2 Standard Deviation = 28.31 Coefficient of Variation = 2.236

Skewness = 4.172

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
JCW-MW-18005	8	1	0.5	9	4.313	4.5	2.492	0.5778	0.3566
JCW-MW-18006	8	0	5	33	21.13	21.75	7.823	0.3703	-0.7876
MW-50	8	0	1	3	2.25	2	0.7071	0.3143	-0.324
MW-51	8	0	8	20	12.88	11	4.324	0.3358	0.6009
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.063	1	0.6232	0.5866	0.7024
MW-53R	8	0	8	25	16	17	5.398	0.3374	0.05824
MW-54R	8	3	0.5	4	1.438	1	1.208	0.8405	1.259
MW-55	8	0	44	198	90.75	77	50.24	0.5536	1.3
OW-57ROUT	8	8	0.5	0.5	0.5	0.5	0	0	NaN

Constituent: Boron, Total Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 180 Maximum Value = 6170 Mean Value = 1928 Median Value = 1565 Standard Deviation = 1308 Coefficient of Variation = 0.6785 Skewness = 1.359

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	1380	1790	1556	1515	141.4	0.09087	0.3989
JCW-MW-18004	8	0	180	389	280.9	284.5	69.69	0.2481	0.09166
JCW-MW-18005	8	0	930	1290	1079	1038	125	0.1159	0.5031
JCW-MW-18006	8	0	1745	3220	2513	2533	477.3	0.1899	-0.06838
MW-50	8	0	1290	2050	1668	1703	241.2	0.1446	-0.1082
MW-51	8	0	1140	1490	1300	1295	119	0.09157	0.2287
MW-52	8	0	993	1330	1143	1080	139.2	0.1218	0.4173
MW-53	8	0	2150	4370	3673	3990	825.7	0.2248	-1.063
MW-53R	8	0	1560	2340	2098	2165	277.5	0.1323	-0.9589
MW-54R	8	0	4110	6170	5056	5105	690.5	0.1366	0.117
MW-55	8	0	642	1290	933.8	901	231.7	0.2482	0.2118
OW-57ROUT	8	0	1570	2030	1831	1845	146.9	0.08023	-0.3437

Constituent: Calcium, Total Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 82.5 Maximum Value = 555 Mean Value = 202.9 Median Value = 184.5 Standard Deviation = 87.74 Coefficient of Variation = 0.4324

Skewness = 1.901

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	335	555	438.9	438.5	73.67	0.1679	0.124
JCW-MW-18004	8	0	193	265	232.3	232	24.14	0.1039	0.001605
JCW-MW-18005	8	0	150	280	208.9	197.5	51.03	0.2442	0.2594
JCW-MW-18006	8	0	109	152	128.1	123.5	14.39	0.1124	0.4426
MW-50	8	0	143	267.5	183.4	177.8	37.06	0.2021	1.54
MW-51	8	0	162	316	217.1	211	53.65	0.2471	0.6276
MW-52	8	0	217	251	232.1	229.5	12.05	0.05192	0.4384
MW-53	8	0	82.5	166	126.9	131	28.37	0.2235	-0.1765
MW-53R	8	0	188	232	210.6	211	15.77	0.07485	-0.06506
MW-54R	8	0	158	187	169.1	165.5	11.34	0.06708	0.8146
MW-55	8	0	141	198	164.8	162.5	17.14	0.104	0.6661
OW-57ROUT	8	0	113	140	122.6	120.5	9.471	0.07723	0.6961

Constituent: Iron, Total Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 96 ND/Trace = 2 Wells = 12 Minimum Value = 10 Maximum Value = 40500 Mean Value = 3723 Median Value = 1225 Standard Deviation = 6880 Coefficient of Variation = 1.848 Skewness = 3.159

OKEWI	1633	_	J.	100

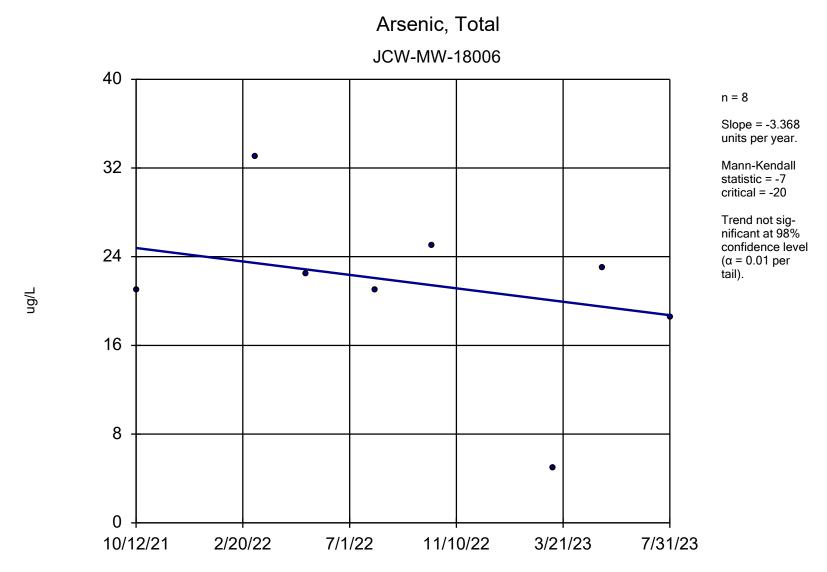
<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0	86	2790	775.1	514	912.3	1.177	1.453
JCW-MW-18004	8	2	10	952	149.1	42	325	2.179	2.252
JCW-MW-18005	8	0	171	5840	2419	2265	1784	0.7377	0.6384
JCW-MW-18006	8	0	2920	9040	6734	6968	1773	0.2633	-1.145
MW-50	8	0	602.5	2605	1519	1565	786.1	0.5175	0.1092
MW-51	8	0	450	5130	1831	1300	1539	0.8407	1.325
MW-52	8	0	2030	6720	4175	3875	1798	0.4307	0.2607
MW-53	8	0	403	1760	1087	1135	432.6	0.3981	-0.2276
MW-53R	8	0	460	2170	1202	1130	530.3	0.4414	0.4429
MW-54R	8	0	74	2280	600.1	314.5	754.7	1.258	1.575
MW-55	8	0	15000	40500	24125	22000	7983	0.3309	1.039
OW-57ROUT	8	0	30	96	59.75	60.5	22.93	0.3838	0.1667

Constituent: Sulfate Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

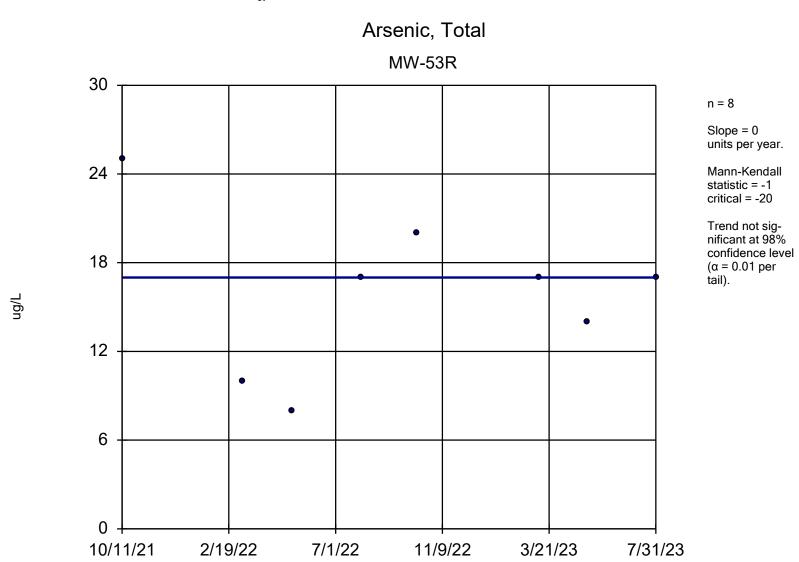
Observations = 96 ND/Trace = 0 Wells = 12 Minimum Value = 7.39 Maximum Value = 1770 Mean Value = 337 Median Value = 222 Standard Deviation = 359.7 Coefficient of Variation = 1.067 Skewness = 2.125

Well	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	Skewness
JCW-MW-18001	8	0	752	1770	1284	1290	399.6	0.3113	-0.1682
JCW-MW-18004	8	0	428	722	526.9	512	86.16	0.1635	1.504
JCW-MW-18005	8	0	160	437	289.7	221.5	119	0.4108	0.4302
JCW-MW-18006	8	0	14.9	38.65	31.3	34.05	8.321	0.2658	-1.144
MW-50	8	0	285.5	504	357.4	333	67.71	0.1894	1.312
MW-51	8	0	308	446	388.3	399	44.38	0.1143	-0.5553
MW-52	8	0	110	663	544	586	178.8	0.3286	-2.094
MW-53	8	0	7.39	215	95.29	102.3	64.26	0.6744	0.4726
MW-53R	8	0	71.7	533	229.7	201	145	0.6314	1.105
MW-54R	8	0	62	86.3	71.89	71.5	7.266	0.1011	0.7467
MW-55	8	0	35.4	249	143.9	118.5	80.52	0.5596	0.2355
OW-57ROUT	8	0	69.4	93.1	82.08	81.8	6.884	0.08387	-0.286

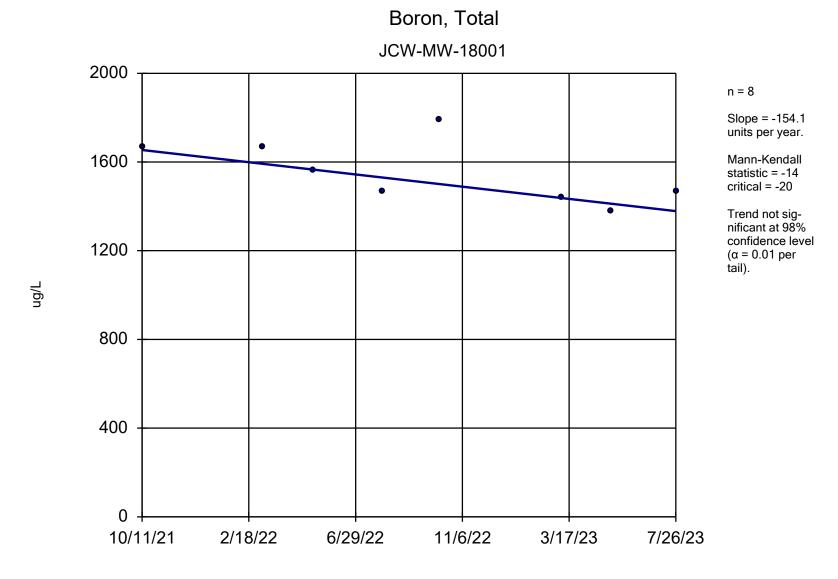


Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

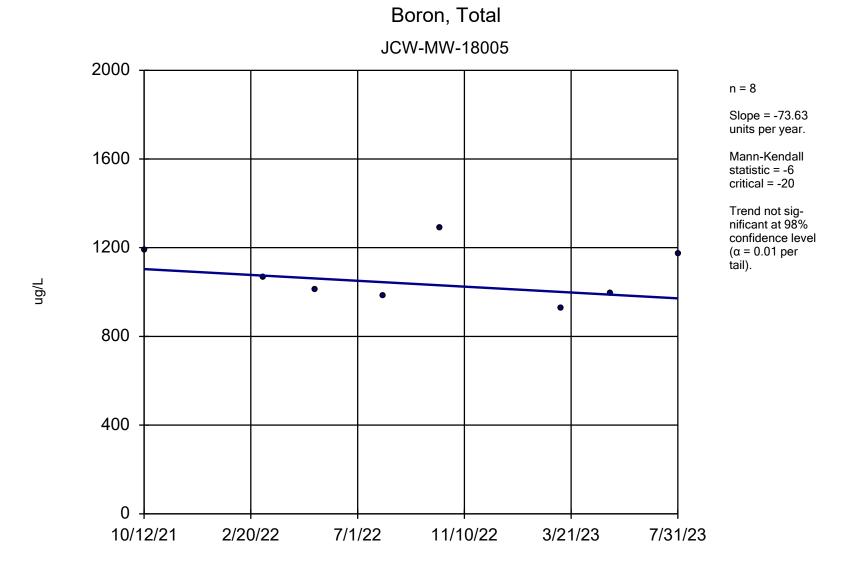


Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM



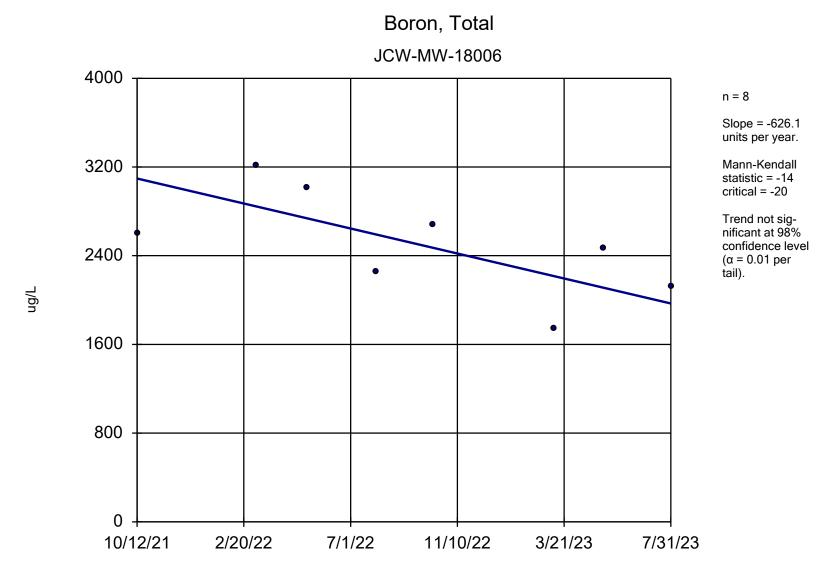
Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



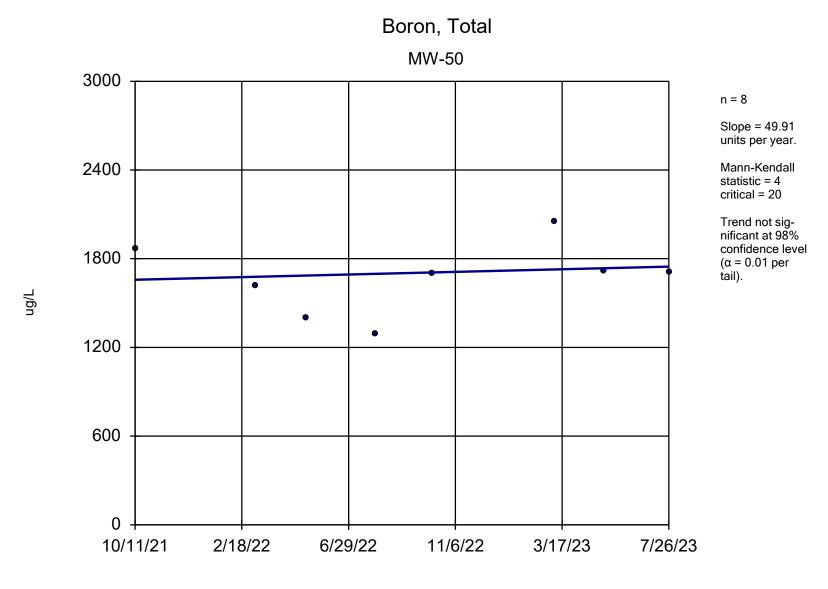
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Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

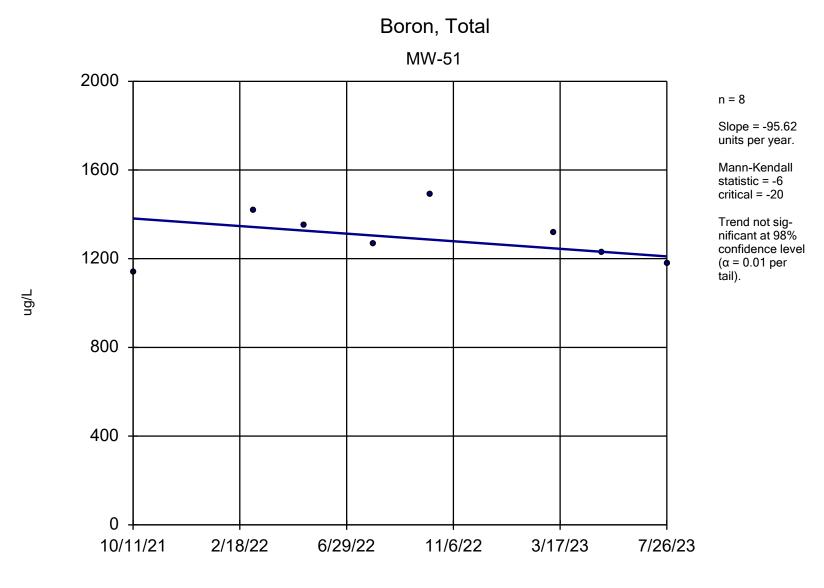


Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

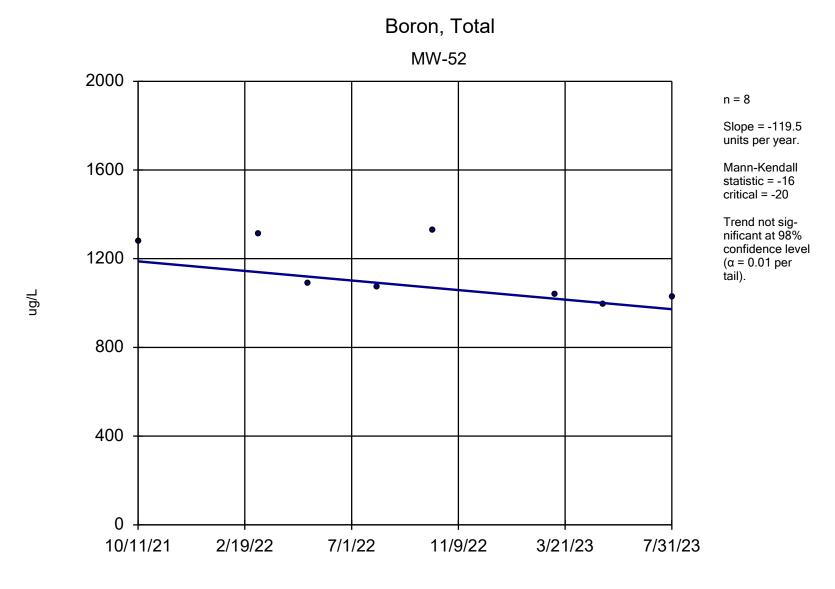
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

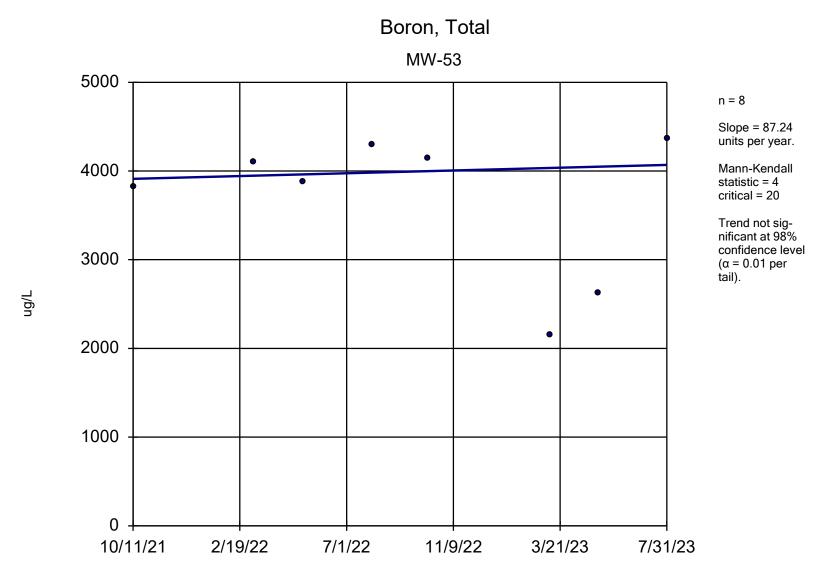


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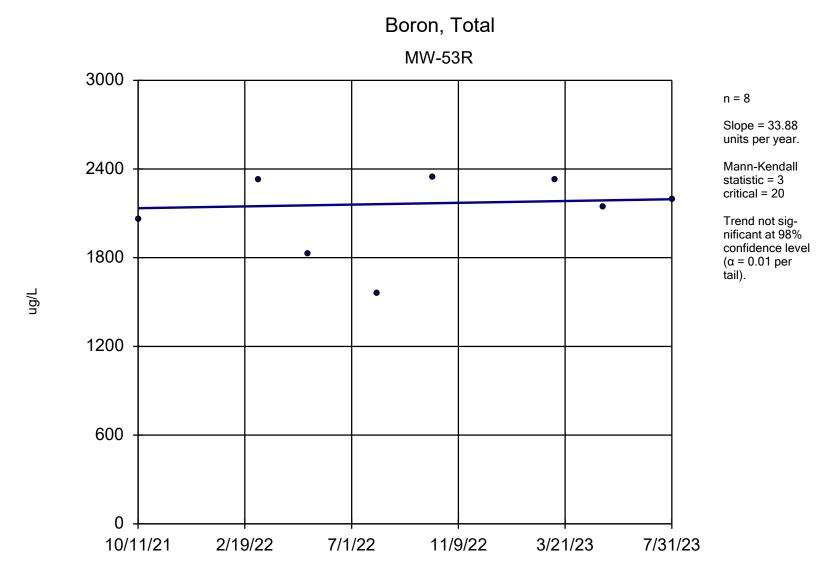


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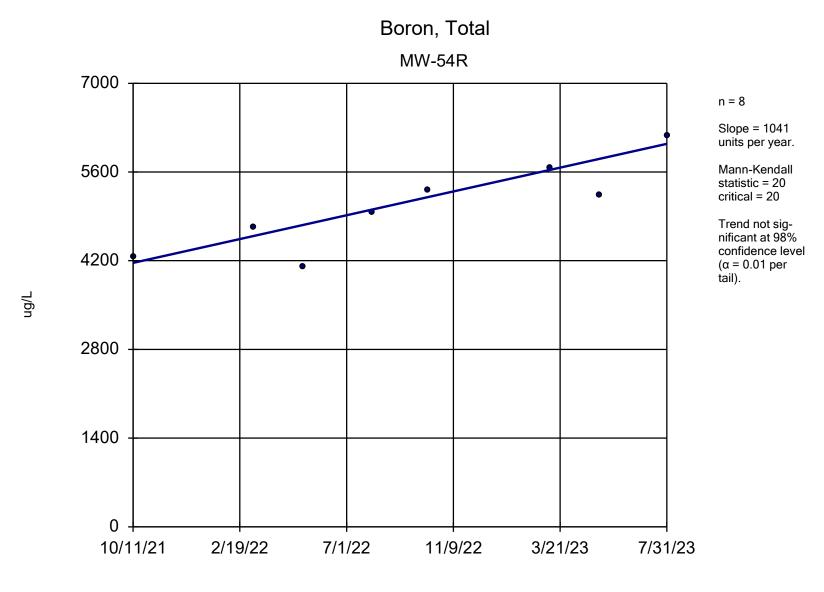
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

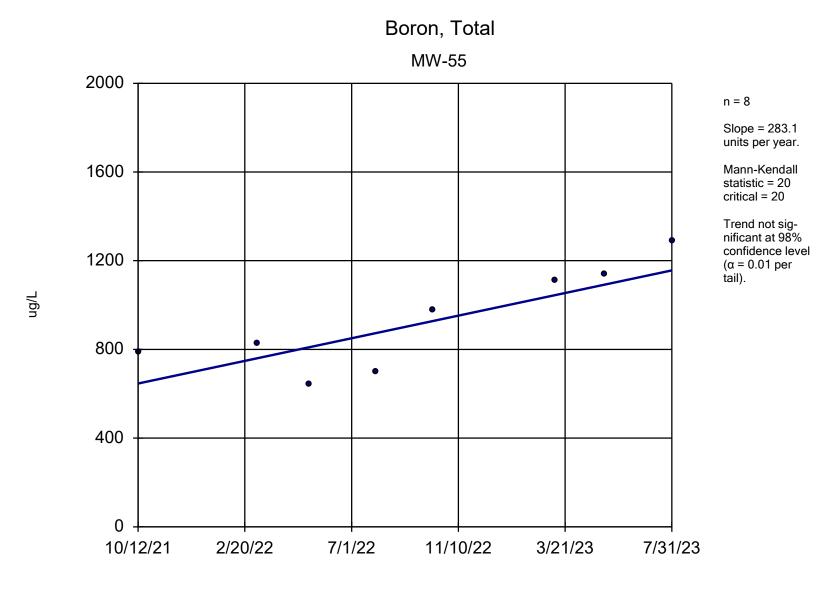


Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM



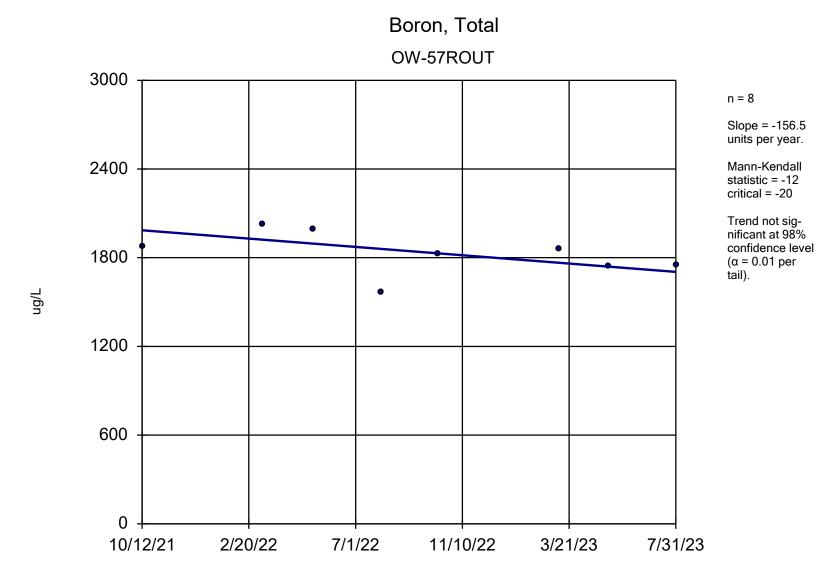
Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



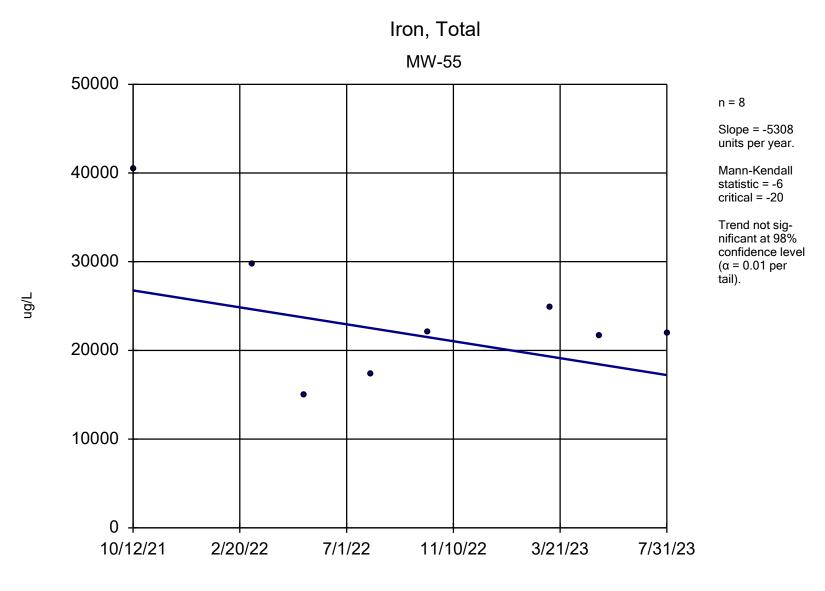
Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



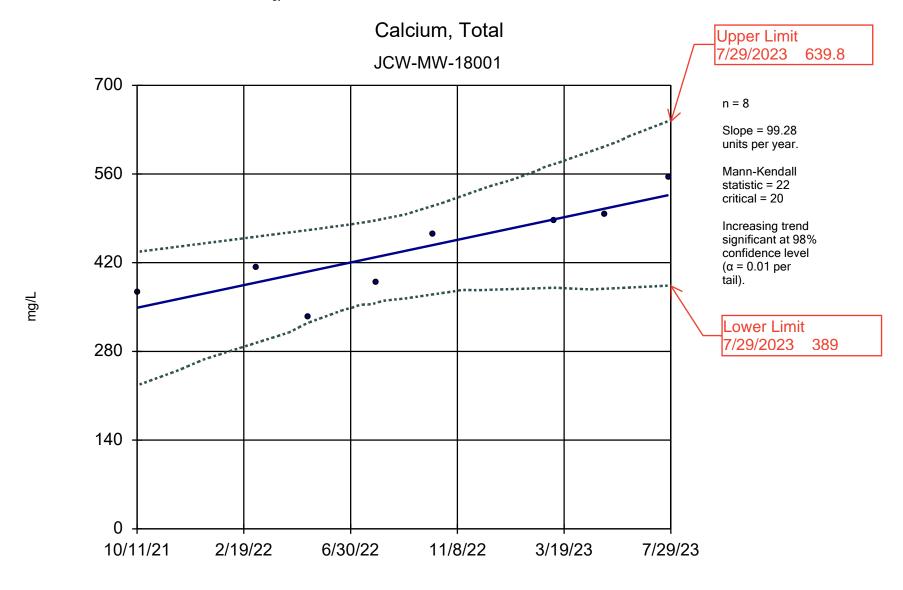
Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

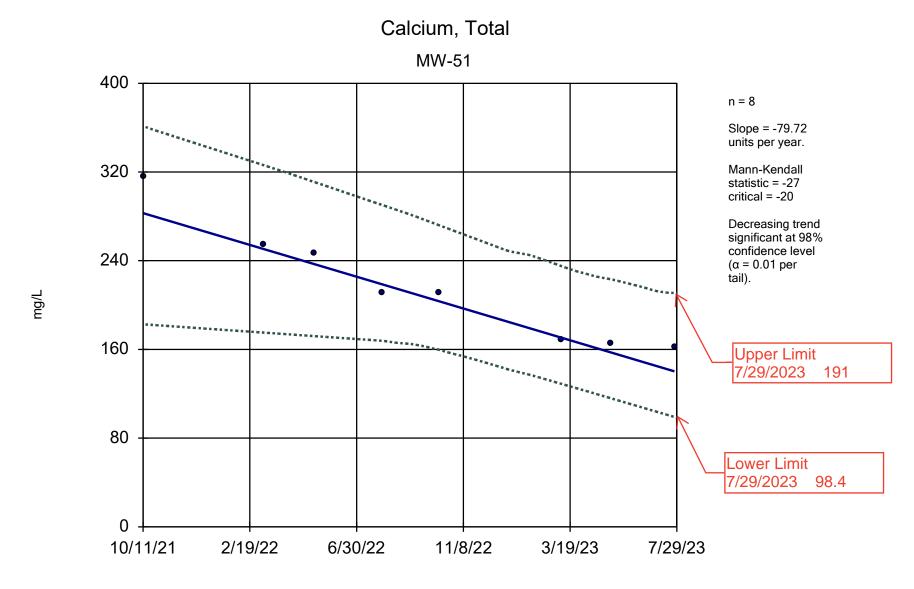


Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

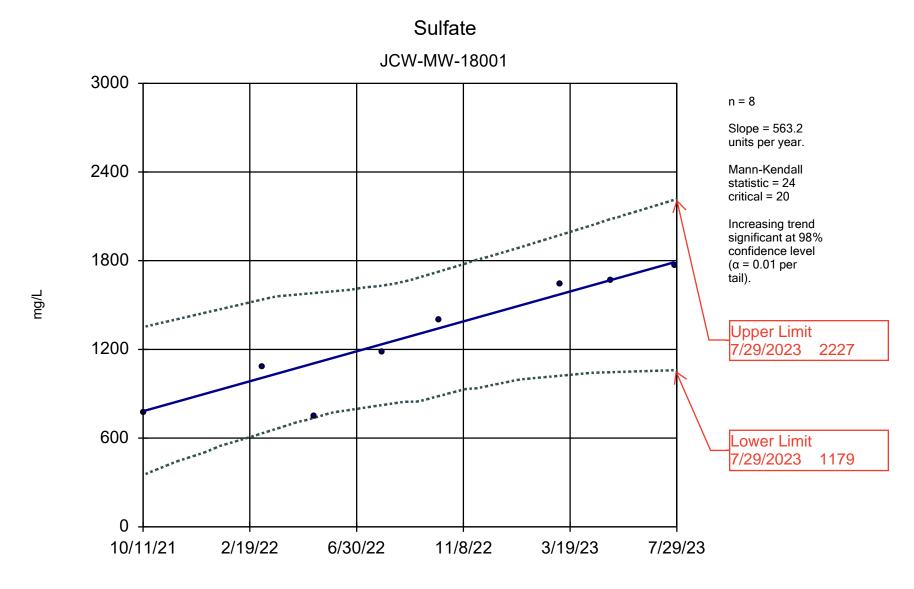
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



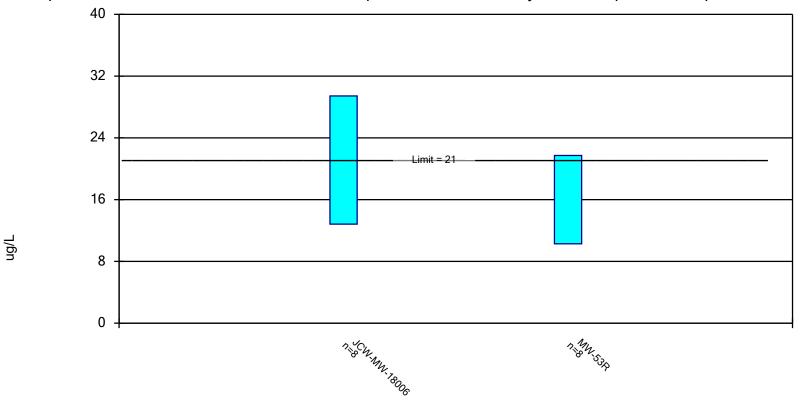
Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3



Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

#### Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 9/5/2023 1:07 PM

## **Confidence Interval**

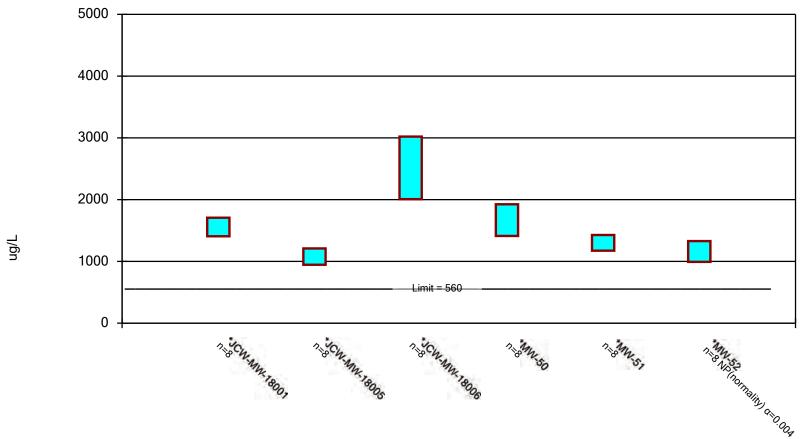
Constituent: Arsenic, Total (ug/L) Analysis Run 9/5/2023 1:08 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	JCW-MW-18006	MW-53R
10/11/2021		25
10/12/2021	21	
3/7/2022	33	
3/8/2022		10
5/9/2022	22.5 (D)	8
8/1/2022		17
8/2/2022	21	
10/10/2022		20
10/11/2022	25 (D)	
3/9/2023	5 (D)	17
5/8/2023		14
5/9/2023	23 (D)	
7/31/2023	18.5 (D)	17
Mean	21.13	16
Std. Dev.	7.823	5.398
Upper Lim.	29.42	21.72
Lower Lim.	12.83	10.28

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

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



Constituent: Boron, Total Analysis Run 9/5/2023 1:08 PM

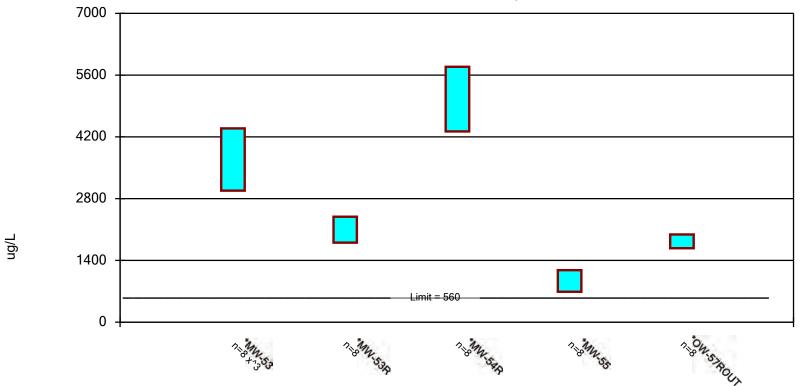
## **Confidence Interval**

Constituent: Boron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	JCW-MW-18001	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51	MW-52
10/11/2021	1670			1865 (D)	1140	1280
10/12/2021		1190	2600			
3/7/2022	1670	1065 (D)	3220			
3/8/2022				1615 (D)	1420	1310
5/9/2022	1560		3010 (D)	1400 (D)	1350	1090
5/10/2022		1010				
8/1/2022	1470			1290 (D)	1270	1070
8/2/2022		981	2260			
10/10/2022	1790			1700 (D)	1490	1330
10/11/2022		1290	2685 (D)			
3/8/2023	1440			2050 (D)		
3/9/2023		930	1745 (D)		1320	1040
5/8/2023	1380			1720 (D)	1230	993
5/9/2023		992	2465 (D)			
7/26/2023	1470			1705 (D)	1180	
7/31/2023		1170	2120 (D)			1030
Mean	1556	1079	2513	1668	1300	1143
Std. Dev.	141.4	125	477.3	241.2	119	139.2
Upper Lim.	1706	1211	3019	1924	1426	1330
Lower Lim.	1406	946	2007	1412	1174	993
	10/12/2021 3/7/2022 3/8/2022 5/9/2022 5/10/2022 8/1/2022 8/1/2022 10/10/2022 10/11/2022 3/8/2023 3/9/2023 5/9/2023 7/26/2023 7/31/2023 Mean Std. Dev. Upper Lim.	10/11/2021 1670 10/12/2021 3/7/2022 1670 3/8/2022 5/9/2022 1560 5/10/2022 8/1/2022 1470 8/2/2022 10/10/2022 1790 10/11/2022 3/8/2023 1440 3/9/2023 5/8/2023 1380 5/9/2023 7/26/2023 1470 7/31/2023 Mean 1556 Std. Dev. 141.4 Upper Lim. 1706	10/11/2021       1670         10/12/2021       1190         3/7/2022       1670       1065 (D)         3/8/2022       5/9/2022       1560         5/10/2022       1470       1010         8/2/2022       981       10/10/2022         10/10/2022       1790       1290         3/8/2023       1440       3/9/2023         5/8/2023       1380       5/9/2023         5/9/2023       1470       1706         7/31/2023       141.4       125         Upper Lim.       1706       1211	10/11/2021       1670         10/12/2021       1190       2600         3/7/2022       1670       1065 (D)       3220         3/8/2022       3/8/2022       3010 (D)         5/10/2022       1560       3010 (D)         5/10/2022       1470       260         8/2/2022       981       2260         10/10/2022       1790       2685 (D)         3/8/2023       1440       2685 (D)         3/8/2023       1440       3/9/2023         5/8/2023       1380       1745 (D)         5/9/2023       992       2465 (D)         7/26/2023       1470       1170       2120 (D)         Mean       1556       1079       2513         Std. Dev.       141.4       125       477.3         Upper Lim.       1706       1211       3019	10/11/2021       1670       1190       2600         3/7/2022       1670       1065 (D)       3220         3/8/2022       1560       3010 (D)       1400 (D)         5/9/2022       1560       3010 (D)       1400 (D)         5/10/2022       1470       1290       1290         8/2/2022       981       2260       1700 (D)         10/10/2022       1790       1290       2685 (D)         3/8/2023       1440       2685 (D)       2050 (D)         3/9/2023       1380       1745 (D)       1720 (D)         5/9/2023       1380       1725 (D)       1720 (D)         5/9/2023       1470       2120 (D)       1705 (D)         7/31/2023       1470       1170       2120 (D)         Mean       1556       1079       2513       1668         Std. Dev.       141.4       125       477.3       241.2         Upper Lim.       1706       1211       3019       1924	10/11/2021       1670       1190       2600       1140         37/2022       1670       1065 (D)       3220       1615 (D)       1420         3/8/2022       1560       3010 (D)       1400 (D)       1350         5/9/2022       1560       3010 (D)       1400 (D)       1350         5/10/2022       1470       1010       1290 (D)       1270         8/2/2022       1790       2260       1700 (D)       1490         10/10/2022       1790       2685 (D)       1700 (D)       1490         10/11/2022       1440       2685 (D)       2050 (D)       1320         3/8/2023       1440       1745 (D)       1320       1320         5/8/2023       1380       1725 (D)       1230       1230         5/9/2023       1380       1720 (D)       1230       1230         5/9/2023       1470       2120 (D)       1705 (D)       1180         7/31/2023       1470       2120 (D)       1705 (D)       1180         Mean       1556       1079       2513       1668       1300         Std. Dev.       141.4       125       477.3       241.2       119         Upper Lim.       170

#### Parametric Confidence Interval

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



Constituent: Boron, Total Analysis Run 9/5/2023 1:08 PM

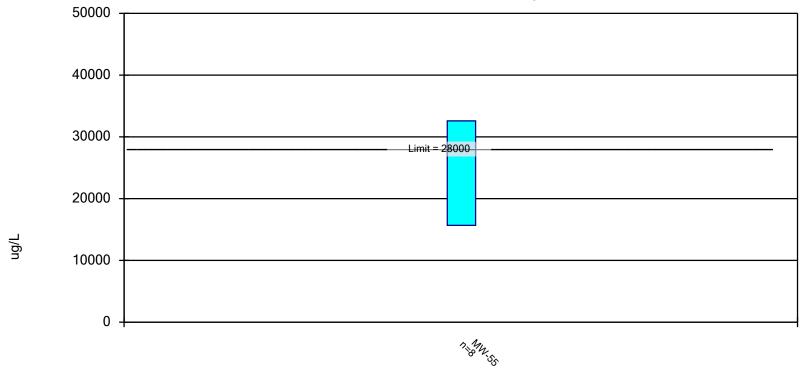
## **Confidence Interval**

Constituent: Boron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
10/11/2021	3820	2060	4270		
10/12/2021				788	1880
3/7/2022				826	
3/8/2022	4100	2330			
3/9/2022			4720		2030
5/9/2022	3880	1830	4110		
5/10/2022				642	1990
8/1/2022	4300	1560	4970	698 (D)	
8/2/2022					1570
10/10/2022	4140	2340	5310	976	
10/11/2022					1830
3/9/2023	2150	2330	5660	1110	1860
5/8/2023	2620	2140			
5/9/2023			5240	1140	1740
7/31/2023	4370	2190	6170	1290	1750
Mean	3673	2098	5056	933.8	1831
Std. Dev.	825.7	277.5	690.5	231.7	146.9
Upper Lim.	4392	2392	5788	1179	1987
Lower Lim.	2983	1803	4324	688.1	1676

#### Parametric Confidence Interval

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



Constituent: Iron, Total Analysis Run 9/5/2023 1:08 PM

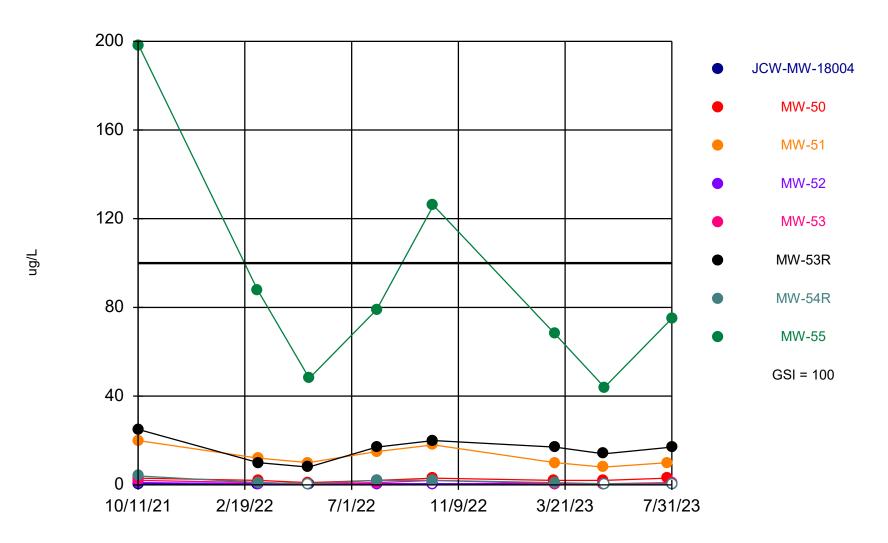
## **Confidence Interval**

Constituent: Iron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	MW-55
10/12/2021	40500
3/7/2022	29800
5/10/2022	15000
8/1/2022	17300 (D)
10/10/2022	22100
3/9/2023	24800
5/9/2023	21600
7/31/2023	21900
Mean	24125
Std. Dev.	7983
Upper Lim.	32586
Lower Lim.	15664

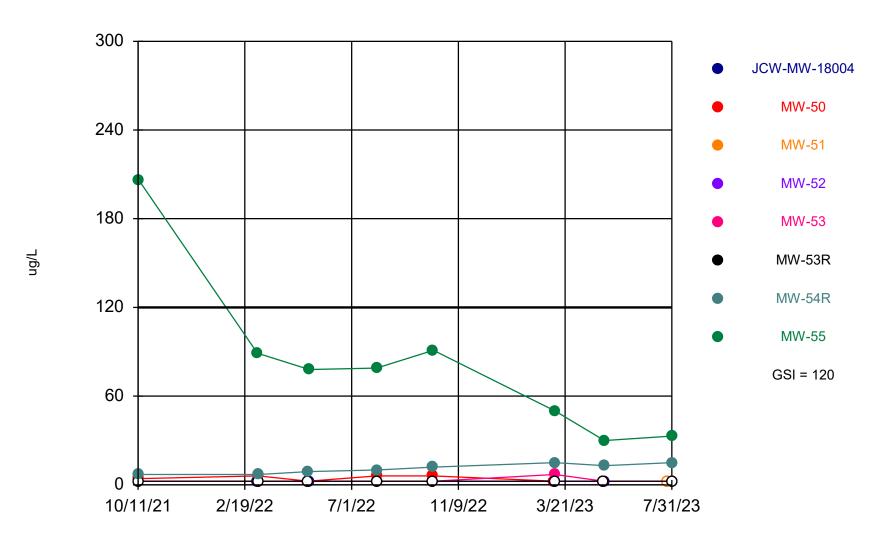
# Attachment 2 GSI Evaluation Sanitas™ Output Files

# Arsenic Comparison to GSI



Time Series Analysis Run 9/5/2023 1:35 PM

## Molybdenum Comparison to GSI



Time Series Analysis Run 9/5/2023 1:35 PM

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG

## **Summary Report**

Constituent: Arsenic, Total Analysis Run 9/5/2023 1:37 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 21 Wells = 8 Minimum Value = 0.5 Maximum Value = 198 Mean Value = 15.68 Median Value = 2 Standard Deviation = 33.72 Coefficient of Variation = 2.15

Skewness = 3.473

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	0.5	0.5	0.5	0.5	0	0	NaN
MW-50	8	0	1	3	2.25	2	0.7071	0.3143	-0.324
MW-51	8	0	8	20	12.88	11	4.324	0.3358	0.6009
MW-52	8	7	0.5	1	0.5625	0.5	0.1768	0.3143	2.268
MW-53	8	3	0.5	2	1.063	1	0.6232	0.5866	0.7024
MW-53R	8	0	8	25	16	17	5.398	0.3374	0.05824
MW-54R	8	3	0.5	4	1.438	1	1.208	0.8405	1.259
MW-55	8	0	44	198	90.75	77	50.24	0.5536	1.3

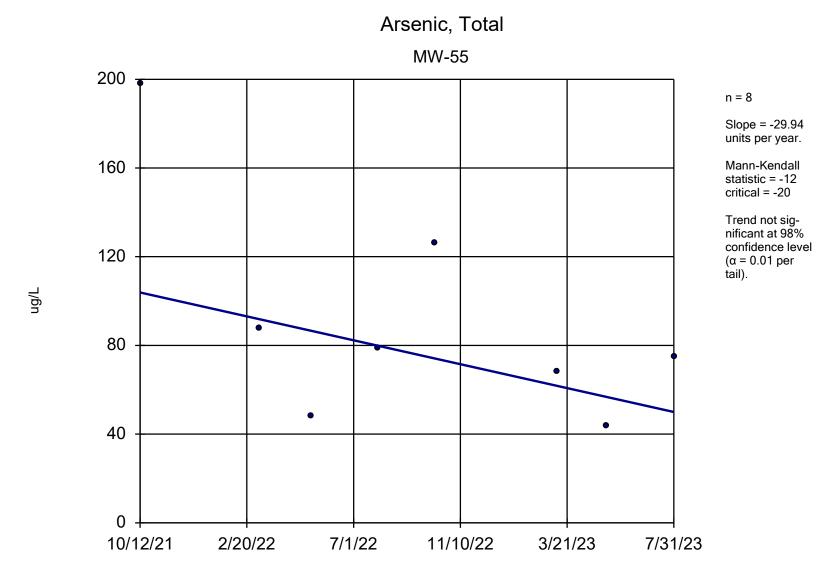
## **Summary Report**

Constituent: Molybdenum, Total Analysis Run 9/5/2023 1:37 PM Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

Observations = 64 ND/Trace = 43 Wells = 8 Minimum Value = 2.5 Maximum Value = 206 Mean Value = 13.76 Median Value = 2.5 Standard Deviation = 32.08 Coefficient of Variation = 2.331 Skewness = 4.134

<u>Well</u>	#Obs.	ND/Trace	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-50	8	4	2.5	6	4.031	3.375	1.734	0.4302	0.2501
MW-51	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-52	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-53	8	7	2.5	7	3.063	2.5	1.591	0.5195	2.268
MW-53R	8	8	2.5	2.5	2.5	2.5	0	0	NaN
MW-54R	8	0	7	15	11	11	3.251	0.2956	0
MW-55	8	0	30	206	82	78.5	55.63	0.6784	1.434



Sen's Slope Estimator Analysis Run 9/5/2023 1:38 PM

ng/L

## Molybdenum, Total

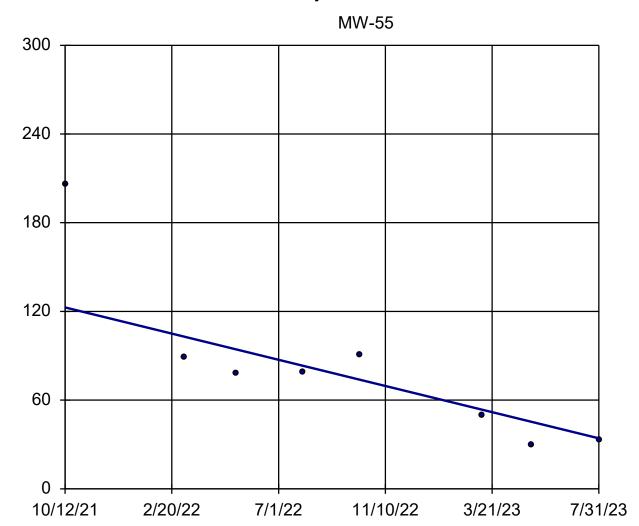
n = 8

Slope = -49.22 units per year.

Mann-Kendall statistic = -18 critical = -20

Trend not significant at 98% confidence level

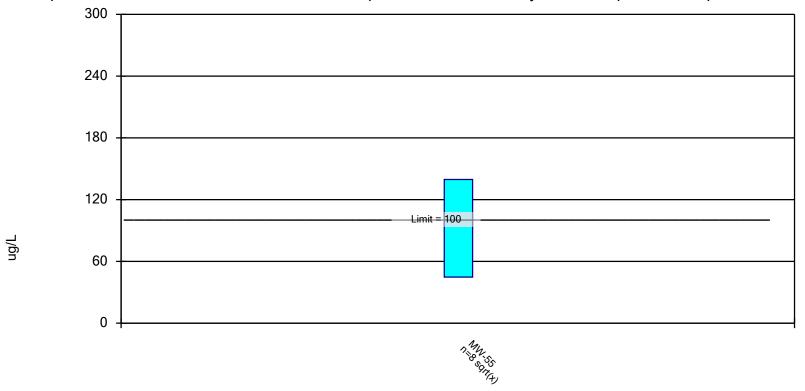
 $(\alpha = 0.01 \text{ per tail}).$ 



Sen's Slope Estimator Analysis Run 9/5/2023 1:38 PM

## Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 9/5/2023 1:39 PM

## **Confidence Interval**

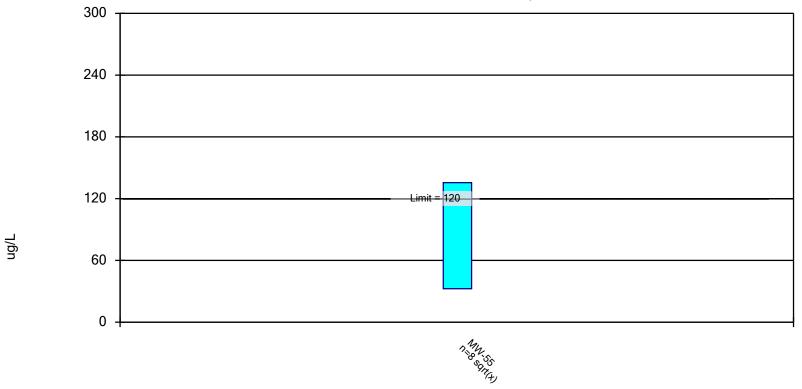
Constituent: Arsenic, Total (ug/L) Analysis Run 9/5/2023 1:39 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	MW-55
10/12/2021	198
3/7/2022	88
5/10/2022	48
8/1/2022	79 (D)
10/10/2022	126
3/9/2023	68
5/9/2023	44
7/31/2023	75
Mean	90.75
Std. Dev.	50.24
Upper Lim.	139.6
Lower Lim.	44.79

## Parametric Confidence Interval

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



Constituent: Molybdenum, Total Analysis Run 9/5/2023 1:39 PM

## **Confidence Interval**

Constituent: Molybdenum, Total (ug/L) Analysis Run 9/5/2023 1:39 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q3

	MW-55
10/12/2021	206
3/7/2022	89
5/10/2022	78
8/1/2022	79 (D)
10/10/2022	91
3/9/2023	50
5/9/2023	30
7/31/2023	33
Mean	82
Std. Dev.	55.63
Upper Lim.	135.5
Lower Lim.	32.44



# Appendix E Laboratory Analytical Report



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 12, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q3

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0723

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 07/24/2023 and 07/31/2023 for the 3<sup>rd</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/27/2023 and 07/31//2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2023 Weadock Porewater Wells

**Date Received:** 7/27/2023 and 7/31/2023

Chemistry Project: 23-0723

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0723-01	JCW-MW-18001	Groundwater	07/26/2023 12:12	JCW Solid Waste Disposal Area, Porewater
23-0723-02	JCW-MW-18004	Groundwater	07/31/2023 08:17	JCW Solid Waste Disposal Area, Porewater
23-0723-03	JCW-MW-18005	Groundwater	07/31/2023 09:34	JCW Solid Waste Disposal Area, Porewater
23-0723-04	JCW-MW-18006	Groundwater	07/31/2023 10:35	JCW Solid Waste Disposal Area, Porewater
23-0723-05	MW-50	Groundwater	07/26/2023 13:40	JCW Solid Waste Disposal Area, Porewater
23-0723-06	MW-51	Groundwater	07/26/2023 14:13	JCW Solid Waste Disposal Area, Porewater
23-0723-07	MW-52	Groundwater	07/31/2023 06:07	JCW Solid Waste Disposal Area, Porewater
23-0723-08	MW-53	Groundwater	07/31/2023 06:40	JCW Solid Waste Disposal Area, Porewater
23-0723-09	MW-53R	Groundwater	07/31/2023 07:30	JCW Solid Waste Disposal Area, Porewater
23-0723-10	MW-54R	Groundwater	07/31/2023 07:47	JCW Solid Waste Disposal Area, Porewater
23-0723-11	MW-55	Groundwater	07/31/2023 08:55	JCW Solid Waste Disposal Area, Porewater
23-0723-12	OW-57ROUT	Groundwater	07/31/2023 10:07	JCW Solid Waste Disposal Area, Porewater
23-0723-13	MW-58	Groundwater	07/31/2023 11:05	JCW Solid Waste Disposal Area, Porewater
23-0723-14	DUP-JCW-LF-01	Groundwater	07/26/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0723-15	DUP-JCW-LF-02	Groundwater	07/31/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0723-16	JCW-MW-18001 MS	Groundwater	07/26/2023 12:12	JCW Solid Waste Disposal Area, Porewater
23-0723-17	JCW-MW-18001 MSD	Groundwater	07/26/2023 12:12	JCW Solid Waste Disposal Area, Porewater
23-0723-18	FB-01	Water	07/31/2023 11:10	JCW Solid Waste Disposal Area, Porewater
23-0723-19	EB-01	Water	07/31/2023 11:13	JCW Solid Waste Disposal Area, Porewater



08/12/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-01
 Collect Time:
 12:12 PM

Metals by EPA 6020B: CCR Rule Apper				Aliquot #: 23-0	723-01-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	49		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1470		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	555000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	2790		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	102		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	138000		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	41		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	17200		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	233000		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	2		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	723-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F, S	504, Aqu	ieous	Aliquot #: 23-0	723-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	58900		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	1770000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-01-C03-A01	Analyst: SL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
i didilictor(3)		-			•	



## **Analytical Report**

**Report Date:** 08/12/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457)

Laboratory Project: 23-0723
Collect Date: 07/26/2023

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-01
 Collect Time:
 12:12 PM

Alkalinity by SM 2320B			Aliquot #: 23-0	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	722000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	722000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01



08/12/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 JCW-MW-18004
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-02
 Collect Time:
 08:17 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV T	Total Metals	в Ехр	Aliquot #: 23-0	723-02-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	30		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	310		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	229000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	24		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	50		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	75400		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	2340		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	19900		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	723-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F	F, SO4, Aqı	ieous	Aliquot #: 23-0	723-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	14200		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	478000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-02-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1220		mg/L	10.0	08/01/2023	AB23-0801-05
		02 0722 Daga	7 of 21			



08/12/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 JCW-MW-18005
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-03
 Collect Time:
 09:34 AM

	ndix III-IV To			Aliquot #: 23-0	723-03-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	76		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1170		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	202000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	171		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	33		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	52400		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	8		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	2910		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	47500		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	723-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	723-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	44100		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	216000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-03-C03-A01	Analyst: SLM
D	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	rtoourt	ı ıug	Office		Allalysis Date	Hacking



08/12/23



**Laboratory Services** A CENTURY OF EXCELLENCE

JCW Solid Waste Disposal Area, Porewater (395457) Sample Site: Laboratory Project:

23-0723 Collect Date: Field Sample ID: JCW-MW-18006 07/31/2023 Lab Sample ID: 23-0723-04 Collect Time: 10:35 AM

				Aliquot #: 23-0	123-04-001-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	18		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	354		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	2100		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	126000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	6910		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	36		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	43700		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	3750		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	87600		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	3		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueo	us			Aliquot #: 23-0	723-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	723-04-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	73000		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	39400		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-04-C03-A01	Analyst: SLI
				-		
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking



08/12/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-50
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-05
 Collect Time:
 01:40 PM

Metals by EPA 6020B: CCR Rule Apper		- Inotal		Aliquot #: 23-0	723-05-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	3		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	114		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1720		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	188000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	1960		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	58		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	56500		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	2		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	7060		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	1		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	56700		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	723-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	723-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	37400		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	392000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-05-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



08/12/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-51
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-06
 Collect Time:
 02:13 PM

				Allquot #. 25-0	723-06-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	10		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	141		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1180		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	162000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	3		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	1290		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	40		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	47200		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	4		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	4930		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	110000		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	723-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-06-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	97000		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	308000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-06-C03-A01	Analyst: SL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking



08/12/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-52
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-07
 Collect Time:
 06:07 AM

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	723-07-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	99		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1030		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	247000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	6720		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	27		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	93900		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	3770		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	60700		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analy	te List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-07-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	31500		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	569000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-07-C03-A01	Analyst: SLF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1520		mg/L	10.0	08/01/2023	AB23-0801-05
	23-0	0723 Page 1	2 of 31			



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Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-53
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-08
 Collect Time:
 06:40 AM

				Allquot #1 20 0	723-08-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	1		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	692		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	4370		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	146000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	1390		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	44		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	41600		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	7340		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	70900		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqued	ous			Aliquot #: 23-0	723-08-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Anal	yte List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 23-0	723-08-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	80300		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	7390		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-08-C03-A01	Analyst: SL
	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Nesult	··ug	Oilito		Allaryolo Bato	



08/12/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-53R
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-09
 Collect Time:
 07:30 AM

Metals by EPA 6020B: CCR Rule Apper				Aliquot #: 23-0	723-09-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	17		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	144		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	2190		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	220000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	1		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	1180		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	62		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	65000		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	5810		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	71100		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	723-09-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-09-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	34600		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	217000		ug/L	1000.0	08/05/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-09-C03-A01	Analyst: SLM
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
` '						





Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457)

Laboratory Project: 23-0723
Collect Date: 07/31/2023
Collect Time: 07:47 AM

Report Date:

08/12/23

Lab Sample ID: 23-0723-10 Matrix: Groundwater

Field Sample ID: MW-54R

Metals by EPA 6020B: CCR Rule	Appenaix III-IV 10	tai wetai	s ⊏xp	Aliquot #: 23-0	723-10-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	106		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	6170		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	162000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	6		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	111		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	75		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	45000		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	15		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	2800		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	1		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	31400		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aq	ueous			Aliquot #: 23-0	723-10-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule A	analyte List, Cl, F,	SO4, Aqı	ueous	Aliquot #: 23-0	723-10-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	48500		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	73800		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 254	10C			Aliquot #: 23-0	723-10-C03-A01	Analyst: SL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
• •		ı ıag			-	
Total Dissolved Solids	761		mg/L	10.0	08/01/2023	AB23-0801-05
	<u>23-</u> (	0723 Page 1	15 of 31			



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Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-55
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-11
 Collect Time:
 08:55 AM

	ndix III-IV To			Aliquot #: 23-0	723-11-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	75		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	240		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1290		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	150000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	21900		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	27		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	29500		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	33		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	22		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	3210		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	1		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	105000		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	723-11-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-11-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	18500		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	129000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-11-C03-A01	Analyst: SLK
D	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	Nesan	ı lag	Oilits		Allalysis Date	Hacking



08/12/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

Field Sample ID: OW-57ROUT Collect Date: 07/31/2023
Lab Sample ID: 23-0723-12 Collect Time: 10:07 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	723-12-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	72		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1750		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	124000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	1		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	30		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	24		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	68300		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	6		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	13		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	2610		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	1		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	61000		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	723-12-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	53700		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	79000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-12-C03-A01	Analyst: SLk
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	762	3	mg/L	10.0	08/01/2023	AB23-0801-05
		0723 Page 1				



08/12/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 MW-58
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-13
 Collect Time:
 11:05 AM

		tal Metals		Aliquot #: 23-0	723-13-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	3		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	166		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	154		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	137000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	16600		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	24		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	22000		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	3		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	8030		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	330000		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	4		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	723-13-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-13-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	559000		ug/L	1000.0	08/07/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	4880		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-13-C03-A01	Analyst: SLM
	- I	Floor	l linite	RL	Analysis Data	Trackina
Parameter(s)	Result	Flag	Units	KL	Analysis Date	Tracking



08/12/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

Field Sample ID: DUP-JCW-LF-01 Collect Date: 07/26/2023 Lab Sample ID: 23-0723-14 Collect Time: 12:00 AM

				Allquot #. 20 0	723-14-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	3		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	113		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1690		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	187000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	2		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	1900		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	59		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	56000		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	6710		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	1		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	57100		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqued	ous			Aliquot #: 23-0	723-14-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Anal	yte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	723-14-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	39100		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	385000		ug/L	1000.0	08/01/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-14-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking





Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457)

Laboratory Project: 23-0723
Collect Date: 07/31/2023

Collect Time:

Report Date:

08/12/23

12:00 AM

Field Sample ID: **DUP-JCW-LF-02**Lab Sample ID: 23-0723-15

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV 1	Total Metals	s Ехр	Aliquot #: 23-0	723-15-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	19		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	346		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	2140		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	126000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	6860		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	36		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	44300		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	3680		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	2		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	87300		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	3		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	723-15-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F	F, SO4, Aqı	ieous	Aliquot #: 23-0	723-15-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	75900		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	37900		ug/L	1000.0	08/02/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	723-15-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	770		mg/L	10.0	08/01/2023	AB23-0801-05
	2	2 0722 Dago 1	00 of 21			



08/12/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 JCW-MW-18001 MS
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-16
 Collect Time:
 12:12 PM

Metals by EPA 6020B: CCR	Rule Appendix III-IV 10	iai wetais Exp	Aliquot #: 23-0	723-16-C01-A01	Analyst: EE
Parameter(s)	Result	Flag Unit	s RL	<b>Analysis Date</b>	Tracking
Antimony	102	%	1.0	08/07/2023	AB23-0807-02
Arsenic	106	%	1.0	08/07/2023	AB23-0807-02
Barium	95	%	5.0	08/07/2023	AB23-0807-02
Beryllium	90	%	1.0	08/07/2023	AB23-0807-02
Boron	113	%	20.0	08/07/2023	AB23-0807-02
Cadmium	90.1	%	0.2	08/07/2023	AB23-0807-02
Calcium	114	%	1000.0	08/08/2023	AB23-0807-02
Chromium	98	%	1.0	08/07/2023	AB23-0807-02
Cobalt	97	%	6.0	08/07/2023	AB23-0807-02
Copper	90	%	1.0	08/07/2023	AB23-0807-02
Iron	107	%	20.0	08/07/2023	AB23-0807-02
Lead	88	%	1.0	08/07/2023	AB23-0807-02
Lithium	98	%	10.0	08/07/2023	AB23-0807-02
Magnesium	108	%	1000.0	08/08/2023	AB23-0807-02
Molybdenum	113	%	5.0	08/07/2023	AB23-0807-02
Nickel	96	%	2.0	08/07/2023	AB23-0807-02
Potassium	101	%	100.0	08/08/2023	AB23-0807-02
Selenium	100	%	1.0	08/07/2023	AB23-0807-02
Silver	87.8	%	0.2	08/07/2023	AB23-0807-02
Sodium	111	%	1000.0	08/08/2023	AB23-0807-02
Thallium	87	%	2.0	08/07/2023	AB23-0807-02
Vanadium	110	%	2.0	08/07/2023	AB23-0807-02
Zinc	89	%	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Tota	al, Aqueous		Aliquot #: 23-0	723-16-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Mercury	100.0	%	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR R	tule Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	723-16-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Chloride	101	%	1000.0	08/01/2023	AB23-0801-04
Fluoride	91	%	1000.0	08/01/2023	AB23-0801-04
Sulfate	102	%	1000.0	08/02/2023	AB23-0801-04



08/12/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 JCW-MW-18001 MSD
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0723-17
 Collect Time:
 12:12 PM

Metals by EPA 6020B: CCR	Rule Appendix III-IV 10	tai WetaiS E	xh	Aliquot #: 23-0	723-17-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	103	%	)	1.0	08/07/2023	AB23-0807-02
Arsenic	106	%	)	1.0	08/07/2023	AB23-0807-02
Barium	98	%	)	5.0	08/07/2023	AB23-0807-02
Beryllium	90	%	)	1.0	08/07/2023	AB23-0807-02
Boron	93	%	)	20.0	08/07/2023	AB23-0807-02
Cadmium	91.5	%	)	0.2	08/07/2023	AB23-0807-02
Calcium	113	%	)	1000.0	08/08/2023	AB23-0807-02
Chromium	98	%	)	1.0	08/07/2023	AB23-0807-02
Cobalt	96	%	)	6.0	08/07/2023	AB23-0807-02
Copper	89	%	)	1.0	08/07/2023	AB23-0807-02
Iron	105	%	)	20.0	08/07/2023	AB23-0807-02
Lead	86	%	)	1.0	08/07/2023	AB23-0807-02
Lithium	93	%	)	10.0	08/07/2023	AB23-0807-02
Magnesium	105	%	)	1000.0	08/08/2023	AB23-0807-02
Molybdenum	113	%	)	5.0	08/07/2023	AB23-0807-02
Nickel	95	%	)	2.0	08/07/2023	AB23-0807-02
Potassium	101	%	)	100.0	08/08/2023	AB23-0807-02
Selenium	100	%	)	1.0	08/07/2023	AB23-0807-02
Silver	87.9	%	)	0.2	08/07/2023	AB23-0807-02
Sodium	109	%	)	1000.0	08/08/2023	AB23-0807-02
Thallium	88	%	)	2.0	08/07/2023	AB23-0807-02
Vanadium	108	%	)	2.0	08/07/2023	AB23-0807-02
Zinc	89	%	)	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, To	Mercury by EPA 7470A, Total, Aqueous			Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	102	%	)	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqueo	ous	Aliquot #: 23-0	723-17-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	103	%	)	1000.0	08/01/2023	AB23-0801-04
Fluoride	86	%	)	1000.0	08/01/2023	AB23-0801-04
Sulfate	107	%	)	1000.0	08/02/2023	AB23-0801-04



08/12/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 FB-01
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-18
 Collect Time:
 11:10 AM

Matrix: Water

Metals by EPA 6020B: CCR	Rule Appendix III-IV Tot	al Metals E	хр	Aliquot #: 23-0	723-18-C01-A01	Analyst: EB
Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Antimony	ND	ug	g/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND	ug	g/L	1.0	08/07/2023	AB23-0807-02
Barium	ND	ug	g/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND	ug	g/L	1.0	08/07/2023	AB23-0807-02
Boron	ND	ug	J/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND	ug	g/L	0.2	08/07/2023	AB23-0807-02
Calcium	ND	ug	g/L	1000.0	08/08/2023	AB23-0807-02
Chromium	2	ug	g/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND	ug	g/L	6.0	08/07/2023	AB23-0807-02
Copper	ND	ug	g/L	1.0	08/07/2023	AB23-0807-02
Iron	ND	ug	g/L	20.0	08/07/2023	AB23-0807-02
Lead	ND	ug	g/L	1.0	08/07/2023	AB23-0807-02
Lithium	ND	ug	g/L	10.0	08/07/2023	AB23-0807-02
Magnesium	ND	ug	g/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND	ug	g/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND	ug	g/L	2.0	08/07/2023	AB23-0807-02
Potassium	ND	ug	J/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND	ug	J/L	1.0	08/07/2023	AB23-0807-02
Silver	ND	ug	g/L	0.2	08/07/2023	AB23-0807-02
Sodium	ND	ug	g/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND	ug	g/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND	ug	g/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND	ug	g/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous			Aliquot #: 23-0723-18-C01-A02		Analyst: CLE	
Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Mercury	ND	ug	g/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR I	Rule Analyte List, Cl, F, S	SO4, Aqueo	us	Aliquot #: 23-0	723-18-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag l	Jnits	RL	Analysis Date	Tracking
Chloride	ND	uç	g/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND	_	j/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	ND	_	j/L	1000.0	08/01/2023	AB23-0801-04



08/12/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0723

 Field Sample ID:
 EB-01
 Collect Date:
 07/31/2023

 Lab Sample ID:
 23-0723-19
 Collect Time:
 11:13 AM

Matrix: Water

Metals by EPA 6020B: CCR Ru	uie Appendix III-IV 10	lai Wielais	Exp	Aliquot #: 23-0	723-19-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	ND		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	ND		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	ND		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	ND		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	ND		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	ND		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	ND		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Ru	le Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot #: 23-0	723-19-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04



A CENTURY OF EXCELLENCE

## **Analytical Report**

**Report Date:** 08/12/23

Data Qualifiers	Exception Summary		
	No exceptions occurred.		

CONSUMERS ENERGY

## Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

# TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Inspection Date: 7-27-	23		Inspection By:	is .	
Inspection Date: 7-27- Sample Origin/Project Name	: 03-2023	Weado	ck Porewater	Wells	
Shipment Delivered By: Ente					
			USPS_		irborne
Tracking Number:					
Shipping Containers: Enter t	he type and nur	nber of shipp	ing containers received.		
Cooler Loose/Unpackaged C	Cardboard Box		Custom Case	Envelo	ope/Mailer
Condition of Shipment: Ente					
Damaged Shipment C	bserved: None		Dented	Le	eaking
Shipment Security: Enter if a	ny of the shipp	ing container	s were opened before re	eceipt.	
Shipping Containers I	Received: Open	ned	Sealed	_	
Enclosed Documents: Enter t	he type of docu	ments enclos	ed with the shipment.		
CoC _ Wo			Air Data Sheet	Other	
Temperature of Containers: As-Received Tempera			Samples Received of		No
M&TE # and Expirati	on 015402	5-23-24			
Number and Type of Contain	ners: Enter the	total number	of sample containers re	eceived.	
Container Type VOA (40mL or 60mL)	Water Z	Soil	Other	Broken	Leakin
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	12	_			
24 mL vial (glass)	_				_
500 mL (plastic)		_			
Other 250 mc	4	_			-

## **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page	1	1
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135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells				PROJECT NUMBER:	SAP CC or '	WO#:							A	NAI	YSIS	S REC	QUES	STED		QA REQUIREMENT:	
Q3-:	2023 Weadock P	orewater Wells			23-0723	REQUESTE	ER: Haro	ld I	Regis	ter			19	Atta	h Lis	st if M	lore S	pace is	s Needed	1)	QA REQUIREMENT:
SAM	IPLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ S	TANDARD ⊠ C	THER_														□ NPDES  □ TNI
SEN	ID REPORT TO:	Caleb Batts			email:	phone:											Ш				☐ ISO 17025
	COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Other	er.		CC	ONTA	INE	RS										☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sluc W = Water / Aqueous Liquid A = Air	ige		F	PRESI	ERV	ATIV	E	als								☐ INTERNAL INFO
	LAB	SAMPLE COLI	LECTION	XX	S = Soil / General Solid WP = Wi	pe neral Waste	AL#						Metals	us		linity					□ OTHER
S	SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOTAL#	None	HNO3	NaOH	HCI	Other	Total	Anions	TDS	Alkalinity					REMARKS
- 1	23-0723-01	7/24/23	1212	GW	JCW-MW-18001		5	4	1				x	x	x	x					
	-02			GW	JCW-MW-18004		3	24	1				x	x	x						
	-03			GW	JCW-MW-18005		3	1/2	1				x	x	x						
	-04			GW	JCW-MW-18006		3	12	1				x	x	x						
	-05	7/26/53	13016	GW	MW-50			2					x	x	x						
	-06	n l	1 4113	GW	MW-51		*	12	1				x	x	x						
	-07			GW	MW-52		100	1					x	x	x						
	-08			GW	MW-53		1/3						x	x	x						
	-09			GW	MW-53R		63						x	x	x						
	-10			GW	MW-54R			1					х	х	x						
	-11			GW	MW-55		3	1/2	1				x	x	х						
	-12			GW	OW-57ROUT			K					x	x	x						
_	NQUISHED BY:	_ 7/	150	DATE/	0970	RECEIVED BY:								MME			Yes		) Mě	&TE#:	015402
					23-0723 Page 27 of 31						Tem	perat	ure: 1	.4.	-1.8	°C	Ca	l. Due	015462 Date: 5-23-24		

## **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

SERVICES Page 7 of 2

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

SAMP	AMPLING SITE / CUSTOMER: 3-2023 Weadock Porewater Wells				PROJECT NUMBER:	SAP CC or W	/O#:							AN	IAL	YSI	SRE	OUE	STE	D	
Q3-20	23 Weadock F	orewater Wells			23-0723	REQUESTER	R: Haro	ld R	egis	ter			(.	Attach	Lis	t if N	lore S	pace	is Ne	eded)	QA REQUIREMENT:
SAMP	LING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ S	STANDARD Ø 01	THER _													,	□ NPDES ☑ TNI
SEND	REPORT TO:	Caleb Batts			email:	phone:															☐ ISO 17025
(	OPY TO:	Harold Registe	r		MATRIX CODES: GW = Groundwater OX = Oth	er		СО	NTA	INE	RS										☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sluc W = Water / Aqueous Liquid A = Air	dge		PI	RESE	ERVA	TIVI		Metals			_					☐ INTERNAL INFO
	LAB	SAMPLE COLI	LECTION	RIX	S = Soil / General Solid WP = W O = Oil WT = Ge	ipe eneral Waste	TOTAL#		3	-	Н		I Me	Suc		Alkalinity					□ OTHER
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	OCATION	T01	None	HNO H,SO	NaOl	МеОН	Other	Total	Anions	TDS	Alka					REMARKS
2	3-0723-13			GW	MW-58		1/2	2	1				x	x	х						
- 1	-14	Them	-	GW	DUP-JCW-LF-01		1	*2	1				x	x	х						
	-15	7		GW	DUP-JCW-LF-02		3		- 1				x	х	x						
	-16	7/26/03	1213	GW	JCW-MW-18001 MS		2		1				x	х							
	-17	11.01	123	GW	JCW-MW-18001 MSD	THE STATE OF THE S			1				x	x	1		П		П		
	-18			W	FB-01		2	1	1	П			x	x							
-	-19			w	EB-01		2	1	1				х	x	1			П			
																				ΗĖ	
												1		1				Н			
									t	H		+									
-									+		+	+									
RELING	QUISHED BY:		I	DATE/I	ΓΙΜΕ:	RECEIVED BY:						+	COM	MEN	TS:						
	/	7 -	7/20	,	23 0930	₹.															
RELING	UISHED DT:			DATE/I		RECEIVED BY:								ived o							#: 015402 ne Date: 5-23-24
						23-0723 Page 28	of 31													1	

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

			········	
TITLE: SAMPLE LOG-IN - SHIP	MENT IN	SPECTION FORM	i i	
Project Log-In Number: 23-672	3			
Inspection Date: 1.31.23		Inspection By: Cle		
Sample Origin/Project Name: 03-2023				
Shipment Delivered By: Enter the type of shi				
			Airb	orne
PonyFedEx	Urs.		Allo	orne
Tracking Number:				No
Shipping Containers: Enter the type and num				
15				
		Custom Case		
Loose/Unpackaged Containers		Other		
Condition of Shipment: Enter the as-received	/	of the shipment container.		
Damaged Shipment Observed: None		Dented	Leal	cing
Other				
Shipment Security: Enter if any of the shipping	ng containe	rs were opened before rec	eipt.	
Shipping Containers Received: Open	ed	Sealed		
Enclosed Documents: Enter the type of documents		The second secon		
CoC Work Request		Air Data Sheet	Other	-
Temperature of Containers: Measure the tem	perature of	several sample containers		
As-Received Temperature Range 7.4	.9.8℃	Samples Received on	Ice: Yes P N	0
M&TE # and Expiration 019402				
6.23.2	4			
Number and Type of Containers: Enter the	ołal number	r of sample containers rec	eived.	
Container Type Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)				
Quart/Liter (g/p)	_			
9-oz (amber glass jar)	_			
2-oz (amber glass)				-
125 mL (plastic)				-
24 mL vial (glass)	_			-
150 800 mL (plastic)				

PH 75P 0-14 1205522

Other

23-0723 Page 29 of 31

76.292 not needed

## **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

		-
Page	of	_

	PLING SITE / CU				PROJECT NUMBER:	SAP CC or W	O#:									REQ			QA REQUIREMENT:
Q3-2	023 Weadock F	orewater Well	S		23-0723	REQUESTER	Hard	old R	egis	ter			(Atta	ch Li	st if M	ore Spa	ace is l	Needed)	QA REQUIREMENT.
SAMI	PLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STA	ANDARD ⊠ OT	HER_												□ NPDES  ⊠ TNI
SEN	D REPORT TO:	Caleb Batts			email:	phone:												11	☐ ISO 17025
	COPY TO:	Harold Regi	ster		MATRIX CODES: GW = Groundwater OX = Other			CC	NTA	INE	RS								☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			P	RESI	ERVA	TIVE	Metals			Q				☐ INTERNAL INFO
	LAB	SAMPLE COL	LECTION	XIX	S = Soil / General Solid $WP = Wipe$ $O = Oil$ $WT = General Solid$	al Waste	TOTAL#				-	l Me	Suc		Alkalinity	11			□ OTHER
S	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	ATION	TOT	None	HYSO	NaOI	MeOH MeOH	Total	Anions	TDS	Alka				REMARKS
	23-0723-01			GW	JCW-MW-18001		5	4	1	Ш		x	x	x	x				
	-02	7/3/133	רזטט	GW	JCW-MW-18004	EB	35	24-	ı			x	x	x					
	-03	a (1	0934	GW	JCW-MW-18005	07-21-	23	4	1			x	x	x					
	-04	7/3163	1035	GW	JCW-MW-18006		4	4	ι			x	x	x					
	-05			GW	MW-50		4	4	1			x	x	x					
	-06			GW	MW-51		1	1	ı			x	x	x		4			
	-07	7/3/153	0607	GW	MW-52		5	4	1			x	x	x					
	-08	1610	0640	GW	MW-53		5	4	1			x	x	x					
	-09	a.	טצט	GW	MW-53R		5	+	1			x	x	x					
	-10	((L	רשרט	GW	MW-54R		5	#	i			x	x	x					
	-11	WW	0055	GW	MW-55		1	4	1.			x	x	х					
	-12	uu	1007	GW	OW-57ROUT		1	1	I			x		x					
,	QUISHED BY:		2/3/1	DATE/	3 13-11	CEIVED BY:							OMME			Van F	T No.	\ <i>A&amp;</i> -T	<sub>Е#:_</sub> _ a15402_
KELIN	QUISHED IN:		1	JATE/		3-0723 Page 30 c	of 31												Due Date: 5-23-24

## **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page 2 of 2

SAMP	LING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or WC	#:						A	NAI	VSIS	REC	QUEST	red	C. I. & L. C. L. M. B. B. Tall. Co.
Q3-20	23 Weadock P	orewater Wells			23-0723	REQUESTER:	Haro	old I	Regis	ter								Needed)	QA REQUIREMENT:
SAMP	LING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ ST	TANDARD ⊠ OTH	ER_												□ NPDES  □ TNI
SEND	REPORT TO:	Caleb Batts			email:	phone:													☐ ISO 17025
C	OPY TO:	Harold Registe	er		MATRIX CODES:  GW = Groundwater OX = Other			C	ONTA	INE	RS								☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Slndg W = Water / Aqueous Liquid A = Air			I	PRES	ERVA	TIVE	Metals			>				☐ INTERNAL INFO
	LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid   WP = Wip   O = Oil   WT = Gen	eral Waste	TOTAL#			, E	II.	al Me	suo		Alkalinity				□ OTHER
SA	MPLE ID	DATE				9.5	1 1		NaOi	MeOH	Total	Anions	TDS	Alka				REMARKS	
2.	3-0723-13	7/3/153	1105	GW	MW-58	EB 07-31-23	3	4	1			x	x	x					
	-14	11,,,,,,,		GW	DUP-JCW-LF-01		1	4	ï			x	x	x					
	-15	7/3/63	_	GW	DUP-JCW-LF-02		1	1	1			x	x	x					
	-16			GW	JCW-MW-18001 MS	E.B 07-31-23	24	1	1			x	x						
	-17			GW	JCW-MW-18001 MSD	01-3-2	1		1			x	x						
	-18	7/3/15)	1110	W	FB-01		2	1	1			x	x						
,	-19	7/3/123	1113	w	EB-01		2	1	1			х	х						
										Н			-						
DEL DI	QUISHED BY:			DATE/	TIME: . P	RECEIVED BY:	1					CO	MME	NTS					
KELIN	QUISTIED BY:	7			134/23/34								VIIVIL						
RELING	QUISHED		( 1	DATE/		RECEIVED BY:						Rec	eived	on Io	e? D	Yes	□ No	M&T	E#: 015402-
						23-0723 Page 31 o	f 31					Ten	npera	ture: 7	.4-	9.8	°C	Cal. I	Due Date: 5-23-24



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 11, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q3

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 23-0721** 

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 07/24/2023 for the 3<sup>rd</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/27/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2023 DEK-JCW Background Wells

**Date Received:** 7/27/2023 **Chemistry Project:** 23-0721

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0721-01	MW-15002	Groundwater	07/26/2023 08:52	DEK JCW Background
23-0721-02	MW-15008	Groundwater	07/24/2023 13:23	DEK JCW Background
23-0721-03	MW-15016	Groundwater	07/26/2023 09:33	DEK JCW Background
23-0721-04	MW-15019	Groundwater	07/24/2023 14:05	DEK JCW Background
23-0721-05	DUP-Background	Groundwater	07/24/2023 00:00	DEK JCW Background
23-0721-06	FB- Background	Water	07/26/2023 09:33	DEK JCW Background





A CENTURY OF EXCELLENCE

Report Date: 08/11/23

Sample Site: **DEK JCW Background** Laboratory Project: 23-0721

Field Sample ID: MW-15002 Collect Date: 07/26/2023 Lab Sample ID: 23-0721-01 Collect Time: 08:52 AM

Matrix: Groundwater

			_			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Appe	endix III-IV Tot	tal Metals	s Ехр	Aliquot #: 23-0	721-01-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	651		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	146		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	221000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	2		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	2		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	13500		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	1		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	23		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	31400		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	7		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	4200		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	1130000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	10		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	18		ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule Analy	te List. Cl. F. S	SO4. Aau	ieous	Aliguot #: 23-0	721-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1940000	3	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01 AB23-0731-01
Sulfate	2160		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Calida by CM 25400				Allmust #- 00.0	704 04 000 404	Amalian C. O. K
Total Dissolved Solids by SM 2540C Parameter(s)	Result	Flor	Units	Aliquot #: 23-0 RL	721-01-C03-A01	Analyst: SLK Tracking
` ,		Flag			Analysis Date	_
Total Dissolved Solids	2100		mg/L	10.0	07/28/2023	AB23-0728-09



08/11/23



A CENTURY OF EXCELLENCE

Sample Site: **DEK JCW Background** Laboratory Project: **23-0721** 

 Field Sample ID:
 MW-15008
 Collect Date:
 07/24/2023

 Lab Sample ID:
 23-0721-02
 Collect Time:
 01:23 PM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous	by EPA 7470A, Total, Aqueous Aliquot #: 23-0721-02-C01-A01					Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Appen	dix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	721-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	85		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	149		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	123000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	2		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	20800		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	23		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	19500		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	2		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	3390		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	208000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	6		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule Analyte	List. Cl. F.	SO4. Aqı	ieous	Aliquot #: 23-0	721-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	333000	_	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	19000		ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Solids by SM 2540C				Alignot #: 22.0	721_02_002_004	Analyst CLV
Parameter(s)	Result	Flag	Units	RL	721-02-C03-A01 Analysis Date	Analyst: SLK Tracking
Total Dissolved Solids	526	ı iug			-	_
rotal Dissolved Solids		0721 Paga	mg/L	10.0	07/28/2023	AB23-0728-09



08/11/23



A CENTURY OF EXCELLENCE

Sample Site: **DEK JCW Background** Laboratory Project: **23-0721** 

 Field Sample ID:
 MW-15016
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0721-03
 Collect Time:
 09:33 AM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Ac	lueous		Aliquot #: 23-0	721-03-C01-A01	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	)721-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag Units	-	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	19	ug/L	1.0	08/03/2023	AB23-0803-02
Barium	104	ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Boron	572	ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND	ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	240000	ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1	ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND	ug/L	6.0	08/03/2023	AB23-0803-02
Copper	1	ug/L	1.0	08/03/2023	AB23-0803-02
Iron	15100	ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	73	ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	36400	ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND	ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	10	ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	12000	ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND	ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	96600	ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND	ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND	ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND	ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule A	Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	)721-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Units	-	Analysis Date	Tracking
Chloride	191000	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND	ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	138000	ug/L	1000.0	07/31/2023	AB23-0731-01
Total Dissolved Solids by SM 254	10C		Aliquot #: 23-0	)721-03-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag Units	-	Analysis Date	Tracking
Total Dissolved Solids	660	mg/L	10.0	07/28/2023	AB23-0728-09
		0721 Daga 7 of 12			



08/11/23



A CENTURY OF EXCELLENCE

Sample Site: **DEK JCW Background** Laboratory Project:

23-0721 Field Sample ID: MW-15019 Collect Date: 07/24/2023 Lab Sample ID: 23-0721-04 Collect Time: 02:05 PM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueou		Aliquot #: 23-0	Analyst: CLE			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Ехр	Aliquot #: 23-0	721-04-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Barium	362		ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Boron	275		ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	174000		ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND		ug/L	6.0	08/03/2023	AB23-0803-02
Copper	1		ug/L	1.0	08/03/2023	AB23-0803-02
Iron	23500		ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND		ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	15		ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	39700		ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND		ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	4		ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	2300		ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	1		ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND		ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	218000		ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND		ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND		ug/L	10.0	08/03/2023	AB23-0803-02
Anions by EPA 300.0 CCR Rule Analys	te List. Cl. F.	SO4. Aqı	ieous	Aliguot #: 23-0	721-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	339000	J	ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	105000		ug/L	1000.0	07/31/2023	AB23-0731-01 AB23-0731-01
Total Discolused Oal' In his OM 05/00						
Total Dissolved Solids by SM 2540C	D "		11.24		721-04-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	671		mg/L	10.0	07/28/2023	AB23-0728-09
	22	0721 Dogo	0 of 12			





A CENTURY OF EXCELLENCE

Sample Site: DEK JCW Background Laboratory Project: 23-0721

Field Sample ID: **DUP-Background** 

Lab Sample ID: 23-0721-05 Matrix: Groundwater Collect Date: 07/24/2023
Collect Time: 12:00 AM

Report Date:

08/11/23

Mercury by EPA 7470A, Total, Aqueous Aliquot #: 23-0721-05-C01-A01 **Analyst: CLE** Units Parameter(s) Result Flag RL **Analysis Date Tracking** ND 08/01/2023 ug/L 0.2 AB23-0801-01 Mercury

Metals by EPA 6020B: CCR Ru	Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp				Analyst: EB
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Barium	84	ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Boron	151	ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND	ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	123000	ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	1	ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND	ug/L	6.0	08/03/2023	AB23-0803-02
Copper	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Iron	20500	ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	23	ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	18800	ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND	ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	3	ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	3490	ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND	ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND	ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	202000	ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND	ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	6	ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND	ug/L	10.0	08/03/2023	AB23-0803-02

Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot #: 23-0721-05-C02-A01 Analyst: KDR Parameter(s) Result Flag Units RL**Analysis Date Tracking** Chloride 336000 ug/L 07/31/2023 AB23-0731-01 1000.0 Fluoride ND ug/L 1000.0 07/31/2023 AB23-0731-01 Sulfate 18800 ug/L 07/31/2023 AB23-0731-01 1000.0

**Total Dissolved Solids by SM 2540C** Aliquot #: 23-0721-05-C03-A01 Analyst: SLK Parameter(s) Result Units RL Flag **Analysis Date Tracking Total Dissolved Solids** 559 07/28/2023 AB23-0728-09 mg/L 10.0



08/11/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0721** 

Field Sample ID: FB- Background Collect Date: 07/26/2023
Lab Sample ID: 23-0721-06 Collect Time: 09:33 AM

Matrix: Water

Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	ι	ug/L	0.2	08/01/2023	AB23-0801-01
Metals by EPA 6020B: CCR Rule Ap	pendix III-IV To	tal Metals	Ехр	Aliquot #: 23-0	721-06-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Arsenic	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Barium	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02
Beryllium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Boron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02
Cadmium	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02
Calcium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Chromium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Cobalt	ND	ι	ug/L	6.0	08/03/2023	AB23-0803-02
Copper	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Iron	ND	ι	ug/L	20.0	08/03/2023	AB23-0803-02
Lead	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Lithium	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02
Magnesium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Molybdenum	ND	ι	ug/L	5.0	08/03/2023	AB23-0803-02
Nickel	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Potassium	ND	ι	ug/L	100.0	08/03/2023	AB23-0803-02
Selenium	ND	ι	ug/L	1.0	08/03/2023	AB23-0803-02
Silver	ND	ι	ug/L	0.2	08/03/2023	AB23-0803-02
Sodium	ND	ι	ug/L	1000.0	08/03/2023	AB23-0803-02
Thallium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Vanadium	ND	ι	ug/L	2.0	08/03/2023	AB23-0803-02
Zinc	ND	ι	ug/L	10.0	08/03/2023	AB23-0803-02





**Report Date:** 08/11/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

#### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Townselfor Date: Co.	772		Townsell or Dog Al C		
Inspection Date: 07.2					
Sample Origin/Project Name:	03.202	3 .JCW-	DEK Backgro	nund	
Shipment Delivered By: Enter	r the type of sl	nipment carr	er.		
Pony F Other/Hand Carry (who	edExom)_TRC	UPS	USPS	Air	borne
Tracking Number:			Shipping Form A	Attached: Yes	No
Shipping Containers: Enter th	ne type and nu	mber of ship	ping containers received	i.	
Cooler (1)	Cardboard Box		Custom Case	Envelor	oe/Mailer
Loose/Unpackaged Co			Other		
Condition of Shipment: Enter			of the shipment contain	er.	
			Dented		aking
Other					
Enclosed Documents: Enter the CoC Wor			osed with the shipment.  Air Data Sheet	Other	
Temperature of Containers: N	Measure the te	mperature of	several sample contain	ers.	
remperature or containers :				- A	
And the second second second second second	ture Range 2	8-3.60	Samples Received	on Ice: Yes	No
As-Received Temperal	on <u>01540</u>	24			No
As-Received Tempera M&TE # and Expiration Number and Type of Contain	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	
As-Received Temperators  M&TE # and Expiration  Number and Type of Contain  Container Type	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe			
As-Received Temperar M&TE # and Expiration Number and Type of Contain Container Type VOA (40mL or 60mL)	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	
As-Received Temperators  M&TE # and Expiration  Number and Type of Contain  Container Type	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	
As-Received Temperal M&TE # and Expiration Number and Type of Contain Container Type VOA (40mL or 60mL) Quart/Liter (g/p)	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	
As-Received Temperator  M&TE # and Expiration  Number and Type of Contain  Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	
As-Received Temperator M&TE # and Expiration Number and Type of Contain Container Type VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	Leaking
As-Received Temperator M&TE # and Expiration Number and Type of Contain Container Type VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic)	on <u>01540</u> 5-23 ers: Enter th	21 e total numbe	er of sample containers i	received.	

PH FSP 0-3 13 1410-511 124 - 205522 PAP' 2-15-25

76. 28 Zhot needed

### **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page 1 of 1

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

SAMI	LING SITE / CU	JSTOMER:			PROJECT NUMBER: SAP CC		WO#:						ANALYSIS REQUESTED							
Q3-2	023 JCW-DEK	Background W	ells		23-0721	REQUESTE	R: Haro	ld I	Regi	ster			(Attach List if More Space is Needed)							QA REQUIREMENT:
SAMI	PLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER												□ NPDES  ☑ TNI			
SEN	O REPORT TO:	Caleb Batts			email:	phone:														□ ISO 17025
	COPY TO:	Harold Register TRC			MATRIX CODES:  GW = Groundwater OX = O	ther		C	ONT	AIN	ERS	3								☐ 10 CFR 50 APP. B
					WW = Wastewater SL = Sh W = Water / Aqueous Liquid A = Air	ndge		1	PRES	ERV	/AT	IVE	lals							☐ INTERNAL INFO
	LAB	SAMPLE COLLECTION		MATRIX	S = Soil / General Solid WP = V	Vipe General Waste	'AL#			7 7		H	Il Metals	suc						□ OTHER
SAMPLE ID		DATE	TIME		FIELD SAMPLE ID / L	OCATION	TOTAL	None	HNO	NaOl	HCI	MeOH	Total	Anions	TDS		À.			REMARKS
	23-0721-01	7-26-27	0852	GW	MW-15002		3	2	1				x	x	x					
	-02	7-24-23	1323	GW	MW-15008		3	2	1				x	x	x					
	-03	7-26-23	0933	GW	MW-15016		3	2	i				x	x	x					
	-04	7-24-27	1405	GW	MW-15019		3	2	1	1	П		х	x	x					
	-05	7-24-27	_	GW	DUP-Background		3	2	1	T		T	x.	x	x		Ī			
	-06	7-26-23	0933	W	FB- Background		1.			İ			x			7	1			
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				Г						Ī										
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U	QUISHED BY:	white		DATE/	17/23 0800	RECEIVED BY:									NTS:					
RELIN	QUISHED BY:			DATE/	rimē:	RECEIVE BY: 23-0721 Page 13	3 of 13									e? ⊌Y .8-3				#: 015402 ne Date: 5-23-24



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 11, 2023

Subject: HMP GROUNDWATER MONITORING – JCWEADOCK ASD – 2023 Q3

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0724

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 07/24/2023 for the 3<sup>rd</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The sample was received for analysis by the Chemistry department of Laboratory Services on 07/27/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex Work Order ID: Q3-2023 Weadock ASD

Date Received: 7/27/2023 Chemistry Project: 23-0724

Sample # Field Sample ID Matrix Sample Date Site

23-0724-01 JCW-OW-18001 Groundwater 07/26/2023 13:02 JC Weadock ASD

08/11/23



Sample Site: JC Weadock ASD Laboratory Project: 23-0724

 Field Sample ID:
 JCW-0W-18001
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0724-01
 Collect Time:
 01:02 PM

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	724-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Arsenic	160		ug/L	1.0	08/07/2023	AB23-0807-02
Barium	116		ug/L	5.0	08/07/2023	AB23-0807-02
Beryllium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Boron	1520		ug/L	20.0	08/07/2023	AB23-0807-02
Cadmium	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Calcium	256000		ug/L	1000.0	08/08/2023	AB23-0807-02
Chromium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Cobalt	ND		ug/L	6.0	08/07/2023	AB23-0807-02
Copper	1		ug/L	1.0	08/07/2023	AB23-0807-02
Iron	13600		ug/L	20.0	08/07/2023	AB23-0807-02
Lead	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Lithium	61		ug/L	10.0	08/07/2023	AB23-0807-02
Magnesium	57300		ug/L	1000.0	08/08/2023	AB23-0807-02
Molybdenum	7		ug/L	5.0	08/07/2023	AB23-0807-02
Nickel	5		ug/L	2.0	08/07/2023	AB23-0807-02
Potassium	12400		ug/L	100.0	08/08/2023	AB23-0807-02
Selenium	ND		ug/L	1.0	08/07/2023	AB23-0807-02
Silver	ND		ug/L	0.2	08/07/2023	AB23-0807-02
Sodium	63500		ug/L	1000.0	08/08/2023	AB23-0807-02
Thallium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Vanadium	ND		ug/L	2.0	08/07/2023	AB23-0807-02
Zinc	ND		ug/L	10.0	08/07/2023	AB23-0807-02
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	724-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/08/2023	AB23-0808-01
Anions by EPA 300.0 CCR Rule Analy	te List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	724-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	45400		ug/L	1000.0	08/01/2023	AB23-0801-04
Fluoride	ND		ug/L	1000.0	08/01/2023	AB23-0801-04
Sulfate	557000		ug/L	1000.0	08/02/2023	AB23-0801-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	724-01-C03-A01	Analyst: SLF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	08/01/2023	AB23-0801-05
	23	-0724 Page	5 of 9			



A CENTURY OF EXCELLENCE

#### **Analytical Report**

**Report Date:** 08/11/23

Sample Site: JC Weadock ASD Laboratory Project: 23-0724

 Field Sample ID:
 JCW-OW-18001
 Collect Date:
 07/26/2023

 Lab Sample ID:
 23-0724-01
 Collect Time:
 01:02 PM

Lab Sample ID: 23-0724-01 Matrix: Groundwater

Alkalinity by SM 2320B			Analyst: DLS		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	431000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Bicarbonate	431000	ug/L	10000.0	08/03/2023	AB23-0803-01
Alkalinity Carbonate	ND	ug/L	10000.0	08/03/2023	AB23-0803-01





**Report Date:** 08/11/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

#### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

	ject Log-In Number: 13-0724			0	
	pection Date: 7-27-23	20.02	Inspection By:		
San	nple Origin/Project Name: <u>Q3</u>	-2023 U	leaduck ASD		
Shi	pment Delivered By: Enter the type	of shipment car	rier.		
	Pony FedEx Other/Hand Carry (whom)		USPS USPS	Airt	oorne
	Tracking Number:		Shipping Form A	Attached: Yes	No
Shi	pping Containers: Enter the type and	d number of shi	pping containers received	i.	
	Cooler Cardboard				e/Mailer
	Loose/Unpackaged Containers _			_ Enverop	
Cor	idition of Shipment: Enter the as-rec				
Cui					tin z
	Damaged Shipment Observed: 1 Other			Lea	king
C1 1				O N. D.	
Shi	pment Security: Enter if any of the s	hipping contain	ers were opened before r	eceipt.	
	Shipping Containers Received:	Opened	Sealed	_	
End	closed Documents: Enter the type of	documents encl	osed with the shipment.		
	CoC Work Request		Air Data Sheet	Other	
Ten	nperature of Containers: Measure th	e temperature d	of several sample contains		
	As-Received Temperature Range				Ter
				on Ice: Yes - N	40
	M&TE # and Expiration _0154	02 5-23-2	4		
Nui	mber and Type of Containers: Ente	r the total numb	er of sample containers r	eceived.	
	Container Type Water	Soil	Other	Broken	Leaking
	VOA (40mL or 60mL)				
	Quart/Liter (g/p)	5-0			
	9-oz (amber glass jar)	_			_
	2-oz (amber glass)	_	-		_
	125 mL (plastic)	_	-		
	24 mL vial (glass)	_			-
	500 mL (plastic)	_			-
	Other 250 ms plates 1				

## **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 1 of 1

SAMPLING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or Wo	O#:				Ī			ANALYSIS REQUESTED			U Later Committee			
Q3-2023 Weadock A	SD			23-0724	REQUESTER:	: Haro	old I	Regi	ster									Needed)	QA REQUIREMENT:
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ S	URNAROUND TIME REQUIRED:  1 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER													□ NPDES  ⊠ TNI	
SEND REPORT TO:	Caleb Batts			email:	phone:	phone:												☐ ISO 17025	
COPY TO:	Harold Regis	ter		MATRIX CODES:  GW = Groundwater OX = Other			CC	ONT	AIN	ERS	3								☐ 10 CFR 50 APP. B
	TRC			WW = Wastewater SL = Slud W = Water / Aqueous Liquid A = Air	ge		F	PRES	SER	VAT	IVE	als							☐ INTERNAL INFO
LAB	SAMPLE COLI	LECTION	XIX	S = Soil / General Solid WP = Will O = Oil WT = Gen	oe neral Waste	TOTAL#					Total Metals	su		Alkalinity				□ OTHER	
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TOT	None	HNO	H <sub>2</sub> SO <sub>4</sub>	HCI	MeOF	Tota	Anions	TDS	Alka				REMARKS
23-0724-01	7126133	1302	GW	JCW-OW-18001		5	4	i				x	x	x	x				
																17			
						9						M							
													6						
RELINQUISHED BY:	)	>	-	57 5970	RECEIVED BY:								MME			,			
RELINQUISHED BY:		I	DATE/1	CIME: I	RECLIVED BY:	of O											□ No		ue Date: 5-23-24



## Appendix F Field Records

# TRC

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NUMBER:	514403.0000.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	7/24/2023 TO PROPERTY 7-31-23
PURPOSE OF FIELDWORK:	Third Quarter HMP Sampling Event
	<u> </u>
	Javier Jasso
WORK PERFORMED BY:	

SIGNED

DATE

снескер ву

8-1-2

DATE

REVISED 04/2019



#### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com	DATE: '	7/20/22	TIME ARRIVED: 113-
PROJECT NUMBER			AUTHO	· · · · · · · · · · · · · · · · · · ·	TIME LEFT: 1 4)
	Alvert	\			1 30
		V	VEATHE	R	
TEMPERATURE: _ 🎖	<b>℃</b> °F WIND:	15	MPH	VIS	SIBILITY: OUR/ Cont
GA)				PERFORMED	
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	V				
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NAME	DEDDECENTING	COM	MUNICA		COMMENTO
NAME	REPRESENTING	D) ( II	1.	SUBJECT / C	COMMENTS
Darby Litz	TRC	PM - Up			- Wh
Caleb Batts P. Mad Zinr	Consumers	Site Con	itact	•	
		-			
	INVESTI	GATION D	ERIVED	WASTE SUMMAR	Y
WASTE MATRIX	QUANTITY			COMM	IENTS
Groundwater	NM	To Grou	ınd		
	0-1/6 >			10	01 01 00
	011135			Je	Ky 8-1-23

**REVISED 04/2019** 



#### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	GW Com DATE:	5/3/63	TIME ARRIVED: 0 530
PROJECT NUMBER:	514403.0000.0	000 AUTHO	R: Javier Jasso	TIME LEFT: (\) (\@
		WEATH		
TEMPERATURE:	°F WIND:	15+2 MPH	VISIBILITY:	Ourcar
		RK / SAMPLING		
MW- 53,	53, 53R, 5	54R .55	, STROUT , S	& FB#OI
Sac mus	14004, 18	005,18	,57Rout ,5	, EB +01
	•	1	• • •	1
				1
PROBI	LEMS ENCOUNTERED	)	CORRECTIVE	ACTION TAKEN
[		COMMUNIC	ATION	
NAME	REPRESENTING	COMMON	SUBJECT / COMME	NTS
Darby Litz	TRC	PM - Updates		
Galeb Batts	Consumers	Site Contact		
P. Madz.kr		one contact		
			•	
1				
		SATION DERIVE	D WASTE SUMMARY	
WASTE MATRIX	QUANTITY	m 0 1	COMMENTS	
Groundwater	NM	To Ground		

REVISED 04/2019

SIGNED

8/1/53



#### **EQUIPMENT SUMMARY**

PROJECT NAIVIE:	CEC vveado	OCK LF: 2023 GVV Cq	CAMPLED MANE	Leuden Janea
PROJECT NO.:	514403.00	00.000	SAMPLER NAME:	Javier Jasso
WATER LEVEL MEASI	JREMENTS COL	LECTED WITH:		WARE TO SERVICE THE SERVICE TH
HEF	RON DIPPER-T			TRC A2
NAME AND MODEL OF IN	NSTRUMENT		SERIAL NUMBER (	IF APPLICABLE)
PRODUCT LEVEL MEA	ASUREMENTS C	OLLECTED WITH	l:	
	NA			NA
NAME AND MODEL OF IN	NSTRUMENT		SERIAL NUMBER (	IF APPLICABLE)
<b>ДЕРТН ТО ВОТТОМ С</b>	F WELL MEASU	REMENTS COLL	ECTED WITH:	
HEF	RON DIPPER-T			TRC A2
NAME AND MODEL OF IN	ISTRUMENT		SERIAL NUMBER (	(IF APPLICABLE)
PURGING METHOD				
PERI	STALTIC PUMP			TRC A2
NAME AND MODEL OF P	UMP OR TYPE OF	BAILER	SERIAL NUMBER (	(IF APPLICABLE)
SAMPLING METHOD				)
PERI	STALTIC PUMP			TRC A2
NAME AND MODEL OF P	UMP OR TYPE OF	BAILER	SERIAL NUMBER (	(IF APPLICABLE)
GEOTECH	DISPOSABLE FI	LTER		0.45 MICRON
NAME AND MODEL OF F	ILTERATION DEVI	CE	FILTER TYPE AND	SIZE
DEDICA	TED POLY TUBI	NG	✓ LOW-F	LOW SAMPLING EVENT
TUBING TYPE			•	
PURGE WATER DISPO	SAL METHOD	***		
☑ GROUND	□ DRUM	☐ POTW	POLYTANK [	OTHER
DECONTAMINATION A	AND FIELD BLAN	IK WATER SOUR	CE	
ST	ORE BOUGHT		L	ABORATORY PROVIDED
POTABLE WATER SOUR	ce - & []	53	DI WATER SOURCE	My 8-1-23
SIGNED		DATE	CHECKED BY	DATE
EVISED 04/2019			•	

## TRC

#### WATER QUALITY METER CALIBRATION LOG

<del></del>	WAI EN G	OALII		EN GALIBITATION EGG			
PROJECT NAME:	CEC Weadock LF: 2023 GV	V Complian	се	MODEL: YSI Pro DSS	SAMPLER:	JJ	
PROJECT NO.:	514403.0000.0000			SERIAL#: RENTAL	DATE:717@1	23	
PH (	CALIBRATION CHECK			SPECIFIC CONDU	ICTIVITY CALIBR	RATION C	HECK
рН 7 (LOT #): 36 СЧУ	рН 4 / 10 (LOT #): <b>36 N</b> U 3 6	CAL.	TIME	CAL. READING	TEMPERATURE	CAL.	TIME
POST-CAL. READING / STANDARD	(EXP. DATE): U()	RANGE		(EXP. DATE): 364	(°CELSIUS)	RANGE	
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1	1	WITHIN		,		WITHIN	
ORP	CALIBRATION CHECK			D.O. CAL	IBRATION CHEC		
CAL. READING	TEMPERATURE			CAL. READING	TEMPERATURE		
(LOT #): } K (U) (80 (EXP. DATE): (U)	(°CELSIUS)	CAL. RANGE	TIME	GAL INDING	(°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD				POST-CAL. READING /SATURATED AIR		_	
OCE 1 OCE	250		113	7.09 12.69	26.0	WITHIN RANGE	(A)
1		☐ WITHIN RANGE				☐ WITHIN RANGE	
1		☐ WITHIN RANGE		] /		☐ WITHIN RANGE	
1		WITHIN RANGE		1		☐ WITHIN RANGE	
TURBID	ITY CALIBRATION CHEC	CK	-	•	COMMENTS		-
CALIBRATION	READING (NTU)			☐ AUTOCAL SOLUTION	☑ STANDARD	SOLUTION	(S)
(LOT #): <b>りゅう</b> /	(LOT #):	CAL.	TIME	(LOT #):	LIST LOT NUMBERS A		
(EXP. DATE): 4()	(EXP. DATE):	RANGE		(EXP. DATE):	UNDER CALIE	BRATION CHE	СК
POST-CAL. READING / STANDARD	POST-CAL, READING / STANDARD			CALIBRATED PARAMETERS	CALIBRATIO	ON RANGES (	1)
0 /	/	WITHIN RANGE		pH	pH: +/- 0.2 S.I	U.	
<i>(a)</i> /	/	☐ WITHIN RANGE	ניי) י	COND	COND: +/- 1% OF	CAL. STAN	IDARD
1	1	☐ WITHIN RANGE		ORP	ORP: +/- 25 mV	,	
1	1	WITHIN RANGE		□ D.O.	D.O.: VARIES		
	NOTES			TURB	TURB: +/- 5% OF	CAL. STAN	IDARD
					(1) CALIBRATION RAN THE MODEL OF THE		
F	ROBLEMS ENCOUNTERED			CORRECT	IVE ACTIONS		
	0/1/2				0		10-
SIGNED	011125	DATE	-	CHECKED BY	py		1-23

## TRC

#### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Weadock LF: 2023 GV	V Complian	ice	MODEL: YSI Pro DSS	SAMPLER: JJ
PROJECT NO.:	514403.0000.0000			SERIAL#: RENTAL	DATE: (7/2)
TROJECT NO	314403.0000.0000			SERIAL#. REINTAL	DATE -/(31/33
	CALIBRATION CHECK	Y=		SPECIFIC CON	IDUCTIVITY CALIBRATION CHECK
PH 7 (LOT #): 30 (1) 4 (EXP. DATE): 3 / 5	pH 4 / 10 (LOT #): 36 A / 136 (EXP. DATE): 1 / 2	CAL. RANGE	TIME	CAL. READING (LOT #): ろんしいける (EXP. DATE): コルケ	
POST-CAL. READING / STANDARD	POST-CAL READING / STANDARD	10000		(EXP. DATE): 3 12 4 POST-CAL. READING / STAND	(
700 700	400 / HW	WITHIN RANGE	U527	1309/130	
/	<i>.</i> :	☐ WITHIN RANGE			☐ WITHIN RANGE
1	1	☐ WITHIN RANGE		1	☐ WITHIN RANGE
/	1	WITHIN RANGE		1	□ WITHIN RANGE
ORP	CALIBRATION CHECK			D.O. (	CALIBRATION CHECK
CAL READING	TEMPERATURE			CAL. READING	TEMPERATURE
(LOT #): 2) K 100180 (EXP. DATE): 10/27	(°CELSIUS)	CAL. RANGE	TIME		(°CELSIUS) CAL. RANGE TIME
POST-CAL. READING / STANDARD				POST-CAL. READING /SATURATE	
273 1333	19.0	WITHIN RANGE	ひか	885188	~
/		☐ WITHIN RANGE		/	☐ WITHIN RANGE
/		☐ WITHIN RANGE		/	☐ WITHIN RANGE
1		WITHIN RANGE		1	☐ WITHIN RANGE
	ITY CALIBRATION CHEC	K	1		COMMENTS
CALIBRATION	READING (NTU)			☐ AUTOCAL SOLUTION	I ☑ STANDARD SOLUTION (S)
		-	l		31ANDARD SOLUTION (5)
(LOL#): A Mo t	(LOT #):	CAL.	TIME	(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES
	(LOT #): (EXP. DATE):	CAL. RANGE	TIME	(EXP. DATE):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(LO <u>#)</u> : A Mo *** (EXP. DATE):	(LOT #):	1	TIME	l [ '	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE):	RANGE WITHIN RANGE	TIME USIN	(EXP. DATE):  CALIBRATED PARAMETER	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES (1)
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE):	RANGE WITHIN RANGE	53E	(EXP. DATE):  CALIBRATED PARAMETER  pH	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES (1)  pH: +/- 0.2 S.U.
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE):	RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES <sup>(1)</sup> pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE):	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  pH  COND  ORP	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES <sup>(1)</sup> pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  pH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES <sup>(1)</sup> pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES
(LOZ#): A Mo ** (EXP. DATE):  POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD
(LOZ#): A Me ** (EXP. DATE):  POST-CAL. READING / STANDARD  1  / ()  1  / ()  /	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD
(LOZ#): A Me ** (EXP. DATE):  POST-CAL. READING / STANDARD  1  / ()  1  / ()  /	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / / NOTES	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  RS CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD  (*) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
(LOZ#): A Me ** (EXP. DATE): POST-CAL. READING / STANDARD  1	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / / NOTES	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  RS CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD  (*) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
(LOZ#): A Me ** (EXP. DATE): POST-CAL. READING / STANDARD  1	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / / NOTES	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  RS CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD  (*) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
(LOZ#): A Me ** (EXP. DATE):  POST-CAL. READING / STANDARD  1  / ()  1  / ()  /	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD / / / NOTES	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE	05% 05%	(EXP. DATE):  CALIBRATED PARAMETER  PH  COND  ORP  D.O.  TURB	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK  RS CALIBRATION RANGES (*)  pH: +/- 0.2 S.U.  COND: +/- 1% OF CAL. STANDARD  ORP: +/- 25 mV  D.O.: VARIES  TURB: +/- 5% OF CAL. STANDARD  (*) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 7 / 24/3
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

				7.01110	11: 00:10:000	
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW-MW-18001	dex	TOC	Helen	237~	NA	NM
JCW-MW-18004	oroce	TOC	1205	1477	NA	NM
JCW-MW-18005	6723	TOC	8.43	1626	NA	NM
JCW-MW-18006	6743	TOC	13.13	23.68	NA	NM
JCW-OW-18001	6633	TOC	6.80	2005	NA	NM
JCW-OW-18002	0636	TOC	1060	19.41	NA	· NM
JCW-OW-18003	où37	TOC	8,50	100 Plus	NA	NM
JCW-OW-18004	0707	TOC	7.30	1487	NA	NM
JCW-OW-18006	0744	TOC	7.90	2345	NA	NM
LH-103R	0649	TOC	22.80	33.46	NA	NM
LH-104	0715	тос	9.00	1400	NA	NM
<b>₩</b> -MW-20	6734	TOC	6.44	1400	NA	NM
MW-50	deste	тос	1330	19.40	NA	NM
MW-51	6631	TOC	1423	20.00	NA	NM
MW-52	0436	TOC	1467	19.74	NA	NM
MW-53	rout	TOC	1368	1818	NA	NM
MW-53R	6654	TOC	14.20	18.60	NA	NM
MW-54R	0700	TOC	13.60	17.23	· NA	NM
MW-55	0716	TOC	13.85	18.47	NA	NM
MW-58	0839	TOC	556	1828	NA	NM
OW-51	C(23)	TOC	9.34	17.26	NA	NM
OW-53	6643	TOC	7.78	1800	NA	NM
OW-54	070 (	тос	7.80	16.48	NA	NM
OW-55	0719	тос	6-76	18.47	NA	NM
OW-56	0729	TOC	604	19.27	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

ENED E 1/3

CHECKED LY

8-1-23

DATE

REVISED 04/2019



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 7/24/33
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
OW-56R	UNZU	TOC	605	30.08	NA	NM
OW-57 IN	0738	TOC	574	19,600	NA	NM
OW-57R IN	0739	TOC	5.95	20.68	NA	NM
OW-57 OUT	0740	TOC	(038)	2070	NA	NM
OW-57R OUT	0337	TOC	9.68	19 96	NA	NM
JCW-MW-15007	7)80	TOC	3:70	8.9	NA	NM
JCW-MW-15009	CE274	TOC	8.65	13.00	NA	NM
JCW-MW-15010	080	TOC	17.03	19.57	NA	NM
JCW-MW-15028	0818	TOC	7.60	25.10	NA	NM
MW-15002	0851	TOC	7.15	1680	NA	NM
MW-15008	0630	TOC	463	17.40	NA	NM
MW-15016	6894	TOC	4-6)	8.10	NA	NM
MVV-15019	0840	тос	3.56	16.67	NA	NM
owul	cer		8.35	37.07		
Jan 1500)	de 35		15.55	inc plus		
YU MUISUX	DOT		1495	10076		
MW-lle P	600		1412	19.67		
Jaumalson	074		15.50	100 Hers		,
nu-19	0750		8.85	20.08		
MW-104B	0829		7.40	1000	/w.	
Ju mu15007	08)5		9.40	100 dus		
Mu-150x	かもろく		932	17:17		
mullers	0841		305	32.76		
MU15024	0843		5 50	17.17		
Mw- 15018	ollo		5.73	994		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

DATE

CHEC

8-1-23

DATE

PROJECT NAME: CEC	Karn BAP/LI: 2023	gw d	PRE	PARED		CHEC	KED		
PROJECT NUMBER: 5144	04.0001.0000	BY:	AW, JK) J.	J DATE:7-2	6-23 BY: AC	J	DATE:814123		
SAMPLE ID: MW-1	5002	WELL DIAME	ETER: 🗸	2"	6" OTHER	₹			
WELL MATERIAL: 💟 PVC	SS IR	ON GALV	ANIZED S	TEEL	☐ OTHER	₹	ART OF THE PROPERTY AND ADDRESS OF THE PROPERTY AS A SECOND OF THE PROPERTY AS A SECON		
SAMPLE TYPE:	□ ww □ sv	V □ DI	L	EACHATE	☐ OTHER	₹	TO THE STORY OF THE STAT		
PURGING TIME: ()	730 DATE	7-26-23			TIME: 0852	DA	TE: 7-26-23		
PURGE ☑ PUMP METHOD: ☐ BAILER	PERISTALTIC PU	MP		6.61 s		VITY: <u>\$34</u> 5. <b>8</b> _ mg	/6 umhos/cm		
DEPTH TO WATER: 7.17	T/ PVC		TURBIC	DITY: 5.3	NTU	· income and in the			
DEPTH TO BOTTOM 16.80	T/ PVC		ME NON			ODERATE	□ VERY		
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 15.5 °C OTHER:									
VOLUME REMOVED 16	LITERS       □	GALLONS	COLOR	1		DOR:	none		
COLOR: Clear	ODOR	: none	FILTRA	TE (0.45 um)		NO NO			
TURBIDITY FILTRATE COLOR: FILTRATE ODOR:									
NONE   SLIGHT	MODERATE	☐ VERY		MPLE: MS		DUP-			
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:									
TIME PURGE PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE		
RATE (ML/MIN) (SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	PURGE VOLUME (GAL OR L)		
0732 200 6.56	1	88.1	2.7	9.31	15.9	7.35			
0737 200 6.75		34.3	1.2	6.51	15.9	7.45	ſ		
0742 200 6.82	o 🎙 kara ya na ili arawa ina 🌬 ya sa sa ƙasar ƙasar in	8.3	1.0	6.41	16.0	7.50	2		
0747 200 6.88	The state of the s	-18.3	1.0	5.41		7.55	3		
0752 200 6.92	A STATE OF THE STA		0.9	5.43	15.5	7.55	2/		
0757 200 6,71	artare a referencia anti-care for an		0.9	5.16	15.5				
0802 200 6.65	- promise and a series		0.9	5.33	15,5	7.55	6		
0807 200 6,64	· [			5,47	15,5	7.55	7		
0812 200 6.62	The second section of the second section is a second secon		0.9	5.51	15.4	7.55	8		
6817 200 6.62	Market Committee Committee Committee Committee Committee Committee Committee Committee Committee Committee Com		0.9	5,61	15.3	7.55	9		
pH: +/- 0.1 COND.: +/		10 D.C		TURB: +/-			TEMP.: +/-		
BOTTLES FILLED PRESER	VATIVE CODES A	- NONE E	B - HNO3	C - H2SO4	D - NaOH	E - HC	L F		
NUMBER SIZE TYPE	PRESERVATIVE	FILTERED	NUMBE	R SIZE	TYPE F	PRESERVATI	VE FILTERED		
1 500ml Plastic	A	1 KJ Y 🖂	N				□ Y □ N		
1 125ml	A	□ Y 🗷 I	N				□ Y □ N		
1 125mL V	R	□ Y 🗷 I	N	1			□ Y □ N		
The second secon			N .			. 100 801 8 8 1 1 101	□ Y □ N		
			V				$\square$ $\vee$ $\square$ $\bowtie$		
SHIPPING METHOD: (a)	Day of DATE	SHIPPED:	7-2	7-23	AIRBILL NU	MBER:			
COC NUMBER:		ATURE:	//	dy	DATE SIGN	ED:	8-1-23		

# TRC

# WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Co		PREPARED		CHECKED	
PROJECT NUMBER:	514404.0001.0000	BY:	AW(JK,)JJ DATE: 7-26-23	BY:	DATE: SH	123

	PURGE							WATER	CUMULATIVE
TIME	RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	LEVEL	PURGE VOLUM
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
0877	200	6.62	4701	-57.8	0,9	5.27	15.2	7.55	10
0827	200	6.61	4833	-54.8	0.8	5,47	15.3	7.55	11
5832	200	6.60	4985	-55.1	0,8	5.53	15.3	7.55	
0837	200	6.61	5052	-55.5	0.8	5.66	15,3	7.55	Control to the control of the control of
0842	200	6,60	5222	-55.5	and the second of the second	5.59	15,6	7.55	
0847	200	6.60		-56,4			15.6	7,55	
			5346		0,8	5.43	dere movement of the		ner indexe of a few field in the interest and
322	200	6.61	3 3 7 6	-56.8	0.8	5.37	15,5	7,55	16
	er orași de le constitut de la constitut de la constitut de la constitut de la constitut de la constitut de la					AN II			
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			the state of the s					1 · · · · · · · · · · · · · · · · · · ·	in election is the party of the first of the
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	et an or i soleto es								
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				to the transfer of process of the		annya ini dipiliba ina aring pel		er har ere i a oor op betroomste	attions have no good a test a star con
	1 (44) C (#84) (10) - 1 (10) - 10 (10) - 1 (10)		e con di me degle i problema (di al-	to the control of the second	} · · · · · · · · · · · · · · · · · · ·	100 pt 14 11 12 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1			an definition for the second of the second
	1 % 1041 601 101 604 1011			A CAMPAGE OF THE SECOND		and the second of the second second			- 14 - 14 - 14 - 14 - 14 - 14 - 14 - 14
	phys forth a growth							,	
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8-1-23

SAMPLE ID:       MW ~ 15008       WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER         WELL MATERIAL:       ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL       ☐ OTHER         SAMPLE TYPE:       ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE       ☐ OTHER         PURGING       TIME: 125 ☐ DATE: 7-24-23       SAMPLE       TIME: 1323 ☐ DATE: 7.2         PURGE       ☑ PUMP       PERISTALTIC PUMP       PH: 6,47 ☐ SU CONDUCTIVITY: ☐ 1340 ☐ ORP: -\$5.5 ☐ mV DO: ☐ 0.9 ☐ mg/L         DEPTH TO WATER:       ☐ 4.64 ☐ T/ PVC       TURBIDITY: ☐ 0.63 ☐ NTU	umhos/cm						
WELL MATERIAL:  PVC SS IRON GALVANIZED STEEL OTHER  SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER  PURGING TIME: 125 DATE: 7-24-23 SAMPLE TIME: 1323 DATE: 7.2  PURGE PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PERISTALTIC PUMP PH: 6,47 SU CONDUCTIVITY: 1340  ORP: -\$5.5 mV DO: 0.9 mg/L  TURBIDITY: 0.63 NTU	umhos/cm						
SAMPLE TYPE:         ☑ GW         ☐ WW         ☐ SW         ☐ ☐ LEACHATE         ☐ OTHER           PURGING         TIME: 125 )         DATE: 7-24-23         SAMPLE         TIME: 1323         DATE: 7.2           PURGE         ☑ PUMP         PERISTALTIC PUMP         PH: 6,47         SU         CONDUCTIVITY: 1340           METHOD:         ☐ BAILER         ORP: -\$5.5         mV         DO: 0.9         mg/L           DEPTH TO WATER:         4.64         T/ PVC         TURBIDITY: 0.63         NTU	umhos/cm						
PURGING         TIME: 125 )         DATE: 7-24-23         SAMPLE         TIME: 1323         DATE: 7.2           PURGE METHOD:         □ BAILER         □ BAILER	umhos/cm						
PURGE         ☑ PUMP         PERISTALTIC PUMP         PH: 6,47 SU CONDUCTIVITY: 1340           METHOD:         ☐ BAILER         ORP: -\$5.5 mV DO: 0.9 mg/L           DEPTH TO WATER:         4.64 T/ PVC         TURBIDITY: 0.63 NTU	umhos/cm						
METHOD:         □ BAILER         ORP: -\$5.5 mV DO: 0.9 mg/L           DEPTH TO WATER:         4.64 T/ PVC         TURBIDITY: 0.63 NTU	and the second s						
	VERY						
DEPTH TO BOTTOM 17,42 T/ PVC MONE SLIGHT MODERATE	VERY						
DEPTH TO BOTTOM 17,42 T/ PVC   Ø NONE □ SLIGHT □ MODERATE □ VERY							
WELL VOLUME: NA ☐ LITERS ☐ GALLONS TEMPERATURE: 1419 °C OTHER:							
VOLUME REMOVED 5 A LITERS GALLONS COLOR: Clear ODOR: NONE							
COLOR: Llear ODOR: nome FILTRATE (0.45 um) YES X NO							
TURBIDITY FILTRATE COLOR: FILTRATE ODOR:							
NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP- Backgr	and						
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:							
TIME RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE	JLATIVE VOLUME						
	L OR L)						
1870 800 830 1102 750	ITIAL						
1303 200 6.38 1455 -26.8 1.1 0.36 16.0 4.66 1							
1308 200 6.42 1422 -40.6 1.0 0.42 15.6 4.66 2	•						
1313 200 6,45 1373 -47.5 0.9 0.57 15.0 4.66 3							
1318 200 6.46 1360 -52.1 0.9 0.41 15.0 4.66 4	,						
1723 200 6.47 1340 -55.5 0.9 0.63 14.9 4.66 5							
	and the second of the second						
	P make all to the con-						
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMIT	·s·						
pH: +/- <b>0.1</b> COND.: +/- <b>3</b> % ORP: +/- <b>10</b> D.O.: +/- <b>0.3</b> TURB: +/- <b>10</b> % or = <b 10 TEMP.:							
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F -							
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FI	LTERED						
2 500 mc plastic A DYXN	Υ□N						
2 125ml 1 B 🗆 Y 🛛 N	Υ□N						
2 125mL / A DYXN	Y 🗆 N						
	Y D N						
	Y D N						
SHIPPING METHOD: Lab Stop off DATE SHIPPED: 7:27-27 AIRBILL NUMBER:							
COC NUMBER: SIGNATURE: Al My DATE SIGNED: 8-1-	23						

PROJECT	ΓNAME:	CEC k	(arn BAP/LI	I: 2023 GW C		PREP	PARED			CHEC	KED	
PROJECT	T NUMBER	R: 51440	4.0001.000	0	BY: A	M'(IK)11	DATE: <b>7-2</b>	6-23	BY: ACJ	1 134	DATE: 8 1/23	
SAMPLE WELL MAT SAMPLE T	TERIAL:		□ ss	WELL	GALVA	NIZED STE	☐ 4" ☐ EEL ACHATE		OTHER OTHER OTHER	· · · · · · · · · · · · · · · · · · ·		
PUR	GING	TIME: O	916	DATE: 7-20	5-23	SAN	/IPLE	TIME:	093	<b>3</b> DA	TE: 7-26-23	
PURGE METHOI	٦.	PUMP BAILER	PERISTALT	TIC PUMP		PH: <u>6</u>		U CON	IDUCTIVI			
	O WATER:		T/ PVC			TURBIDITY: 6.04 NTU  NONE SLIGHT MODERATE VERY						
DEPTH TO	<b>дертн то воттом <u>7.75</u></b> т/ рус									DERATE	☐ VERY	
WELL VOL			LITERS			TEMPERA		9,3				
	REMOVED		LITERS						ODO		none	
COLOR:		lleur		ODOR: NOV	re	COST CONTRACTOR CONTRACTOR	(0.45 um)	☐ YES	⊠		· · · · · · · · · · · · · · · · · · ·	
NT NONE			BIDITY		DV.	FILTRATE		/MOD		TRATE ODC	PR:	
NONE			MODERATE				PLE: MS	/WSD		DUP-		
DISPOSAL		☑ GROUI	אט [_] טאנ	JW 🗌 OTHE	·	COMMEN	N15:			I		
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIV			D.O. T	TURBIDITY (NTU)		RATURE C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)	
0918	200	7.00	1554	-63,	9 2	.0	7.63	20	1,2	4.95	INITIAL	
0923	200	6.85	1561	-750		1,2	6.14	n	5	5,03	1	
0828	200	6.83	1562			'-in-	***************************************	. e	. 11		à l	
Och	$ \omega$	A 10 7	1000	- 781.	7 (	D.4	5.01	17	.4	5.02	~	
0 933	200	6.83	1559	and the same of the first	7		5.87		.3	8,02	3	
the second second second	la como o construir. L		ha i Familia di sana	and the same of the first	7					to a comment		
the second second second	la como o construir. L		ha i Familia di sana	and the same of the first	7					to a comment		
the second second second	la como o construir. L		ha i Familia di sana	and the same of the first	7					to a comment		
the second second second	la como o construir. L		ha i Familia di sana	and the same of the first	7					to a comment		
the second second second	la como o construir. L		ha i Familia di sana	and the same of the first	7					to a comment		
o ¶33	200 DTE: STABI	6.83	/559	- 8 7,	N 3 SUC	O , 9	6,04 READINGS	J ។	HIN THE	FOLLOWIN	IG LIMITS:	
0 <b>3</b> 33	DITE: STABIL	LIZATION TOOND.: +/-	7559 TEST IS COI 3% O	- 8 1, WPLETE WHEI RP: +/- 10	N 3 SUC	CESSIVE F	READINGS /	ARE WIT	HIN THE	FOLLOWIN 10	IG LIMITS: TEMP.: +/-	
NO PH: +/-	DITE: STABII 0.1 (S FILLED	LIZATION TOOND.: +/-	rest is cor 3% O	WPLETE WHEIRP: +/- 10	N 3 SUC D.O.	CESSIVE F +/- 0.3	<b>C</b> - H2SO4	ARE WIT	HIN THE or =</td <td>FOLLOWIN 10 E - HC</td> <td>3 IG LIMITS: TEMP.: +/-</td>	FOLLOWIN 10 E - HC	3 IG LIMITS: TEMP.: +/-	
0 <b>3</b> 33	DITE: STABIL	LIZATION 1 COND.: +/- PRESERV	7559 TEST IS COI 3% O	WPLETE WHEI RP: +/- 10 ES A - NONE 'ATIVE FILT	N 3 SUC D.O.	CESSIVE F	<b>C</b> - H2SO4	ARE WIT	HIN THE or =</td <td>FOLLOWIN 10</td> <td>IG LIMITS: TEMP.: +/- :L F VE FILTERED</td>	FOLLOWIN 10	IG LIMITS: TEMP.: +/- :L F VE FILTERED	
NO PH: +/-	DITE: STABIL 0.1 C S FILLED SIZE	LIZATION TOOND.: +/- PRESERV	rest is cor 3% O	WPLETE WHEIRP: +/- 10	N 3 SUC D.O.	CESSIVE F +/- 0.3	<b>C</b> - H2SO4	ARE WIT	HIN THE or =</td <td>FOLLOWIN 10 E - HC</td> <td>3 IG LIMITS: TEMP.: +/-</td>	FOLLOWIN 10 E - HC	3 IG LIMITS: TEMP.: +/-	
NO PH: +/-	9.00  OTE: STABIL  O.1  S FILLED  SIZE  250	LIZATION TOOND.: +/- PRESERV	rest is cor 3% O	WPLETE WHEI RP: +/- 10 ES A - NONE VATIVE FILT	N 3 SUC D.O. ERED	CESSIVE F +/- 0.3	<b>C</b> - H2SO4	ARE WIT	HIN THE or =</td <td>FOLLOWIN 10 E - HC</td> <td>3  IG LIMITS:  TEMP.: +/-  L F  VE FILTERED  Y   N</td>	FOLLOWIN 10 E - HC	3  IG LIMITS:  TEMP.: +/-  L F  VE FILTERED  Y   N	
NO PH: +/-	SFILLED SIZE STONE STONE SIZE STONE	LIZATION TOOND.: +/- PRESERV	rest is cor 3% O	WPLETE WHEI RP: +/- 10 ES A - NONE ATIVE FILT Y Y Y Y	N 3 SUC D.O. BERED X N	CESSIVE F +/- 0.3	<b>C</b> - H2SO4	ARE WIT	HIN THE or =</td <td>FOLLOWIN 10 E - HC</td> <td>  3</td>	FOLLOWIN 10 E - HC	3	
NO 933	SFILLED SIZE SOONL	LIZATION TOOND.: +/- PRESERV TYPE  /kshx	TEST IS COI 3% O ATIVE COD PRESERV A A	WPLETE WHEI RP: +/- 10 ES A - NONE 'ATIVE FILT	N3 SUC D.O. B. ERED X N X N	CESSIVE I +/- 0.3 HNO3 NUMBER	READINGS ATURB: +/- C - H2SO4	ARE WIT 10 % D - TYP	HIN THE or =</td <td>FOLLOWIN 10 E - HC</td> <td>3  IG LIMITS:  TEMP.: +/-  IL F-  VE FILTERED    Y   N    Y   N    Y   N</td>	FOLLOWIN 10 E - HC	3  IG LIMITS:  TEMP.: +/-  IL F-  VE FILTERED    Y   N    Y   N    Y   N	
NO 933	SFILLED SIZE SOOL	LIZATION TOOND.: +/- PRESERV TYPE  /kshx	rest is cor 3% O	WPLETE WHEI RP: +/- 10 ES A - NONE ATIVE FILT Y Y Y Y	N 3 SUC D.O. B ERED X N X N X N	CESSIVE F +/- 0.3	READINGS ATURB: +/- C - H2SO4	ARE WIT 10 % D- TYP	HIN THE or =</td <td>FOLLOWIN 10 E-HC RESERVATI</td> <td>3  IG LIMITS:  TEMP.: +/-  IL F-  VE FILTERED    Y   N    Y   N    Y   N</td>	FOLLOWIN 10 E-HC RESERVATI	3  IG LIMITS:  TEMP.: +/-  IL F-  VE FILTERED    Y   N    Y   N    Y   N	

PROJECT	NAME:	CEC K	(arn BAP/LI: 20	)23 GW C		PR	EPARED			. CHEC	KED
PROJECT	NUMBER	R: 51440	4.0001.0000		BY: A	w, 🔞	JJ DATE: 7-2	9-23 BY	Ac	<b>)</b>	DATE:814123
SAMPLE WELL MAT	ERIAL: [	<b>~ /</b>	□ ss □	IRON 🔲	GALVA	NIZED (	2"	□ 0	THER	04 - 200 TO 150	
SAMPLE T			<u> </u>	SW 🗆	DI .				THER		
PURG	I	TIME:	343 DA	TE:7-25	1-23				405		TE:7-24-23
PURGE METHOI	D:	BAILER	PERISTALTIC F	PUMP		ORP:		V DO:		TY: <u>/6</u> 2.9 mg/	36 umhos/cm
	WATER:					TURBIDITY: 4.90 NTU  NONE SLIGHT MODERATE VERY					
	DEPTH TO BOTTOM 16.86, T/ PVC					🕱 ио	and the state of the state of the state of				· U VERY
WELL VOL				GALLO GALLO			RATURE:		<del></del>		none
COLOR:	REMOVED								OD(		710110
M NONE	TURBIDITY FILTRATE COLOR FILTRATE ODOR:										
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:											
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	l l	D.O. mg/L)	TURBIDITY (NTU)	TEMPERA		WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1346	100	6.60		- 37.		· 3	4.39	14.		5.66	INITIAL
1350		6.54		~43,9		٠9٢	4.06	14.		5.66	21
1355	200	Committee of the Commit	1639	-51.9		. (	3,75	14,	8	5.66	
1400	200	6,55	1638	-57.9	1	0,	4.25	14,7		5.66	
1405	200	6.SS	1636	-61.4	[   é	9,9	4,90	14.	7	5.66	4
		tomorrow and the second second second									design of the community of the problem is also such a such that the tensor of the such as
	and a real contract of social	Contago y Contrator	Property and the property of the property of the	ennamento de la competa de la co		and the second second					A CONTRACTOR AND A CONT
			e e e e e e e e e e e e e e e e e e e	na i i i i i i i i i i i i i i i i i i i		e from magniful o	# 1	11 - ANNE 12 - MARINE AND AND AND AND AND AND AND AND AND AND	· .à «aire		art de control en en en en en en en en en en en en en
NO pH: +/-		LIZATION T	EST IS COMPL 3 % ORP:	ETE WHEN +/- 10		CESSI\ +/- 0.3			<b>N THE</b> r =</td <td></td> <td>G LIMITS: TEMP.: +/-</td>		G LIMITS: TEMP.: +/-
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - Na	ОН	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	ERED	NUME	BER SIZE	TYPE	PR	ESERVATI	VE FILTERED
2	500mL 125mL 125mL	plastic J	A B	□ Y	DX N DX N DX N						□ Y □ N □ Y □ N
	INSINC			□ Y	□ N						Y   N
SHIPPING	METHOD:	Jab B	no off da	ATE SHIPPE	ED:	7-	27-23	AIRBIL	L NUM	BER:	
COC NUM	BER:			GNATURE:	_4	le	My	DATE	SIGNE	D:	8-1-23
<u></u>						<del></del>					

→ TRC

PROJECT	ΓNAME:	CEC V	Veadock LF:	2023 GW C	PR	EPARED		CHE	ECKED
PROJECT	NUMBER	R: 51440	3.0000.0000	ВҮ	: JJ	DATE: E	BY:	JK	DATE: 8~1-23
SAMPLE	ID:Jeu	-Mu-	1800	( WELL DIA	METER: ☑	2"	6" □ OTI	HER	7. 4
WELL MAT	ERIAL:	☑ PVC	□ ss □	IRON 🗌 GA	LVANIZED 8	STEEL	□ отп	HER	Type white a very tip place or effectively controlling pipe and a fitter beautiful.
SAMPLE T	YPE: [	☑ GW	□ ww □	SW 🗆 DI		LEACHATE	□ оті	HER	And the second s
PURC	SING	TIME:	(43 p	ATET 20 b		AMPLE	CJ :=MIT		DATE: 7/26/53
PURGE METHOL	٠	PUMP BAILER	PERISTALTIC	PUMP	70 to 100 to 100 to 100 to	(ψ <u>.7 છ</u> s - <b>6Φ</b> .Ο m	U CONDU	СТІVІТҮ: <u>Ц</u>	mg/L umhos/cm
DEPTH TO	O WATER:	1660	T/ PVC		TURB	IDITY: 10-0	<u> 2</u> NTU	CONTRACTOR OF THE STATE OF THE	The second control of the second control of the second
DEPTH TO BOTTOM									
WELL VOL	.UME:	NA	LITERS	☐ GALLONS	TEMPE	ERATURE:	<u>v} ~</u> ~	OTHER:	
VOLUME I	REMOVED	_Q	LITERS	☐ GALLONS	COLO	R: Ue	ev	ODOR:	nor
COLOR:	970	4154	0	OOR: 1001	FILTRA	ATE (0.45 um)	☐ YES	Ø NO	
	4-7	TUR	BIDITY		FILTRA	TE COLOR:	and the second s	FILTRATE O	DDOR:
□ NONE	SLI	GHT 🗌	MODERATE	L VERY	QC SA	MPLE: MS	/MSD	☐ DUP-	
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:									
TIME	PURGE RATE	PH	CONDUCTIVITY		D.O.	TURBIDITY	TEMPERAT	LEVE	L PURGE VOLUME
15:4	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEE	
1147	24	ilee	୦୫୪)	320	7.8	556	⊃35 G	i an in a same providence de la constante de l	·
1147		[a6 5				1,20	16.5	and the state of t	and the state of t
1153		ALMORATE A PROPERTY OF A SALES	4633	an Berlin, include the same of the same and the contract of	045	しずの	16.4	16.6	3 3
1157			1	-55.0	637	iO, o	الو، ح	a comment for the constant	and the state of t
1902		Le78	4699	- 60.0	631	10.0	16.3		
1207		4.70	4110	-60-9	629	10.0	16.3	,   168	+ (
1212		678	4120	-61.0	U760	10-0	16.3	الكال ا	16
	<b></b>			t - par		Barrer 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	pulse are to a compression of a			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	no de la companya de	Stage you a see "TO production's absolute rate	1		
							1		
<b>NO</b> pH: +/-		L <mark>ization <sup>-</sup></mark> Cond.: +/-		PLETE WHEN 3 P: +/- 10	SUCCESSI\ D.O.: +/- 0.3			THE FOLLO	WING LIMITS: TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaC	)H E-	HCL F
NUMBER	SIZE	TYPE	PRESERVAT	TIVE FILTER	ED NUME	BER SIZE	TYPE	PRESERV	ATIVE FILTERED
(,	7 (1	9/45	A	□ Y 15	\ N			4	□ Y □ N
Ϊ́	250	Di	А		N			1	□ Y □ N
ঠ	125	7 1	7		N				
1 5	1	V 1	À		N		-1 (1- 1/2/2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		
β 1 75 PI 75 DY 4 PI N						1 1 at at at at at at at at at at at at at			
<u></u>				ЦΥЦ	N		<u> </u>		ПΥПи
SHIPPING METHOD: Lab Grop 6.44 DATE SHIPPED: 7-28-23 AIRBILL NUMBER:									
сос ним	IBER:		8	SIGNATURE:			DATE S	IGNED:	6/1/3
l					0		· · · · · · · · · · · · · · · · · · ·	WX -	<del></del>

# ◆ TRC

PROJECT NAME	CECV	Veadock LF: 2	023 GW (	PR	EPARED			CHEC	KED	
PROJECT NUMB	ER: 51440	3.0000.0000	BY:	JJ	DATE (	ליל ל	37: 21	K	DATE: 4-1-23	
SAMPLE ID: Year-Our (You)   Well diameter:										
PURGING	TIME: [	DA	TE: ) hub	3 S	AMPLE	TIME:	1363	_ DA	TE7 heliz	
PURGE PUMP PERISTALTIC PUMP  METHOD: BAILER ORP: 720 mV DO: 0.32 mg/L  DEPTH TO WATER: 40 T/ PVC  DEPTH TO BOTTOM 20 7x T/ PVC  PH: 47 SU CONDUCTIVITY: 1977 umhos/cm  ORP: 720 mV DO: 0.32 mg/L  TURBIDITY: 9.00 NTU  PNONE SLIGHT MODERATE VERY										
WELL VOLUME:			GALLONS	<del></del>	<b>C</b> 11		C OTHE			
VOLUME REMOVE	<u>اران، ا</u>	<u> </u>	□ GALLONS OR: <u>n@</u> ん	COLO		<u> </u>	ODO		onQ	
COLOR: COLOR: DOY   FILTRATE (0.45 um)   YES   FILTRATE OLOR:   FILTRATE COLOR:   FILTRATE OLOR:   FILTRATE										
DISPOSAL METHO	D GROU	ND  DRUM	OTHER	COMM	IENTS:	_				
TIME PURGE RATE (ML/MIN	PH	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. ( mg/L)	TURBIDITY (NTU)		RATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)	
1737 760 1237 1237 1247 1253 1257 [302	679 679 679	(0(7 1863 1924 1979 1979 1977 1976	-70.0 -71.0 -71.9 -72.0	7, Y 083 049 033 089 026 024 033	13.5 13.0 11.5 11.0 10.0 10.0	10	3 7 . ``	70く 7.15 7.15 7.15 7.15 7.15 7.15	INITIAL  2  3  4  5  6  7	
pH: +/- <b>0.1</b>	COND.: +/-			.O.: +/- <b>0.3</b>			or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-	
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - 1	NaOH	E - HC	L F	
NUMBER SIZE	TYPE	PRESERVATIV	VE FILTERE	D NUMB	ER SIZE	TYP	E PRE	SERVATI	VE FILTERED	
2 105 9 (css B										
SHIPPING METHOD: 65 DATE SHIPPED: 7-27-23 AIRBILL NUMBER:  COC NUMBER: DATE SIGNATURE: DATE SIGNED: 411-3										
L				<del>-</del>	-	<u> </u>		<u> </u>	y Z	

TRC

SAMPLE ID: N W - S D WELL DIAMETER: 2"									
WELL MATERIAL:  PVC SS IRON GALVANIZED STEEL OTHER  SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER  PURGING TIME:  3 ( DATE: 7/24/23 SAMPLE TIME:  3 W DATE  PURGE PUMP PERISTALTIC PUMP PH: 7.38 SU CONDUCTIVITY:  4 PH: 7.38 SU CONDUCTIVITY:  4 PM: 7.38 SU	umhos/cm								
PURGING TIME: \3 \ \ \ DATE: \7 \Date: umhos/cm									
PURGE PUMP PERISTALTIC PUMP  METHOD: BAILER  PH: 7.38 SU CONDUCTIVITY: 163  ORP: -80-5 mV DO: 0-33 mg/L	umhos/cm								
DEPTH TO WATER: 13 36 T/ PVC TURBIDITY: 10.0 NTU	☐ VERY								
J. 11110 BOTTO									
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 17.3 °C OTHER:									
	ov								
COLOR: CLOW ODOR: COV FILTRATE (0.45 um) ☐ YES NO	r par excess constitution								
TURBIDITY FILTRATE COLOR FILTRATE ODOR									
NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP- HOL									
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:									
TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL P  (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)								
(315 200 7.14 1821 444 7.85 150 73.9 13.30	INITIAL								
1370 / 740 (690 -46 075 165 172 1345	1								
1375 / 739 1600 -705 641 160 17.2 1345	2								
1320 7.30 1609 -80.0 039 10.0 17.2 1345	3								
1335 738 166 -60.3 625 10.0 17.3 1345	٠- ر								
1340 7.36 1620 -805 023 100 17.3 1345									
13-10 14-0 2001 (02) 10 0 17.0 17.1	<del>-</del>								
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING PH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % or = 10 TE</td <td>EMP.: +/-</td>	EMP.: +/-								
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL	F								
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE	E FILTERED								
2 250 P1 A 1 YOU N	□ Y □ N								
2 (25 P) A- DY & N	□ Y □ N								
2 125 pi B 1 4 54 N	□ Y □ N								
	$\square$ Y $\square$ N								
	$\square$ Y $\square$ N								
SHIPPING METHOD: US Drew of DATE SHIPPED: 7-27-23 AIRBILL NUMBER:									
COC NUMBER: SIGNATURE: DATE SIGNED: 1/1/13									
OTT SIGNED.	<u> </u>								

TRC

	PROJECT NAME: CEC Weadock LF: 2023 GW C PREPARED CHECKED								
PROJECT NUMBER: 514403.0000.0000 BY: JJ DATE (いう) BY: JL	DATE:8-1-23								
SAMPLE ID: MU-5 WELL DIAMETER: 2" □ 4" □ 6" □ OTHER   WELL MATERIAL: ☑ PVC □ SS □ IRON □ GALVANIZED STEEL □ OTHER   SAMPLE TYPE: ☑ GW □ WW □ SW □ DI □ LEACHATE □ OTHER									
PURGING TIME: 13 53 DATE: 7/26/23 SAMPLE TIME: (413 DAT	126/23								
PURGE PUMP PERISTALTIC PUMP  METHOD:  BAILER  PH: 7.365 SU CONDUCTIVITY: 176  ORP: 26-3 mV DO: 040 mg/L	umhos/cm								
DEPTH TO WATER: 433 T/ PVC TURBIDITY: 991 NTU									
DEPTH TO BOTTOM YOU T/ PVC NONE SLIGHT MODERATE	☐ VERY								
WELL VOLUME:  NA LITERS GALLONS TEMPERATURE: 15.3 °C OTHER:  VOLUME REMOVED W IT LITERS GALLONS COLOR: (1.00)									
VOLUME KEIMOVED TO THE STATE OF	nq								
	to a particle of the second configuration in particle								
TURBIDITY   FILTRATE COLOR:   FILTRATE ODOR:									
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:									
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE WATER LEVEL I	CUMULATIVE PURGE VOLUME								
(ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (1353 200 76) (814 30.) 7.75 516 20.6 (4.21)	(GAL OR L) INITIAL								
1353 200 767 (814 30.) 7.75 516 20.4 14.21	111174								
The state of the s	The District of the second second second								
The windows we can be confirmed and the formal and the first and the fir	~~								
EAR AND AND A CONTROL OF THE AREA OF THE A	. <u> </u>								
1413   738 1765 -263 040 9.95 153 1470									
1410>	tt ur kalk automatika i i orden eventauren eren olden eta eta eren olden eta eta eta eta eta eta eta eta eta e								
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING PH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % Or = 10 TI</td <td>EMP.: +/-</td>	EMP.: +/-								
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL	F								
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIV	E FILTERED								
250 p   A	Y   N   N   N   N   N   N   N   N   N								
SHIPPING METHOD: 4 Drop off DATE SHIPPED: 7-27-23 AIRBILL NUMBER: DATE SIGNED: 4	1/3								

<b>&lt;&gt;</b>	TRC
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PROJECT NAME: CEC Weadock LF: 2023 GW (	VC PREPARED				CHECKED			
PROJECT NUMBER: 514403.0000.0000	BY:	JJ	DATE: &	ッシ	BY: 5	5K-	DATE: 8-1-23	
WELL MATERIAL: PVC SS IRON SAMPLE TYPE: GW WW SW SW		NIZED STE	☐ 4" ☐ EEL ACHATE		OTHER OTHER OTHER	The state of the s	engen all the end order account	
PURGING TIME: 6547 DATE: 7/3	1103	SAM	//PLE	TIME:	000	) 0	ATE: 7(7(1)	
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	-			CO	NDUCTIVI		48 umhos/cm	
DEPTH TO WATER: 1487 T/ PVC		TURBIDIT	,	_ NTU				
DEPTH TO BOTTOM (9.7° T/ PVC)  WELL VOLUME: NA LITERS GALLO	ONE	-NONE	LJ SLIC	3.6	MOI	DERATE	☐ VERY	
WELL VOLUME: NA ☐ LITERS ☐ GALLO VOLUME REMOVED ☐ M LITERS ☐ GALLO		TEMPERA COLOR:	TURE:		ODO	ER:	1016	
COLOR: ODOR: NC			(0.45 um) [		<del></del>	NO -		
TURBIDITY FILTRATE COLOR FILTRATE ODOR: QC SAMPLE: MS/MSD DUP-								
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:								
TIME PURGE RATE (ML/MIN) (SU) (umhos/cm) (mV)  U547 244 HW (457 700  U543 L.47 1533 33.8  U547 LEW 1543 13.0  U607 LEW 1543 13.0  U607 LEW 1548 13.0		mg/L) 3 & ~ . 60 . 40 . 3 5 . 3 5	TURBIDITY (NTU)  12.0  5.0  4.9  4.9	(3 (3 (3		WATER LEVEL (FEET)  146  146  146  146  146  146  146  14	3	
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-	
BOTTLES FILLED PRESERVATIVE CODES A - NONE		HNO3	C - H2SO4		NaOH	E - H		
NUMBER SIZE TYPE PRESERVATIVE FILT	P Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	NUMBER	SIZE	TYI	PE PR	RESERVAT	FILTERED	
SHIPPING METHOD: LA DAG OFF DATE SHIPP	PED:	7-27	<del>1-23</del> 7-1	1-3/F	RBILL NUM	IBER:		
COC NUMBER: SIGNATURE	:		$\rightarrow$	DA	TE SIGNE	D: 6/	1/83	
	-(		0					

TAC

PROJECT NAME:	CEC	Weadock LF:	2023 GW C		PR	EPARED			CHEC	KED
PROJECT NUMBE	R: 51440	3.0000.0000	E	3Y:	JJ	DATE:	(73	BY: 3	sk_	DATE: 8-1-23
**	53 د ☑ pvc ☑ GW	ss c	] IRON 🔲 G	BALVA	NIZED S	2"				
PURGING	TIME:	615	DATE: 7[31]	733	S	AMPLE	TIME:	مرونز	g D	ATE: 7/3/133
METHOD	PURGE ☑ PUMP PERISTALTIC PUMP				10000	7.10 S	U CC	NDUCTIV		49 umhos/cm
DEPTH TO WATER:		<del>-</del>				DITY: 2.	_	J		eren erene erene erene eren eren eren e
DEPTH TO BOTTOM	, १७१४	_ 17 1 00			NO.				DERATE	☐ VERY
WELL VOLUME:	NA	LITERS	GALLON			RATURE: 13		°C OT	HER:	
VOLUME REMOVED		<u>IX</u> LITERS	GALLON		COLO					<u> </u>
COLOR:C		RBIDITY MODERATE	DORY VER		FILTRA	TE (0.45 um) TE COLOR: MPLE: \[ \] MS	region color tip gr., t	FIL	_NO _TRATE ODO 	DR:
DISPOSAL METHOD	☑ GROU	IND DRU	/I □ OTHER		COMM	ENTS:				
TIME PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVIT			D.O. mg/L)	TURBIDITY (NTU)	1	ERATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
561 \ 200 5430 5670 5670 6637 6646	7.14 7.08 7.10 7.10 7.10	(074)  669  038  (043	30°C -49°C -60°C -60°C		70 .UO .36 .70 .35	7.3 4.1 3.0	13		1337 1337 1337 1337 1337	INITIAL 1 2 3
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORI	PLETE WHEN : P: +/- 10	D.O.:	+/- 0.3		10 %	or =</td <td></td> <td>NG LIMITS: TEMP.: +/-</td>		NG LIMITS: TEMP.: +/-
BOTTLES FILLED		ATIVE CODE		-	HNO3	C - H2SO4		NaOH	E - HC	
NUMBER SIZE	TYPE	PRESERVA		4	NUMB	ER SIZE	TYI	PE P	RESERVAT	
1 250	P1	A A B		N N N						
SHIPPING METHOD:	123	90 gord	DATE SHIPPE	D:	7=	<del>27-23</del> 7-	31-AIR	BILL NUN	∕BER: S	
COC NUMBER:			SIGNATURE:		_		: <del> </del>	TE SIGNE		1/53
					0					,

TRC

		2501						01150	
PROJECT NAME: CEC Weadock LF: 2023 GW C PREPARED CHECKED									
PROJECT	T NUMBEI	R: 51440	3.0000.0000	BY	(: JJ	DATE: E	bカ BY:	'JK	DATE: 8-1-23
SAMPLE	ID: M	W- "	312	WELL DIA	METER: 🔽	2" 🗌 4" 🔲	6" OTHE	R	
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL						STEEL	☐ OTHE	R	
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗆 DI		LEACHATE	OTHE	R	
PUR	GING	TIME &	er DA	TE: 7/31		AMPLE	TIME: U)	20	DATE: 7/3/133
PURGE METHO	D:	PUMP BAILER	PERISTALTIC F	UMP	100,000 111000	<b>(4:7</b> ∫ s <b>23</b> . ) m		1.3 ) m	
DEPTH TO	O WATER:	14,70	T/ PVC		ŢURBI	DITY: 4,	NTU	en garagan ang control to the first	IN BOUNDARY OF A CONTRACT OF THE STATE OF TH
		18.80	T/ PVC		D NO	NE 🗆 SLI	GHT 🗌 N	MODERATE	☐ VERY
WELL VOL	UME:	NA	LITERS [	GALLONS	TEMPE	RATURE:	3.3 °C	OTHER: _	The state of the second
VOLUME	REMOVED		LITERS [	GALLONS	COLO	R: ()	W4 0	DDOR:	non
COLOR:	91	Ayis	V OD	DR: NOK	FILTRA	TE (0.45 um)	☐ YES [	ОИ	
		TUR	BIDITY		FILTRA	TE COLOR:		FILTRATE OF	OR:
☐ NONE	SLI	GHT 🗌	MODERATE	VERY	QC SA	MPLE: MS	/MSD [	DUP-	
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER COMMENTS:									
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATUR	LEVEL	PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	
Churi	200	4.9	(666	294	1 m 1 m 1 m 2 m 2 m 2 m 3	1000	15.3	13.0	INITIAL
OUST	the property of the design of the same	G 7c	1000	23	1.71	900	13.6	1416	
OWIT		4.71	announce of the second con-	23	1,00	500	136	1410	à
0700		6.71	1475	243	1.35	38	13.5	1410	3
TOOK		4.71	1413	24.3	1.3	13	13,5	jule	, 4
0710		471	1387	238	1.34	5.0	13.6	juic	
6715		w71	1300	23.2	1.33	4.5	13.3	juk	<i>(</i>
UT)U		671	1350	23.7	1.34	4.5	13.3		milion of the state of the stat
este strong god them. Not to the war			CONTRACTOR AND AND AND AND AND AND AND AND AND AND	a deface over each a beliefe too.			and and transfer and an angertament of the contract of		
		-							
<b>NO</b> pH: +/-		LIZATION 1 COND.: +/-	TEST IS COMPL 3 % ORP:		SUCCESSIV D.O.: +/- 0.3			HE FOLLOW! = 10</td <td>ING LIMITS: TEMP.: +/-</td>	ING LIMITS: TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E - H	ICL F
NUMBER	SIZE	TYPE	PRESERVATIV	/E FILTER	RED NUMB	ER SIZE	TYPE	PRESERVA	TIVE FILTERED
1	280	PI	A	□ Y Ø	- N				□ Y □ N
ì	125	PI	A	□ Y • <b>7</b>	PN				□ Y □ N
	76	7	A	□ Y □	FN				□ Y □ N
			· · · · · · · · · · · · · · · · · · ·		N	1. Project control by the state			□ Y □ N
. 166 - 914 / 915 # 11,1414		The second of the second of	10 000000000000000000000000000000000000		N			and an extra contract to	
SHIPPING	METHOD:	LLX	100 956 DA	TE SHIPPED	7-31	- 17	AIRBILL N	LIMBER:	
		K O	CALL STREET, S					<u> </u>	11/2
COC NUM	IRFK:		Sic	GNATURE:	$\leftarrow$	$\rightarrow$	DATE SIG	NED:	<i>UIP</i>
									/

# ◆ TRC

PROJECT NAME:	CEC V	Veadock LF: 20	023 GW C	PR	EPARED			CHEC	KED
PROJECT NUMBER	PROJECT NUMBER: 514403.0000.0000 BY:				DATE:	13	BY: 3	5K	DATE: 8-1-23
11 11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	U S ( ☑ PVC ☑ GW	***************************************	WELL DIAN IRON □ GAL SW □ DI	VANIZED S	2"	6"	OTHER OTHER	· · · · · · · · · · · · · · · · · · ·	The second secon
					AMPLE			TDA	TE: 7/- 1 co
PURGE PUMP PERISTALTIC PUMP METHOD:  BAILER  DEPTH TO WATER: 13.66 T/ PVC  DEPTH TO BOTTOM 1722 T/ PVC  PH: 67 SU CONDUCTIVITY: [0] 17 umhos/ my DO: 20 mg/L  TURBIDITY: 3. NTU  DEPTH TO BOTTOM 1722 T/ PVC						umhos/cm /L			
WELL VOLUME:	NA	LITERS [	GALLONS	TEMPE	RATURE: 1	4.0	с отн	IER:	
VOLUME REMOVED		<u> </u>	GALLONS	COLO	R:	2CV	ODC	DR: AC	N
COLOR: ODOR: NONE   SLIGHT   MODERATE   VERY   OTHER   COMMENTS:									
TIME PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY		RATURE	WATER	CUMULATIVE PURGE VOLUME
6772 0737 6743	(SU) 737 6.64 6.64 6.64	(umhos/cm)  0@ \\ 105 \\ 103 \	(mv) 33.0 19-7 23.0 23.0 23.0	(mg/L) 9.6 3.0 3.0 3.0	(NTU) 200 2) 3.9 3.5 3.5	15. 13. 14. 14.	9 0	(FEET) 1341 1360 1360 1360 1360 1360	(GAL OR L) INITIAL  1 2 3
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1									
NUMBER SIZE	TYPE	PRESERVATION (A)	Y   J	N NUMB	ER SIZE	TYP	E PR	ESERVATI	VE FILTERED    Y   N   N   N   N   N   N   N   N   N
SHIPPING METHOD: COC NUMBER:	lab Dro		TE SHIPPED: SNATURE:	7-3	)-23	•	BILL NUMI	£.7	11/3

◆ TRC

PROJECT NAME:	CEC V	Veadock LF: 20	23 GW (	PR	EPARED			CHEC	KED
PROJECT NUMBER	R: 514403	3.0000.0000	ВУ	′: JJ	DATE	77	BY: 3	TL.	DATE: 8-1-23
Children and sales a constraint of the second of	☑ PVC	☐ SS ☐ I	<b>.l</b>	ALVANIZED S	2"		OTHER OTHER OTHER	The state of the state of	
PURGING	TIME: 0	757 DAT	TE:7/31/	)3 S	AMPLE	TIME:	voi-	<b>7</b> DA	TE:7/3//)3
PURGE PUMP PERISTALTIC PUMP METHOD: BAILER					all committee and a social	iU CO nV DO:		TY: <u>13(</u> p.4 mg	umhos/cm
	130 C	T/ PVC		TURBI		<b>O</b> NTU			
<b>DEPTH TO BOTTOM</b>			7 644 644	NO.		GHT 169		DERATE	☐ VERY
WELL VOLUME:	^		GALLONS GALLONS		RATURE:	<del></del>			000.4
COLOR: (	1000			_	TE (0.45 um)		ODO		non
	TURI GHT Ø	BIDITY MODERATE	OR: NOTHER	FILTRA QC SA	TE COLOR: MPLE: MS		FILT	DUP-	DR:
TIME PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O.	TURBIDITY (NTU)		ERATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
080)	7,7°C   '8'E	774 1387	44C 440	9.1 9.1	34 400	17:	イフ	1921	INITIAL
	4.61	1375	49.5	4.7	3.5	14	p &	1661	
(13)	(4. 61	1363	50.0		3.0	16	,9	1991	1.5
0817	(4.B)	1364	50.3	(a6	30	14	». 9	1901	3,4
NOTE: STABI	LIZATION T	EST IS COMPLE	ETE WHEN 3	SUCCESSIV	E READINGS	ARE WIT	THIN THE	FOLLOWIN	IG LIMITS:
ı	COND.: +/-			D.O.: +/- <b>0.3</b>			or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER SIZE	TYPE	PRESERVATIV	E FILTER	ED NUMB	ER SIZE	TYF	PE PR	ESERVATI	VE FILTERED
( 25c ( 1) i	Pr Pr	A P B		N N N N					Y   N   N   N   N   N   N   N   N   N
SHIPPING METHOD:	lab Do	or off DA	TE SHIPPED	: 7-3	1-23	AIR	BILL NUM	BER:	
COC NUMBER:			NATURE:			DA	TE SIGNEI	8/	52/2
						and the same		7//	

<b>&lt;&gt;</b>	TR	C
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PROJECT NAME:	CEC Weadock LF: 2023 GW (	PREPARED	CHECKED
	R: 514403,0000.0000 BY:	•	BY: 5K DATE: 8-1-27
1			
SAMPLE ID:	WELL DIAME	TER: 🗸 2" 🗌 4" 🗌 6" 🗀	OTHER
WELL MATERIAL:	☑ PVC ☐ SS ☐ IRON ☐ GALVA	ANIZED STEEL	OTHER
SAMPLE TYPE:	☑ GW □ WW □ SW □ DI	_ LEACHATE _	OTHER
PURGING	TIME: 0630 DATE: 0/31/33	SAMPLE TIME:	08:T DATE:7/3(1)3
PURGE 🗹	PUMP PERISTALTIC PUMP		ONDUCTIVITY: $134$ umhos/cm
METHOD:	BAILER	ORP: -&(.O mV DC	group, a ser and a series of the series of t
DEPTH TO WATER:	1381 T/ PVC	TURBIDITY: 33 NT	-ับ
DEPTH TO BOTTOM	M_LEGY ST/ PVC	NONE   SLIGHT	☐ MODERATE ☐ VERY
WELL VOLUME:	NA LITERS GALLONS	TEMPERATURE: 15. C	_°C OTHER:
VOLUME REMOVED		COLOR:	OPOR: NON
COLOR:	ODOR: NO NO	FILTRATE (0.45 um) 🗌 YE	s X NO
	TURBIDITY	FILTRATE COLOR:	FILTRATE ODOR:
☐ NONE ☐ SI		QC SAMPLE: ☐ MS/MSD	□ DUP
DISPOSAL METHO	D☑ GROUND □ DRUM □ OTHER	COMMENTS:	
TIME PURGE	PH CONDUCTIVITY ORP	D.O. TURBIDITY TEMP	PERATURE WATER CUMULATIVE LEVEL PURGE VOLUME
RATE (ML/MIN)	(SU) (umhos/cm) (mV)	( mg/L) (NTU)	(°C) (FEET) (GAL OR L)
0676 240			3.6 13 % INITIAL
1580			1751 6
	region of comments of protection of specific contraction of the contra	the second of th	Charles and the control of the contr
0840		and the region of the contract	r and the company of the contribution of the c
	The second section of the second section of the second section of the second section of the second section of the second section of the second section	etimore and property and the second s	
082	A commence we have been a functional and a commence of the com	Prince The part of the second was also as an analysis of the second and	5.5 1377 4
0617	6.41 1176 - 61.0	1. 2 3.3 1	6,6 1357
the first of the second of the first second			
			· · · · · · · · · · · · · · · · · · ·
L.		A CANADA TA TA TA TA TA TA TA TA TA TA TA TA TA	
and the second s			
NOTE: STAE	ILIZATION TEST IS COMPLETE WHEN 3 SU	CCESSIVE READINGS ARE W	ITHIN THE FOLLOWING LIMITS:
pH: +/- <b>0.1</b>	COND.: +/- 3 % ORP: +/- 10 D.O.	:: +/- <b>0.3</b> TURB: +/- <b>10</b> %	or = 10 TEMP.: +/-</td
BOTTLES FILLED	PRESERVATIVE CODES A - NONE B	- HNO3 C - H2SO4 D	- NaOH E - HCL F
NUMBER SIZE	TYPE PRESERVATIVE FILTERED	NUMBER SIZE T	/PE   PRESERVATIVE   FILTERED
12%	PI A DY AN		□ Y □ N
1 121	A DYATN		□ Y □ N
	DI B TY DIN		
1.9			
			□ Y □ N
SHIPPING METHOD	DATE SHIPPED:	/-31-23 A	RBILL NUMBER:
COC NUMBER:	SIGNATURE:	D.	ATE SIGNED: 8/1/13/3

<b>&lt;&gt;</b>	TRC	
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PROJECT NAME:	CEC We	adock LF: 20	)23 GW C	PR	EPARED			CHEC	KED
PROJECT NUMBER	R: 514403.0	0000.0000	BY:	JJ	DATE:	づら	BY: 3	K	DATE: 8-1-23
SAMPLE ID: JCW - MW 1800 T WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER  WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER									
SAMPLE TYPE:	☑ GW 🗆	ww 🗆 :	SW 🗆 DI		LEACHATE		OTHER		<u> </u>
PURGING TIME: () C C G DATE: 7 (3) (3) SAMPLE TIME: 0 (3) DATE: 7 (3) (3) PURGE PUMP PERISTALTIC PUMP METHOD: BAILER ORP: 98.3 mV DO: 13 mg/L  DEPTH TO WATER: 6.43 T/ PVC TURBIDITY: 4. NTU									
DEPTH TO BOTTOM						_		DERATE	☐ VERY
WELL VOLUME:			GALLONS			3.4			
VOLUME REMOVED		LITERS [	GALLONS	COLO	- 1	ied'	ODC		none
	TURBIC		VERY	FILTRA	TE COLOR:		FILT	RATE ODO	R:
DISPOSAL METHOD	☑ GROUND	☐ DRUM [	OTHER	COMM	IENTS:				
TIME PURGE RATE (ML/MIN)		ONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. ( mg/L)	TURBIDITY (NTU)		ERATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0909 100	7051	453 1317	14-5 28.5	7.8	(00	Ç	Σ•3 . ⊃	869	INITIAL
0919	6.74	1281	29.0	1.5	<b>3</b> 0		./	985	CALL THAT AND A VIOLENCE CO. C. C. C. C. CALLER OF C.
0474	675	1248	29.0	1.4	5.0	15	₹3	98	F, (
0929	675	1254	285	1. 3	er samme and the second contract of the contract of the	15	3	985	)
0934	4.70	1249	28.3	1.3	4.5		5.4	985	2.5
	LIZATION TES COND.: +/- 3			O.O.: +/- 0.3	'E READINGS A TURB: +/-		or =</td <td></td> <td>G LIMITS: TEMP.: +/-</td>		G LIMITS: TEMP.: +/-
BOTTLES FILLED	PRESERVAT	IVE CODES	A - NONE	B - HNO3	C - H2SO4	D-	NaOH	E - HC	L F
NUMBER SIZE	TYPE P	RESERVATI	/E FILTERE	D NUMB	ER SIZE	TYF	PE PR	ESERVATI	VE FILTERED
1 13 5	P1 P1	A A A	Y	N N N N					Y
SHIPPING METHOD:	hs Drop	off DA	TE SHIPPED:	7-3	1-23	AIR	BILL NUM	BER:	
COC NUMBER:			SNATURE:			DA	TE SIGNEI	D:(	9/1/53

# ◆ TRC

PROJECT	NAME:	CEC V	Veadock L	F: 2023 GW C		PR	EPARED .			CHEC	KED
PROJEC1	NUMBER	R: 51440	3.0000.000	00	BY:	JJ	DATE:	りろ	BY: 3	k	DATE 8-1-23
SAMPLE WELL MAT SAMPLE T	ERIAL:	☑ PVC		☐ IRON ☐	GALVA	NIZED S	2"				n dan da sin sa sin si sina da sina da sina da sina da sina da sina da sina da sina da sina da sina da sina da
PUR	SING	TIME()	47	DATE: 7/31	153	s	AMPLE	TIME:	007	) DA	TE: 7/3/152
	PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER						506		NDUCTIVI	ITY: 1(?	
DEPTH TO						-	DITY: 2.6			er - mile tiller r , men 4 , , re	er than its of a house last - we have a service of
DEPTH TO						J-NO		GHT ∠ ℃		DERATE	☐ VERY
WELL VOL		1	LITERS			-		5. E		IER:	
VOLUME	REMOVED	·	LITERS			COLO			·,-	DR: NUM	φ
COLOR:		The q		ODOR: 100	<u>vo</u>	FILTRA	TE (0.45 um)	☐ YES	s <b>T</b>	NO	enter entry enterior in a constraint, a minimum
TI-NONE			BIDITY	v-	D.V		TE COLOR:			TRATE ODC	PR:
NONE			MODERAT				MPLE: MS	MSD		DUP-	
DISPOSAL		☑ GROUI	ND [] DR	UM D OTHER	<u> </u>	COMM	ENIS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTI			D.O. mg/L)	TURBIDITY (NTU)		ERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
KEN7	100	719	1213			ر ک پر	120	26		4.84	INITIAL
0998	`	(42	ille	the state of the second second second second		と	3.0	16		10.70	, \
69 57	of Marin parties of probe a 2	6. Go	1140	[		して	るべ		. 9	11.70	
1007		4.90	113	and the second second	and the first species	ίΥ	Ž	)		11.88	
	**********	4.10				·	2.0	ી 5		11.00	
160-7		and the second of the second		A CALL PART AND ALL THE COLUMN					100000000000000000000000000000000000000		7
60				material and the same of the s			ages consiste to be the consistency of the con-				
							talian in the analysis on the forest on a redshirt		a tha a sair a tha a a sairth ann a a dh'a a mar a th		generally, we don't come to a contract and come
		realist a first of the control					to the speciment of the section of t		**************************************		7007070 (1700) 1 1110 (H) 111 (H) 1 1000 1 -
erranar yanar da aabaada a				1881 11 14 1 A		Kirkiya ir mosira rasara iyor	nga na mangang ang magang at timong mangang ang pangang ang mangang ang pangang ang pangang ang pangang ang pa	-			
700											
NO	TE: STABII	IZATION 1	EST IS CO	MPLETE WHEN	1 3 SUC	CESSIV	E READINGS	ARE WI	THIN THE	FOLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % C	PRP: +/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	SFILLED	PRESERV	ATIVE COL	ES A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESER\	ATIVE FILT	ERED	NUMB	ER SIZE	TYF	PE PR	ESERVATI	VE FILTERED
1	296	PI	W)	DΥ	<b>吴</b> N						□ Y □ N
	191	_ [C(	()	1 L Y	N						
	1)(	Pı	6	)   Y	KC N	The state of the s					□ Y □ N
		a toda ya i kasakita di ta isa		□ Y	□N						
			or or designation	Y	□ N						ΠYΠN
SHIPPING	METHOD:	hb br	er eff	DATE SHIPP	ED:	7-31	-23	AIR	BILL NUM	BER:	
COC NUMI	BER:			SIGNATURE:				DA	TE SIGNEI	D: 1/1	1/13
										(/ **	

	<b>;</b>	<b>T</b> 2	C
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PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED			
PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATEY (172	BA: 2K DALES-1-53			
SAMPLE ID: JCW-Mw (5056 WELL DIAME WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALV SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI	ANIZED STEEL	OTHER OTHER OTHER			
PURGING TIME: 10 1 DATE: 7(31 b3	SAMPLE TIME	103 ( DATE 7/21/57			
PURGE PUMP PERISTALTIC PUMP METHOD: BAILER	PH: 6-81 SU C	CONDUCTIVITY: 1049 umhos/cm			
DEPTH TO WATER: 7.90 T/ PVC		TU			
DEPTH TO BOTTOM <u>7分.心</u> T/ PVC	D NONE □ SLIGHT	☐ MODERATE ☐ VERY			
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 15				
VOLUME REMOVED X LITERS GALLONS	COLOR: Clay	ODOR: NO			
COLOR: COM ODOR: NOV FILTRATE (0.45 um) YES NO  TURBIDITY FILTRATE COLOR: FILTRATE ODOR: COMMENTS:  DISPOSAL METHOD GROUND DRUM OTHER COMMENTS:					
	( mg/L) (NTU)	MPERATURE LEVEL PURGE VOLUME  (°C) (FEET) (GAL OR L)  1346  INITIAL			
107 687 1053 -10.5	1.4 42 19 1.3 4.1 1	5.0   346   INITIAL 5.0   36c   1 5.1   136c   2 5.1   136c   3 5.1   136c   4			
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O	: +/- 0.3 TURB: +/- 10 %				
BOTTLES FILLED PRESERVATIVE CODES A - NONE B	- HNO3 C - H2SO4 D	) - NaOH E - HCL F			
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE T	YPE PRESERVATIVE FILTERED			
3 250 PI A		□ Y □ N □ Y □ N □ Y □ N □ Y □ N □ Y □ N			
SHIPPING METHOD: IN DAY off DATE SHIPPED:	7-31-23 A	AIRBILL NUMBER:			
COC NUMBER: SIGNATURE:		DATE SIGNED: E/// 2			

# TRC

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED CHECKED
PROJECT NUMBER: 514403.0000.0000 BY:	JJ DATER (1)7 BY: JK DATE: 8-1-23
SAMPLE ID: MW . S & WELL DIAME WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALV. SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI	TER:
PURGING TIME: 104 C DATE 7/3/103	SAMPLE TIME: 10 C DATE:7/3/13
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	PH: CONDUCTIVITY: 219E umhos/cm
DEPTH TO WATER: 5.5 V T/ PVC	TURBIDITY: 3.0 NTU
DEPTH TO BOTTOM 18.30 T/ PVC	NONE SLIGHT MODERATE VERY
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE:OTHER:
VOLUME REMOVED ☐ GALLONS	COLOR: ODOR: NOK
color: Brownish odor: nov	FILTRATE (0.45 um) ☐ YES 1 NO
TURBIDITY	FILTRATE COLOR: FILTRATE ODOR:
□ NONE ☐ SLIGHT □ MODERATE □ VERY	QC SAMPLE: MS/MSD DUP-
DISPOSAL METHOD☑ GROUND ☐ DRUM ☐ OTHER	COMMENTS:
TIME PURGE RATE PH CONDUCTIVITY ORP (ML/MIN) (SU) (umhos/cm) (mV)	D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME ( mg/L) (NTU) (°C) (FEET) (GAL OR L)
0.00	90 20 20.1 5.55 INITIAL
	16 37 16.7 351 1
	1.3 3.5 16.1 5.55 2
	.3 3.3 16.7 5.51 3
1101 620 2138 - 43.3	-3 3.0 161 5.55
	CCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: .: +/- 0.3 TURB: +/- 10 % or = 10 TEMP.: +/-</td
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
1 254 D1 A DY IN 1 185 D1 B DY IN	
SHIPPING METHOD: Lab Drop of DATE SHIPPED:	7-31-23 AIRBILL NUMBER:
COC NUMBER: SIGNATURE:	DATE SIGNED: Q///3

# TRC

PROJEC <sup>*</sup>	T NAME:	CEC V	Veadock LF: 20	)23 GW (	PR	EPARED .		CHEC	KED
PROJEC <sup>*</sup>	T NUMBEI	R: 51440	3.0000.0000	BY:	JJ	DATE !	) PY:	JK	DATE: 7-1-23
SAMPLE WELL MAT SAMPLE T		☑ PVC	□ss □ ı	WELL DIAN RON	VANIZED S	2"	6"	ER	and an enter of the state of th
PUR	GING	TIME:	DA	Τ <b>E</b> :	s	AMPLE	TIME: (1 (C	) D	ATE:) (3//52
	D: D WATER:	PUMP BAILER	PERISTALTIC P  T/ PVC  T/ PVC	UMP	TURBI	DITY:		TIVITY: V mg	7 PT F.W
	REMOVED	<del></del>	<del></del>	GALLONS	COLO		(1) 1		non
COLOR:			OD0	OR:		TE (0.45 um)		1-NÔ	
□ NONE		GHT 🗌	BIDITY  MODERATE  ND	□ VERY	QC SA	TE COLOR: MPLE: D MS IENTS:		FILTRATE OD	OR:
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATUR	RE WATER	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
NO	TE: STABII	LIZATION	FEST IS COMPLE	ETE WHEN 3 S	SUCCESSIV	E READINGS	ARE WITHIN T	HE FOLLOWII	NG LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- <b>10</b> D	.O.: +/- <b>0.3</b>	TURB: +/-	10 % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
	S FILLED		ATIVE CODES		B - HNO3	C - H2SO4			
NUMBER	7) Y	Pi	PRESERVATIV		N NUMB	ER SIZE	TYPE	PRESERVAT	FILTERED
SHIPPING	METHOD:	lab D		TE SHIPPED:	7-3	31-27	AIRBILL N	- G/I	1
	BER:	lab D		TE SHIPPED:	<u> </u>	31-27	:	- G/I	13

<b>&lt;&gt;</b>	TRC
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PROJECT NAME:	CEC \	Neadock LF: 2	023 GW C	PR	EPARED .			CHEC	KED
PROJECT NUMBE	R: 51440	3.000.0000	BY:	JJ	DATE:	つう	3Y: 2	く	DATE: 8-1-23
SAMPLE ID: E WELL MATERIAL: SAMPLE TYPE:	B # ☑ PVC ☑ GW		IRON 🗌 GAL	VANIZED 8	2"	Comment of the second of the s	OTHER OTHER OTHER		
PURGING	TIME:	DA	TE:	s	AMPLE	TIME:	1113	DA	ATE7/31/22
PURGE METHOD:  DEPTH TO WANTER	PUMP BAILER	PERISTALTIC F	PUMP	ORP:		V DO:		TY: <u>/\)  </u> mg	white the first of the state of
DEPTH TO BOTTO	1	TIPVE		TIMO		u	□ мог	DERATE	☐ VERY
WELL VOLUME \	N/A	-/	GALLONS		RATURE: 1		C OTH		- A 3A
VOLUME REMOVED		• '	GALLONS	COLO			Opc		70 N
COLOR:  NONE SI  DISPOSAL METHOI	IGHT 🗆	RBIDITY MODERATE	OR:	FILTRA QC SA	TE (0.45 um) TE COLOR:MPLE:MS	- 1 had the Material Street Minner	FILT	RATE ODO	DR:
DISPOSAL METHO			U OTHER	COMIN	IENTS:			WATER	CUMULATIVE
TIME RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. ( mg/L)	TURBIDITY (NTU)		RATURE (C)	LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL
pH: +/- <b>0.1</b>	COND.: +/-	TEST IS COMPL 3 % ORP:		O.: +/- 0.3			or =</td <td></td> <td>IG LIMITS: TEMP.: +/-</td>		IG LIMITS: TEMP.: +/-
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - I	NaOH	E - HC	CL F
NUMBER SIZE	TYPE	PRESERVATION	/E FILTERE	D NUMB	ER SIZE	TYP	E PR	ESERVATI	VE FILTERED
1 (37	ף'	A	Y   1   1   1   1   1   1   1   1   1	N N N N N N N N N N N N N N N N N N N					Y
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Page \_\_ of \_\_\_

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 PROJECT NUMBER: SAMPLING SITE / CUSTOMER: SAP CC or WO#: ANALYSIS REQUESTED OA REQUIREMENT: (Attach List if More Space is Needed) 23-2023 Weadock Porewater Wells 23-0723 REQUESTER: Harold Register **AMPLING TEAM:** TURNAROUND TIME REQUIRED: ☐ NPDES ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER ☑ TNI Caleb Batts ☐ ISO 17025 SEND REPORT TO: email: phone: MATRIX CODES: **CONTAINERS** □ 10 CFR 50 APP. B COPY TO: Harold Register GW = Groundwater OX = OtherWW = Wastewater SL = Sludge **PRESERVATIVE** TRC ☐ INTERNAL INFO W = Water / Aqueous Liquid A = AirAlkal inity S = Soil / General Solid WP = Wine MATRIX Anions SAMPLE COLLECTION TOTAL  $\square$  OTHER WT = General Waste O = OilLAB None HNO<sub>3</sub> H<sub>2</sub>SO<sub>4</sub> NaOH HCI MeOH Total Other SAMPLE ID FIELD SAMPLE ID / LOCATION DATE TIME REMARKS 5 23-0723-01 GW JCW-MW-18001 4 х х х 7/26/23 6161 GW JCW-MW-18004 х х -02 х -03 GW JCW-MW-18005 х  $\mathbf{x}$ x JCW-MW-18006 -04 х х x اعنندا -05 7/26/22 GW MW-50 х х х 1 6113 MW-51 -06 х х х -07 GW MW-52 x x x MW-53 GW -08 х х х MW-53R -09 GW х х х GW MW-54R ·x -10 х х MW-55 -11 GW х х х OW-57ROUT -12 GW х х ELINOUISHED BY: DATE/TIME: RECEIVED BY: COMMENTS: 717/13 0920 Received on Ice? Yes □ No ELINQUISHED ECEIVED BY: Temperature: 1.4 -1.8°C

-23-0723-Page 27 of 31

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Cal. Due Date: 5-23-24

Page 2 of 2 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 Count on Us® **JAMPLING SITE / CUSTOMER:** PROJECT NUMBER: SAP CC or WO#: ANALYSIS REOUESTED QA REQUIREMENT: (Attach List if More Space is Needed) )3-2023 Weadock Porewater Wells 23-0723 REQUESTER: Harold Register TURNAROUND TIME REQUIRED: AMPLING TEAM: □ NPDES ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER\_ ⊠ TNI phone: ☐ ISO 17025 Caleb Batts SEND REPORT TO: email: MATRIX CODES: CONTAINERS ☐ 10 CFR 50 APP. B COPY TO: Harold Register OX = OtherGW = Groundwater WW = Wastewater SL = Sludge Metals **PRESERVATIVE** ☐ INTERNAL INFO TRC W = Water / Aqueous Liquid A = AirAlkalinity S = Soil / General Solid WP = WipeSAMPLE COLLECTION ☐ OTHER O = OilWT = General Waste LAB None HNO<sub>3</sub> H<sub>2</sub>SO<sub>4</sub> NaOH HCI MeOH Total TDS Other SAMPLE ID DATE TIME FIELD SAMPLE ID / LOCATION REMARKS GW MW-58 23-0723-13 x x х GW DUP-JCW-LF-01 フランしりろ х х х -14 GW DUP-JCW-LF-02 -15 х х х JCW-MW-18001 MS 1212 х х -16 7/26/03 16.61 133 GW JCW-MW-18001 MSD -17 х х FB-01 -18 х х EB-01 2 -19 х х DATE/TIME: RECEIVED BY: COMMENTS: **ELINQUISHED BY:** Received on Ice? Yes □ No M&TE#: 015402 RECEIVED BY: ELINQUISHED DY: Temperature: 1.4-1.8 °C

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Page 1 of 2

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SAMPLING TEAM:				TURNAROUND TIME REQUIRED:																	□ NPDES		
				□ 24 HR □ 48 HR □ 3 DAYS □ ST	TANDARD 🛭	OTHER	·				_										⊠ TNI		
SEND REPORT TO:	Caleb Batts			email:	phone:																□ ISO 170	25	
COPY TO:	Harold Regis	ster .		MATRIX CODES: GW = Groundwater OX ≠ Other		CONTAINERS															□ 10 CFR	<b>50 APP.</b> !	В
	TRC			WW = Wastewater SL = Slud W = Water / Aqueous Liquid A = Air	ge	_	PRESERVATIVE				E	als	]								□ INTERN	IAL INF(	0
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23-0723-01			GW	JCW-MW-18001		:	5 4	1		$\overline{\parallel}$		х	x	х	x					Ī	<u> </u>		
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AMPLING SITE / CUSTOMER:	PROJECT NUMBER:	SAP CC or WO#	ANALYSIS REQUESTED									QA REQUIREMENT:					
3-2023 Weadock Porewater Wells	23-0723	REQUESTER: H	Iaro	ld Re	giste	r		1	(Atta	ch Lis	t if M		QA REQUIREMENT.				
AMPLING-TEAM:	TURNAROUND TIME REQUIRED:																☐ NPDES
	□ 24 HR □ 48 HR □ 3 DAYS □ STAN	NDARD 🛮 OTHE	R_												-		⊠ TNI
SEND REPORT TO: Caleb Batts	email:	phone:															☐ ISO 17025
COPY TO: Harold Register	MATRIX CODES:  GW = Groundwater OX = Other		CONTAINERS														☐ 10 CFR 50 APP. B
TRC	WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE				Metals			_			ľ			☐ INTERNAL INFO
SAMPLE ID SAMPLE COLLECTION X Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	S = Soil / General Solid WP = Wipe O = Oil WT = General	Waste	TOTAL#	۾ ا	7	Ξ	E   =	al Me	Anions	, s	Alkalinity						□ OTHER
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-14 GW	DUP-JCW-LF-01		-	4 1				х	х	x							
-15 7/31/53 - GW	DUP-JCW-LF-02		J	1				х	х	х							
-16 GW	JCW-MW-18001 MS	EB 07-31-22	2	<u>ئ</u>				x	x								
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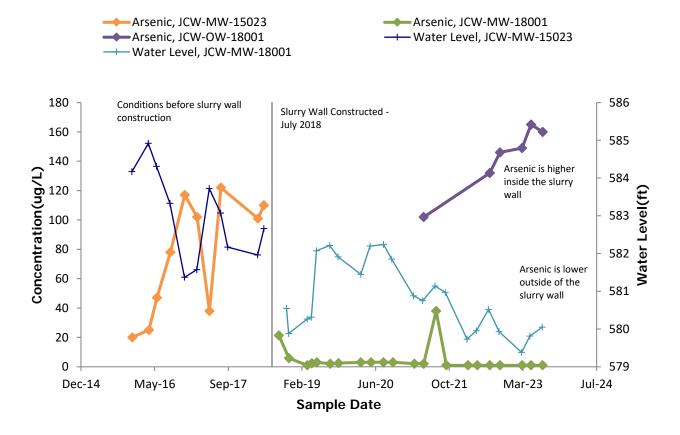
Page \_ l of \_ l

SAMPLING SITE / CU	ISTOMER:			PROJECT NUMBER:	SAP CC or WO	#:						ANALYSIS REQUESTED										
Q3-2023 JCW-DEK	Background W	ells		23-0721	REQUESTER:	Haro	old Re	gist	er			(Attach List if More Space is Needed)									QA REQUIRE	MENT:
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:	•																NPDES	
				□ 24 HR □ 48 HR □ 3 DAYS □ STA	NDARD ☑ OTH	ER_					-									Ø	ĭnt ∑	
SEND REPORT TO:	Caleb Batts			email:	phone:															[	ISO 17025	
COPY TO:	Harold Regist	ter		MATRIX CODES: GW = Groundwater OX = Other			CONTAINERS														10 CFR 50 AI	PP. B
	TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PR	ESE	RVA	TIV	E	Metals									INTERNAL I	NFO
LAB	SAMPLE COLL	ECTION	ZIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gener	al Waste	TOTAL#		HNO3 H2SO4 NaOH HCI McOH			M M	Suc								OTHER		
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TOI	Nome	H,SO	NaO	Meg F	Other	Total	Anions	TDS							REMARI	KS
23-0721-01	7-26-27	0852	GW	MW-15002		3	2 1					x	x	x								
-02	7-24-23	1323	GW	MW-15008		3	2 1					x	x	x								
-03	7-26-23	0933	GW	MW-15016		3	2 1					x	x	х								
-04	7-24-27	1405	GW	MW-15019		3	2 1					x	x	x								
-05	7-24-23		GW	DUP-Background		3	2 1					x	x	x								
-06	7-26-23	0933	w	FB- Background		1						x										
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# Appendix G Alternate Source Demonstration Supporting Information

Figure G1: Time Series Plots for JCW-MW-18001 ASD



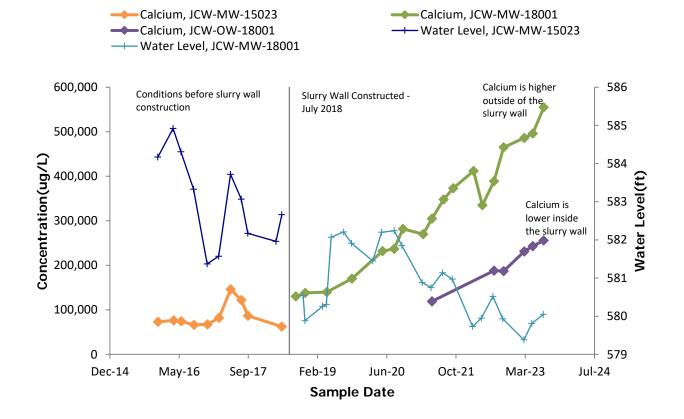
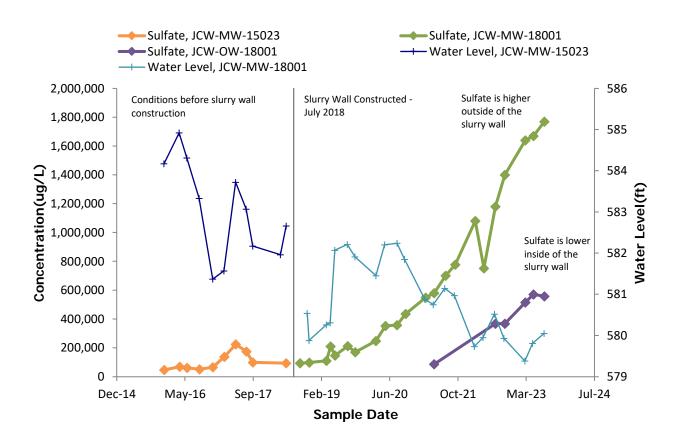


Figure G1: Time Series Plots for JCW-MW-18001 ASD



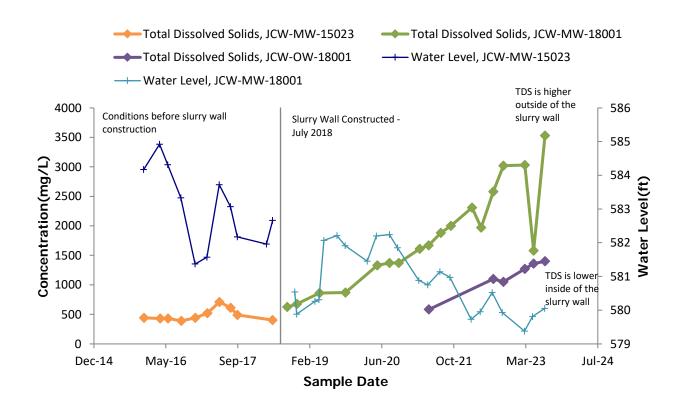


Figure G1: Time Series Plots for JCW-MW-18001 ASD

Oxidation Reduction Potential, Field, JCW-MW-15023
 Oxidation Reduction Potential, Field, JCW-MW-18001
 Oxidation Reduction Potential, Field, JCW-OW-18001

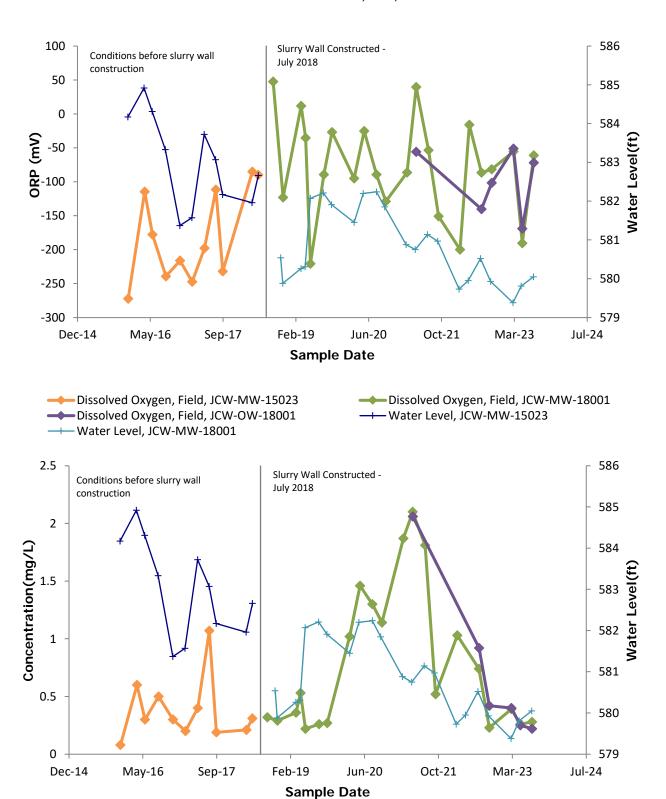
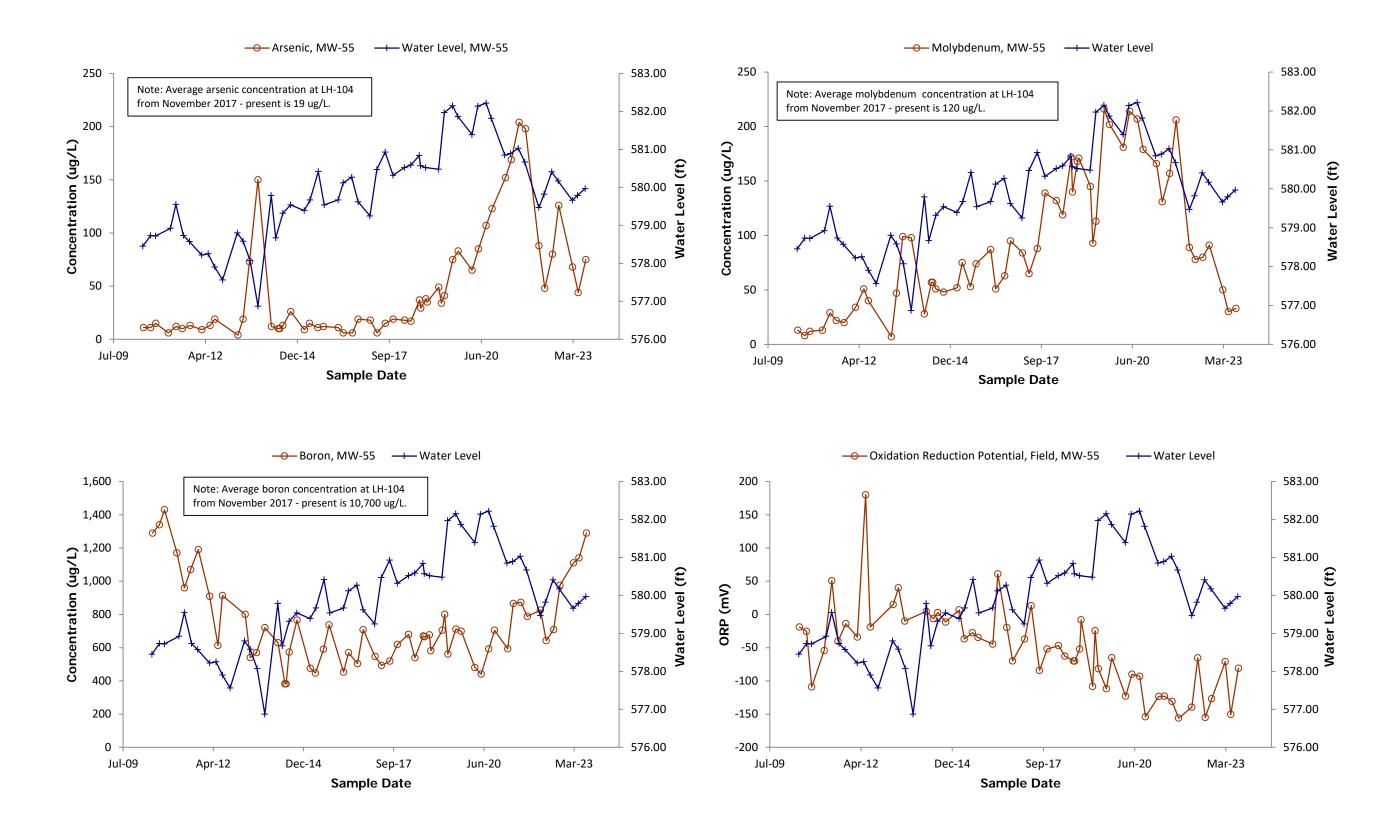


Figure G2: Time Series Plots for MW-55 ASD





# 2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

Essexville, Michigan

January 2024

Darby Litz

Project Manager/Hydrogeologist

## **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

### **Prepared By:**

**TRC** 

1540 Eisenhower Place Ann Arbor, Michigan 48108

Kristin Lowery, P.E Project Engineer

TRC | Consumers Energy
Final
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Table	e 3	Summary of Groundwater Sampling Results (Analytical): DE Karn & JC W Background	/eadock
Table	e 4	Summary of Groundwater Sampling Results (Analytical): JC Weadock Sol Waste Disposal Area	lid
Table		Summary of Confidence Interval Evaluation: October 2023	
Table		EGLE Exceedance Summary Table	
Table	e /	Leachate Headwell Results	



### **FIGURES**

Figure 1 Site Location Map

Figure 2 Site Map

Figure 3 Potentiometric Surface Map – October 2023

### **APPENDICES**

Appendix A Static Water Level Evaluation

Appendix B Data Quality Review

Appendix C Detection Monitoring Statistical Trend Tests

Appendix D Assessment Monitoring and GSI Statistical Evaluation

Appendix E Laboratory Analytical Report

Appendix F Field Records

Appendix G Alternate Source Demonstration Supporting Information



### 1.0 Introduction

Consumers Energy implemented a comprehensive compliance monitoring plan documented in the *Revised Hydrogeological Monitoring Plan* (Natural Resource Technology, 2010) for the JC Weadock Solid Waste Disposal Area required by Special License Condition 20.b in Solid Waste Disposal Area Operating License No. 9233 issued on October 15, 2009. Since that time, 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) imposing groundwater monitoring and corrective action requirements that apply to the landfill (Weadock Landfill). Michigan amended Part 115 of the Natural Resources and Environmental Protection Act (NREPA) PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management) to provide a basis for establishing a groundwater monitoring system and initiating detection and assessment monitoring to conform requirements for any licensed coal ash impoundment or landfill after December 28, 2018 with Part 115 amendments and the CCR Rule.

On January 15, 2021, Consumers Energy submitted the *Landfill Hydrogeological Monitoring Plan, JC Weadock Power Plant, Essexville, Michigan* (Weadock Landfill HMP), which includes components for Detection Monitoring and Assessment Monitoring, as well as Groundwater Surface Water Interface (GSI) Compliance Monitoring, to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115 and the CCR Rule. The Weadock Landfill HMP (TRC, February 2021) was revised per EGLE comments, submitted, and approved by EGLE on February 19, 2021 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021.

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

This Fourth Quarter 2023 JC Weadock Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring and reporting requirements during the active life of the coal ash landfill. 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 (MDEQ) — Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 Format for Solid Waste Disposal Facility Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the approved Weadock Landfill HMP that was approved by the EGLE on February 19, 2021. The Weadock Landfill HMP is compliant with Public Act No. 640 of 2018 (PA 640) to amend the NREPA, also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

### 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the fourth quarter 2023 at the JC Weadock Solid Waste Disposal Area located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). This JC Weadock Disposal Area is currently authorized



under a permit (Groundwater Discharge Authorization GWE-0005) issued pursuant to Part 31 to discharge to the unusable aquifer directly underlying the solid waste that vents almost immediately to the Saginaw River and Saginaw Bay.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule. Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report JC Weadock Power Plant Bottom Ash Pond CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JCW-MW-15011, JCW-MW-15012, JCW-MW-15023; and
- Field pH at JCW-MW-15023 (high).

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 notice to the Department on January 14, 2019 that arsenic was detected at statistically significant levels above the federal groundwater protection standards (GWPS) established pursuant to §257.95(h) in one monitoring well at the JC Weadock Landfill (JCW-MW-15023), which was located downgradient of a 1,600 linear foot vent within the slurry wall enclosing the historical fly ash disposal area. The vent was designed to direct groundwater flow beneath the landfill to the discharge channel immediately upgradient from the National Pollutant Discharge Elimination System (NPDES) external outfall to prevent water from building up within the facility. In July 2018, this vent was closed (Golder, 2018) and the engineering improvement was approved by the Department (MDEQ, 2018). As a part of the vent closure, monitoring wells JCW-MW-15011, JCW-MW-15012, and JCW-MW-15023 were decommissioned by overdrilling, removing the well material, and sealing the borehole to allow for the slurry wall construction as discussed in the 2018 Annual Groundwater Monitoring Report for the JC Weadock Landfill CCR Unit (TRC, 2019a). Consumers Energy installed an additional nine monitoring wells in August 2018 to supplement the preexisting Michigan Part 115 compliance groundwater well network and provide appropriate coverage for the collection of groundwater levels and water quality data along the perimeter of the Weadock Landfill, as discussed in the Weadock Landfill HMP. Closing the vent and completely encircling the Weadock Landfill with a soil-bentonite slurry wall has demonstrated reduced groundwater flux around the entire perimeter of the landfill.

In March 2019, Consumers Energy submitted a Response Action Plan (Consumers, 2019), which identified interim response activities taken or to be taken to control possible sources of contamination. Consumers Energy further evaluated arsenic in groundwater at the Weadock Landfill as part of the nature and extent analysis and outlined potential remedies in the Assessment of Corrective Measures (TRC, 2019b), which was initiated on April 14, 2019 and completed on September 11, 2019, and focused on materials management with an emphasis on improving source control through the closure plan.

Compliance monitoring is being implemented under the Weadock Landfill HMP dated February 2021 and approved by the EGLE on February 19, 2021. Groundwater data collected in accordance with the Weadock Landfill HMP are used to:



- Assess background groundwater quality for the purposes of establishing and updating GWPS (HMP Section 7.1 Background Determination)
- Perform detection monitoring to assess whether a new release has occurred during operation of the landfill (i.e. statistically significant increase (SSI) over background) (HMP Section 7.2 Detection Monitoring)
- Perform assessment monitoring to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. statistically significant level over the GWPS) (HMP Section 7.3 Assessment Monitoring)
- Assess compliance with the GSI pathway (HMP Section 7.4)

Consumers Energy also continues 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. Assessment monitoring data collected in accordance with the CCR Rule is used to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (*i.e.* statistically significant level over the Appendix IV GWPS).

#### 1.3 Site Overview

The JC Weadock Solid Waste Disposal Area is located within the former JC Weadock Power Plant (Site), located south of the DE Karn Power Plant, east of the Saginaw River, west of Underwood Drain and Saginaw Bay, and north of Tacey Drain and agricultural land (Figure 1). In addition to the disposal area, the Site consists of the generating facility which retired eight coal-fired generating units and infrastructure and utilities that support electrical transmission. Units 1 to 6 commenced operation in 1940 and retired in 1980 and Units 7 and 8 were added in 1955 and 1958 continued to operate through April 15, 2016.

### 1.4 Geology/Hydrogeology

The majority of Weadock Landfill area is comprised of surficial CCR and sand fill, as described in the Weadock Landfill HMP. USGS topographic maps and aerial photographs dating back to 1950, in addition to field descriptions of subsurface soil at the Site, indicate that the Site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10-30 feet below ground surface (ft bgs) overlying a clay till which is observed at depth ranging from 25-75 ft bgs. A sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts, and sands deposited in or on the shores of glacial lakes) at other areas. Along the perimeter of the landfill, there is a well-graded sand unit present at depths ranging from 10 to 20 ft bgs. The sand is variable in thickness, ranging from <1 to ~6.5 feet, and is discontinuous along the landfill perimeter, as evidenced by the soil boring logs and slurry wall construction documentation.



The alluvium soils pinch out and are not observed in soil borings located south and east of the Weadock Bottom Ash Pond and Weadock Landfill, along the location of the historic shoreline. The non-water-bearing region south of these units extends for at least a mile south and southeast of the Site.

Beneath the surficial fill and sand unit (where present) is 70 to 80 feet of clay till. Along the southern perimeter of the landfill, some of the upper portion of the clay till is sand-rich (generally greater than 20 ft bgs). The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. The sandstone unit, which is part of the Saginaw Formation, is generally encountered at 80-90 ft bgs.

The Weadock Landfill is bounded by several surface water features (Figures 1 and 2): the Saginaw River to the west, a discharge channel and Saginaw Bay (Lake Huron) to the north, Underwood Drain to the east, and Tacey Drain to the south. Groundwater flow in this water bearing zone is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay.



# 2.0 Leachate Monitoring

The leachate monitoring program consists of an annual laboratory leachate sampling program (Q1) and an annual field leachate sampling program (Q4) per the Weadock Landfill HMP. This program was instituted to maintain the facility under the applicable portions of Part 115, Rule 311 – Leaching tests to evaluate potential for groundwater contamination at unlined industrial waste landfills. Specifically, Subrule (3) states that waste that is disposed of in an industrial waste landfill shall be retested to evaluate potential for groundwater contamination annually or on a more frequent schedule as specified by the solid waste control agency. The Weadock Landfill HMP includes laboratory leachate testing, which consists of four dry-handled Coal Combustion Residual (CCR) samples collected under normal plant operating conditions during the active life of the landfill.

Additional support for evaluating the potential for groundwater contamination at the unlined industrial waste landfill includes the field leachate monitoring program conducted during the fourth quarter of each year. This program consists of an annual sampling collection from two (2) leachate headwells; LH-103R and LH-104. This program was implemented to determine constituents in the leachate as measured under actual conditions in the field and to assess which constituents have the potential to exceed applicable criteria at the compliance well locations.

Field leachate data for the leachate headwells (2020 through 2023) are shown in Table 7. Field leachate data was collected from LH-103R and LH-104 in the fourth quarter of 2023. Field leachate data for LH-103R and LH-104 are generally consistent with data collected in previous years. The October 2023 low-level mercury concentrations for LH-103R and LH-103R DUP are potentially biased high due to a high matrix spike recovery reported in the laboratory report as noted in the data quality review (Appendix B); however, low-level mercury concentrations are generally consistent with prior sample results and field leachate concentrations are below the GSI criterion of 1.3 nanograms per liter. No new constituents have been identified for inclusion in the porewater and GSI monitoring programs.



# 3.0 Groundwater Monitoring

# 3.1 Monitoring Well Network

The groundwater monitoring system presented in the HMP has been established in accordance with R 299.4906 and the CCR Rule §257.91 and consists of 27 monitoring wells (four background monitoring wells, 12 downgradient monitoring wells, and 11 additional wells used for static water level measurements only) that are screened in the uppermost aquifer. The monitoring well network has been designed to provide appropriate coverage for water level and water quality data collection along the perimeter of the landfill. The monitoring well locations are shown on Figure 2. Monitoring well specifications and purpose (i.e. static water level monitoring, groundwater quality monitoring, or GSI monitoring) are included in Table 1.

The Weadock Landfill HMP groundwater monitoring system consists of the following:

- **Background Groundwater Quality:** Four monitoring wells located southwest of the Weadock Landfill provide data on background groundwater quality that has not been affected by the CCR unit (MW-15002, MW-15008, MW-15016, and MW-15019) and are used to establish groundwater protection standards (GWPSs) for the landfill:
  - MW-15002 MW-15008 MW-15016 MW-15019
- **Downgradient Groundwater Quality:** The twelve downgradient monitoring wells, located on the outside of the perimeter slurry wall include:

JCW-MW-18001 - JCW-MW-18004 - JCW-MW-18005 - JCW-MW-18006

- MW-50 - MW-51 - MW-52 - MW-53

MW-53R
 MW-54R
 MW-55
 OW-57R Out

■ Groundwater-Surface Water Interface (GSI) Monitoring: Monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the monitoring program to meet the requirements of Part 31. Locations and alignments were established in the Phase II Groundwater Discharge Evaluation, Figure: Appendix K (Natural Resource Technology, 2005) as a baseline for monitoring future results. These monitoring wells are screened across the water table of the uppermost aquifer and will serve as GSI monitoring wells to determine compliance with generic GSI criteria or site-specific mixing zone-based criteria as appropriate. The eight GSI compliance monitoring wells include:

- MW-50 - MW-51 - MW-52 - MW-53

MW-53RMW-54RMW-55JCW-MW-18004

■ **Static Water Level Measurement Only:** Eleven additional monitoring wells, located on the inside of the perimeter slurry wall, at paired locations with several of the downgradient monitoring wells include:

JCW-OW-18001 - JCW-OW-18002 - JCW-MW-18003 - JCW-MW-18004

JCW-MW-18005 - JCW-MW-18006 - MW-20 - OW-51

– OW-53 – OW-54 – OW-55 – OW-56R

- OW-57R IN - OW-61 - OW-63



# 3.2 October 2023 Monitoring Event

In accordance with the Weadock Landfill HMP, TRC conducted the fourth quarter 2023 monitoring event for the Weadock Landfill by collecting water levels on October 2, 2023, and collecting groundwater samples on October 2 through 9, 2023. Samples that were collected during this event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan for analysis of total metals and inorganic parameters. Radium Analysis was performed by Eurofins Environment Testing in Earth City, Missouri. Semiannual monitoring constituents include:

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

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity. Analytical results from the monitoring event are included in the attached laboratory reports (Appendix E).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the Weadock Landfill HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix F).

Groundwater samples were collected using a peristaltic pump. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Groundwater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of two field blanks, one equipment blank, three



field duplicates (MW-15008, JCW-MW-18006, and MW-50), and one field matrix spike/matrix spike duplicate samples collected at JCW-MW-18001.

## 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The laboratory data were found to be complete and usable for the purposes of the Weadock Landfill HMP. The data quality reviews for the JC Weadock Disposal Area network wells are summarized in Appendix B.

#### 3.3 Groundwater Flow Rate and Direction

Potentiometric monitoring in the unusable aquifer beneath the facility includes static water level data collected for development of water table contours and evaluation of the potential for discharge from the facility. The monitoring under this section will be conducted quarterly until closure, as approved by the Director, and semiannually during the 30-year post-closure period. Monitoring will continue until the end of post closure (30 years) or as otherwise approved by the Director.

The measurements for top of casing (TOC) and quarterly recorded depth to water (DTW) with corresponding calculated static water level (SWL) is tabulated and presented in Table 1. A potentiometric surface map is provided as Figure 3.

Groundwater elevations measured at the Site in October 2023 are generally within the range of 578 to 594 feet above mean sea level (ft NAVD88). Groundwater elevations in monitoring wells located adjacent to Saginaw Bay and adjoining surface water bodies are typically encountered at a similar or slightly higher elevation relative to surrounding surface water features measured by the NOAA gauging station. A time-series plot included in Appendix A compares the groundwater elevation of at the GSI monitoring wells (MW-50, MW-51, MW-52, MW-53, MW-54R, JCW-MW-18004, and MW-55) to the nearby NOAA staff gauge. Water levels in wells adjacent to surface water bodies (e.g. Saginaw Bay, Tacey Drain) closely mirror the surface water elevation. Such conditions would result in a minimal gradient to potentially a reverse gradient (i.e., toward the landfill) between the well and the drain which would result in minimal to zero mass flux to the drain (Appendix A: Table A1).

The groundwater monitoring system is structured such that there are eleven monitoring well pairs used to evaluate the hydraulic gradient and potential for water flux across the slurry wall. Static water level observations from the paired wells are shown on time series charts in Appendix A. The static water level elevations inside of the Weadock Landfill perimeter slurry wall are generally significantly different (>3 ft) than static water levels outside of the slurry wall, which demonstrates the presence of a low permeability feature between the well pairings inside and outside of the constructed slurry wall. As such, the water level elevations indicate that the slurry wall is performing as designed. The general flow direction observed within the confinement of the slurry wall is similar to that identified in previous monitoring rounds. Due to the potential for radial flow, the downgradient wells are appropriately positioned to detect the presence of detection or assessment parameters that could potentially migrate from the



Weadock Landfill. As shown on Figure 3 and in Appendix A, the static water level outside of the slurry wall is lower than the static water level inside of the wall; therefore, the potential groundwater flux across the slurry wall was calculated and included in Table A2 of Appendix A.

## 3.4 Groundwater Analytical Data and Relevant Screening Criteria

Groundwater analytical data are evaluated in accordance with the Weadock Landfill HMP to determine the effectiveness of landfill structural and operational enhancement measures on the quality and quantity of groundwater flow beneath the footprint of the facility (Section 3.4.1 Detection Monitoring and Section 3.4.2 Assessment Monitoring). Additionally, analytical results for these wells are being evaluated in support of GSI compliance. GSI criteria only apply to the designated compliance point as specified in Section 3.4.3 below; however, analytical results and data trends in groundwater collected from the perimeter dike wells are evaluated to identify potential GSI compliance issues. Data are evaluated by using a combination of screening against relevant criteria, as well as utilizing statistical analyses.

Analytical results from the fourth quarter 2023 monitoring event are included in the attached laboratory report (Appendix E). Groundwater analytical data from the fourth quarter 2023 monitoring event are summarized in Table 3 (background monitoring wells) and Table 4 (Weadock Landfill Monitoring Wells), as well as the associated Part 201 generic GSI and site-specific mixing-zone GSI criteria. Field data are summarized in Table 2.

Mixing-zone criteria for arsenic, boron, and selenium are provided for the Karn-Weadock complex in the mixing zone determination, dated December 23, 2015 (MDEQ, 2015). As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. All data are screened against GSI criteria; however, compliance with GSI criteria is determined at select monitoring locations as noted in Section 3.4.3 below.

The mixing zone determination included both final acute values (FAV) and final chronic values (FCV). If a concentration of a constituent at a groundwater well exceeds the acute criteria, and the exceedances are upgradient of the GSI compliance monitoring wells, Consumers Energy must demonstrate that data from all of the compliance monitoring wells are, and will be, in compliance with acute mixing zone-based GSI criteria for those parameters. Averaging of groundwater data is not allowed for comparison to generic GSI or acute mixing zone-based GSI criteria. Acute mixing zoned-based or generic GSI criteria may not be exceeded in any individual GSI compliance monitoring well. If a concentration of a constituent at a well exceeds the chronic criterion, compliance can be demonstrated on a mass-flux basis. The facility can choose to demonstrate compliance by evaluating the total chronic loading based upon the contribution from each compliance well with respect to the total flux observed in the mixing zone.

Table 6 provides a summary of the statistically significant increases or exceedances over the most recent four quarters in accordance with the EGLE-prescribed format; only well/constituent pairs that exceed the relevant Part 115 compliance standard – the GSI pathway standard (Section 3.4.3) (within the last four quarters) are included.



## 3.4.1 Detection Monitoring

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. The potentiometric analysis, as discussed in Section 3.3, demonstrates that the slurry wall is performing as designed.

In addition to the comparison of analytical data to relevant screening criteria (Table 4), statistical trend analyses are used to evaluate groundwater quality each quarter. Consumers Energy manages and evaluates its groundwater data using Sanitas™ Statistical Software. Consumers Energy conducts intrawell trend analyses to examine data for a given well over time to determine if changes in water quality are occurring that may be associated with the landfill and to identify potential GSI compliance issues. Specifically, the Mann-Kendall test for trend was performed at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant.

Appendix C includes a table summarizing the results of the trend tests as well as the Sanitas<sup>™</sup> output summary statistics and graphs. Data are stable or declining for the majority of the well/constituent pairs, with the following exceptions:

- The increasing trend for boron at MW-54R continued in Q4 2023.
- The increasing trend of boron at MW-55 initially observed in Q3 2023 was confirmed in Q4 2023.
- The increasing trend for calcium at JCW-MW-18001 continued in Q4 2023.
- The increasing trend for iron at JCW-MW-18001 initially observed in Q3 2023 was confirmed in Q4 2023.
- The increasing trend for sulfate at JCW-MW-18001 continued in Q4 2023.

Although increasing trends for detection monitoring constituents were observed, individual constituent trends provide a *potential indication* that there may be a release coming from the monitored unit. When these indicator trends are evaluated with other co-monitored conditions and parameters at the Weadock Landfill, the increasing trends for detection monitoring constituents do not appear to be a result of a new release from operation of the landfill. The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill. Several of these newly observed trends, such as those observed for calcium, iron, and sulfate are likely a result of localized geochemical changes influenced by changes in lake levels rather than a change in flux from the landfill and will continue to be evaluated. The increasing trends of calcium and sulfate in JCW-MW-18001 are attributed to localized changes in geochemistry proximal to each well, rather than a change in flux from the landfill, as discussed further in Section 3.5. Additionally, iron concentrations in all monitoring wells remain below the relevant Part 115 compliance standard – the GSI pathway standard.

Consumers is further evaluating possible causes of the increasing boron concentrations at several porewater compliance monitoring wells. Previous studies (NRT, 2005) documented boron at significantly elevated concentrations at the Karn-Weadock Power Generating Complex.



Boron was also identified at SSI background levels in the 2017 *Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit* (TRC, 2018) and was one of the detection monitoring constituents that triggered the initiation of the assessment monitoring program. Statistical significance above the GWPS established for boron has been noted for these monitoring wells per the Part 115 groundwater monitoring program requirements, as discussed in Section 3.4.2.2. Continued monitoring and assessment for potential future actions is warranted at this time; however, observed concentrations of boron in each of the monitoring wells are less than the relevant Part 115 compliance standard – the GSI pathway standard (Section 3.4.3).

# 3.4.2 Assessment Monitoring Data Evaluation

Assessment monitoring is continuing at the Weadock Landfill in accordance with the Weadock Landfill HMP and §257.95. The assessment monitoring data were statistically evaluated in accordance with the procedures in the Weadock Landfill HMP. The statistical evaluation details are provided in Appendix D. A summary of the confidence interval evaluation is provided in Table 5.

# 3.4.2.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess constituent concentrations present in groundwater as a result of CCR unit operations by statistically comparing concentrations in the downgradient wells to each of the respective GWPSs for each detection and assessment monitoring constituent. The calculation of the GWPSs in accordance with the Weadock Landfill HMP is documented in the *Groundwater Protection Standards* technical memorandum included as Appendix H of the *First Quarter 2021 Hydrogeological Monitoring Report* (TRC, April 2021). The Federal CCR Rule requires establishment of GWPSs for assessment monitoring (Appendix IV) constituents only. Part 115 requires establishment of GWPSs for both detection and assessment monitoring constituents.

## 3.4.2.2 Data Comparison to Groundwater Protection Standards

Consistent with the Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (Unified Guidance) (USEPA, 2009) and the Weadock Landfill HMP, 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.

**Detection Monitoring Constituents (Part 115):** The fourth quarter 2023 statistical evaluation indicates that boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001 were present at statistically significant levels above the GWPS. Boron was one of the Appendix III SSIs that originally triggered assessment monitoring. Boron concentrations have been consistently above the GWPS but less than the chronic-based mixing zone-based GSI criterion of 44,000 ug/L within the Weadock Landfill monitoring well network since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate was present at JCW-MW-18001 at statistically



significant levels above the GWPS for the first time in second quarter 2023 due to increasing concentrations. Consumers is asserting an ASD for the increases in calcium and sulfate at JCW-MW-18001, as detailed in Section 3.5.

The GWPSs for boron, calcium, and sulfate were established based on background concentrations observed in wells unaffected by the Weadock Landfill or Weadock Bottom Ash Pond. Detection monitoring (i.e., Appendix III) constituents do not have associated health-based criteria and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. Overall, data continue to demonstrate compliance with the applicable GSI criteria, as discussed in Section 3.4.3.

Assessment Monitoring Constituents (Part 115 and Federal CCR): Based on the fourth quarter 2023 statistical evaluation, there are no assessment monitoring constituents present at statistically significant levels above the GWPSs within the Weadock Landfill groundwater monitoring system. Although concentrations of arsenic and molybdenum at MW-55 observed during individual sampling events are above the GWPS, the elevated concentrations of those constituents are not a result of a release from the Weadock Landfill, as detailed in Section 3.5. The head differential of 7.22 feet between OW-55 inside the slurry wall and MW-55 outside of the slurry wall also suggests that the integrity of the slurry wall is maintained and groundwater flow from the landfill to the south is impeded by the low permeability of the slurry wall. Groundwater conditions at MW-55 will continue to be monitored.

# 3.4.3 GSI Compliance Monitoring

The GSI monitoring program consists of the eight monitoring points located along the surface water features:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

Fourth quarter 2023 data from the GSI monitoring points are tabulated in Table 4. Consistent with the Weadock Landfill HMP, confidence limits were established for the following GSI monitoring program constituents:

■ Boron ■ Iron

■ pH ■ Sulfate

■ Lithium ■ Molybdenum

■ Selenium ■ Vanadium

The confidence interval calculations are provided in Appendix D. The confidence interval test compares the lower confidence limit to the GSI. Overall, data continue to demonstrate compliance with the applicable GSI criteria.

**Boron:** The assessment monitoring statistical evaluation found that boron was present at statistically significant levels above the GWPS at JCW-MW-18001, JCW-MW-18005, JCW-MW-



18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT. Boron is a detection monitoring (i.e. Appendix III) constituent and there is not a complete drinking water pathway on-site. As such, the relevant Part 115 compliance pathway is the GSI pathway. All observations of boron are less than the recommended mixing-zone based GSI value specified in Table 3 of the *Implementation of a Mixing Zone Request, Consumers Energy DE Karn/JC Weadock Complex* (MDEQ, 2015) (Appendix D: Table 2).

Arsenic and Molybdenum at MW-55: Concentrations of arsenic and molybdenum at MW-55 have at times exceeded the GSI criteria on a direct comparison to the fixed limit basis (Appendix D: Table 2). The October 2023 sampling event results show that both arsenic and molybdenum concentrations are below applicable GSI criteria. The statistical evaluation presented in Appendix D shows that the lower confidence limits of the arsenic and molybdenum data over the past 8 events do not exceed the GSI criteria. Additionally, water levels in MW-55 closely mirror the surface water elevation measured at the NOAA gauging station, which indicates there is a minimal outward gradient to a potentially, modest reverse gradient (i.e., toward the landfill) between the monitoring well and the drain, resulting in a minimal to zero mass flux to the drain (Appendix A).

#### 3.5 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed below:

- Calcium and sulfate in monitoring well JCW-MW-18001; and
- Arsenic and molybdenum in monitoring well MW-55.

The groundwater conditions do not conclusively indicate a release from the unit for several reasons as detailed below. The Professional Engineer Certification Statement is included in Appendix G.

# 3.5.1 Monitoring Well JCW-MW-18001: Calcium and Sulfate

Although confirmed increasing trends were observed at JCW-MW-18001 for calcium and sulfate (through Q4 2023), these trends are not indicative of a new release from the landfill. Calcium and sulfate are two of several constituents that contribute to the overall TDS concentration and increasing calcium and sulfate concentrations could result in an increase in TDS as well. Although, TDS concentrations are not currently exhibiting a statistically significant upward trend, TDS concentrations have been increasing in past events and the data are discussed as part of this ASD. Increases of calcium, sulfate, and TDS concentrations at JCW-MW-18001 are attributed to changes occurring outside of the slurry wall as a result of changing water levels, rather than a change in flux from the landfill; therefore, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for these constituents. The following lines of evidence as well as additional time series charts included in Appendix G support this ASD:

- The potentiometric analysis demonstrates that the slurry wall is effective in reducing the flux of groundwater from the landfill (Appendix A).
- Concentration data also support that the slurry wall is effective in reducing the flux of groundwater from the landfill, based on the following observations (Appendix G1):



- JCW-MW-18001 was installed after the 1,600 linear foot gap in the landfill perimeter slurry wall was closed, as discussed in Section 1.2. Prior to the slurry wall expansion in July 2018, monitoring well JCW-MW-15023 was located within the gap of the slurry wall and was sampled between December 2015 and May 2018 as a part of the original Federal CCR program monitoring well network. The groundwater quality data collected from JCW-MW-15023 shows that groundwater in contact with CCR managed within the landfill was high in arsenic, and low in sulfate, calcium, and TDS (Appendix G1).
- To accommodate the July 2018 slurry wall expansion, JCW-MW-15023 was decommissioned. Once slurry wall construction was completed, JCW-MW-18001 was installed within 10-ft of the location of the former JCW-MW-15023 well, on the discharge channel side of the slurry wall. Additionally, an observation well, JCW-OW-18001, was installed on the landfill side of the slurry wall to monitor water levels to assess the effectiveness of the hydraulic control. Both JCW-MW-18001 (outside) and JCW-OW-18001 (inside) have been sampled recently to assess concentration trends.
  - Concentrations of arsenic are much higher inside of the slurry wall, within the landfill, while arsenic concentration remain low on the outside of the landfill.
  - Concentrations of calcium, sulfate, and TDS are much lower on the inside of the slurry wall and are higher outside of the slurry wall.
- These combined lines of evidence support that increasing concentrations of calcium, sulfate, and TDS are not a result of a change in flux from the landfill and instead are a result of changing groundwater conditions on the outside of the slurry wall.

# 3.5.2 Monitoring Well MW-55: Arsenic and Molybdenum

Additionally, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD) for arsenic and molybdenum at MW-55 indicating elevated levels of constituents at that location are not related to materials management of the Weadock Landfill (2021 Annual Groundwater Monitoring and Corrective Action Report, TRC, January 2022). The basis for this ASD is summarized below and updated time series plots in support of this ASD are included in Appendix G (Figure G2).

Data collected from the 2018 investigation as well as data collected during routine sampling events for Part 115 and Federal CCR groundwater compliance show the following:

- **Distinct Chemistry from Leachate** The leachate chemistry from a monitoring well screened at the base of the ash fill (LH-104) is distinctly different from the groundwater chemistry near MW-55 and the temporary monitoring wells installed by TRC in the investigation area, as illustrated Appendix G of the 2019 Annual Groundwater Monitoring and Corrective Action Report (TRC, January 2020). Additionally, concentrations of arsenic are generally much lower, and concentrations of boron are much higher within the landfill (LH-104) than outside of the landfill at MW-55 (Figure G2).
- Conservative Tracer Boron is a metalloid known to be present in coal ash and can be used as a conservative tracer in groundwater. The average concentration of boron in Leachate Headwell LH-104 (10,800 ug/L: November 2017 October 2023) is significantly higher than concentrations observed at any of the other locations sampled as a part of this monitoring program. Additionally, recently observed boron concentrations at MW-55 are



- similar to or lower than historical concentrations, which further supports that the water quality at MW-55 is not directly affected by groundwater migrating from the landfill.
- Reducing Conditions and Groundwater Head Levels Water levels observed at MW-55, as shown in Appendices A and G, increased over 4-ft between 2010 and 2020. The oxidation-reduction potential (ORP) at MW-55 has generally decreased (i.e., is more reducing) since 2010. The lowering of ORP over time as a result of increased water levels has changed the geochemical conditions in the vicinity of MW-55 and has resulted in increased solubility of arsenic and molybdenum. Since 2021, water levels have been generally decreasing, resulting in a slight increase in ORP (i.e., is less reducing) and decreases in concentrations of both arsenic and molybdenum, which further illustrates the relationship between groundwater elevations, redox state, and concentration of arsenic and molybdenum in groundwater.



## 4.0 Conclusions and Recommendations

Detection monitoring is continuing through the active life of the Weadock Landfill to monitor for new releases from landfill operations. The detection monitoring program consists of potentiometric analysis and groundwater quality analysis. Evaluation of the fourth quarter 2023 data demonstrate that the slurry wall is functioning as designed.

The Weadock Landfill is currently in assessment monitoring pursuant to the CCR Rule, as discussed in the *2022 Annual Groundwater Monitoring and Corrective Action Report*, due to observed groundwater concentrations that are indicative of impact from past landfill operations. Evaluation of the fourth quarter 2023 data in accordance with the Weadock Landfill HMP demonstrate that boron, calcium, and sulfate are present at concentrations above the GWPSs. Boron, calcium, and sulfate are detection monitoring (i.e., Appendix III) constituents that do not have associated health-based criteria and there is not a complete drinking water pathway onsite. As such, the relevant Part 115 compliance pathway is the GSI pathway. The statistical evaluation in fourth quarter 2023 found that no constituents were present at statistically significant levels above applicable GSI criteria.

Therefore, Consumers Energy will continue with the detection and assessment monitoring as required by the CCR rule as well as the monitoring program relative to the implementation of the site-specific mixing zone authorization at the Weadock Landfill unit in conformance with the JC Weadock Landfill HMP. The first quarter monitoring event for is scheduled for March 2024.



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Table 1

# Summary of Groundwater Elevation Data JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

	тос		Screen Interval	Octobe	er 2, 2023
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitori	na Walls			(ILBTOC)	(11)
MW-15002	587.71	Sand	580.9 to 570.9	7.60	580.11
MW-15008	585.36	Sand with clay	578.7 to 568.7	4.68	580.68
MW-15016	586.49	Sand	581.2 to 578.2	4.33	582.16
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	5.98	580.19
Bottom Ash Pond: Do		·	070.0 10 000.0	0.00	000.10
JCW-MW-15007	587.40	Sand	582.7 to 579.2	3.65	583.75
JCW-MW-15009	589.64	Sand	581.9 to 576.9	9.12	580.52
JCW-MW-15010	597.76	Sand	579.7 to 578.2	19.39	578.37
JCW-MW-15028	589.64	Sand	567.7 to 564.7	8.18	581.46
		ls (outside slurry wall)	007.7 10 001.7	0.10	001.10
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3 to 573.3	17.08	579.65
JCW-MW-18004	593.04	Sandy Clay	583.9 to 578.9	12.75	580.29
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0 to 575.0	9.18	581.71
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8 to 577.8	13.53	587.19
MW-50	593.36	Sand	577.8 to 574.8	13.70	579.66
MW-51	594.29	Sand and Clay	577.8 to 574.8	14.58	579.71
MW-52	594.90	Sand	579.3 to 576.3	15.21	579.69
MW-53	593.68	Sand and Clay	579.1 to 576.1	13.95	579.73
MW-53R	594.25	Sand and Clay	580.4 to 575.4	14.55	579.70
MW-54R	593.89	Clay and Sand	581.3 to 576.3	14.07	579.82
MW-55	593.82	Sand	581.5 to 578.5	14.20	579.62
OW-57R OUT	591.00	Sandy Clay	577.0 to 572.0	8.35	582.65
Landfill: Static Water	Level Only (inside				
JCW-OW-18001	595.84	Fly Ash and Sand	581.1 to 576.1	6.97	588.87
JCW-OW-18002	593.63	Sand	578.9 to 573.9	11.28	582.35
JCW-OW-18003	593.99	Sand and Clay	580.5 to 575.5	8.20	585.79
JCW-OW-18004	594.19	Sandy Clay	584.6 to 579.6	6.71	587.48
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9 to 577.9	7.77	592.84
MW-20	592.73	NR	~581.1 to ~578.1	5.95	586.78
OW-51	593.62	Clay and Sand	578.9 to 575.9	9.28	584.34
OW-53	593.64	Clay and Sand	579.0 to 576.0	7.85	585.79
OW-54	594.10	Clay and Sand	580.0 to 577.0	7.45	586.65
OW-55	594.67	Clay (or Sand and Clay)	580.9 to 577.9	7.83	586.84
OW-56R	592.01	Ash and Sand	577.5 to 572.5	5.18	586.83
OW-57R IN	590.86	Sandy Clay	575.7 to 570.7	6.10	584.76
OW-61	602.15	Ash and Sand	588.0 to 585.0	8.25	593.90
Landfill: Leachate He	adwells				
LH-103R	612.70	Fly Ash	30.2 to 33.2	22.39	590.31
LH-104	596.56	Fly Ash	8.0 to 11.0	8.54	588.02

#### Notes:

Survey data from: Rowe Professional Services Company (Nov. 2015) and Consumers Energy Company drawings: SG-21733, Sheet 1, Rev. G (Karn, 11/27/18); and SG-21733, Sheet 2, Rev. C (Weadock, 11/27/18).

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.

# Summary of Field Parameters JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Background							
MW-15002	10/4/2023	0.20	-96.7	6.7	7,538	15.3	3.7
MW-15008	10/2/2023	0.10	-87.4	6.5	1,506	15.7	2.7
MW-15016	10/4/2023	0.30	-122.4	6.9	1,844	17.7	5.8
MW-15019	10/2/2023	0.30	-92.9	6.6	1,691	15.9	2.6
Weadock Landfill							
JCW-MW-18001	10/5/2023	0.18	-16.3	6.5	2,860	15.6	3.2
JCW-MW-18004	10/9/2023	5.20	61.3	7.0	1,275	15.7	4.9
JCW-MW-18005	10/9/2023	0.70	-21.5	6.9	1,149	14.5	7.5
JCW-MW-18006	10/9/2023	0.60	-79.5	7.0	965	12.3	4.0
MW-50	10/9/2023	0.40	-100.5	7.0	1,220	11.7	3.0
MW-51	10/9/2023	0.40	-100.0	7.2	1,158	12.3	4.5
MW-52	10/9/2023	0.45	-66.3	6.8	1,462	12.2	2.5
MW-53	10/9/2023	0.50	-119.5	7.3	1,009	13.4	2.0
MW-53R	10/9/2023	0.60	-10.0	7.0	1,345	13.4	4.5
MW-54R	10/9/2023	0.60	-13.1	7.0	979	13.5	5.5
MW-55	10/9/2023	0.50	-112.3	7.0	1,150	15.5	3.5
OW-57ROUT	10/9/2023	0.60	59.5	7.0	1,068	14.2	4.0

#### Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

# Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	MW-15019
					Sample Date:	10/4/2023	10/2/2023	10/4/2023	10/2/2023
				MI Non-			Daale		•
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		Васко	ground	
Appendix III <sup>(1)</sup>									
Boron	ug/L	NC	500	500	4,000	205	157	533	275
Calcium	mg/L	NC	NC	NC	500EE	245	126	244	162
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	3,170	387	239	368
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	< 1	89	149	101
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	5,430	1,160	1,340	1,400
pH, Field	SU	6.5 - 8.5**	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 9.0	6.7	6.5	6.9	6.6
Appendix IV <sup>(1)</sup>									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	2	2	28	1
Barium	ug/L	2,000	2,000	2,000	1,200	968	94	154	373
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	2	2	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	27	20	54	14
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	1.18	0.352	0.182	0.543
Radium-228	pCi/L	NC	NC	NC	NC	3.30	1.67	< 0.700	1.23
Radium-226/228	pCi/L	5	NC	NC	NC	4.48	2.02	< 0.700	1.77
Selenium	ug/L	50	50	50	5.0	< 1	< 1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>								
Iron	ug/L	300**	300 <sup>E</sup>	300Ĕ	500,000⋿	30,400	22,500	22,500	21,800
Copper	ug/L	1,000**	1,000E	1,000E	20	2	< 1	< 1	< 1
Nickel	ug/L	NC	100	100	120	5	3	8	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	11	5	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	< 10	< 10	< 10	< 10

#### Notes

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

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

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, updated October 12, 2023.
- \*\* 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

hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- $^{\rm E}$  Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

 $\ensuremath{\mathbf{BOLD}}$  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.

# Summary of Groundwater Sampling Results (Analytical)

# JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

							e, michigan						
							Sample Location:	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
							Sample Date:	10/5/2023	10/9/2023	10/9/2023	10/9/2023	10/9/2023	10/9/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	Downgradient	Downgradient/ GSI	Downgradient	Downgradient	Downgradient/ GSI	Downgradient/ GSI
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,620	319	1,470	2,280	2,070	1,170
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	562	218	159	117	205	132
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	51.1	15.8	48.1	72.3	37.6	91.6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	1,890	466	154	46.9	470	267
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	3,430	1,160	884	738	1,170	952
pH, Field	SU	6.5 - 8.5**	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 <b>-</b> 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	6.5	7.0	6.9	7.0	7.0	7.2
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	100	680	1	< 1	1	17	3	18
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	48	34	74	342	135	141
Beryllium	ug/L	4	4.0	4.0	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	110	49	32	37	59	34
Mercury	ug/L	2	2.0	2.0	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	NC	NC	< 0.139	< 0.155	0.221	0.506	0.291	0.285
Radium-228	pCi/L	NC	NC	NC	NC	NC	NC	0.783	1.24	1.17	0.783	1.15	1.23
Radium-226/228	pCi/L	5	NC	NC	NC	NC	NC	0.886	1.30	1.39	1.29	1.44	1.52
Selenium	ug/L	50	50	50	5.0	55	120	1	< 1	1	< 1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	5 <sup>(2)</sup>												
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000€	NC	NC	3,840	36	948	5,660	2,300	1,660
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	NC	NC	2	2	1	< 1	1	2
Nickel	ug/L	NC	100	100	120	NC	NC	3	< 2	9	< 2	< 2	< 2
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013, updated October 12, 2023.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

surface water used as a drinking water source as described in footnote (X). GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

**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.

TRC | Consumers Energy Page 1 of 2 January 2024

### Summary of Groundwater Sampling Results (Analytical)

# JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

							Sample Location:	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
							Sample Date:	10/9/2023	10/9/2023	10/9/2023	10/9/2023	10/9/2023	10/9/2023
						Chronic-Based	Acute-Based	10/3/2023		10/3/2023	10/3/2023	10/3/2023	10/3/2023
				MI Non-		Mixing Zone GSI	Mixing Zone GSI	Downgradient/	Downgradient/	Downgradient/	Downgradient/	Downgradient/	Downgradient
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^	Criteria^	Criteria^	GSI	GSI	GSI	GSI	GSI	Downgradient
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4,000	44,000	69,000	1,140	5,530	2,420	5,520	1,200	1,790
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	234	136	206	165	163	120
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC NC	NC NC	30.2	77.4	35.5	45	16.7	50.6
Fluoride	ug/L	4,000	NC	NC	NC	NC NC	NC NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	25 <b>0</b> **	250E	250E	500EE	NC NC	NC NC	572	2.28	221	67.4	156	94.8
Total Dissolved Solids	mg/L	500**	500E	500E	500==	NC NC	NC NC	1,440	722	1,090	756	846	758
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC NC	NC NC	6.8	7.3	7.0	7.0	7.0	7.0
Appendix IV <sup>(1)</sup>	30	0.5 - 0.5	0.3 - 0.3-	0.5 - 0.5-	0.5 - 9.0	INC	INC	0.0	7.5	7.0	1.0	7.0	7.0
Antimony	ug/L	6	6.0	6.0	2.0	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L ug/L	10	10	10	10	100	680	< 1	1	16	1	75	< 1
Barium	ug/L ug/L	2,000	2,000	2,000	1,200	NC	NC	108	719	110	113	248	77
Beryllium	ug/L ug/L	2,000	4.0	4.0	33	NC NC	NC NC	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L ug/L	5	5.0	5.0	2.5	NC NC	NC NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L ug/L	100	100	100	2.5 11	NC NC	NC NC	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L ug/L	NC	40	100	100	NC NC	NC NC	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L ug/L	4,000	NC	NC	NC	NC NC	NC NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L ug/L	4,000 NC	4.0	4.0	14	NC NC	NC NC	< 1	< 1,000	< 1	< 1	< 1	< 1,000
Lithium	ug/L ug/L	NC	170	350	440	NC NC	NC NC	27	42	61	70	26	23
Mercury	ug/L ug/L	2	2.0	2.0	0.20#	NC NC	NC NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L ug/L	NC	73	210	120	NC NC	NC NC	< 5	< 5	< 5	17	56	7
Radium-226	pCi/L	NC	NC	NC NC	NC	NC NC	NC NC	0.444	0.679	0.174	0.160	0.406	< 0.155
Radium-228	pCi/L	NC NC	NC NC	NC NC	NC NC	NC NC	NC NC	1.64	1.72	0.968	1.38	1.26	0.586
Radium-226/228	pCi/L	5	NC NC	NC NC	NC NC	NC NC	NC NC	2.08	2.40	1.14	1.54	1.67	0.680
Selenium	ug/L	50	50	50	5.0	55	120	< 1	2.40	1	1.04	1.07	< 1
Thallium	ug/L	2	2.0	2.0	2.0	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11			2.0	2.0	2.0	110	140	``_	` ` ` _	1 2	1	``_	
Iron	ug/L	300**	300Ĕ	300€	500,000EE	NC	NC	7,560	1,080	834	829	16,800	40
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000E	20	NC	NC	1	< 1	1	2	< 1	2
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	< 2	2	3	15
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000E	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

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

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

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013, updated October 12, 2023.
- \*\* 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 hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote (X). GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}

- # 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.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendment Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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.

# Summary of Confidence Interval Evaluation: October 2023 JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Assessment Mo	nitoring Stati	stical Evalua	tion																					
Constituent	Units	GWPS	MW	V-50	MV	V-51	MV	V-52	MV	V-53	MW	-53R	MW	-54R	MW	<i>I</i> -55	OW-57	R OUT	JCW-M\	N-18001	JCW-M/	N-18005	JCW-M	W-18006
Constituent	Office	GWF3	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron <sup>(1)</sup>	ug/L	560	1,400	2,000	1,200	1,400	990	1,300	2,800	5,000	1,800	2,400	4,600	5,900	910	1,500	1,700	2,000	1,400	1,700	920	1,300	2,000	3,000
Calcium	mg/L	280										-							470	660				
Sulfate	mg/L	780															-	-	1,400	2,300				
Arsenic	ug/L	21													(2)	<b></b> <sup>(2)</sup>		-		-			12	29
Molybdenum	ug/L	73													(2)	<b></b> <sup>(2)</sup>								
Iron	ug/L	28,000													16,000	26,000	-	-		-				

GSI Statistical E	valuation					
Constituent	Units	GSI	MW-55			
Constituent	Offics	GSI	LCL	UCL		
Arsenic	ug/L	100	48	100		

#### Notes:

ug/L - micrograms per Liter

mg/L - milligrams per Liter

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

GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated April 23, 2021

GSI - Groundwater Surface Water Interface Criteria; GSI criteria is the generic Michigan Part 201 GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

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

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

1,300	Indicates a statistically significant exceedance of the GWPS (detection monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the GWPS (assessment monitoring constituent). An exceedance occurs when the LCL is greater than the criterion.
1,300	Indicates a statistically significant exceedance of the applicable GSI criterion. An exceedance occurs when the LCL is greater than the criterion.

- (1) Boron concentrations were confirmed as a statistically significant increase (SSI) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).
- (2) The concentrations of arsenic and molybdenum at MW-55 are not a result of a release from the unit, as detailed in the Alternate Source Demonstration (TRC, January 2022); therefore, confidence intervals were not calculated for comparison to GWPSs.

Page 1 of 1 January 2024

# EGLE Exceedance Summary Table JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

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

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

Facility: JC Weadock - WDS# 395457

Well#	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2023 ( <b>bold</b> >201)	3 Qtr. 2023 ( <b>bold</b> >201)	2 Qtr. 2023 ( <b>bold</b> >201)	1 Qtr. 2023 ( <b>bold</b> >201)
		No Exceed	ances	at Compl	iance Loca	ations		

# Leachate Headwell Results

# Fourth Quarter 2023 Quarterly Report

JC Weadock Solid Waste Disposal Area, Essexville, Michigan

Parameter	Reporting	Units	2023 Field	I Leachate	20	)22 Field Leacha	ate	2021 Field Leachate	2020 Field	Leachate
Parameter	Limit	Units	LH-103R	LH-104	LH-103R	LH-104	LH-103R <sup>(1)</sup>	LH-104	LH-103	LH-104
			10/4/	2023	10/5/	2022	3/10/2022	10/7/2021	10/12	/2020
Indicator Parameters							•			
Alkalinity, Bicarbonate	10,000	ug/L	899,000	338,000	1,100,000	547,000	1,200,000	351,000	202,000	886,000
Dissolved Oxygen	0.1	mg/L	1.60	0.50	0.10	1.95	1.16	0.49	1.35	1.32
O.R.P.	1	mV	-167.0	-89.3	-114	-86	-121.6	-119.6	-137.1	-88.8
pH	0.05	S.U.	7.04	7.46	6.75	7.35	6.95	7.47	7.52	7.39
Specific Conductance	1	uS/cm	3113.5	1,089	2,095	1,489	2,498	1,715	805	2,000
Metals										
Antimony	1	ug/L	< 1	< 1	< 1	1	< 1	2	< 1	< 1
Arsenic	1	ug/L	21	44	41	16	87	26	394	23
Barium	5	ug/L	180	181	369	225	589	266	334	474
Beryllium	1	ug/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	20	ug/L	6,270	12,100	8,040	10,800	8,240	11,200	5,370	13,900
Cadmium	0.2	ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	ug/L	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1
Cobalt	15	ug/L	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Copper	1	ug/L	2	1	< 1	< 1	2	1	< 1	1
Iron	20	ug/L	8,110	817	12,300	196	17,800	285	5,220	414
Lead	1	ug/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	10	ug/L	97	63	139	45	188	58	84	61
Mercury (low-level)	0.5	ng/L	1.01	< 0.5	< 0.5	0.54	2.25	0.58	0.86	0.69
Molybdenum	5	ug/L	88	128	< 5	67	12	40	132	21
Nickel	2	ug/L	5	4	7	6	18	8	< 2	6
Selenium	1	ug/L	4	2	< 1	< 1	21	5	2	2
Silver	0.2	ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Sodium	1,000	ug/L	583,000	62,000	111,000	77,900	156,000	80,500	72,300	59,500
Sulfate	1,000	ug/L	984,000	352,000	36,400	202,000	94,800	178,000	< 1,000	62,900
Thallium	2	ug/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Vanadium	2	ug/L	5	< 2	4	16	5	28	< 2	11
Zinc	10	ug/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

#### Notes:

mg/L = milligrams per liter

ug/L = micrograms per liter

ng/L = nanograms per liter

mV = millivolts

S.U. = standard units

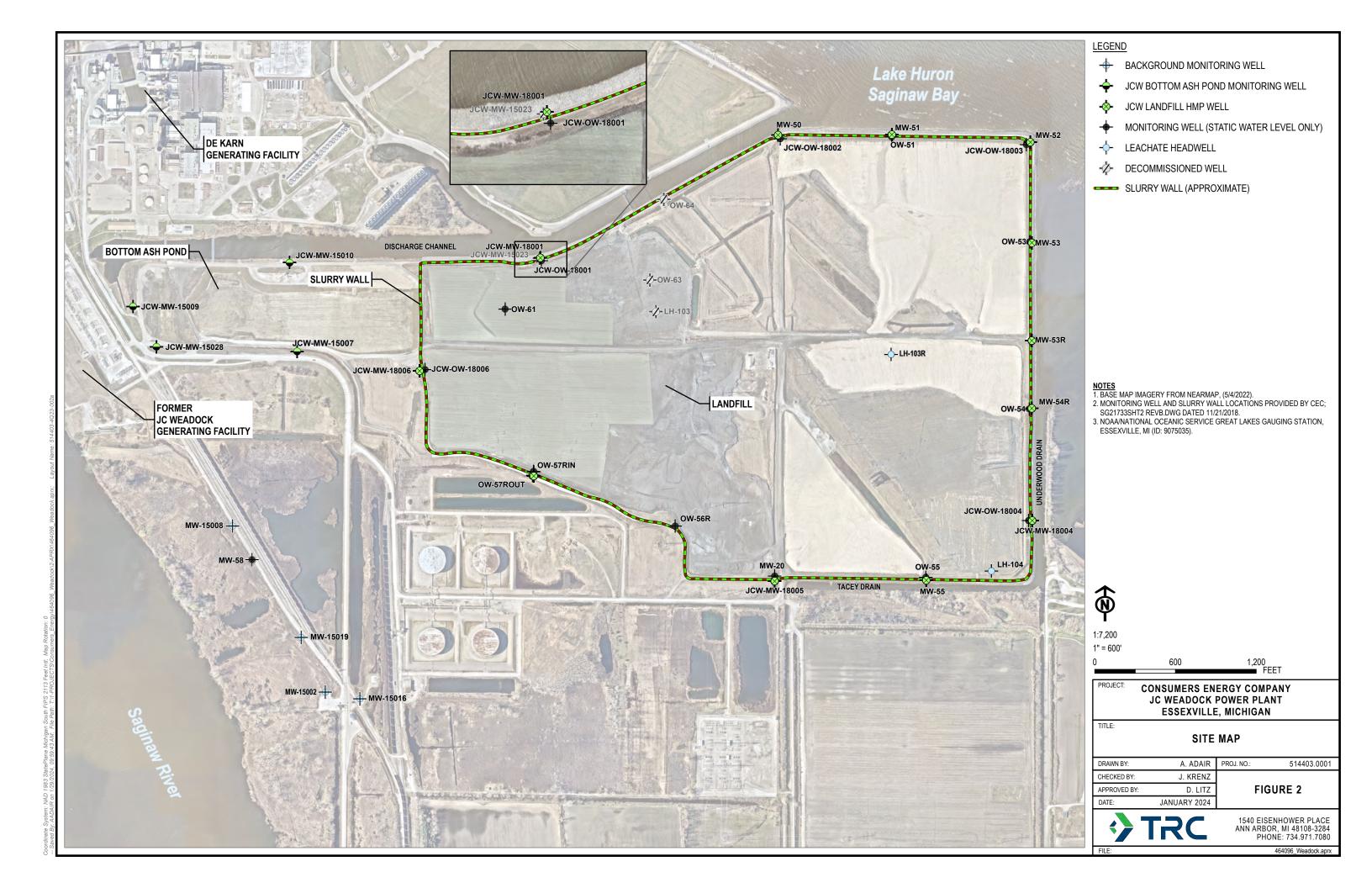
uS/cm = microSiemens per centimeter

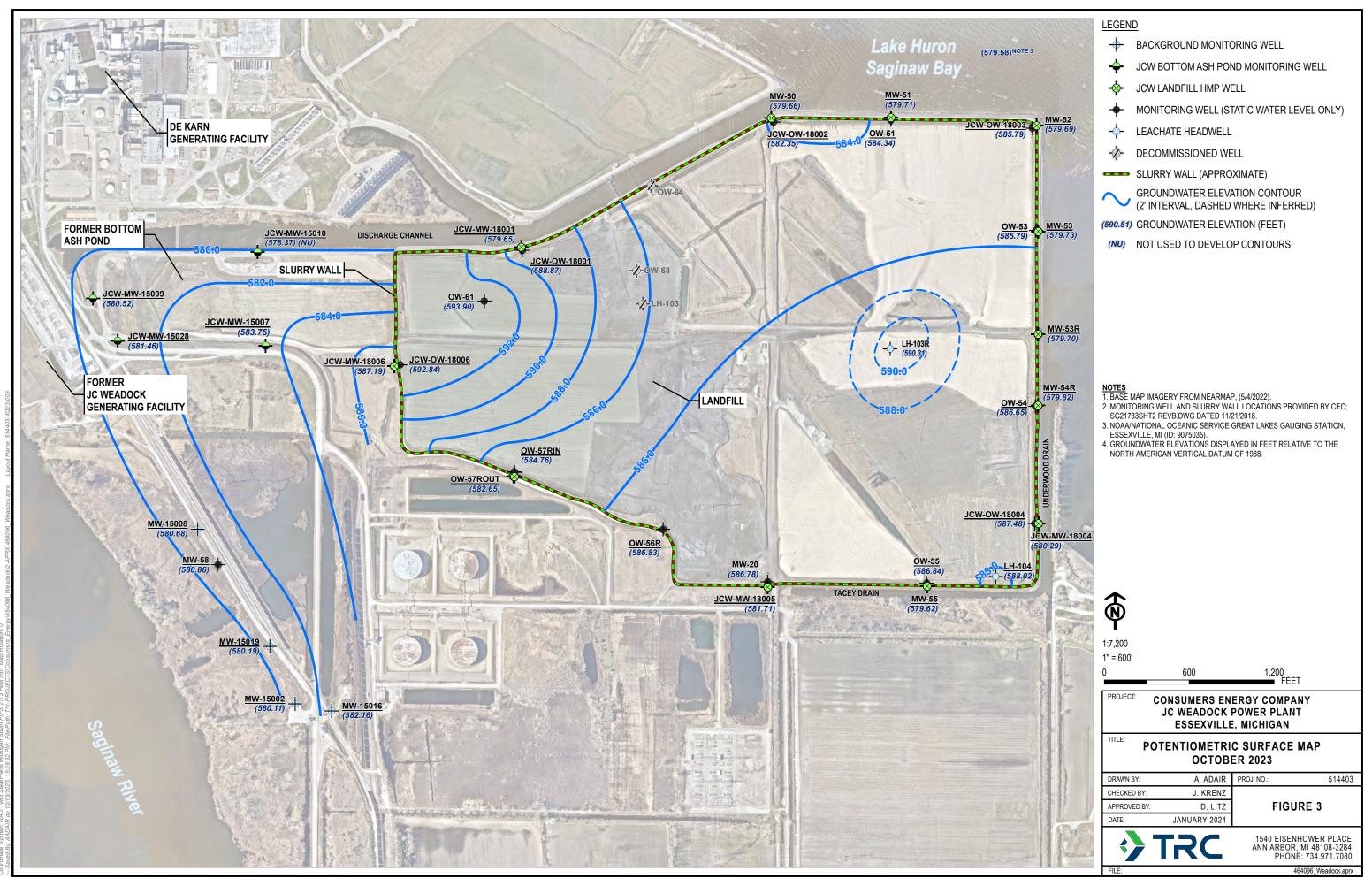
O.R.P. = oxidation-reduction potential

(1) In 2021, leachate headwell LH-103 was damaged, therefore, a sample could not be collected. Leachate headwell LH-103 was replaced with LH-103R in March 2022.



# **Figures**







# Appendix A Static Water Level Evaluation

#### Table A1

Static Water Levels for Select Perimeter Dike Monitoring Wells and NOAA Staff Gauge JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Well Location	Date Measured	Groundwater Water Elevation (GWE) (ft)	Saginaw Bay Surface Water Elevation (SWE) (ft)	Elevation Difference (GWE- SWE) <sup>(1)</sup>	
MW-50	10/2/2023	579.66		0.08	
MW-51	10/2/2023	579.71	]	0.13	
MW-52	10/2/2023	579.69		0.11	
MW-53	10/2/2023	579.73	579.58	0.15	
MW-53R	10/2/2023	579.70	579.50	0.12	
MW-54R	10/2/2023	579.82	1	0.24	
MW-55	10/2/2023	579.62		0.04	
JCW-MW-18004	10/2/2023	580.29		0.71	
Average:		579.78			

#### Notes:

Elevation in feet above North American Vertical Datum 1988 (NAVD 88)

TOC: top of well casing

ft BTOC: feet below top of well casing

(1) Positive elevation difference indicates flow toward the surface water body.

#### Table A2

# Slurry Wall Gradient and Flux JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program Essexville, Michigan

Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Discharge Channel	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
JCW-OW-18001	588.87	,	22.37	4.12E-01	2.00	2.88	1,010	ì	0.41	2,904	7.80E-02	0.58	213
JCW-MW-18001		579.65			3.75			2.30E-08	0.41	2,904	7.00E-02	0.56	213
JCW-OW-18002	582.35		28.87	9.32E-02	4.00	4.25	970	2.30L-00	0.09	4,123	2.50E-02	0.19	68
MW-50		579.66			4.50				0.00	4,120	2.00L-02	0.10	00
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-51	584.34		14.38	3.22E-01	4.00	4.21	1,850		0.32	7,779	1.63E-01	1.22	446
MW-51		579.71			4.41				0.02	.,			
JCW-OW-18003	585.79		33.85	1.80E-01	3.50	3.70	740	2.30E-08	0.18	2,738	3.22E-02	0.24	88
MW-52		579.69			3.90				0	2,. 00	0.222 02	0.2.	
OW-53	585.79		20.14	3.01E-01	1.25	1.57	730		0.30	1,146	2.25E-02	0.17	61
MW-53		579.73			1.89					.,		****	
Monitoring Well Pair	SWL Obs Well	SWL MW	X <sub>wells</sub>	i	Saturated	Mean	Section	K	i	Area	Flow	Flow	Flow
Non-Adjacent Zone	(ft NAVD 88)	(ft NAVD 88)	(ft)	(ft/ft)	Thickness (ft)	Thickness (ft)	Length (ft)	(cm/sec)	(ft/ft)	(ft <sup>2</sup> )	ft <sup>3</sup> /day	Gal/day	Gal/yr
OW-54	586.65		21.23	3.22E-01	2.00	2.25	510		0.32	1,148	2.41E-02	0.18	66
MW-54R		579.82			2.50				0.02	1,140	2.412-02	0.10	00
JCW-OW-18004	587.48		26.59	2.70E-01	8.00	4.19	820		0.27	3,440	6.06E-02	0.45	166
JCW-MW-18004		580.29			0.39			2.30E-08	0.27	3,440	0.00E-02	0.43	100
OW-55	586.84		23.95	3.01E-01	2.00	1.81	1,220	2.30E-06	0.30	2,208	4.34E-02	0.32	118
MW-55		579.62			1.62				0.50	2,200	7.07L-02	0.52	110
MW-20	586.78		40.93	1.24E-01	1.50	1.38	1,120		0.12	1,540	1.24E-02	0.09	34
JCW-MW-18005		581.71			1.25				0.12	1,540	1.27L-02	0.03	J- <del>1</del>

Calculated Groundwater Discharge from JC Weadock (gal per day) = 3.45

(cubic ft per day) = 0.46 (cubic ft per min) 3.2E-04

168

0.14

Calculated Groundwater Discharge from JC Weadock (gal per yr) = 1,260

(cubic ft per yr) =

Calculated Groundwater Discharge from JC Weadock (gal per year per linear foot of dike)

(cubic feet per year per linear foot of dike) = 1.88E-02

#### Notes:

Water level data collected on October 2, 2023 are shown by yellow cells:

579.578

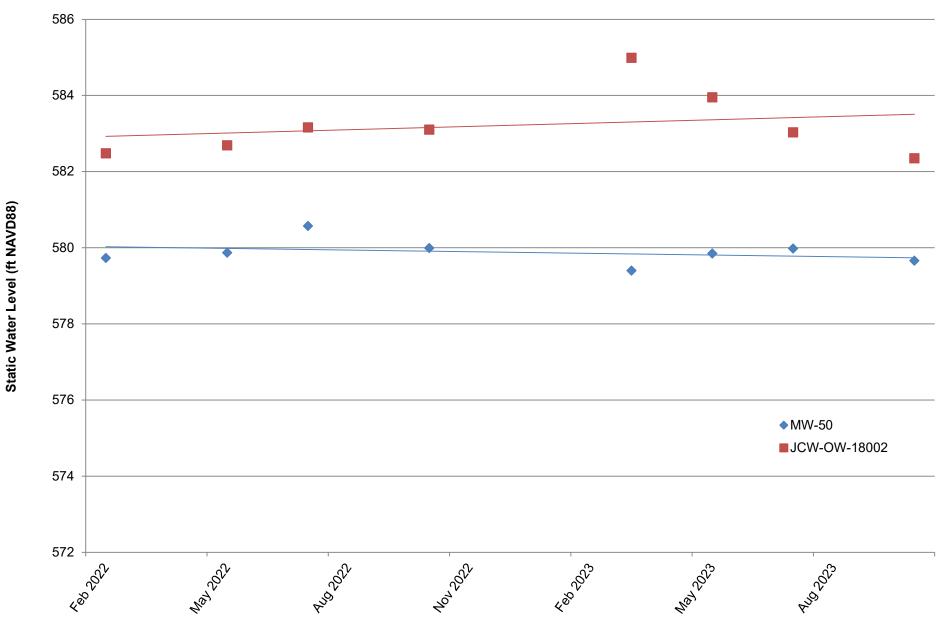
- 1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
- 2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above the top of the sand unit, or the measured saturated thickness of the sand unit if the SWL is below the top of the sand unit.
- 3. Hydraulic conductivity taken as harmonic mean of laboratory tests done on in-place slurry wall from NTH Certified Quality Assurance Report, Appendix E, April 24, 2009
- 4. Arithmetic average used to develop geometric properties of each section/zone (e.g. discharge channel, adjacent, and non-adjacent)
- 5. If Obs well SWL < MW SWL calculated flow will be zero.

SWL = Static Water Level; Obs Well = Observation Well; MW= Monitoring Well; ft NAVD 88 = feet above North American Vertical Datum 1988

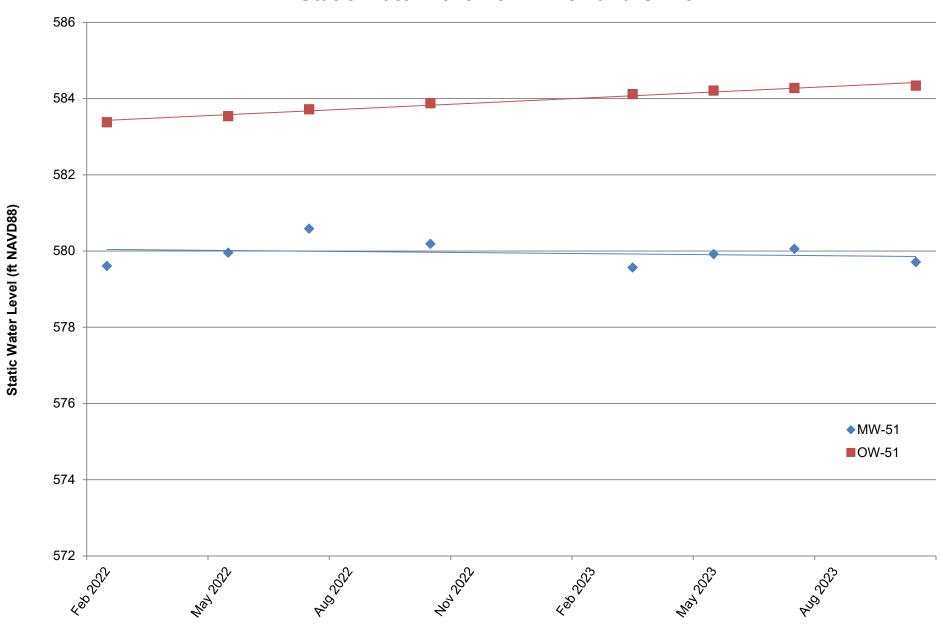
ft/ft = feet per foot; cm/sec = centimeters per second; ft<sup>2</sup> = square feet; ft<sup>3</sup>/day = cubic feet per day; Gal/day = gallons per day; Gal/yr = gallons per year

i = hydraulic gradient; K = hydraulic conductivity;  $x_{wells}$  = distance between well pairs

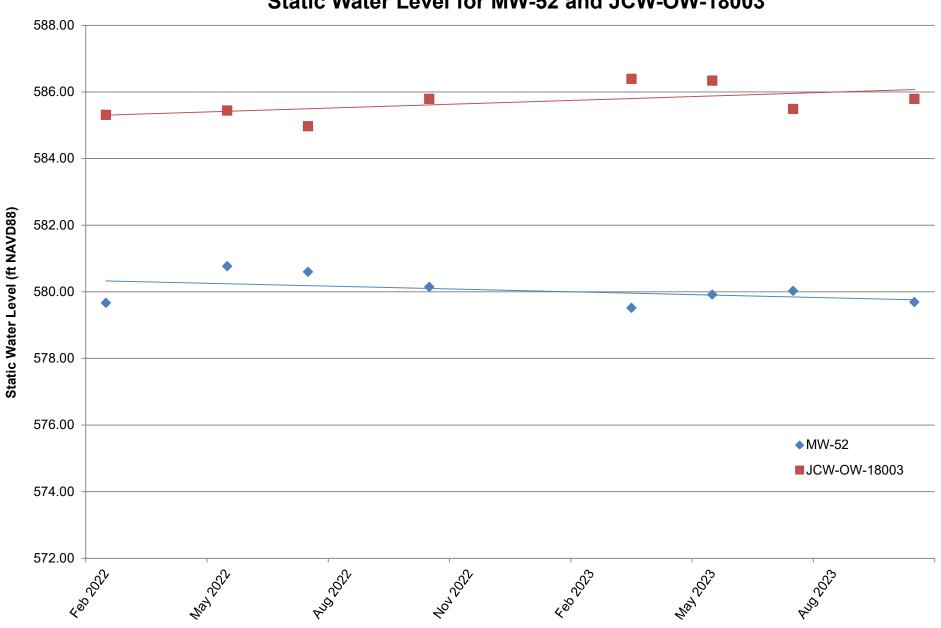
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



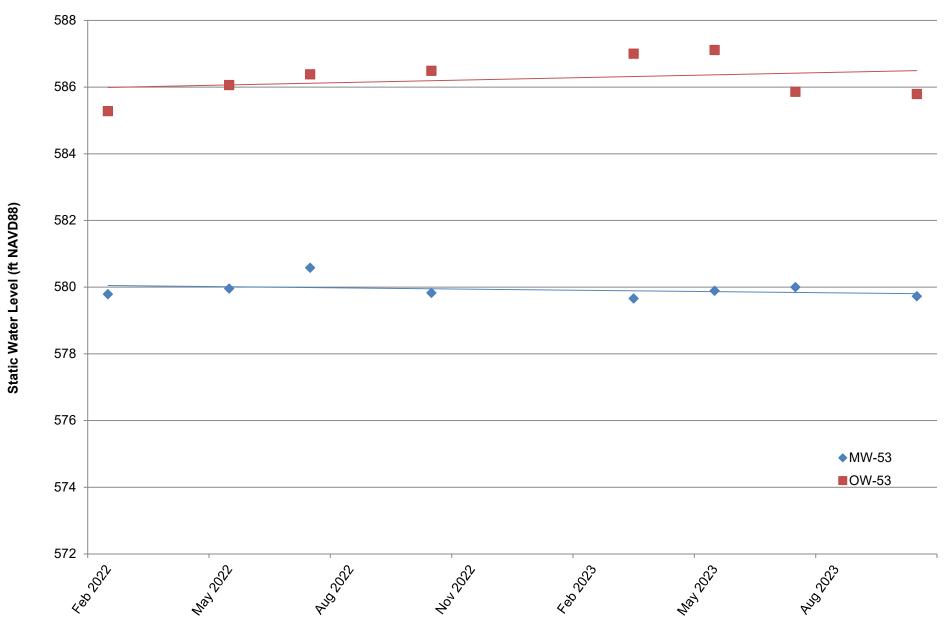
Appendix A
Static Water Level for MW-51 and OW-51



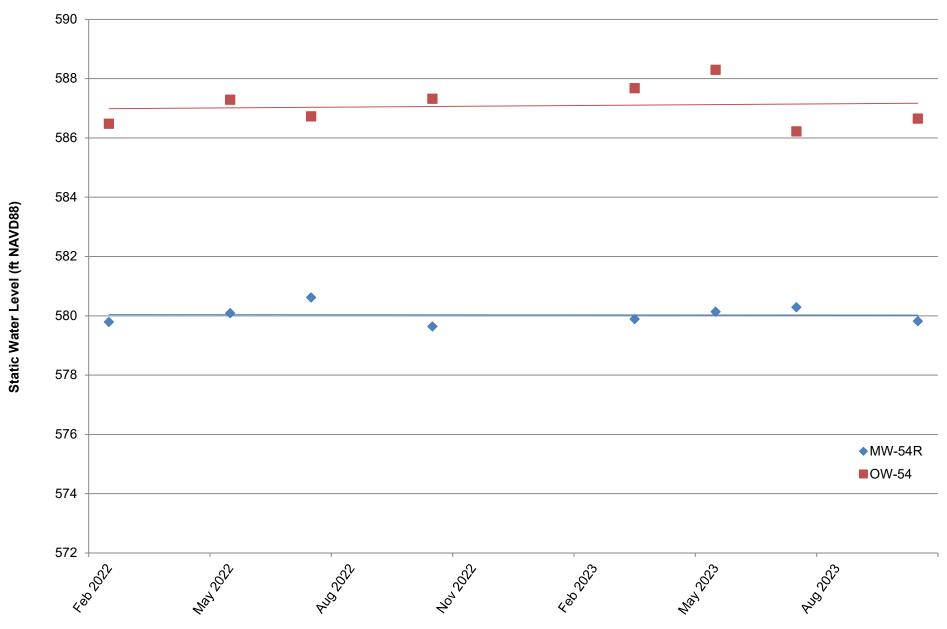
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



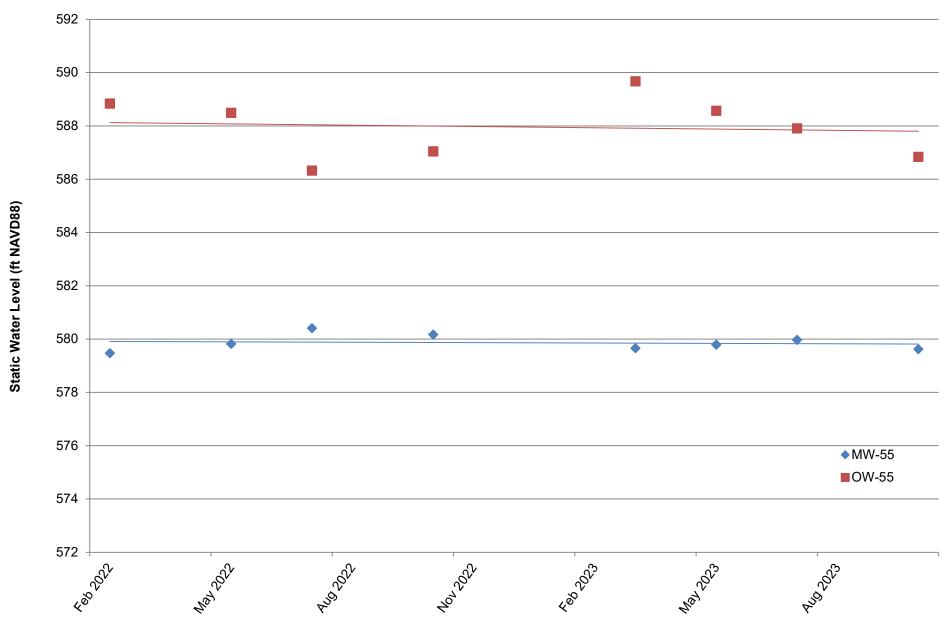
Appendix A
Static Water Level for MW-53 and OW-53



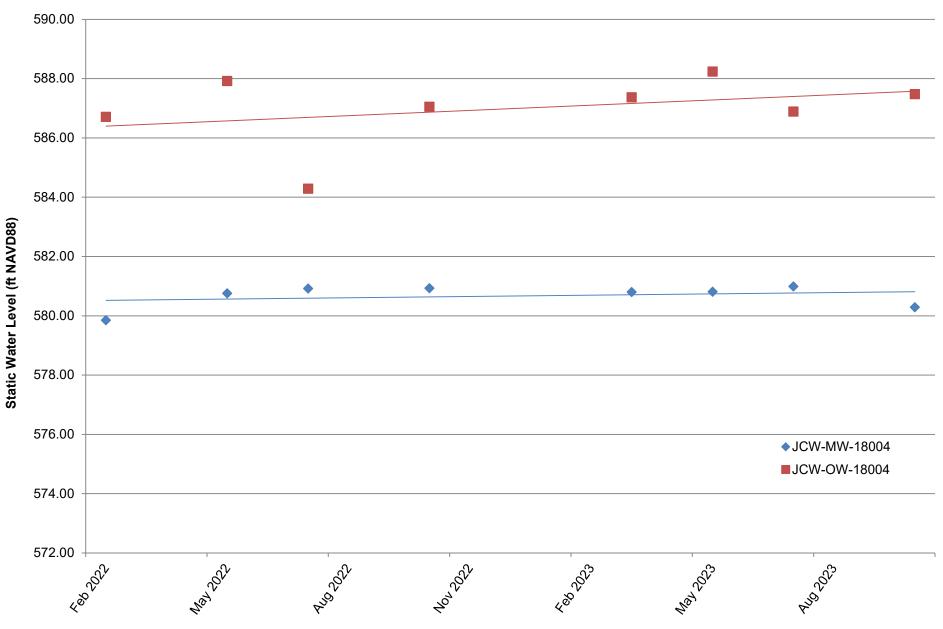
Appendix A
Static Water Level for MW-54R and OW-54



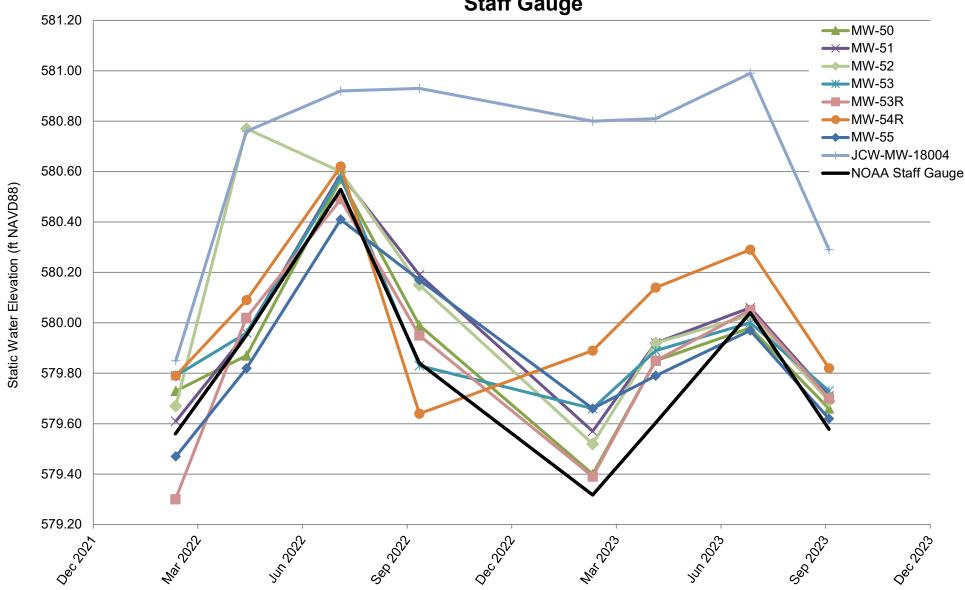
Appendix A
Static Water Level for MW-55 and OW-55



Appendix A
Static Water Level for JCW-MW-18004 and JCW-OW-18004



Appendix A
Static Water Elevations for Select Perimeter Dike Monitoring Wells and NOAA
Staff Gauge





# Appendix B Data Quality Review

# Laboratory Data Quality Review Groundwater Monitoring Event October 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and/or alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0934.

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

•	JCW-MW-18001	•	JCW-MW-18004	•	JCW-MW-18005
•	JCW-MW-18006	•	MW-50	•	MW-51
•	MW-52	•	MW-53	•	MW-53R
	MW-54R	•	MW-55		MW-58

OW-57R OUT

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

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the 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**

- One field blank (FB-01) and one equipment blank (EB-01) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JCW-MW-18001 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- Samples DUP-JCW-LF-02/JCW-MW-18006 and DUP-JCW-LF-01/MW-50 were submitted as the field duplicate pairs with this data set; all criteria between the parent and duplicate samples were met.

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Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event October 2023 JC Weadock Landfill

Groundwater samples were collected by TRC for the October 2023 sampling event. The samples were analyzed for total metals, low-level mercury, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0941.

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

■ LH-103R

■ LH-104

The samples were analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Low-Level Mercury	EPA 1631E
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, field blanks, and trip 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 and trip blanks are used to assess potential contamination arising during shipment to the laboratory;
- 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and LCSs were not provided for review by CE Laboratory Services. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals (including low-level mercury), anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

### **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents, as well as low-level mercury, will be utilized for the purposes of the 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**

- One field blank (FB-02), one trip blank (TB-01), and one equipment blank (EB-02) were collected. Low-level mercury was not detected in these blank samples. It was noted that the RL for low-level mercury in these blank samples (0.2 ng/L) was lower than the field samples (0.5 ng/L).
- MS and MSD analyses were performed on sample LH-103R for low-level mercury. The %R for low-level mercury in the MS (128%) was above the method acceptance limits (71-125%). The positive results for low-level mercury in samples LH-103R and LH-103R Dup should be considered estimated with potential high-bias, as summarized in the attached table, Attachment A. The relative percent difference (RPD) was not provided by the laboratory and therefore was not evaluated; further, MS/MSD concentrations were not provided by the laboratory.

- Samples LH-103R Dup/LH-103R and LH-104 Dup/LH-104 were submitted as the field duplicate pairs with this data set; all criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

#### Attachment A

Summary of Data Non-Conformances for Groundwater Monitoring Event Analytical Data

JCW Leachate Wells

Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue		
LH-103R	10/4/2023	Low-level Mercury	High matrix enike recovery potential high high axists for the listed sample results		
LH-103R Dup	10/4/2023	Low-level Mercury	High matrix spike recovery; potential high-bias exists for the listed sample results.		

# Laboratory Data Quality Review Groundwater Monitoring Event October 2023 JC Weadock/DE Karn Background

Groundwater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0933R.

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

■ MW-15002

■ MW-15008

■ MW-15016

MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses:
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

### **Review Summary**

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium 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**

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- Samples DUP-Background and MW-15008 were submitted as the field duplicate pair with this data set; all criteria were met.
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Porewater Monitoring Event October 2023 JC Weadock Landfill

Porewater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-193278-1.

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

•	JCW-MW-18001	•	JCW-MW-18004	•	JCW-MW-18005
•	JCW-MW-18006	•	MW-50	•	MW-51
•	MW-52	•	MW-53	•	MW-53R
•	MW-54R	•	MW-55	•	MW-58

OW-57ROUT

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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;

- 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.

- The reviewed 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**

- Results for radium-226 were reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. Positive radium-226 results reflect the total alpha radium and should be considered potentially high biased, as summarized in the attached table. Associated samples had activity below the RL (1.0 picocuries per liter) after the 7 day total alpha radium count time, and are well below the MCL for combined Radium-226/228 (5 picocuries per liter); therefore the data are deemed usable as reported.
- Target analytes were not detected in the method blanks (MBs) with the following exception.
  - Radium-228 was detected in MB 160-631941/1-A at 0.8284 +/- 0.396 pCi/L. Potential false positive exists for radium-228 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.</li>
- One equipment blank (EB-01) was collected. Target analytes were not detected in the equipment blank sample with the following exceptions.
  - Radium-228 was detected in sample EB-01 at 0.804 +/- 0.375 pCi/L. This result was likely a false positive due to method blank contamination and therefore did not impact any field sample results.
  - Combined radium-226+228 was detected in sample EB-01 at 0.909 +/- 0.388 pCi/L.
     Potential false positive exists for combined radium-226+228 results with NADs <1.96</li>

and potential high bias exists for combined radium-226+228 results with NADs >1.96 but < 2.58, as summarized in attachment A.

- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from this data set.
- Laboratory duplicate analyses were performed on sample JCW-MW-18004 for radium-226 and radium-228; all criteria were met
- Samples DUP-01/MW-50 and DUP #02/JCW-MW-18006 were submitted as the field duplicate pairs with this data set; all criteria were met.
- Carrier recoveries were within 40-110%.

#### Attachment A

# Summary of Data Non-Conformances for Impoundment Porewater Analytical Data JCW Landfill Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JCW-MW-18005	10/9/2023		
JCW-MW-18006	10/9/2023	1	
MW-50	10/9/2023	1	
MW-51	10/9/2023	1	
MW-52	10/9/2023	1	
MW-53	10/9/2023	D !!	Results are potentially biased high due to not undergoing 21-day waiting period prior to analysis. The results are well
MW-53R	10/9/2023	Radium-226	below the applicable screening criteria and are therefore deemed usable as reported.
MW-54R	10/9/2023	1	
MW-55	10/9/2023	1	
MW-58	10/9/2023	1	
DUP-01	10/9/2023	1	
DUP #02	10/9/2023	1	
JCW-MW-18001	10/5/2023		
JCW-MW-18004	10/9/2023		
JCW-MW-18005	10/9/2023	1	
JCW-MW-18006	10/9/2023	1	
MW-50	10/9/2023	1	
MW-51	10/9/2023	1	
MW-52	10/9/2023	Radium-228	
MW-53	10/9/2023		Method blank contamination; potential false positive.
MW-53R	10/9/2023	Radium-220	
MW-54R	10/9/2023		
MW-55	10/9/2023		
OW-57ROUT	10/9/2023	]	
MW-58	10/9/2023		
DUP-01	10/9/2023	]	
DUP #02	10/9/2023		
EB-01	10/9/2023		
JCW-MW-18001	10/5/2023		
JCW-MW-18004	10/9/2023	]	
JCW-MW-18005	10/9/2023	]	
JCW-MW-18006	10/9/2023	]	
MW-50	10/9/2023	Combined radium-226+228	
MW-51	10/9/2023		Equipment blank contamination; potential false positive.
MW-52	10/9/2023		Equipment biank contamination, potential laise positive.
MW-53R	10/9/2023		
MW-54R	10/9/2023	]	
MW-55	10/9/2023	]	
OW-57ROUT	10/9/2023		
MW-58	10/9/2023		

#### Attachment A

Summary of Data Non-Conformances for Impoundment Porewater Analytical Data JCW Landfill Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
DUP-01	10/9/2023	Combined	Equipment blank contamination; potential false positive.
DUP #02	10/9/2023	Combined adium-226+228 –	
MW-53	10/9/2023	Tadiui11-220+220	Equipment blank contamination; potential high bias.

# Laboratory Data Quality Review Groundwater Monitoring Event October 2023 JC Weadock/Karn DEK Background

Groundwater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-193059-1.

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

■ MW-15002

■ MW-15008

■ MW-15016

■ MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
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 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, where 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 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;
- 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.

- The reviewed 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**

- Results for radium-226 were reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out for all samples in this data set except MW-15002. Positive radium-226 results in the affected samples reflect the total alpha radium and should be considered potentially high biased, as summarized in the attached table. Associated samples had activity below the RL (1.0 picocuries per liter) after the 7 day total alpha radium count time, and are well below the MCL for combined Radium-226/228 (5 picocuries per liter); therefore the data are deemed usable as reported.
- Target analytes were not detected in the method blanks.
- One equipment blank (EQ-BACKGROUND) was collected. Target analytes were not detected in the equipment blank sample.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from this data set.
- Laboratory duplicate analyses were performed on sample EQ-BACKGROUND for radium-226 and radium-228; all criteria were met.
- Samples DUP-BACKGROUND/MW-15008 were submitted as the field duplicate pair with this data set: all criteria were met.
- Carrier recoveries were within 40-110%.

#### Attachment A

Summary of Data Non-Conformances for Groundwater Analytical Data Karn and Weadock Background Wells Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue		
MW-15008	10/2/2023	Radium-226			
MW-15016	10/4/2023		Results have potential high bias due to not undergoing 21-day waiting period prior to analysis. The results are well below the applicable screening criteria and are therefore deemd usable as reported.		
MW-15019	10/2/2023				
DUP-BACKGROUND	10/2/2023				



# **Appendix C Detection Monitoring Statistical Trend Tests**

#### Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility Fourth Quarter 2023 Data from March 2022 to October 2023

Porewater Monitoring Points									
PARAMETER	JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51			
Boron <sup>(1)</sup>	0	0	0	0	0	↓*			
Calcium	↑ <sup>ASD</sup>	0	0	0	0	<b>↓</b>			
Chloride	0	0	0	0	↓*	0			
Fluoride	O*	O*	O*	O*	O*	O*			
Iron	<b>↑</b>	0	0	0	0	0			
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0			
Sulfate	↑ <sup>ASD</sup>	0	0	0	0	<u></u>			
Total Dissolved Solids	0	0	0	0	0	<u></u>			

#### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

= Upward trend, confirmed

↓ = Downward trend, continuous

↓\* = Downward trend, new

↑ ASD = Alternate Source Demonstration (Fourth Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, January 2024).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

#### Appendix C

# Detection Monitoring Statistical Summary for JC Weadock Facility Fourth Quarter 2023 Data from March 2022 to October 2023

Porewater Monitoring Points									
PARAMETER	MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57R OUT			
Boron <sup>(1)</sup>	0	0	0	1	<b>↑</b>	0			
Calcium	0	0	0	0	0	0			
Chloride	$\downarrow$	0	0	0	0	0			
Fluoride	O*	O*	O*	O*	O*	O*			
Iron	0	0	0	0	0	0			
pH/Corrosivity <sup>(1)</sup>	0	0	0	0	0	0			
Sulfate	↓*	0	0	0	0	0			
Total Dissolved Solids	0	0	0	0	0	0			

#### Notes:

O\* = Non-detect (70%)

O = No trend

↑ = Upward trend, continuous

↑\* = Upward trend, new

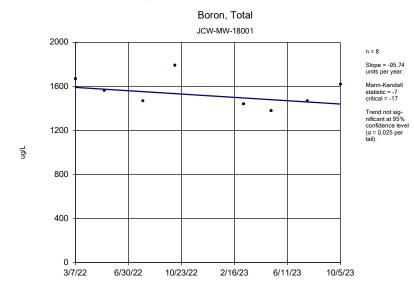
↑ = Upward trend, confirmed

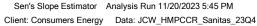
= Downward trend, continuous

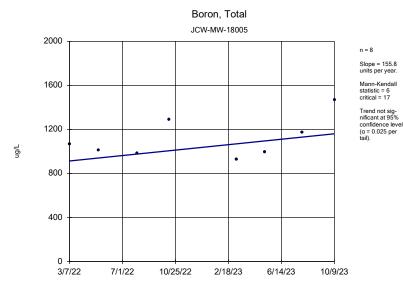
↓\* = Downward trend, new

↑ ASD = Alternate Source Demonstration (Fourth Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, January 2024).

(1) Boron concentrations and pH levels were confirmed as statistically significant increases (SSIs) over background levels and triggered assessment monitoring (2017 Annual Groundwater Monitoring Report – JC Weadock Power Plant, Landfill CCR Unit, TRC, 2018).

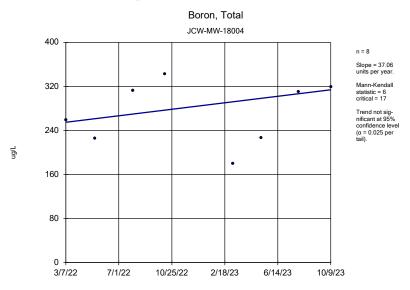






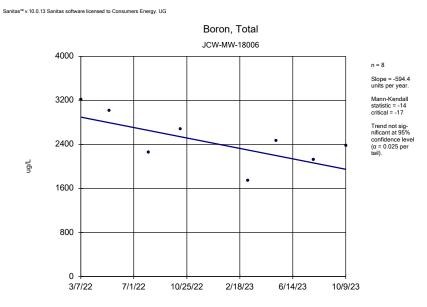
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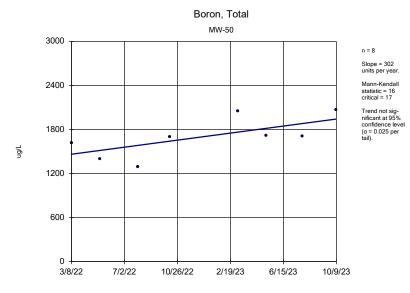


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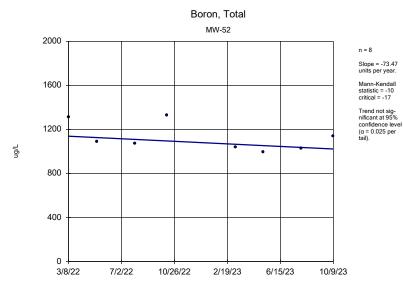
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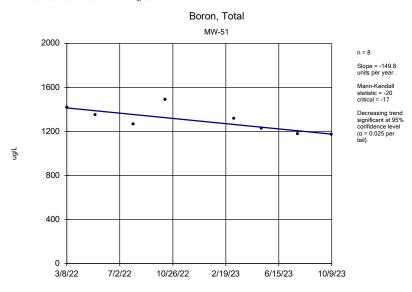


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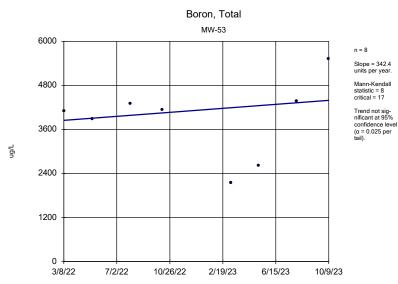
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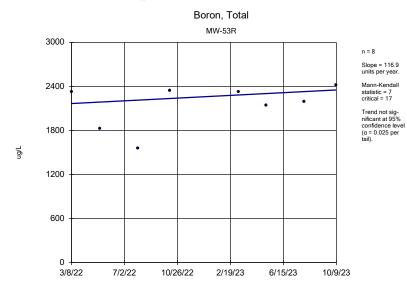
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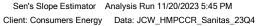
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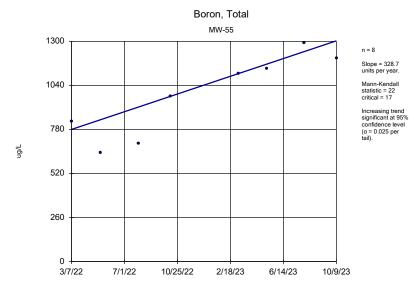


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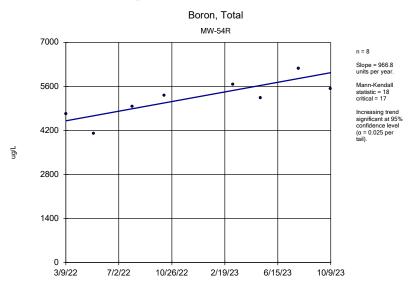






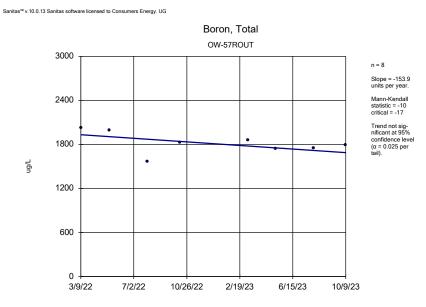
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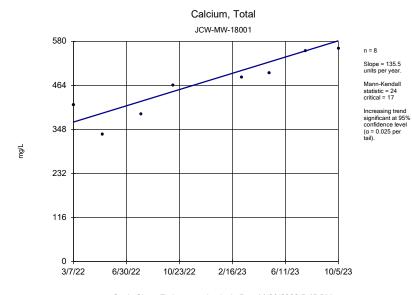
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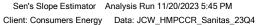
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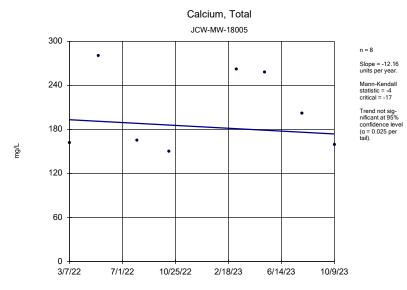


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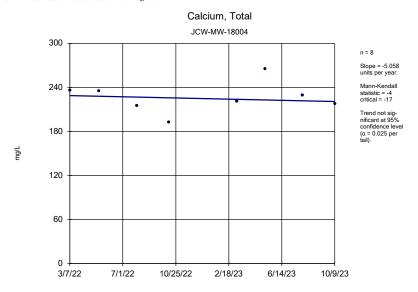






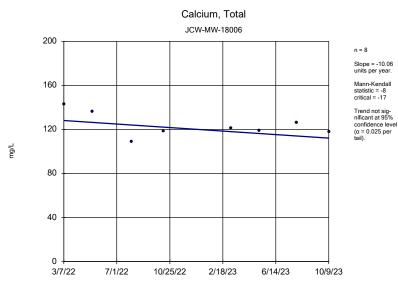
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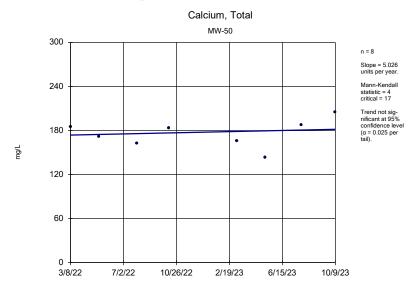
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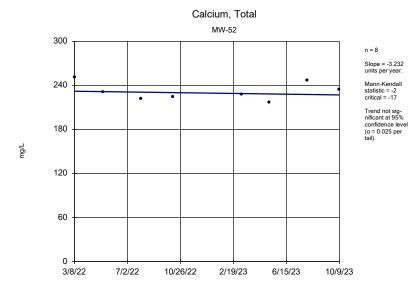


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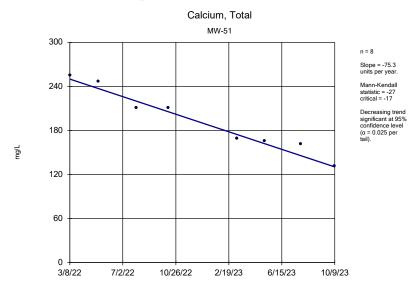


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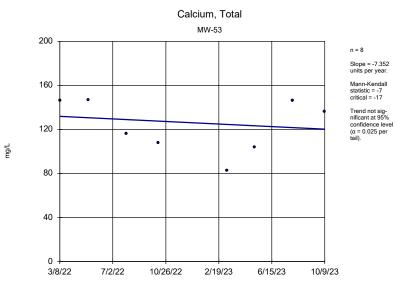


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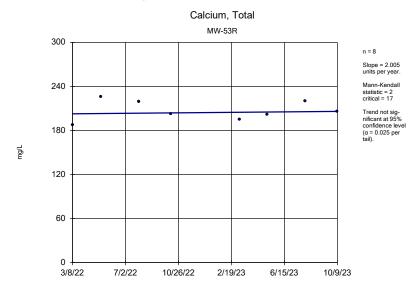


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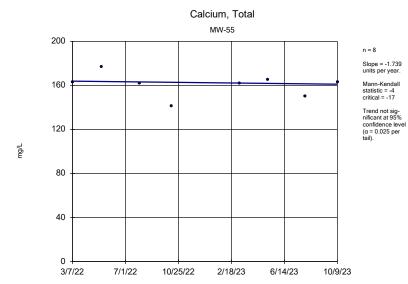


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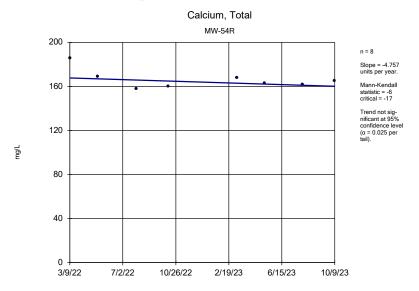


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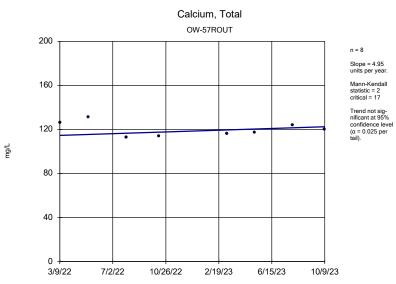
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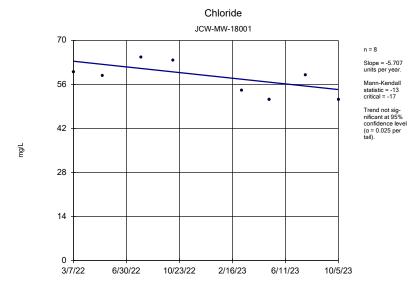
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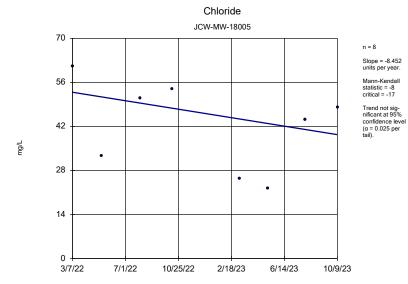
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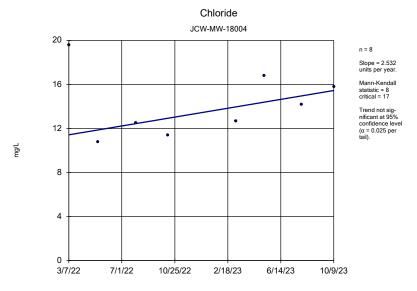


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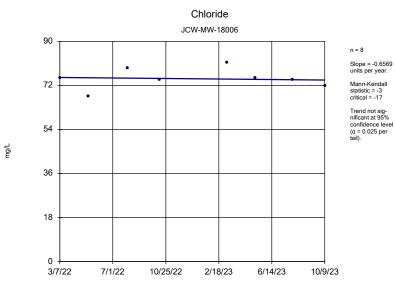


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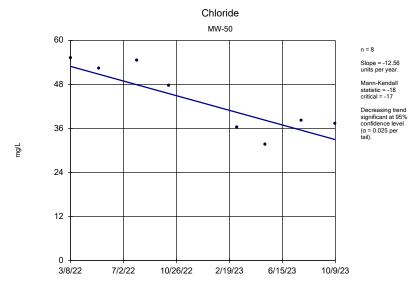
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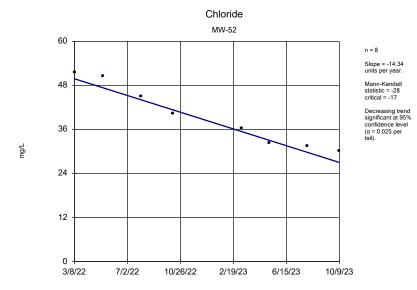


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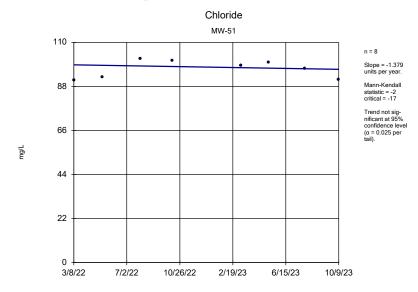


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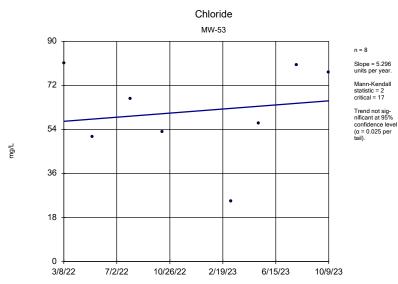
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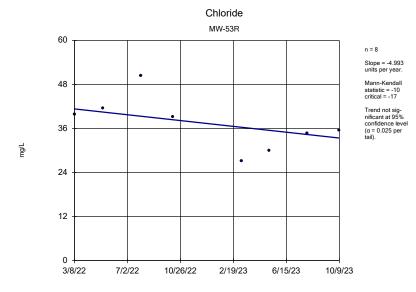
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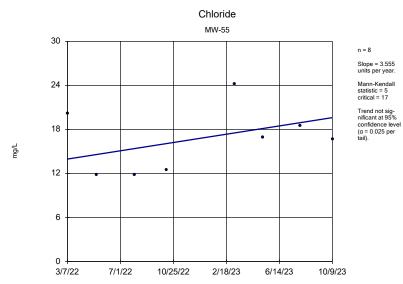


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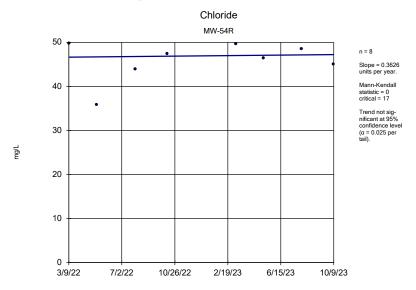


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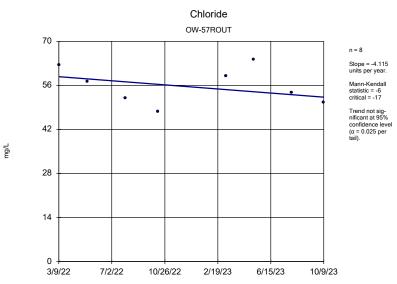
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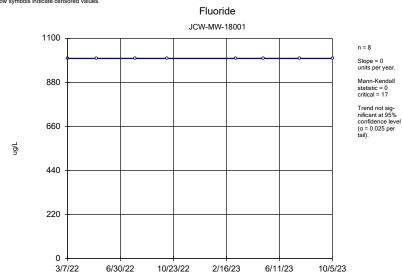
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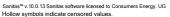
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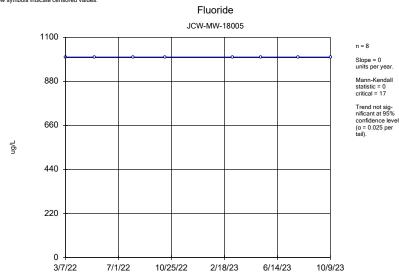
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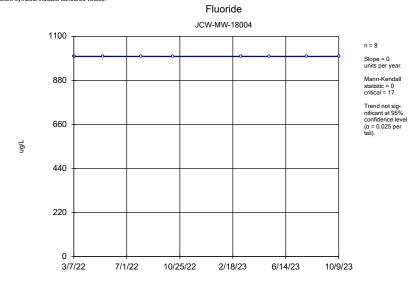




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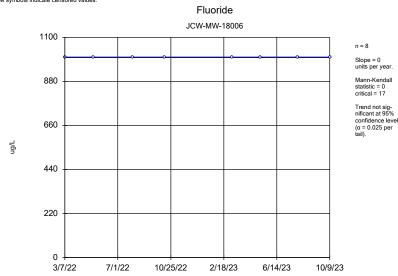
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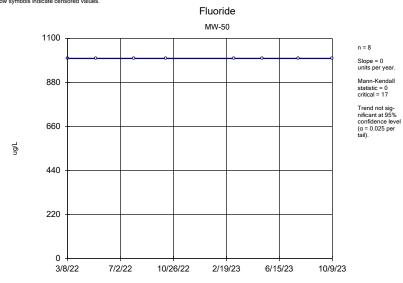
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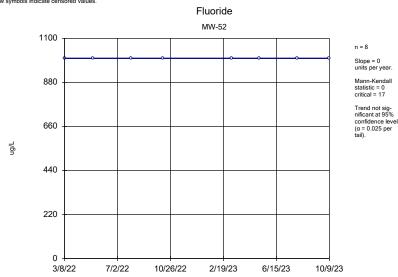
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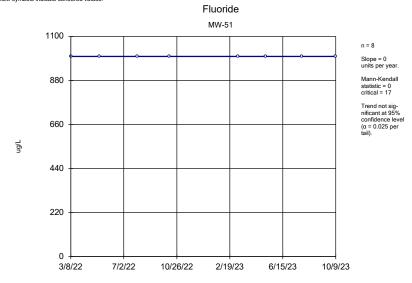
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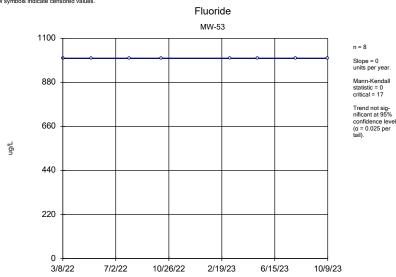
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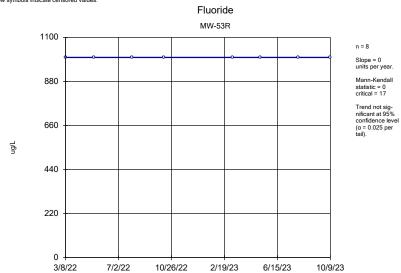
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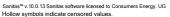
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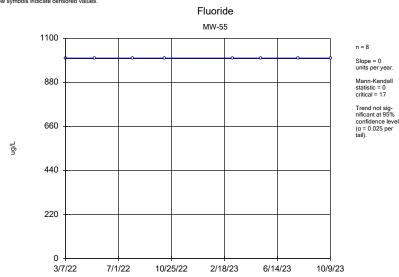
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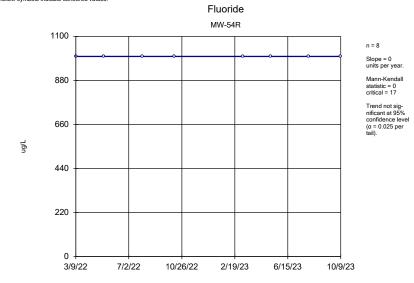




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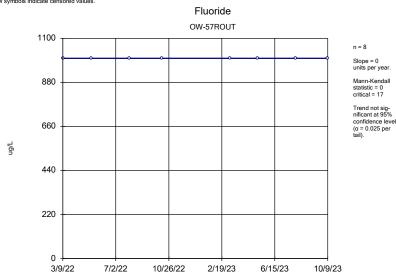
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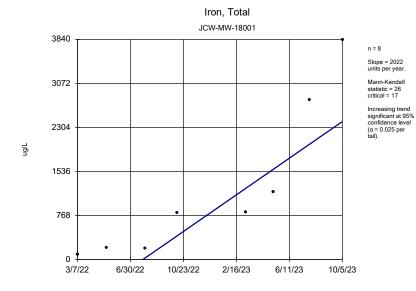
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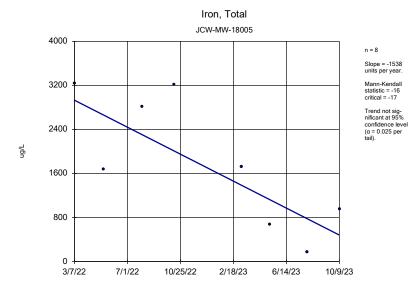


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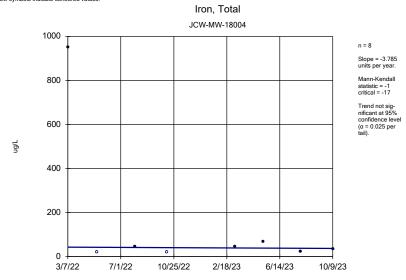
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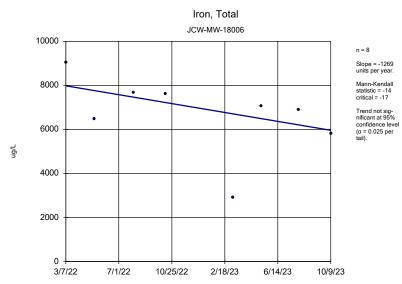


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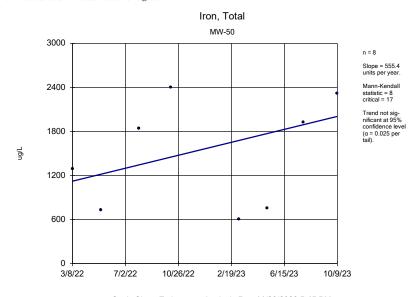
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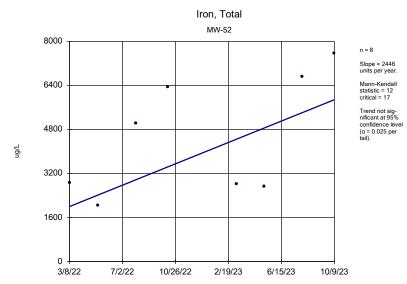


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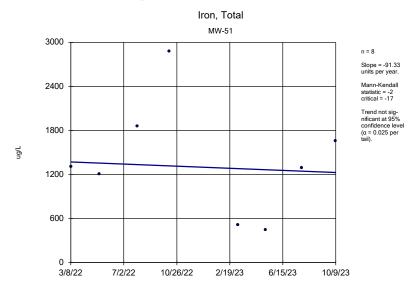


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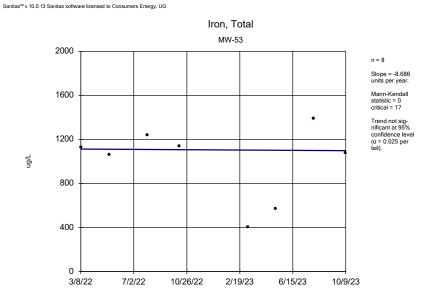
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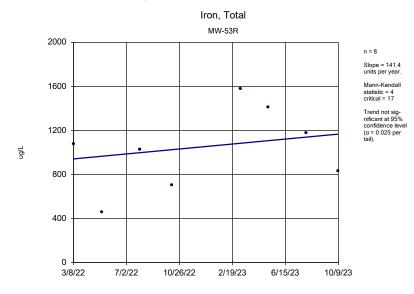
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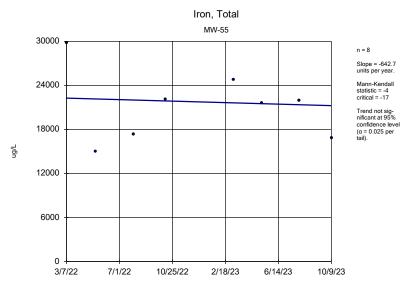


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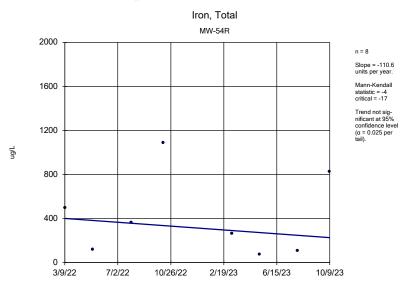


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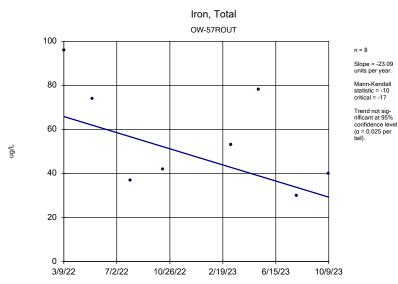
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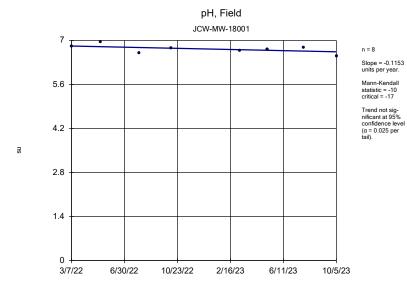
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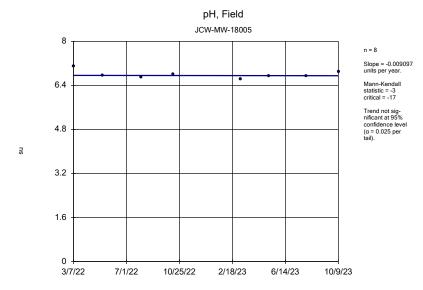
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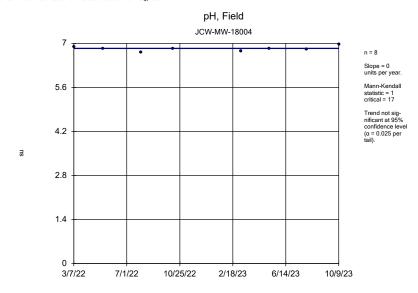
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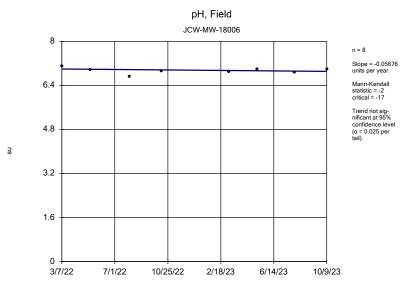


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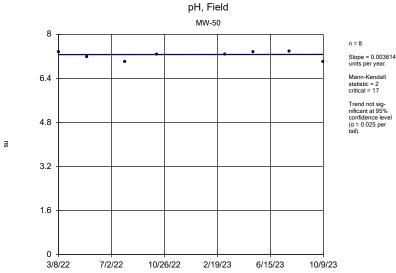


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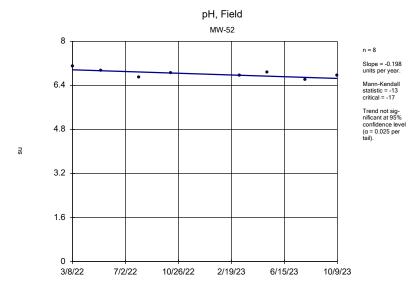


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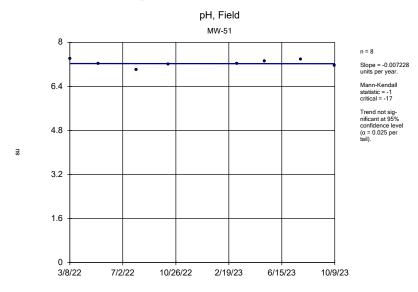




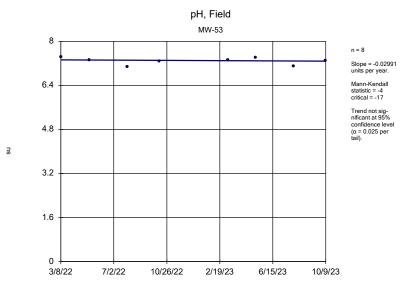


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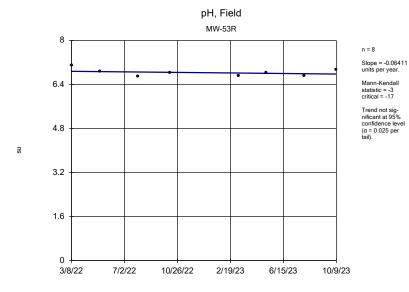


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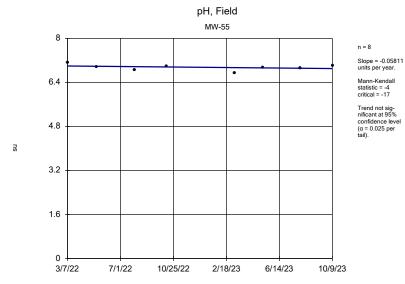
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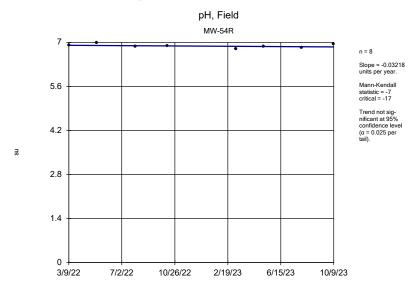
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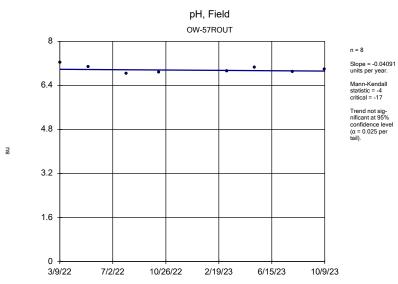
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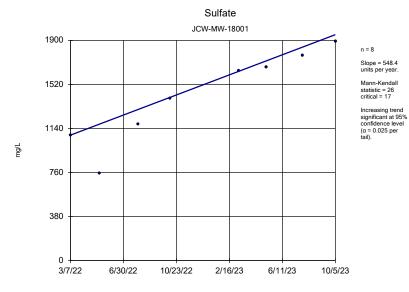
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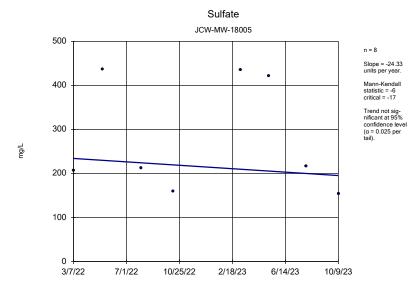


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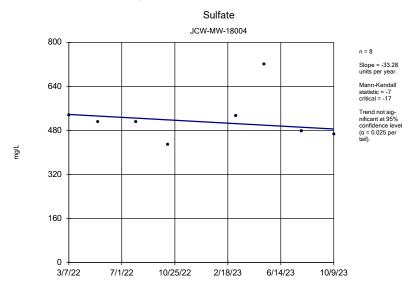


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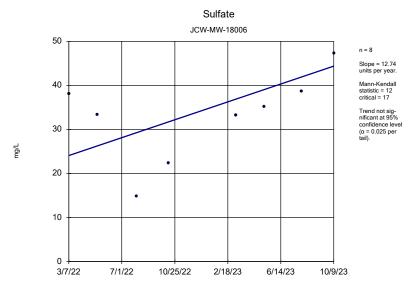
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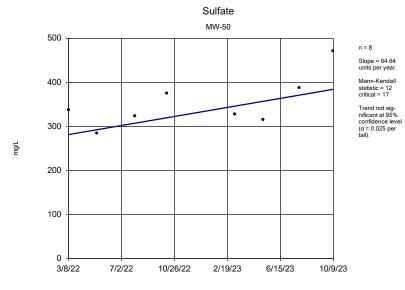
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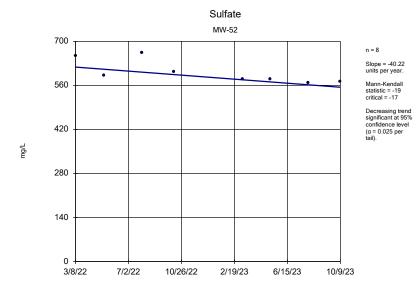


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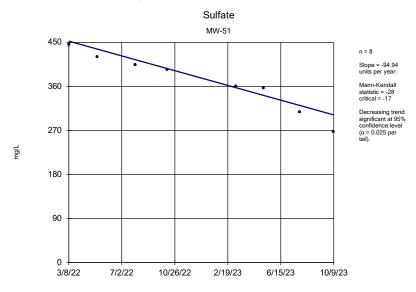


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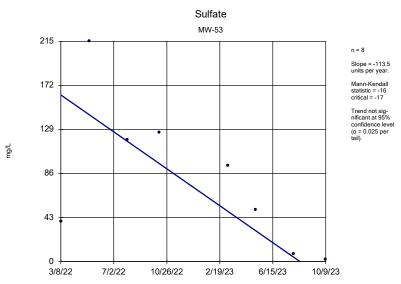
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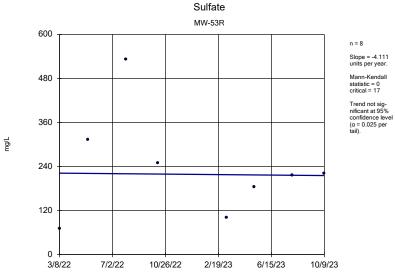
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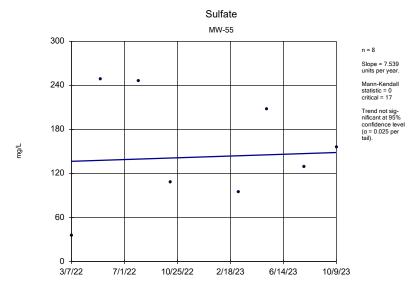


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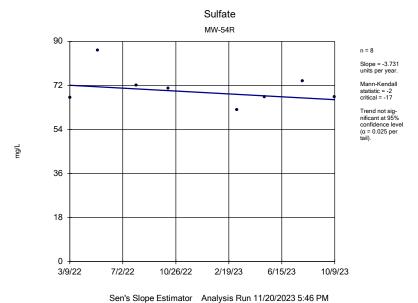






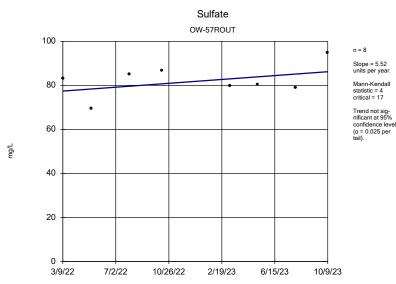
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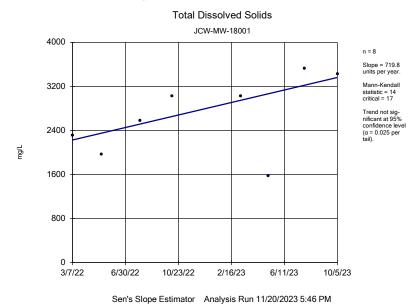
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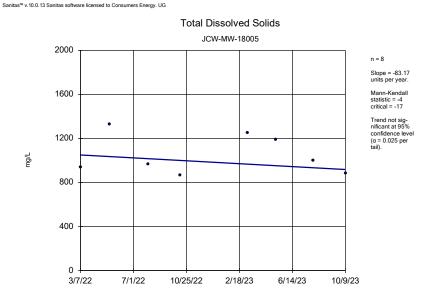
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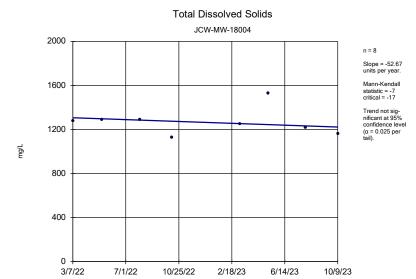
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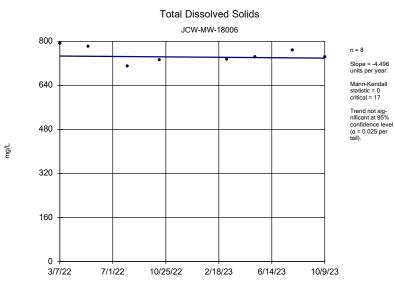
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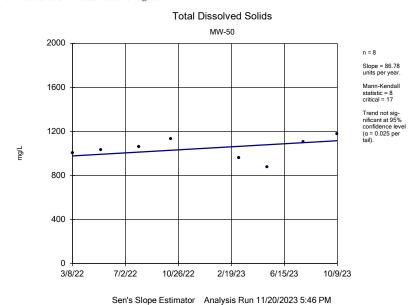
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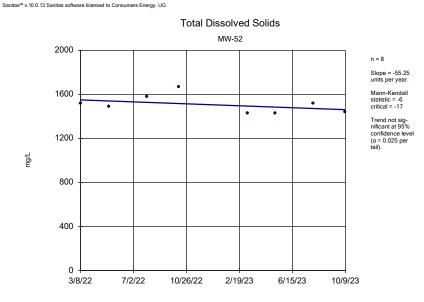


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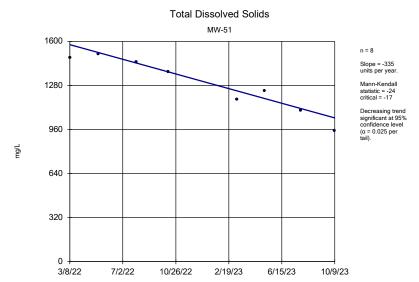


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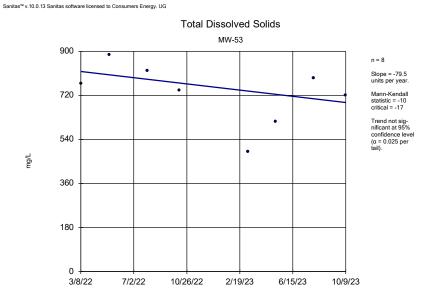


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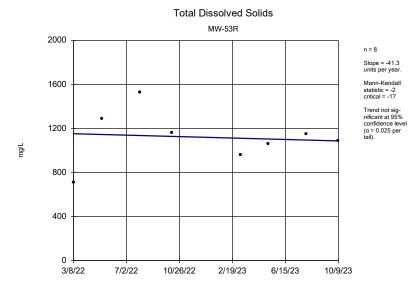
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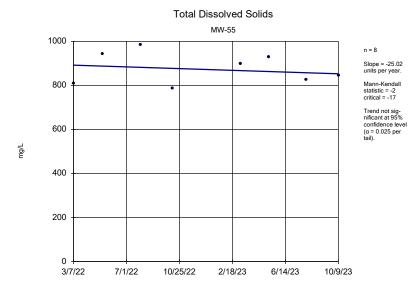


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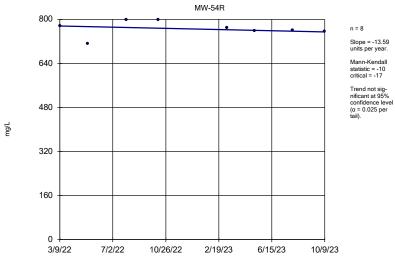
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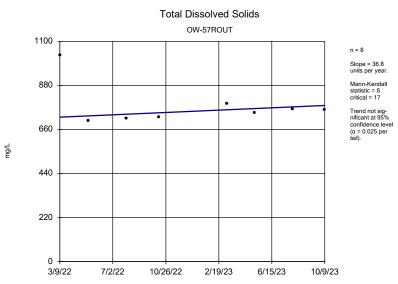
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### Total Dissolved Solids



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# Appendix D Assessment Monitoring and GSI Statistical Evaluation



**Date:** January 30, 2024

**To:** J.R. Register, Consumers Energy

From: Darby Litz, TRC

Alex Eklund, TRC

**Project No.:** 514403.0000 Phase 002, Task 002

**Subject:** Assessment Monitoring and GSI Statistical Evaluation of the Fourth Quarter 2023

Sampling Event

JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan

During the statistical evaluation of the initial assessment monitoring event (May 2018), arsenic was present in one or more downgradient monitoring wells at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined. The ACM was completed on September 11, 2019.

Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule¹ at the JC Weadock Power Plant Landfill and quarterly groundwater monitoring in accordance with the February 2021 Landfill Hydrogeological Monitoring Plan (HMP). The fourth quarter 2023 monitoring event was conducted on October 2-9, 2023. In accordance with §257.95 and the HMP, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix III and Appendix IV constituents, and additional Michigan Part 115 (as amended by PA 640) Section 11511a(3) and Section 11519b(2) constituents, are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h) and Part 115, as detailed in the April 23, 2021 Groundwater Protection Standards technical memorandum, which was also included in the First Quarter 2021 Hydrogeological Monitoring Report². In accordance with the HMP, groundwater monitoring data from the designated groundwater-surface water (GSI) monitoring wells must be also compared to the GSI criteria to determine whether or not the GSI monitoring constituents are detected at statistically significant levels above the GSI criteria.

The evaluation of the initial semiannual assessment monitoring event data (April and May 2018) indicated that arsenic was present at statistically significant levels above the GWPS at one of the three former downgradient wells. The three downgradient wells were located within a vent (e.g., opening) of the perimeter soil/bentonite slurry wall to assess the quality of groundwater passing the waste

<sup>&</sup>lt;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).

<sup>&</sup>lt;sup>2</sup> TRC. 2021. First Quarter 2021 Hydrogeological Monitoring Report – JC Weadock Solid Waste Disposal Area, Essexville, Michigan. Prepared for Consumers Energy Company. April.

boundary. As discussed in detail in the HMP, in July 2018, the vent in the perimeter soil/bentonite slurry wall was closed and the slurry wall is now continuous along the entire perimeter of the Weadock Landfill. As a result, the groundwater monitoring system was revised, as documented in the HMP. The monitoring well network now consists of twelve (12) downgradient monitoring wells and eight (8) GSI monitoring wells.

The statistical evaluation of the fourth quarter 2023 assessment monitoring event data indicates that the following constituents are present at statistically significant levels above the GWPSs in downgradient monitoring wells at the Weadock Landfill:

Constituent	GWPS	#Downgradient Wells Exceeded
Boron	560 μg/L	11 of 12
Calcium	280 mg/L	1 of 12
Sulfate	780 mg/L	1 of 12

Corrective action has been triggered as a result of data collected during the initial assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and execute the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria.

### **Statistical Evaluation Procedures**

Following each quarterly sampling event, compliance well data for the Weadock Landfill are evaluated in accordance with the Assessment Monitoring Statistical Data Evaluation and GSI Data Evaluation procedures in the HMP. The assessment monitoring and GSI monitoring programs were developed to evaluate concentrations of constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs or GSI criteria). To evaluate whether or not a criterion exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given monitoring event compared to the applicable criterion 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 3, the preferred method for comparisons to a fixed standard is confidence limits. Based on the number of historical observations in the representative sample population, the sample mean, the sample 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 the 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 criterion. If the confidence interval straddles the criterion (i.e., the lower confidence level is below the criterion, but the upper confidence level is above), the statistical test result indicates that there is insufficient

<sup>&</sup>lt;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.

confidence that the measured concentrations are different from the criterion 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 Part 115 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 constituent, the concentrations for each well were first compared directly to the GWPS, as shown on Table 1, or the GSI criteria, as shown on Table 2. Parameter-well combinations that included a direct exceedance of the criteria within the most recent two years of sampling events (eight quarterly sampling events, March 2022 through October 2023) were retained for further analysis. Data collected under the previous HMP is used where available.

Groundwater data were evaluated utilizing Sanitas<sup>™</sup> statistical software. Sanitas<sup>™</sup> is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas<sup>™</sup> statistical program, confidence limits were used to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each parameter with a direct exceedance using a per test<sup>4</sup> 99 percent confidence level, i.e., a significance level (α) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas<sup>™</sup> 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.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the assessment and GSI monitoring programs. Initially, the results were observed visually for potential outliers. No outliers were identified in the data set.

The Sanitas<sup>TM</sup> software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. The tests were run with a per-test significance of  $\alpha = 0.01$ . Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

<sup>&</sup>lt;sup>4</sup> Confidence level is assessed for each individual comparison (i.e., per well and per constituent).

The Sanitas<sup>™</sup> software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes data transformations, as appropriate.

### **Assessment Monitoring Statistical Evaluation**

The assessment monitoring statistical evaluation is performed on the downgradient monitoring wells in accordance with the HMP. The downgradient monitoring wells include:

■ JCW-MW-18001 ■ JCW-MW-18004 ■ JCW-MW-18005 ■ JCW-MW-18006

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ OW-57R Out

The concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Constituent-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events were retained for further analysis (Attachment 1). Direct comparison GWPS exceedances include the following constituent well combinations:

- Boron in MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, OW-57R OUT, JCW-MW-18001, JCW-MW-18005, and JCW-MW-18006;
- Calcium in JCW-MW-18001;
- Sulfate in JCW-MW-18001;
- Arsenic in MW-55 and JCW-MW-18006;
- Molybdenum in MW-55; and,
- Iron in MW-55.

The purpose of assessment monitoring is to assess whether constituent concentrations in groundwater from prior operations are above a risk-based standard (i.e. GWPS). As detailed in the *Alternate Source Demonstration* (TRC, December 2019), the arsenic and molybdenum concentrations at MW-55 are not the result of a release from the unit; therefore, comparison of these concentrations to the GWPS is not appropriate and assessment monitoring confidence intervals were not calculated.

The software outputs for the assessment monitoring data evaluation 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. Visual trends were apparent in multiple wells for arsenic, boron, calcium, and sulfate. These data sets were tested further in Sanitas™ utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test for significance of the trend at the 98% confidence level. The trend tests show that the trends for boron at MW-55, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001 are statistically significant (Attachment 1). The trends are causing the confidence intervals to widen. Calculating a confidence interval around a trending data set incorporates not only variability present naturally in the underlying dataset, but also incorporates variability due to the trend itself. Based on the observed trends, confidence bands were selected as a more appropriate assessment for boron at MW-55, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001. Confidence bands are selected by the Unified Guidance as the appropriate method for calculating confidence intervals on trending data. A confidence band calculates upper and lower confidence limits at each point along the trend to reduce variability and create a narrower confidence interval.

The Sanitas<sup>™</sup> software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-53, MW-54R, and OW-57R OUT
	Arsenic at JCW-MW-18006
	Iron at MW-55
	Boron at MW-52 (square root)
Normalized by power transformation	Boron at MW-53R (squared)
	Boron at MW-55
Not Applicable – confidence bands used	Calcium at JCW-MW-18001
	Sulfate at JCW-MW-18001

The confidence bands and interval tests compare the lower confidence limit to the GWPS. Arsenic concentrations at JCW-MW-18006 were previously considered statistically significant; however, the lower confidence limit has been at or below the GWPS since the second guarter 2021. Calcium concentrations at MW-51 were previously considered statistically significant; however, calcium concentrations are generally decreasing and the lower confidence limit has been below the GWPS since the first guarter 2022. Concentration trends will continue to be monitored. Statistically significant exceedances of the GWPS were noted for boron at JCW-MW-18001, JCW-MW-18005, JCW-MW-18006, MW-50, MW-51, MW-52, MW-53, MW-53R, MW-54R, MW-55, and OW-57R OUT, calcium at JCW-MW-18001, and sulfate at JCW-MW-18001. Boron concentrations have been consistently above the GWPS since monitoring under the February 2021 HMP began. Calcium at JCW-MW-18001 was a confirmed GWPS exceedance in first quarter 2023 resulting from increases in calcium concentration since first quarter 2021. Sulfate at JCW-MW-18001 was a confirmed GWPS exceedance in second quarter 2023 resulting from increases in sulfate concentrations. As noted in the Alternate Source Demonstration (Fourth Quarter 2023 Hydrogeological Monitoring Report for the Weadock Landfill, TRC, January 2024), multiple lines of evidence indicate that the increase in sulfate concentration is not a result of a change in flux from the landfill and is instead the result of changing groundwater conditions outside the slurry wall. Corrective action has been triggered for the site as a result of data collected during the initial May 2018 assessment monitoring event. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

### **GSI Statistical Evaluation**

Eight monitoring wells located along the surface water features adjacent to the Weadock Landfill are included in the GSI monitoring program to meet the requirements of Part 31:

■ MW-50 ■ MW-51 ■ MW-52 ■ MW-53

■ MW-53R ■ MW-54R ■ MW-55 ■ JCW-MW-18004

The concentrations from each well were first compared directly to the GSI criteria, as shown on Table 2. Constituent-well combinations that included a direct exceedance of the GSI criteria within the past eight monitoring events were retained for further analysis (Attachment 2). Direct comparison GSI criteria exceedances include the following constituent well combinations:

■ Arsenic in MW-55

The purpose of the GSI statistical evaluation is to assess compliance with the GSI pathway. Although the *Alternate Source Demonstration* supports that the arsenic concentrations at MW-55 are not the result of a release from the unit, these concentrations still affect compliance with the GSI pathway. Therefore, it is appropriate to calculate confidence limits for arsenic at MW-55 for comparison to the GSI criteria.

The software outputs for the assessment monitoring data evaluation are included in Attachment 2 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 2.

The Sanitas<sup>™</sup> 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 distributions are as follows:

Distribution	Constituent-Well Combinations
Normal	Arsenic at MW-55

The confidence interval tests compare the lower confidence limit to the GSI. The statistical evaluation found that no constituents were present at statistically significant levels exceeding the site-specific GSI criteria. Arsenic concentrations at MW-55 were previously considered statistically significant; however, the arsenic and molybdenum concentrations decreased in 2022 and 2023. The lower confidence limits for arsenic continued to be below the GWPS in fourth quarter 2023.

### **Attachments**

Table 1 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Table 2 Comparison of Groundwater Sampling Results to GSI

Attachment 1 Assessment Monitoring Sanitas™ Output Files

Attachment 2 GSI Evaluation Sanitas™ Output Files

# **Tables**

Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards

JC Weadock Landfill – Hydrogeological Monitoring Program

Essexville, Michigan

									e, Michigan									
		Sample Location:			-		-			MW	-50				-			
		Sample Date:	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022	10/10/2022	3/8/2023	3/8/2023	5/8/2023	5/8/2023	7/26/2023	7/26/2023	10/9/2023	10/9/2023
Constituent	Unit	GWPS																
Appendix III <sup>(1)</sup>				Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720	1,720	1,690	2,070	2,060
Calcium	mg/L	280	186	185	169	175	161	164	186	181	152		142	144	188	187	205	206
Chloride	mg/L	2,300	54.9	55.6	53.3	51.6	54.2	54.9	47.7	47.6	35.9	36.7	31.5	31.9	37.4	39.1	37.6	37
Fluoride	ug/L	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
Sulfate	mg/L	780	346	330	285	286	324	325	376	376	341	315	314	316	392	385	470	472
Total Dissolved Solids	mg/L	4,700	999	1,010	1,020	1,050	1,080	1,040	1,120	1,150	939	984	878	880	1,100	1,110	1,170	1,190
pH, Field	SU	6.5 - 8.5	7.4		7.2		7.0		7.3		7.3		7.4		7.4		7.0	
Appendix IV <sup>(1)</sup>																		
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	2	2	1	1	2	2	3	3	2	2	2	2	3	3	3	3
Barium	ug/L	2,000	115	117	86	86	90	94	106	108	89	92	114	87	114	113	135	136
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	77	77	69	66	64	61	62	62	65	65	55	54	58	59	59	59
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA			< 0.310	< 0.287			0.158	0.343			0.155	0.144	-		0.291	0.320
Radium-228	pCi/L	NA			< 0.493	0.648			1.14	1.37			0.686	< 0.606			1.15	1.46
Radium-226/228	pCi/L	5.0			0.518	0.904			1.30	1.72			0.841	0.633			1.44	1.78
Selenium	ug/L	50	2	2	2	2	2	2	2	2	1	1	1	2	1	1	< 1	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)																	
Iron	ug/L	28,000	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756	1,960	1,900	2,300	2,340
Copper	ug/L	1,000	< 1	< 1	1	1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	2	2	1	1
Nickel	ug/L	100	< 2	19	< 2	6	6	7	4	7	< 2	< 2	3	< 2	2	< 2	< 2	2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

				2000/11/11	ie, iviiciligati					
		Sample Location:				MW	<i>I</i> -51			
		Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/26/2023	10/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,420	1,350	1,270	1,490	1,320	1,230	1,180	1,170
Calcium	mg/L	280	255	247	211	211	169	166	162	132
Chloride	mg/L	2,300	91.1	92.8	102	101	98.4	99.9	97	91.6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	446	420	404	394	360	356	308	267
Total Dissolved Solids	mg/L	4,700	1,480	1,510	1,450	1,380	1,180	1,240	1,100	952
pH, Field	SU	6.5 - 8.5	7.4	7.2	7.0	7.2	7.2	7.3	7.4	7.2
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	12	10	15	18	10	8	10	18
Barium	ug/L	2,000	198	150	169	188	178	180	141	141
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	1	< 1	< 1	< 1	< 1	2	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	58	56	53	50	46	40	40	34
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.423		< 0.397		0.143		0.285
Radium-228	pCi/L	NA		< 0.494		2.19		1.01		1.23
Radium-226/228	pCi/L	5.0		0.576		2.51		1.15		1.52
Selenium	ug/L	50	3	2	2	1	2	1	< 1	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	2)									
Iron	ug/L	28,000	1,310	1,210	1,860	2,880	514	450	1,290	1,660
Copper	ug/L	1,000	< 1	2	< 1	1	< 1	1	3	2
Nickel	ug/L	100	< 2	< 2	6	4	< 2	3	4	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

I <del></del>		-			e, Michigan					
		Sample Location:		1	1	MW	-52	1	_	•
		Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,310	1,090	1,070	1,330	1,040	993	1,030	1,140
Calcium	mg/L	280	251	231	222	224	228	217	247	234
Chloride	mg/L	2,300	51.6	50.5	45.1	40.4	36.3	32.4	31.5	30.2
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	654	591	663	603	581	581	569	572
Total Dissolved Solids	mg/L	4,700	1,520	1,490	1,580	1,670	1,430	1,430	1,520	1,440
pH, Field	SU	6.5 - 8.5	7.1	7.0	6.7	6.9	6.8	6.9	6.6	6.8
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	170	107	118	122	102	95	99	108
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	27	25	29	26	27	23	27	27
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.489		0.205		< 0.128		0.444
Radium-228	pCi/L	NA		< 0.532		< 0.694		< 0.594		1.64
Radium-226/228	pCi/L	5.0		0.875		0.805		< 0.594		2.08
Selenium	ug/L	50	2	2	2	2	1	< 1	< 1	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	2,870	2,030	5,020	6,340	2,820	2,720	6,720	7,560
Copper	ug/L	1,000	1	2	2	2	1	1	2	1
Nickel	ug/L	100	< 2	< 2	5	3	< 2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

				L336AVIIIC,	<u> </u>					
		Sample Location:		1	ı	MW	I-53	1		
		Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	4,100	3,880	4,300	4,140	2,150	2,620	4,370	5,530
Calcium	mg/L	280	146	147	116	108	82.5	104	146	136
Chloride	mg/L	2,300	81.1	50.9	66.5	53	24.8	56.5	80.3	77.4
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	39.5	215	119	126	93.6	50.8	7.39	2.28
Total Dissolved Solids	mg/L	4,700	768	886	820	740	489	613	792	722
pH, Field	SU	6.5 - 8.5	7.4	7.3	7.1	7.3	7.3	7.4	7.1	7.3
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	1	< 1	1	2	< 1	< 1	1	1
Barium	ug/L	2,000	401	356	313	285	202	272	692	719
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	48	41	42	38	33	34	44	42
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	7	< 5	< 5	< 5
Radium-226	pCi/L	NA		0.406		0.269		0.198		0.679
Radium-228	pCi/L	NA		< 0.518		1.15		< 0.518		1.72
Radium-226/228	pCi/L	5.0		0.824		1.42		0.700		2.40
Selenium	ug/L	50	3	1	3	1	1	2	2	2
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters (2)	)									
Iron	ug/L	28,000	1,130	1,060	1,240	1,140	403	569	1,390	1,080
Copper	ug/L	1,000	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	< 2	< 2	4	2	< 2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents

 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

		0	MW-53R									
		Sample Location:				1			1			
	<u> </u>	Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023		
Constituent	Unit	GWPS										
Appendix III <sup>(1)</sup>												
Boron	ug/L	560	2,330	1,830	1,560	2,340	2,330	2,140	2,190	2,420		
Calcium	mg/L	280	188	226	219	203	195	202	220	206		
Chloride	mg/L	2,300	39.9	41.6	50.4	39.2	27.2	30	34.6	35.5		
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000		
Sulfate	mg/L	780	71.7	314	533	250	101	185	217	221		
Total Dissolved Solids	mg/L	4,700	709	1,290	1,530	1,160	960	1,060	1,150	1,090		
pH, Field	SU	6.5 - 8.5	7.1	6.9	6.7	6.8	6.7	6.8	6.7	7.0		
Appendix IV <sup>(1)</sup>												
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Arsenic	ug/L	21	10	8	17	20	17	14	17	16		
Barium	ug/L	2,000	203	147	97	118	179	174	144	110		
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Chromium	ug/L	100	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1		
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6		
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000		
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Lithium	ug/L	180	56	61	70	63	59	56	62	61		
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5		
Radium-226	pCi/L	NA		< 0.325		0.239		0.275		0.174		
Radium-228	pCi/L	NA		< 0.480		0.967		0.490		0.968		
Radium-226/228	pCi/L	5.0		< 0.480		1.21		0.765		1.14		
Selenium	ug/L	50	2	2	2	2	1	1	2	1		
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		
MI Part 115 Parameters	(2)											
Iron	ug/L	28,000	1,080	460	1,030	702	1,580	1,410	1,180	834		
Copper	ug/L	1,000	2	2	2	1	1	1	1	1		
Nickel	ug/L	100	< 2	< 2	5	3	< 2	< 2	< 2	< 2		
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					e, Michigan								
		Sample Location:	MW-54R										
		Sample Date:	3/9/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023			
Constituent	Unit	GWPS											
Appendix III <sup>(1)</sup>													
Boron	ug/L	560	4,720	4,110	4,970	5,310	5,660	5,240	6,170	5,520			
Calcium	mg/L	280	186	169	158	160	168	163	162	165			
Chloride	mg/L	2,300	49.8	35.8	43.9	47.4	49.6	46.5	48.5	45			
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000			
Sulfate	mg/L	780	67.1	86.3	72.1	70.9	62	67.2	73.8	67.4			
Total Dissolved Solids	mg/L	4,700	776	712	800	799	770	759	761	756			
pH, Field	SU	6.5 - 8.5	6.9	7.0	6.9	6.9	6.8	6.9	6.8	7.0			
Appendix IV <sup>(1)</sup>													
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			
Arsenic	ug/L	21	1	< 1	2	2	1	< 1	< 1	1			
Barium	ug/L	2,000	154	111	109	123	126	98	106	113			
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			
Chromium	ug/L	100	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1			
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6			
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000			
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			
Lithium	ug/L	180	74	64	74	74	71	65	75	70			
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			
Molybdenum	ug/L	73	7	9	10	12	15	13	15	17			
Radium-226	pCi/L	NA		< 0.347		0.208		< 0.141		0.16			
Radium-228	pCi/L	NA		< 0.552		1.31		< 0.836		1.38			
Radium-226/228	pCi/L	5.0		< 0.552		1.52		< 0.836		1.54			
Selenium	ug/L	50	2	2	1	2	1	1	1	1			
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2			
MI Part 115 Parameters	(2)												
Iron	ug/L	28,000	496	121	367	1,090	262	74	111	829			
Copper	ug/L	1,000	1	1	1	1	2	1	6	2			
Nickel	ug/L	100	< 2	< 2	2	< 2	< 2	< 2	< 2	2			
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2			
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					Essexville, iviicilly	juii					
		Sample Location:					MW-55				
		Sample Date:	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>						Field Dup					
Boron	ug/L	560	826	642	709	687	976	1,110	1,140	1,290	1,200
Calcium	mg/L	280	163	177	159	165	141	162	165	150	163
Chloride	mg/L	2,300	20.2	11.8	11.8	11.8	12.5	24.2	16.9	18.5	16.7
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	35.4	249	248	245	108	94.6	208	129	156
Total Dissolved Solids	mg/L	4,700	808	942	930	1,040	786	898	929	827	846
pH, Field	SU	6.5 - 8.5	7.1	7.0	6.9		7.0	6.8	6.9	6.9	7.0
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	88	48	80	78	126	68	44	75	75
Barium	ug/L	2,000	299	222	232	231	223	287	267	240	248
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	28	24	29	28	30	27	24	27	26
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	89	78	80	78	91	50	30	33	56
Radium-226	pCi/L	NA		< 0.478			0.365		0.276		0.406
Radium-228	pCi/L	NA		< 0.646			0.966		< 0.916		1.26
Radium-226/228	pCi/L	5.0		0.696			1.33		< 0.916		1.67
Selenium	ug/L	50	1	3	3	4	< 1	3	< 1	1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)										
Iron	ug/L	28,000	29,800	15,000	18,000	16,600	22,100	24,800	21,600	21,900	16,800
Copper	ug/L	1,000	< 1	1	< 1	1	1	< 1	< 1	< 1	< 1
Nickel	ug/L	100	4	3	6	6	4	4	5	22	3
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018
  Section 11511a(3)(c) and 11519b(2) additional detection monitoring
  constituents (iron) and assessment monitoring constituents
  (copper, nickel, silver, vanadium, and zinc) are reported.

				ESSEXVIII	e, iviicnigan							
		Sample Location:		OW-57R OUT								
		Sample Date:	3/9/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023		
Constituent	Unit	GWPS										
Appendix III <sup>(1)</sup>												
Boron	ug/L	560	2,030	1,990	1,570	1,830	1,860	1,740	1,750	1,790		
Calcium	mg/L	280	126	131	113	114	116	117	124	120		
Chloride	mg/L	2,300	62.5	57.3	52.0	47.6	59	64.2	53.7	50.6		
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000		
Sulfate	mg/L	780	83.1	69.4	85.0	86.8	79.7	80.5	79	94.8		
Total Dissolved Solids	mg/L	4,700	1,030	702	714	722	790	743	762	758		
pH, Field	SU	6.5 - 8.5	7.2	7.1	6.8	6.9	6.9	7.1	6.9	7.0		
Appendix IV <sup>(1)</sup>												
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Barium	ug/L	2,000	85	79	67	75	75	72	72	77		
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Chromium	ug/L	100	1	2	1	< 1	4	< 1	< 1	< 1		
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6		
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000		
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1		
Lithium	ug/L	180	26	27	23	22	26	23	24	23		
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Molybdenum	ug/L	73	8	7	7	8	6	6	6	7		
Radium-226	pCi/L	NA		< 0.440		0.199		0.149		< 0.155		
Radium-228	pCi/L	NA		< 0.539		< 0.711		< 0.663		0.586		
Radium-226/228	pCi/L	5.0		< 0.539	-	0.870		< 0.663		0.680		
Selenium	ug/L	50	1	3	1	2	2	2	1	< 1		
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		
MI Part 115 Parameters	(2)											
Iron	ug/L	28,000	96	74	37	42	53	78	30	40		
Copper	ug/L	1,000	2	2	1	2	1	1	1	2		
Nickel	ug/L	100	17	14	17	16	15	15	13	15		
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

-					e, Michigan					
		Sample Location:				JCW-MV	V-18001			
		Sample Date:	3/7/2022	5/9/2022	8/1/2022	10/10/2022	3/8/2023	5/8/2023	7/26/2023	10/5/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	1,670	1,560	1,470	1,790	1,440	1,380	1,470	1,620
Calcium	mg/L	280	412	335	389	465	486	496	555	562
Chloride	mg/L	2,300	60.0	58.8	64.6	63.6	54.2	51.1	58.9	51.1
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	1,080	752	1,180	1,400	1,640	1,670	1,770	1,890
Total Dissolved Solids	mg/L	4,700	2,310	1,970	2,580	3,020	3,030	1,580	3,530	3,430
pH, Field	SU	6.5 - 8.5	6.8	7.0	6.6	6.8	6.7	6.7	6.8	6.5
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1
Barium	ug/L	2,000	129	80	61	66	47	50	49	48
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	87	76	95	97	91	83	102	110
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.327		< 0.142		< 0.122		< 0.139
Radium-228	pCi/L	NA		0.494		0.852		< 0.547		0.783
Radium-226/228	pCi/L	5.0		0.586		0.893		< 0.547		0.886
Selenium	ug/L	50	2	2	3	1	2	2	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	86	210	196	818	830	1,180	2,790	3,840
Copper	ug/L	1,000	2	3	2	3	2	3	2	2
Nickel	ug/L	100	6	8	14	15	< 2	< 2	41	3
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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 and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					e, Michigan					
		Sample Location:				JCW-MV	V-18004			
		Sample Date:	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	GWPS								
Appendix III <sup>(1)</sup>										
Boron	ug/L	560	259	226	313	343	180	227	310	319
Calcium	mg/L	280	236	235	215	193	221	265	229	218
Chloride	mg/L	2,300	19.6	10.8	12.5	11.4	12.7	16.8	14.2	15.8
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	537	512	512	428	533	722	478	466
Total Dissolved Solids	mg/L	4,700	1,280	1,290	1,290	1,130	1,250	1,530	1,220	1,160
pH, Field	SU	6.5 - 8.5	6.9	6.8	6.7	6.8	6.8	6.8	6.8	7.0
Appendix IV <sup>(1)</sup>										
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	ug/L	2,000	32	26	31	37	24	28	30	34
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	34	42	51	46	39	42	50	49
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.417		< 0.135		< 0.131		< 0.155
Radium-228	pCi/L	NA		0.790		< 0.742		< 0.600		1.24
Radium-226/228	pCi/L	5.0		0.910		< 0.742		< 0.600		1.30
Selenium	ug/L	50	2	2	1	1	11	2	2	< 1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	(2)									
Iron	ug/L	28,000	952	< 20	45	< 20	46	67	24	36
Copper	ug/L	1,000	1	2	2	2	1	2	2	2
Nickel	ug/L	100	4	< 2	2	5	< 2	< 2	< 2	< 2
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

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downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules and the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

					Essexville, iviicilly	un					
		Sample Location:				,	JCW-MW-1800	5			
		Sample Date:	3/7/2022	3/7/2022	5/10/2022	8/2/2022	10/11/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	GWPS									
Appendix III <sup>(1)</sup>				Field Dup							
Boron	ug/L	560	1,030	1,100	1,010	981	1,290	930	992	1,170	1,470
Calcium	mg/L	280	159	164	280	165	150	262	258	202	159
Chloride	mg/L	2,300	61.7	60.7	32.6	50.9	53.9	25.4	22.3	44.1	48.1
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	780	204	211	437	213	160	435	422	216	154
Total Dissolved Solids	mg/L	4,700	942	934	1,330	967	868	1,250	1,190	1,000	884
pH, Field	SU	6.5 - 8.5	7.1		6.8	6.7	6.8	6.6	6.8	6.8	6.9
Appendix IV <sup>(1)</sup>											
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	5	5	5	4	5	4	2	< 1	1
Barium	ug/L	2,000	108	110	110	71	80	115	105	76	74
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	32	30	33	32	32	36	33	33	32
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	5	5	6	< 5	5	6	5	< 5	< 5
Radium-226	pCi/L	NA			< 0.414		0.193		0.134		0.221
Radium-228	pCi/L	NA			< 0.521		< 0.800		< 0.573		1.17
Radium-226/228	pCi/L	5.0			0.622		< 0.800	-	< 0.573		1.39
Selenium	ug/L	50	3	3	2	< 1	2	3	2	2	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	2)										
Iron	ug/L	28,000	3,300	3,170	1,680	2,810	3,220	1,720	676	171	948
Copper	ug/L	1,000	< 1	< 1	2	< 1	< 1	1	< 1	2	1
Nickel	ug/L	100	10	25	< 2	9	11	< 2	9	8	9
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018
  Section 11511a(3)(c) and 11519b(2) additional detection monitoring
  constituents (iron) and assessment monitoring constituents
  (copper, nickel, silver, vanadium, and zinc) are reported.

Table 1

Comparison of Groundwater Sampling Results to Groundwater Protection Standards

JC Weadock Landfill – Hydrogeological Monitoring Program

Essexville, Michigan

							2000///	ie, iviiciligan								
		Sample Location:							JCW-M	W-18006						
		Sample Date:	3/7/2022	5/9/2022	5/9/2022	8/2/2022	10/11/2022	10/11/2022	3/9/2023	3/9/2023	5/9/2023	5/9/2023	7/31/2023	7/31/2023	10/9/2023	10/9/2023
Constituent	Unit	GWPS														
Appendix III <sup>(1)</sup>					Field Dup			Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	560	3,220	2,990	3,030	2,260	2,720	2,650	1,730	1,760	2,450	2,480	2,100	2,140	2,280	2,470
Calcium	mg/L	280	143	136	136	109	118	119	121	121	118	120	126	126	117	119
Chloride	mg/L	2,300	75.0	67.3	67.7	79.0	74.2	74.7	79.9	82.8	73.6	76.6	73	75.9	72.3	71.1
Fluoride	ug/L	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	780	38.1	32.8	34.0	14.9	21.6	23.0	32.5	33.9	34.2	36.1	39.4	37.9	46.9	47.6
Total Dissolved Solids	mg/L	4,700	792	788	772	709	720	746	715	753	734	751	765	770	738	748
pH, Field	SU	6.5 - 8.5	7.1	7.0		6.7	6.9		6.9		7.0		6.9		7.0	
Appendix IV <sup>(1)</sup>																
Antimony	ug/L	6.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21	33	22	23	21	25	25	5	5	23	23	18	19	17	18
Barium	ug/L	2,000	665	514	509	452	480	499	232	238	464	465	354	346	342	381
Beryllium	ug/L	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	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	4.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	63	56	57	52	52	52	21	23	45	47	36	36	37	39
Mercury	ug/L	2.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	73	< 5	6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NA		< 0.416			0.516	0.259			0.337	< 0.192			0.506	0.431
Radium-228	pCi/L	NA		< 0.518			< 0.609	0.869			0.746	< 0.816			0.783	1.39
Radium-226/228	pCi/L	5.0		0.690			0.999	1.13			1.08	< 0.816			1.29	1.82
Selenium	ug/L	50	2	< 1	1	< 1	1	1	2	2	1	2	2	2	< 1	1
Thallium	ug/L	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters	2)															
Iron	ug/L	28,000	9,040	6,600	6,360	7,670	7,620	7,630	2,930	2,910	6,890	7,210	6,910	6,860	5,660	5,930
Copper	ug/L	1,000	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1
Nickel	ug/L	100	6	< 2	< 2	5	5	6	< 2	< 2	4	< 2	< 2	< 2	< 2	3
Silver	ug/L	34	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	6.0	4	3	3	3	3	4	< 2	2	2	3	3	3	2	2
Zinc	ug/L	2,400	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 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.

-- - not analyzed.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL, applicable Michigan Part 201 criteria, and UTL as established in TRC's Technical Memorandum dated April 23, 2021.

**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 and the HMP.

All metals were analyzed as total unless otherwise specified.

 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

# Table 2 Comparison of Groundwater Sampling Results to GSI JC Weadock Landfill – Hydrogeological Monitoring Program Essexville, Michigan

					Sample Location:								MW	-50							
					Sample Date:	3/8/2022	3/8/2022	5/9/2022	5/9/2022	8/1/2022	8/1/2022	10/10/2022		3/8/2023	3/8/2023	5/8/2023	5/8/2023	7/26/2023	7/26/2023	10/9/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**											•					
Appendix III <sup>(1)</sup>							Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Boron	ug/L	4,000	44,000	69,000	44,000	1,610	1,620	1,360	1,440	1,290	1,290	1,730	1,670	2,020	2,080	1,720	1,720	1,720	1,690	2,070	2,060
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	346	330	285	286	324	325	376	376	341	315	314	316	392	385	470	472
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.4		7.2		7.0		7.3		7.3		7.4		7.4		7.0	
Appendix IV <sup>(1)</sup>																					
Arsenic	ug/L	10	100	680	100	2	2	1	1	2	2	3	3	2	2	2	2	3	3	3	3
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	1	1	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	77	77	69	66	64	61	62	62	65	65	55	54	58	59	59	59
Molybdenum	ug/L	120	NC	NC	120	6	6	< 5	< 5	6	6	6	6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	2	2	2	2	2	2	2	2	1	1	1	2	1	1	< 1	2
MI Part 115 Parame	ters <sup>(2)</sup>																			•	
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,400	1,180	723	737	1,830	1,850	2,460	2,340	604	601	755	756	1,960	1,900	2,300	2,340
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

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### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

### NC - no criteria.

- -- not analyzed.
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

- \* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.
- F Criterion is the Final Acute Value (FAV) .
- $^{\rm H}$  Chromium GSI criterion based on hexavalent chromium per footnote {H}.
- $^{\mbox{\scriptsize EE}}$  Criterion is based on the total dissolved solids GSI value per footnote {EE}.

 $\textbf{Bold} \ \ \text{value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against}$ 

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

January 2024

# Table 2 Comparison of Groundwater Sampling Results to GSI JC Weadock Landfill – Hydrogeological Monitoring Program Essexville, Michigan

					Sample Location:	: MW-51									
					Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/26/2023	10/9/2023		
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**										
Appendix III <sup>(1)</sup>															
Boron	ug/L	4,000	44,000	69,000	44,000	1,420	1,350	1,270	1,490	1,320	1,230	1,180	1,170		
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	446	420	404	394	360	356	308	267		
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.4	7.2	7.0	7.2	7.2	7.3	7.4	7.2		
Appendix IV <sup>(1)</sup>															
Arsenic	ug/L	10	100	680	100	12	10	15	18	10	8	10	18		
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	1	< 1	< 1	< 1	< 1	2	< 1		
Lithium	ug/L	440	NC	NC	440	58	56	53	50	46	40	40	34		
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5		
Selenium	ug/L	5.0	55	120	55	3	2	2	1	2	1	< 1	< 1		
MI Part 115 Paramet	ers <sup>(2)</sup>	_				_									
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,310	1,210	1,860	2,880	514	450	1,290	1,660		
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		

### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

January 2024

# Table 2 Comparison of Groundwater Sampling Results to GSI JC Weadock Landfill – Hydrogeological Monitoring Program Essexville, Michigan

					Sample Location:				MW	<b>I-52</b>			
					Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**							•	
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	1,310	1,090	1,070	1,330	1,040	993	1,030	1,140
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	654	591	663	603	581	581	569	572
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.0	6.7	6.9	6.8	6.9	6.6	6.8
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	27	25	29	26	27	23	27	27
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	2	2	2	2	1	< 1	< 1	< 1
MI Part 115 Paramet	ters <sup>(2)</sup>	•											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	2,870	2,030	5,020	6,340	2,820	2,720	6,720	7,560
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

assessment monitoring constituents (vanadium and zinc) are reported.

					Sample Location:				MW	1-53			
					Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**			•					
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	4,100	3,880	4,300	4,140	2,150	2,620	4,370	5,530
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	39.5	215	119	126	93.6	50.8	7.39	2.28
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.4	7.3	7.1	7.3	7.3	7.4	7.1	7.3
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	1	< 1	1	2	< 1	< 1	1	1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	48	41	42	38	33	34	44	42
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	7	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	3	1	3	1	1	2	2	2
MI Part 115 Paramet	ters <sup>(2)</sup>	_											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,130	1,060	1,240	1,140	403	569	1,390	1,080
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

					Sample Location:				MW-	-53R			
					Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/8/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													1
Boron	ug/L	4,000	44,000	69,000	44,000	2,330	1,830	1,560	2,340	2,330	2,140	2,190	2,420
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	71.7	314	533	250	101	185	217	221
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	6.9	6.7	6.8	6.7	6.8	6.7	7.0
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	10	8	17	20	17	14	17	16
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	56	61	70	63	59	56	62	61
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5
Selenium	ug/L	5.0	55	120	55	2	2	2	2	1	1	2	1
MI Part 115 Paramet	ers <sup>(2)</sup>												1
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	1,080	460	1,030	702	1,580	1,410	1,180	834
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

					Sample Location:				MW-	-54R			
					Sample Date:	3/8/2022	5/9/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	4,720	4,110	4,970	5,310	5,660	5,240	6,170	5,520
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	67.1	86.3	72.1	70.9	62	67.2	73.8	67.4
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	7.0	6.9	6.9	6.8	6.9	6.8	7.0
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	1	< 1	2	2	1	< 1	< 1	1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	2	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	74	64	74	74	71	65	75	70
Molybdenum	ug/L	120	NC	NC	120	7	9	10	12	15	13	15	17
Selenium	ug/L	5.0	55	120	55	2	2	1	2	1	1	1	1
MI Part 115 Paramet	ters <sup>(2)</sup>					_							
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	496	121	367	1,090	262	74	111	829
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

i <del></del>														
					Sample Location:					MW-55				
					Sample Date:	3/7/2022	5/10/2022	8/1/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**									
Appendix III <sup>(1)</sup>									Field Dup					
Boron	ug/L	4,000	44,000	69,000	44,000	826	642	709	687	976	1,110	1,140	1,290	1,200
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	35.4	249	248	245	108	94.6	208	129	156
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	7.1	7.0	6.9		7.0	6.8	6.9	6.9	7.0
Appendix IV <sup>(1)</sup>														
Arsenic	ug/L	10	100	680	100	88	48	80	78	126	68	44	75	75
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	28	24	29	28	30	27	24	27	26
Molybdenum	ug/L	120	NC	NC	120	89	78	80	78	91	50	30	33	56
Selenium	ug/L	5.0	55	120	55	1	3	3	4	< 1	3	< 1	1	1
MI Part 115 Paramet	ters <sup>(2)</sup>													
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	29,800	15,000	18,000	16,600	22,100	24,800	21,600	21,900	16,800
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

\*\* GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

F - Criterion is the Final Acute Value (FAV) .

 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

**Bold** value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

					Sample Location:				JCW-MV	V-18004			
					Sample Date:	3/7/2022	5/10/2022	8/1/2022	10/10/2022	3/9/2023	5/9/2023	7/31/2023	10/9/2023
Constituent	Unit	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III <sup>(1)</sup>													
Boron	ug/L	4,000	44,000	69,000	44,000	259	226	313	343	180	227	310	319
Sulfate	mg/L	1,200 <sup>F</sup>	NC	NC	1,200	537	512	512	428	533	722	478	466
pH, Field	SU	6.5-9.0	NC	NC	6.5-9.0	6.9	6.8	6.7	6.8	6.8	6.8	6.8	7.0
Appendix IV <sup>(1)</sup>													
Arsenic	ug/L	10	100	680	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11 <sup>H</sup>	NC	NC	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	440	NC	NC	440	34	42	51	46	39	42	50	49
Molybdenum	ug/L	120	NC	NC	120	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	ug/L	5.0	55	120	55	2	2	1	1	11	2	2	< 1
MI Part 115 Paramet	ters <sup>(2)</sup>	•											
Iron	ug/L	500,000 <sup>EE</sup>	NC	NC	500,000	952	< 20	45	< 20	46	67	24	36
Vanadium	ug/L	27	NC	NC	27	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

#### Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

NC - no criteria.

-- - not analyzed.

^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}.

\* Mixing Zone GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

 $^{\star\star}$  GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

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 $^{\rm H}$  - Chromium GSI criterion based on hexavalent chromium per footnote {H}.

 $^{\mbox{\scriptsize EE}}$  - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

Bold value indicates an exceedance of the GSI. Data from downgradient monitoring wells are screened against

the GSI for evaluation purposes only. Confidence intervals will be used to determine compliance per the HMP.

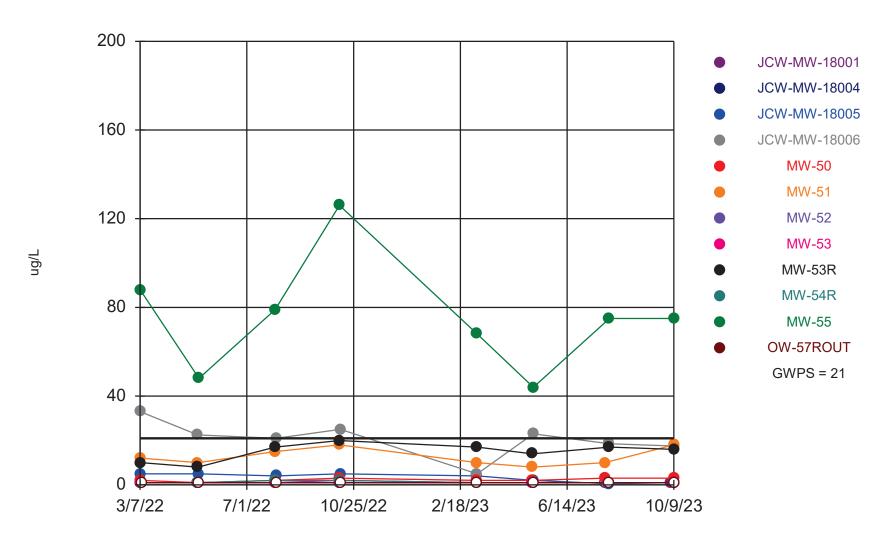
All metals were analyzed as total unless otherwise specified.

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) additional

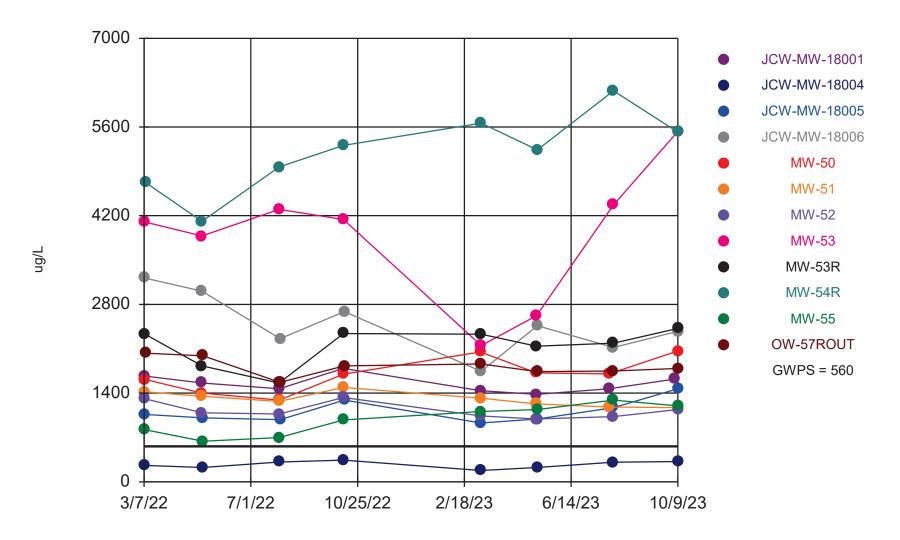
# Attachment 1 Assessment Monitoring Sanitas™ Output Files

## Arsenic Comparison to GWPS



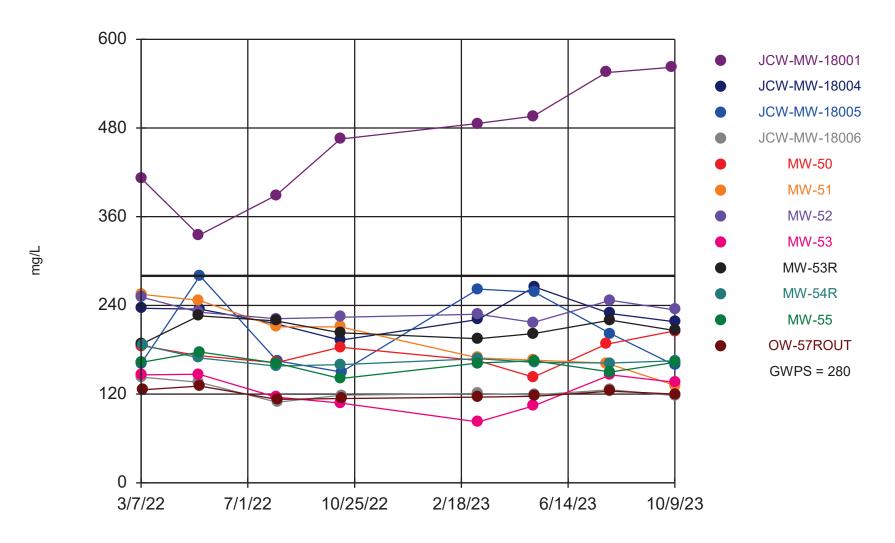
Time Series Analysis Run 11/21/2023 2:40 PM

## Boron Comparison to GWPS



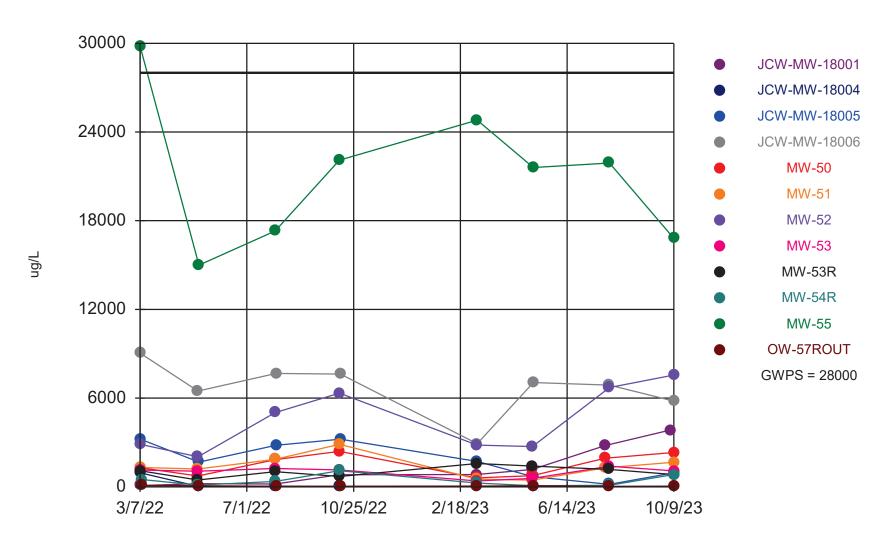
Time Series Analysis Run 11/21/2023 2:49 PM

# Calcium Comparison to GWPS



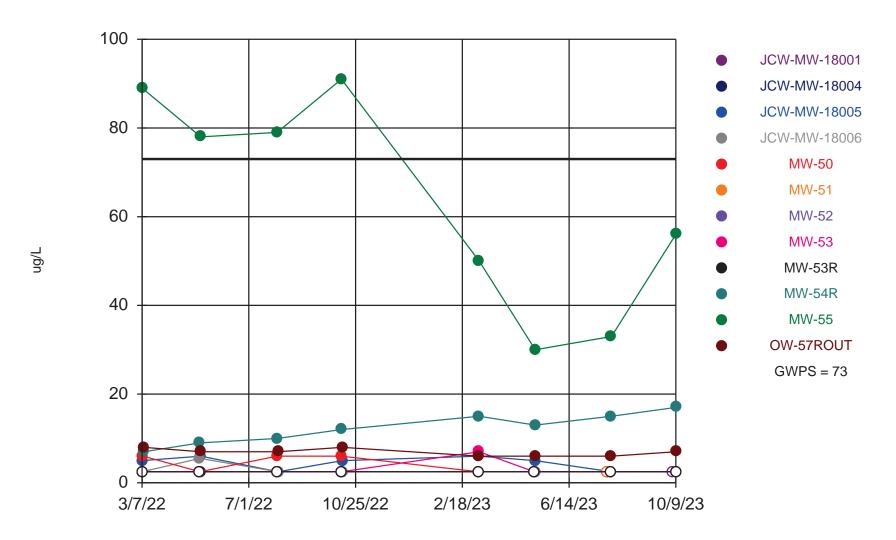
Time Series Analysis Run 11/21/2023 2:50 PM

## Iron Comparison to GWPS



Time Series Analysis Run 11/21/2023 2:47 PM

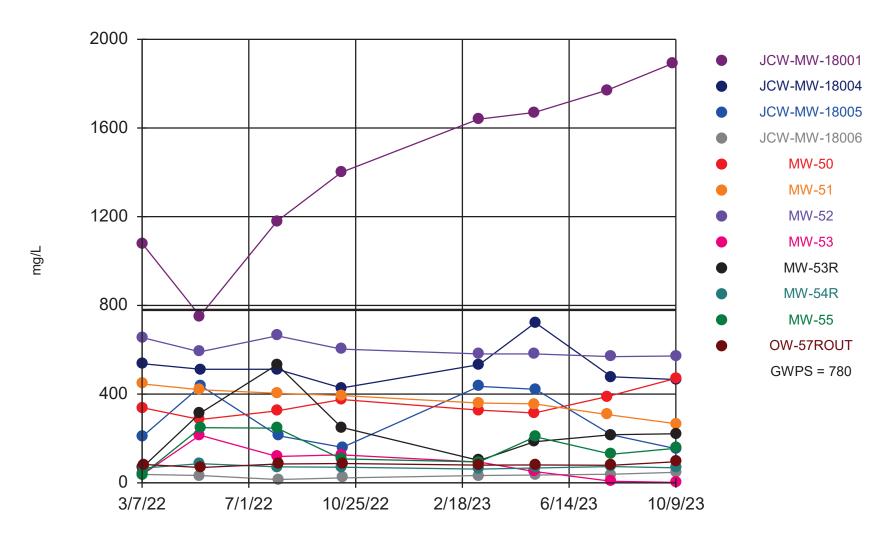
## Molybdenum, Total



Time Series Analysis Run 11/30/2023 1:33 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q4

## Sulfate Comparison to GWPS



Time Series Analysis Run 11/21/2023 2:51 PM

Constituent: Arsenic, Total Analysis Run 11/21/2023 2:54 PM
Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

Observations = 96 NDs = 39% Wells = 12 Minimum Value = 0.5 Maximum Value = 126 Mean Value = 11.29 Median Value = 1.5 Standard Deviation = 21.78 Coefficient of Variation = 1.929 Skewness = 3.084

<u>Well</u>	#Obs.	<u>NDs</u>	<u>Min</u>	Max	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	87%	1	1	1	1	0	0	NaN
JCW-MW-18004	8	100%	1	1	1	1	0	0	NaN
JCW-MW-18005	8	12%	0.5	5	3.313	4	1.87	0.5644	-0.5096
JCW-MW-18006	8	0%	5	33	20.69	21.75	7.928	0.3832	-0.5941
MW-50	8	0%	1	3	2.25	2	0.7071	0.3143	-0.324
MW-51	8	0%	8	18	12.63	11	3.889	0.308	0.4428
MW-52	8	100%	1	1	1	1	0	0	NaN
MW-53	8	37%	1	2	1.125	1	0.3536	0.3143	2.268
MW-53R	8	0%	8	20	14.88	16.5	4.016	0.27	-0.6525
MW-54R	8	37%	1	2	1.25	1	0.4629	0.3703	1.155
MW-55	8	0%	44	126	75.38	75	25.42	0.3373	0.7437
OW-57ROUT	8	100%	1	1	1	1	0	0	NaN

Constituent: Boron, Total Analysis Run 11/21/2023 2:54 PM
Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

Observations = 96 NDs = 0% Wells = 12 Minimum Value = 180 Maximum Value = 6170 Mean Value = 1966 Median Value = 1565 Standard Deviation = 1371 Coefficient of Variation = 0.6972 Skewness = 1.401

<u>Well</u>	#Obs.	<u>NDs</u>	<u>Min</u>	Max	<u>Mean</u>	Median	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0%	1380	1790	1550	1515	136.7	0.08819	0.5159
JCW-MW-18004	8	0%	180	343	272.1	284.5	57.51	0.2113	-0.3152
JCW-MW-18005	8	0%	930	1470	1114	1038	185.4	0.1665	0.9465
JCW-MW-18006	8	0%	1745	3220	2485	2420	478.1	0.1924	0.1163
MW-50	8	0%	1290	2065	1693	1703	272.8	0.1611	0.04305
MW-51	8	0%	1170	1490	1304	1295	113.6	0.08716	0.3547
MW-52	8	0%	993	1330	1125	1080	127.8	0.1136	0.7925
MW-53	8	0%	2150	5530	3886	4120	1058	0.2722	-0.337
MW-53R	8	0%	1560	2420	2143	2260	298.9	0.1395	-1.062
MW-54R	8	0%	4110	6170	5213	5275	625.5	0.12	-0.2973
MW-55	8	0%	642	1290	985.3	1043	240.3	0.2439	-0.2677
OW-57ROUT	8	0%	1570	2030	1820	1810	146.1	0.08027	-0.1111

Constituent: Calcium, Total Analysis Run 11/21/2023 2:54 PM
Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

Observations = 96 NDs = 0% Wells = 12 Minimum Value = 82.5 Maximum Value = 562 Mean Value = 199.7 Median Value = 169 Standard Deviation = 93.43 Coefficient of Variation = 0.4678 Skewness = 2.169

Well	#Obs.	<u>NDs</u>	<u>Min</u>	<u>Max</u>	Mean	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0%	335	562	462.5	475.5	79.59	0.1721	-0.2336
JCW-MW-18004	8	0%	193	265	226.5	225	20.73	0.09152	0.3199
JCW-MW-18005	8	0%	150	280	204.7	183.5	53.88	0.2633	0.3562
JCW-MW-18006	8	0%	109	143	123.8	120	10.92	0.08816	0.6054
MW-50	8	0%	143	205.5	175.6	177.8	19.07	0.1086	-0.1824
MW-51	8	0%	132	255	194.1	190	43.73	0.2253	0.1315
MW-52	8	0%	217	251	231.8	229.5	11.93	0.05146	0.5436
MW-53	8	0%	82.5	147	123.2	126	24.14	0.1959	-0.423
MW-53R	8	0%	188	226	207.4	204.5	13.2	0.06366	0.0421
MW-54R	8	0%	158	186	166.4	164	8.766	0.05269	1.499
MW-55	8	0%	141	177	160.4	162.5	10.69	0.06665	-0.4565
OW-57ROUT	8	0%	113	131	120.1	118.5	6.357	0.05292	0.5082

Constituent: Iron, Total Analysis Run 11/21/2023 2:54 PM
Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

Observations = 96 NDs = 2% Wells = 12 Minimum Value = 20 Maximum Value = 29800 Mean Value = 3412 Median Value = 1160 Standard Deviation = 5917 Coefficient of Variation = 1.734 Skewness = 2.698

<u>Well</u>	#Obs.	<u>NDs</u>	<u>Min</u>	Max	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18001	8	0%	86	3840	1244	824	1362	1.095	1.041
JCW-MW-18004	8	25%	20	952	151.3	40.5	323.9	2.142	2.257
JCW-MW-18005	8	0%	171	3235	1808	1700	1181	0.6532	0.02463
JCW-MW-18006	8	0%	2920	9040	6683	6968	1796	0.2688	-1.029
MW-50	8	0%	602.5	2400	1484	1565	734.6	0.4952	-0.005854
MW-51	8	0%	450	2880	1397	1300	775.8	0.5554	0.6005
MW-52	8	0%	2030	7560	4510	3945	2161	0.4792	0.23
MW-53	8	0%	403	1390	1002	1105	337.7	0.3372	-0.8629
MW-53R	8	0%	460	1580	1035	1055	367	0.3547	-0.04942
MW-54R	8	0%	74	1090	418.8	314.5	369.2	0.8817	0.8236
MW-55	8	0%	15000	29800	21163	21750	4801	0.2269	0.4404
OW-57ROUT	8	0%	30	96	56.25	47.5	23.62	0.4199	0.536

Constituent: Sulfate Analysis Run 11/21/2023 2:54 PM
Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

<u>Min</u>

752

Observations = 96 NDs = 0% Wells = 12 Minimum Value = 2.28 Maximum Value = 1890 Mean Value = 350.7 Median Value = 233.8 Standard Deviation = 390.8 Coefficient of Variation = 1.114 Skewness = 2.202

Well	#Obs.	<u>NDs</u>
JCW-MW-18001	8	0%
JCW-MW-18004	8	0%

JCW-MW-18004	8	0%	428	722	523.5	512	88.18	0.1685	1.485
JCW-MW-18005	8	0%	154	437	280.6	214.5	127	0.4528	0.4168
JCW-MW-18006	8	0%	14.9	47.25	32.87	34.28	10.06	0.3059	-0.5497
MW-50	8	0%	285.5	471	353.3	333	57.79	0.1636	1.008
MW-51	8	0%	267	446	369.4	377	59.47	0.161	-0.4875
MW-52	8	0%	569	663	601.8	586	36.68	0.06095	0.9033
MW-53	8	0%	2.28	215	81.7	72.2	71.54	0.8757	0.6229
MW-53R	8	0%	71.7	533	236.6	219	142.9	0.6039	1.015
MW-54R	8	0%	62	86.3	70.85	69.15	7.237	0.1021	1.161
MW-55	8	0%	35.4	249	153.3	142.5	76.38	0.4982	-0.03436
OW-57ROUT	8	0%	69.4	94.8	82.29	81.8	7.287	0.08856	-0.05038

Mean

1423

Max

1890

Std.Dev.

391.7

Median

1520

CV

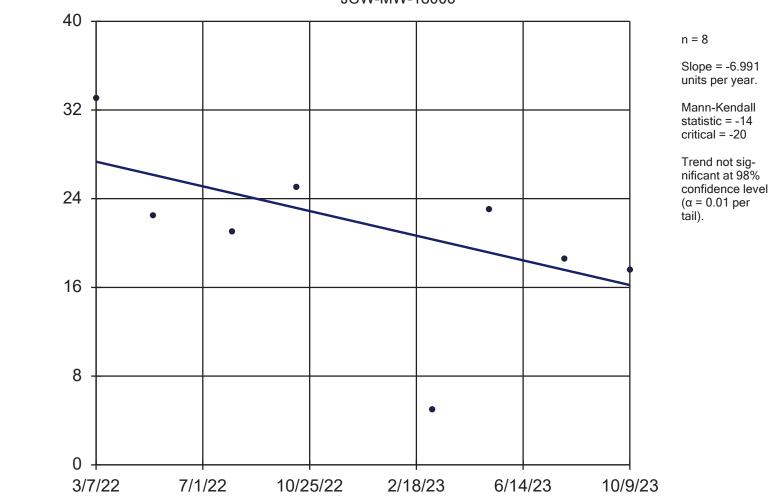
0.2753

Skewness

-0.4754

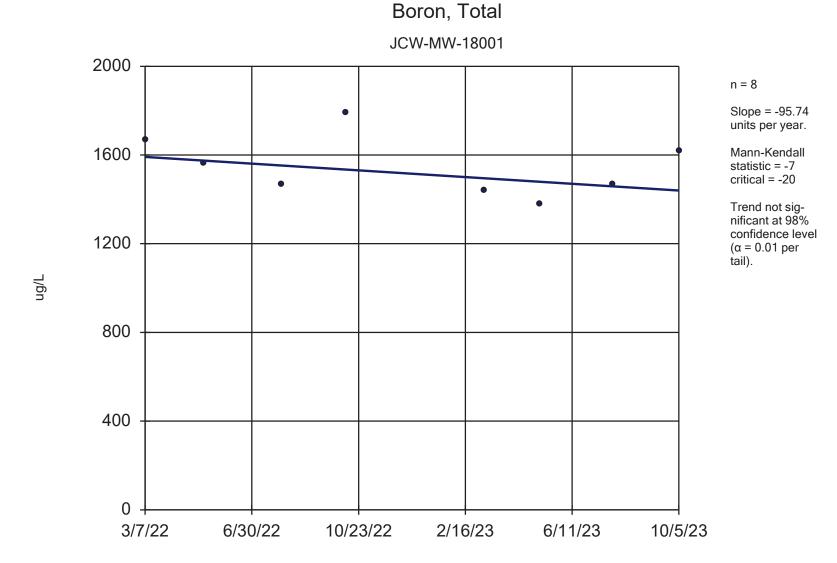


JCW-MW-18006

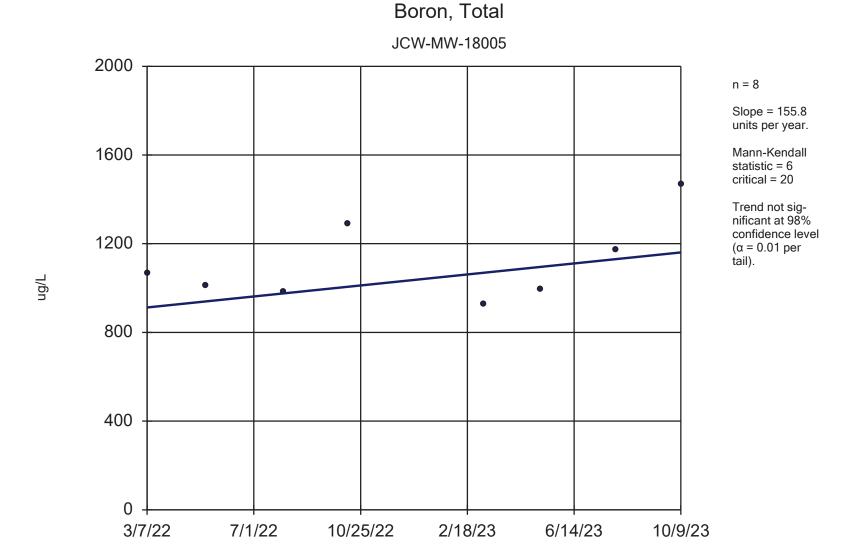


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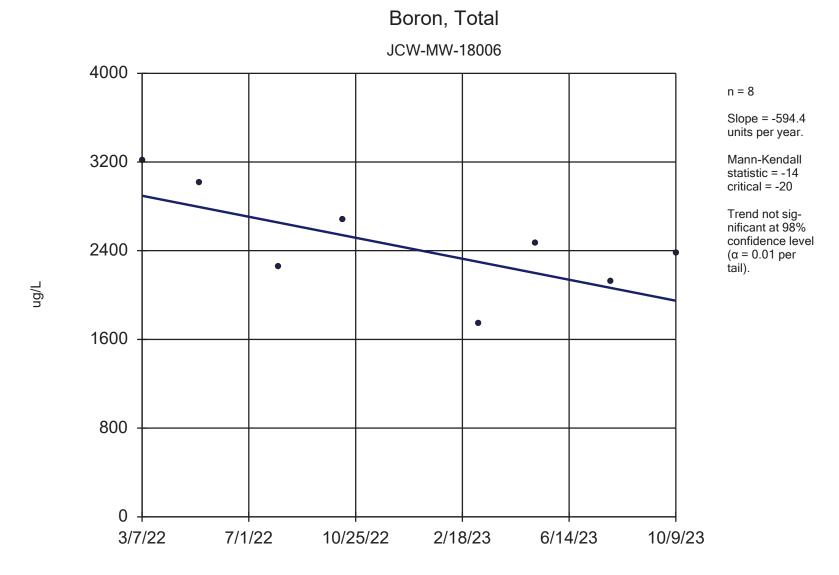
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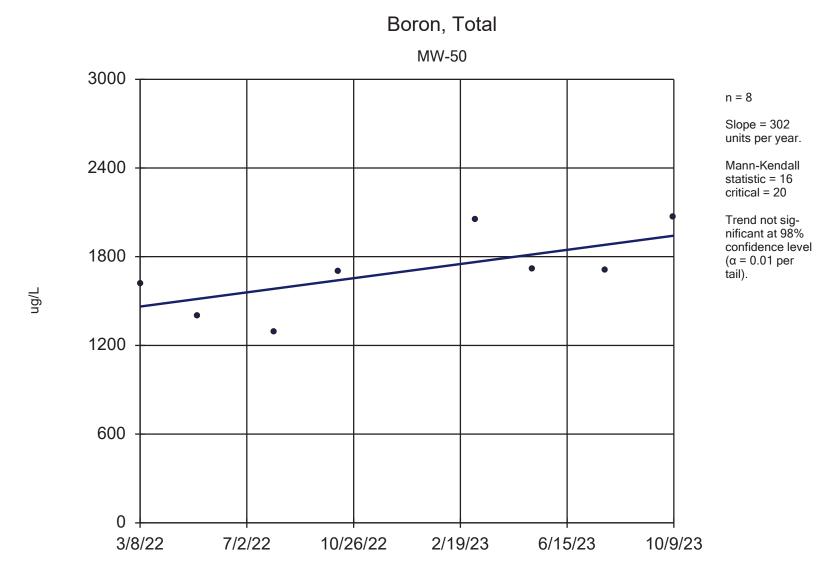
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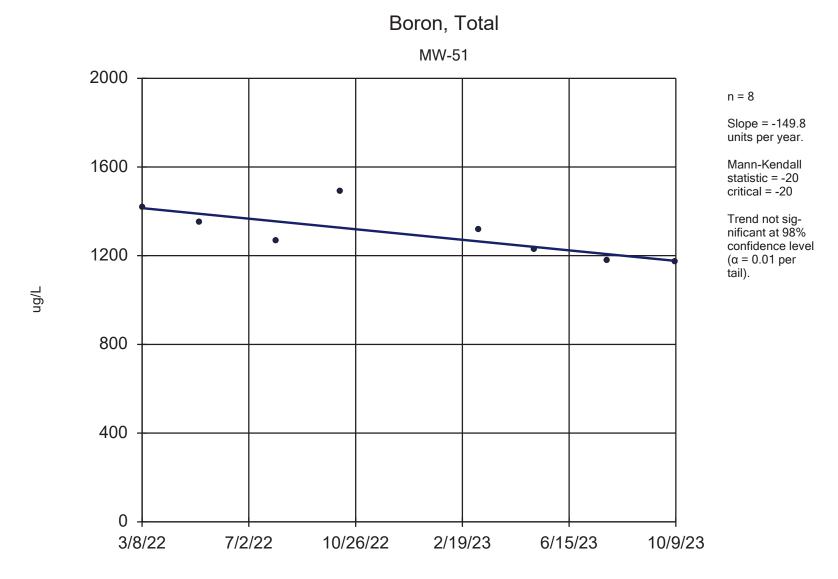
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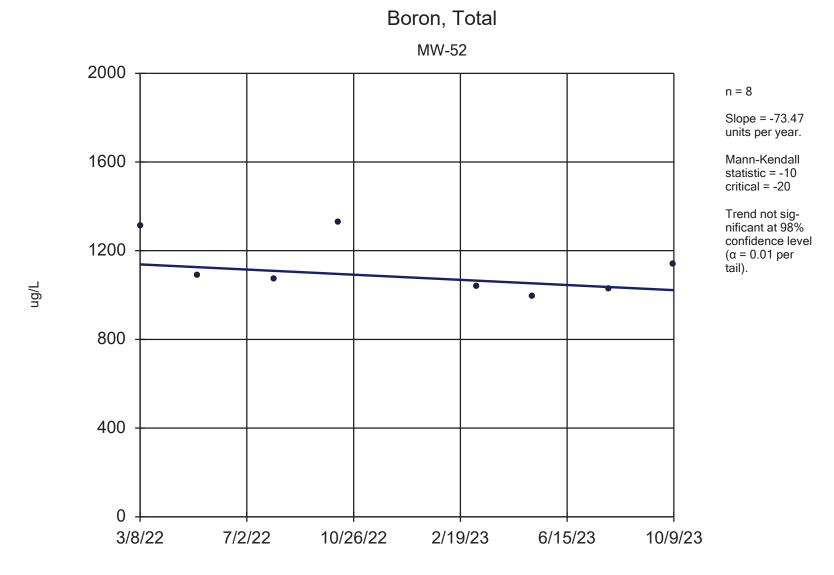
Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



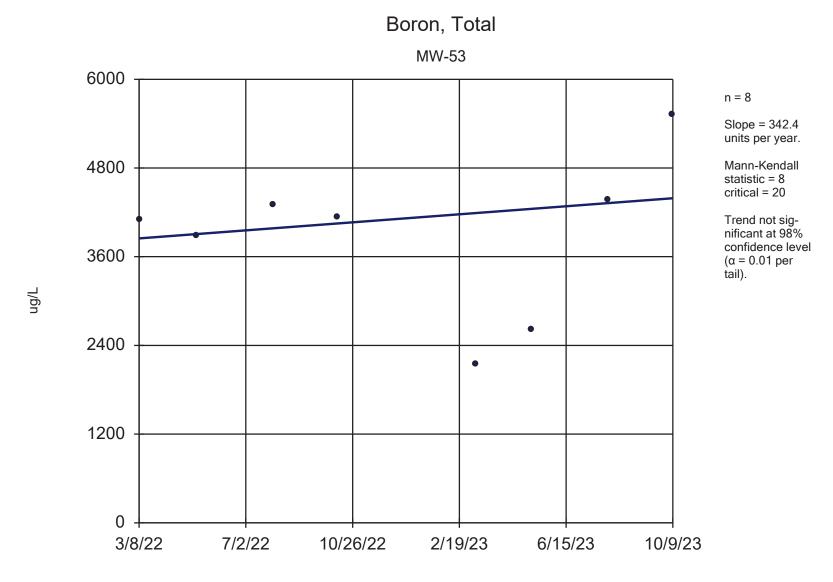
Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



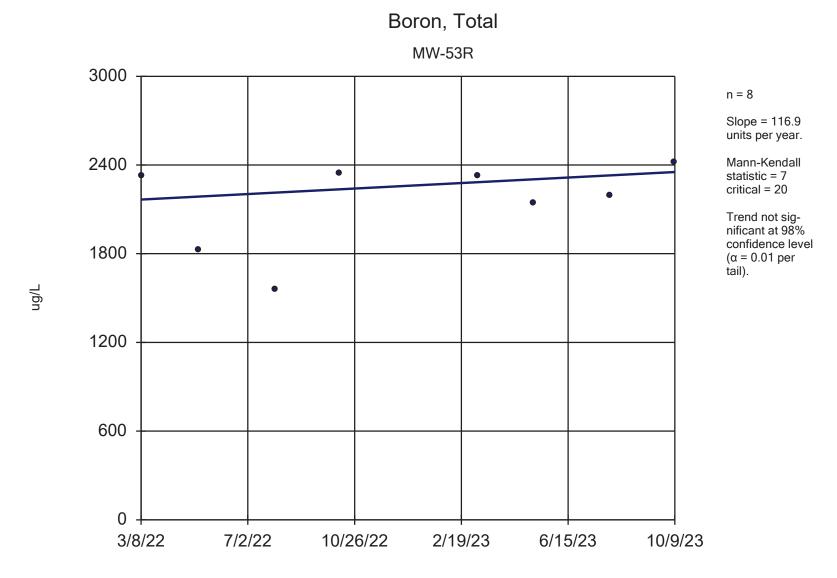
Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



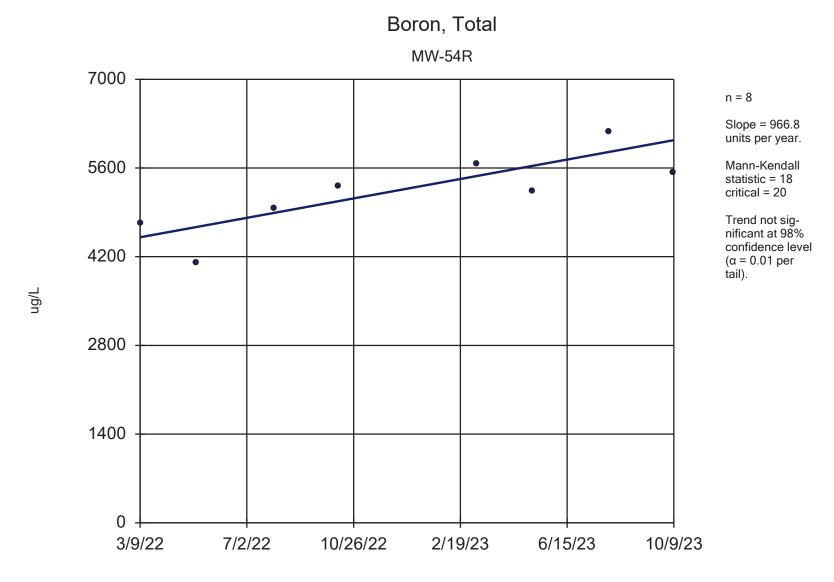
Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



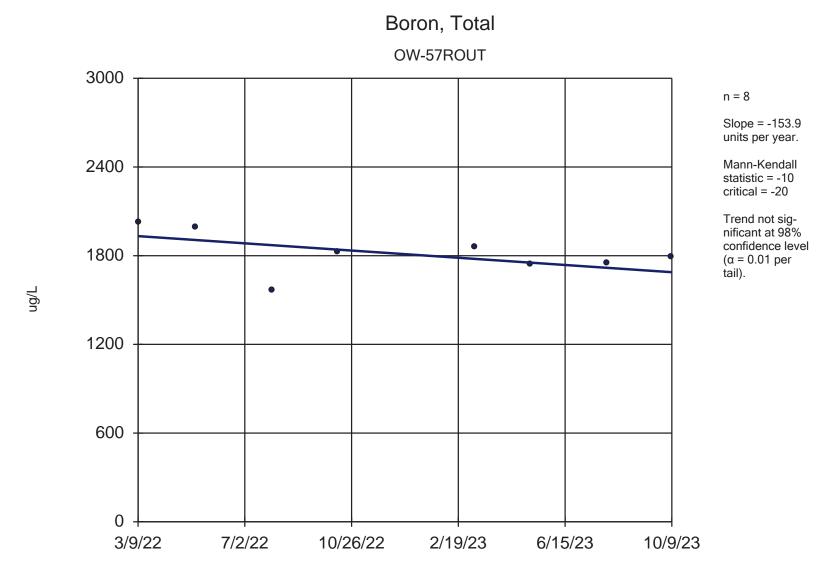
Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4

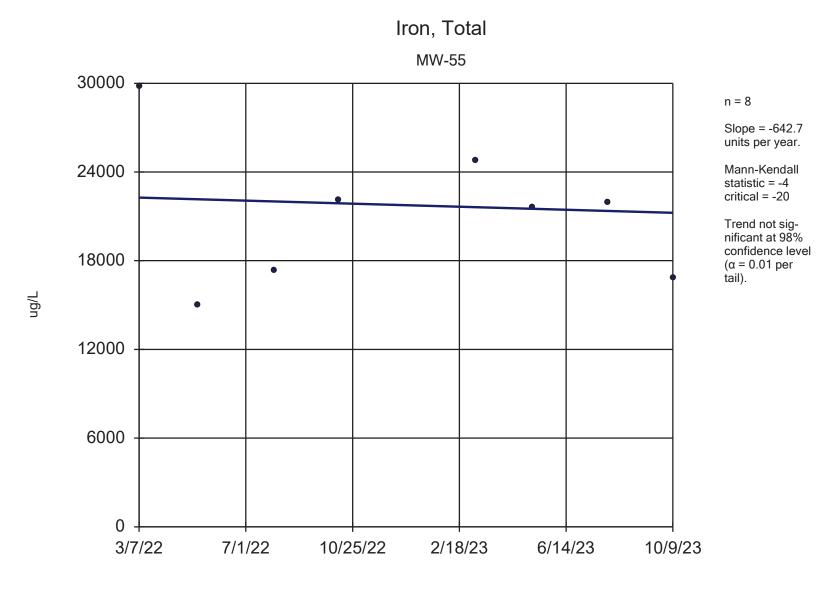


Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4

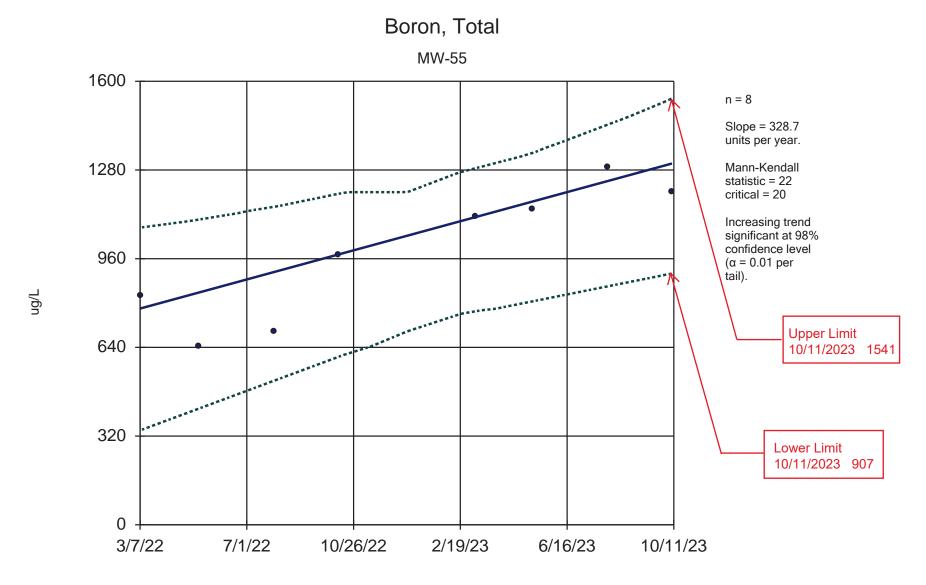


Sen's Slope Estimator Analysis Run 11/30/2023 1:46 PM

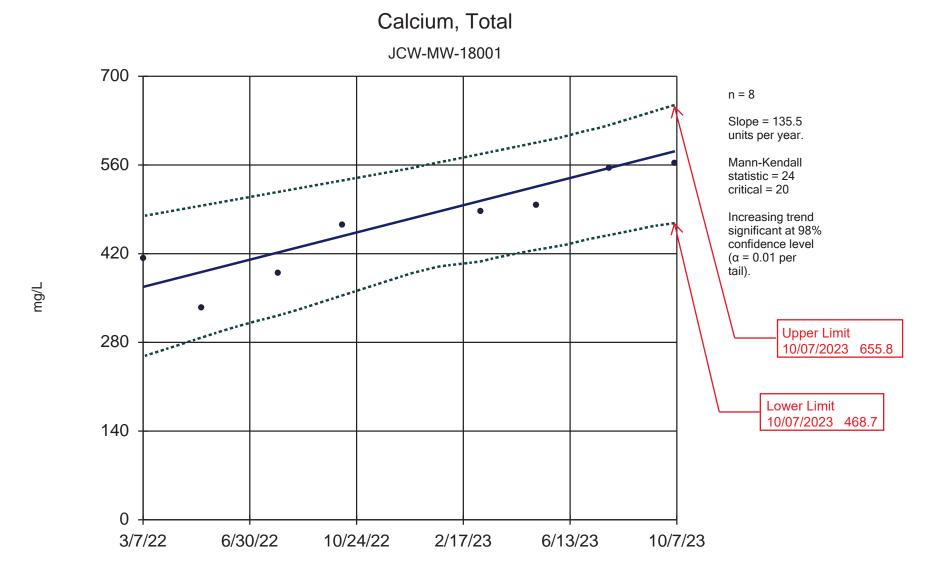
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q4



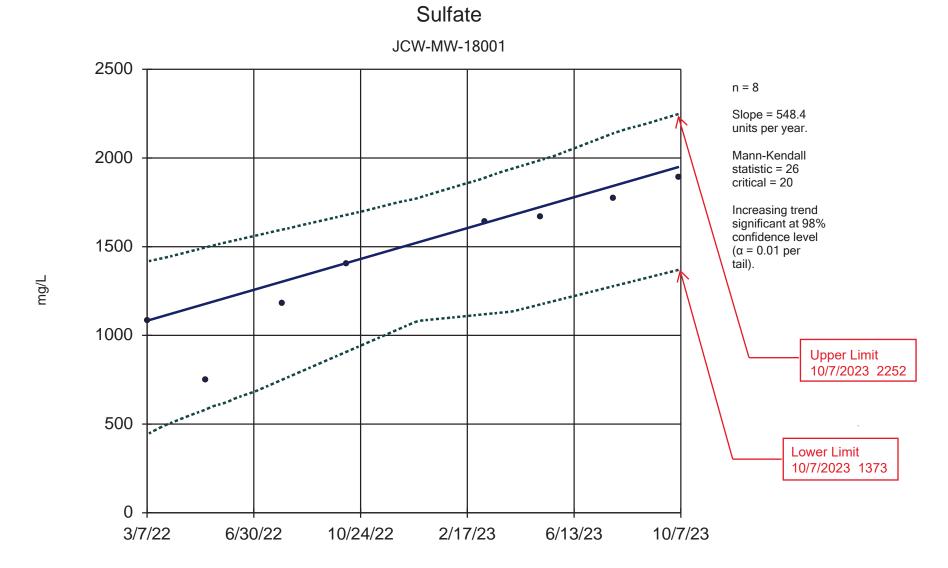
Sen's Slope Estimator Analysis Run 11/21/2023 4:00 PM Data: JCW\_HMPCCR\_Sanitas\_23Q4



Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:10 AM Data: JCW\_HMPCCR\_Sanitas\_23Q4



Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:12 AM Data: JCW\_HMPCCR\_Sanitas\_23Q4

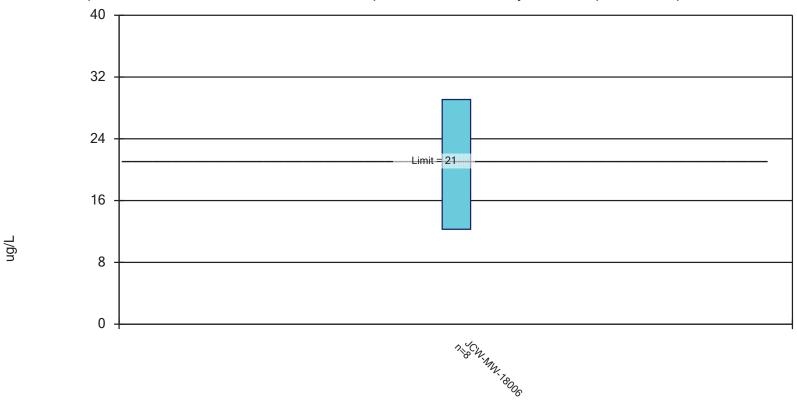


Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:22 AM

Data: JCW\_HMPCCR\_Sanitas\_23Q4

#### Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 11/30/2023 1:39 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q4

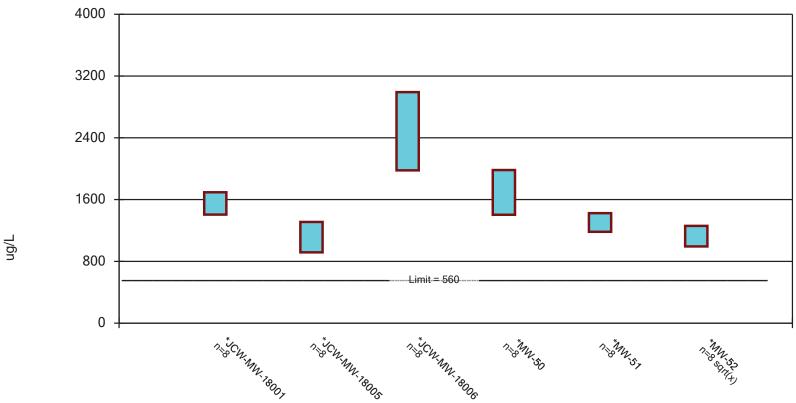
### **Confidence Interval**

Constituent: Arsenic, Total (ug/L) Analysis Run 11/30/2023 1:40 PM
Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q4

	JCW-MW-18006
3/7/2022	33
5/9/2022	22.5 (D)
8/2/2022	21
10/11/2022	25 (D)
3/9/2023	5 (D)
5/9/2023	23 (D)
7/31/2023	18.5 (D)
10/9/2023	17.5 (D)
Mean	20.69
Std. Dev.	7.928
Upper Lim.	29.09
Lower Lim.	12.28

#### Parametric Confidence Interval

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

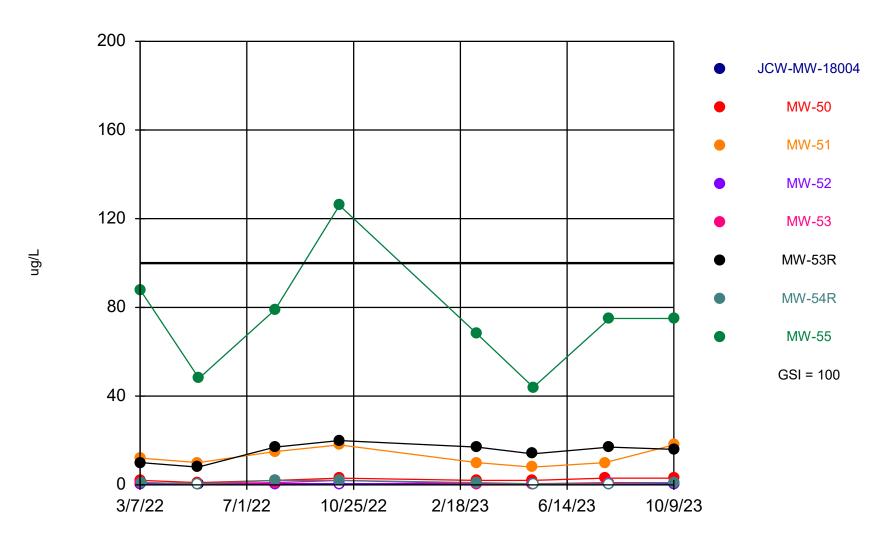


Constituent: Boron, Total Analysis Run 11/30/2023 1:41 PM

Client: Consumers Energy Data: JCW\_HMPCCR\_Sanitas\_23Q4

# Attachment 2 GSI Evaluation Sanitas™ Output Files

# Arsenic Comparison to GSI



Time Series Analysis Run 11/27/2023 10:51 AM

Data: JCW\_HMPCCR\_Sanitas\_23Q4

#### **Summary Report**

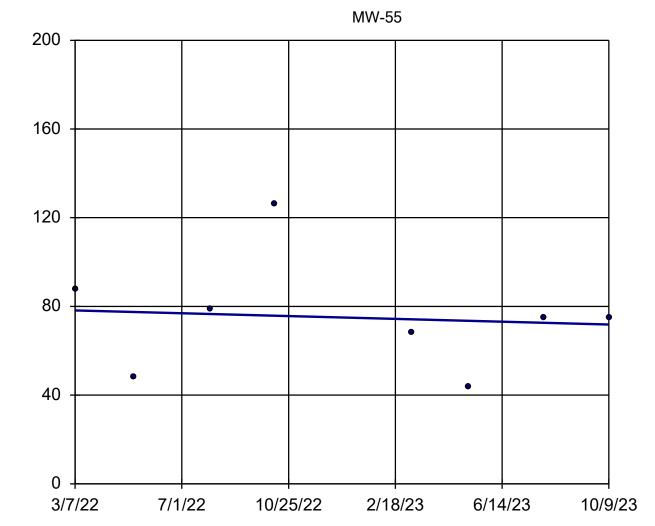
Constituent: Arsenic, Total Analysis Run 11/27/2023 11:09 AM Data: JCW\_HMPCCR\_Sanitas\_23Q4

For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

Observations = 64 NDs = 34% Wells = 8 Minimum Value = 0.5 Maximum Value = 126 Mean Value = 13.52 Median Value = 2 Standard Deviation = 25.7 Coefficient of Variation = 1.902 Skewness = 2.577

<u>Well</u>	#Obs.	<u>NDs</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	Std.Dev.	CV	<u>Skewness</u>
JCW-MW-18004	8	100%	0.5	0.5	0.5	0.5	0	0	NaN
MW-50	8	0%	1	3	2.25	2	0.7071	0.3143	-0.324
MW-51	8	0%	8	18	12.63	11	3.889	0.308	0.4428
MW-52	8	100%	0.5	0.5	0.5	0.5	0	0	NaN
MW-53	8	37%	0.5	2	0.9375	1	0.4955	0.5285	1.191
MW-53R	8	0%	8	20	14.88	16.5	4.016	0.27	-0.6525
MW-54R	8	37%	0.5	2	1.063	1	0.6232	0.5866	0.7024
MW-55	8	0%	44	126	75.38	75	25.42	0.3373	0.7437

# Arsenic, Total



n = 8

Slope = -4.011 units per year.

Mann-Kendall statistic = -5 critical = -20

Trend not significant at 98% confidence level ( $\alpha = 0.01$  per tail).

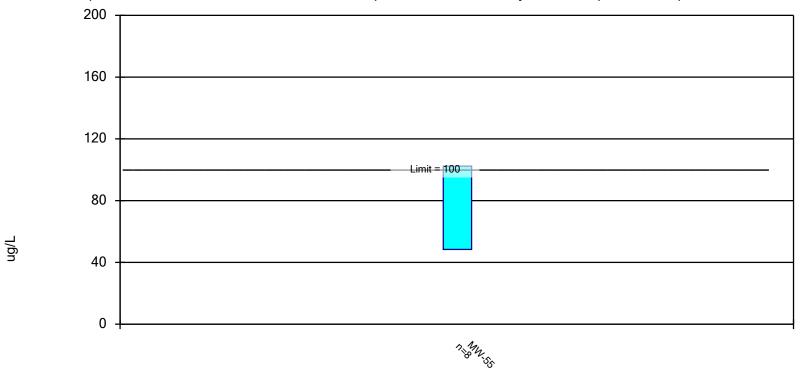
Sen's Slope Estimator Analysis Run 11/27/2023 11:21 AM

Data: JCW\_HMPCCR\_Sanitas\_23Q4

ng/L

#### Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 11/27/2023 11:25 AM

Data: JCW\_HMPCCR\_Sanitas\_23Q4

#### **Confidence Interval**

Constituent: Arsenic, Total (ug/L) Analysis Run 11/27/2023 11:25 AM

Data: JCW\_HMPCCR\_Sanitas\_23Q4

	MW-55
3/7/2022	88
5/10/2022	48
8/1/2022	79 (D)
10/10/2022	126
3/9/2023	68
5/9/2023	44
7/31/2023	75
10/9/2023	75
Mean	75.38
Std. Dev.	25.42
Upper Lim.	102.3
Lower Lim.	48.43



# Appendix E Laboratory Analytical Report



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q4

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0934

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 10/02/2023 and 10/09/2023 for the 4<sup>th</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 10/05/2023 and 10/10//2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2023 Weadock Porewater Wells

**Date Received:** 10/05/2023 and 10/10/2023

Chemistry Project: 23-0934

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0934-01	JCW-MW-18001	Groundwater	10/05/2023 06:17	JCW Solid Waste Disposal Area, Porewater
23-0934-02	JCW-MW-18004	Groundwater	10/09/2023 11:45	JCW Solid Waste Disposal Area, Porewater
23-0934-03	JCW-MW-18005	Groundwater	10/09/2023 13:34	JCW Solid Waste Disposal Area, Porewater
23-0934-04	JCW-MW-18006	Groundwater	10/09/2023 15:00	JCW Solid Waste Disposal Area, Porewater
23-0934-05	MW-50	Groundwater	10/09/2023 06:00	JCW Solid Waste Disposal Area, Porewater
23-0934-06	MW-51	Groundwater	10/09/2023 07:38	JCW Solid Waste Disposal Area, Porewater
23-0934-07	MW-52	Groundwater	10/09/2023 08:30	JCW Solid Waste Disposal Area, Porewater
23-0934-08	MW-53	Groundwater	10/09/2023 09:20	JCW Solid Waste Disposal Area, Porewater
23-0934-09	MW-53R	Groundwater	10/09/2023 10:15	JCW Solid Waste Disposal Area, Porewater
23-0934-10	MW-54R	Groundwater	10/09/2023 11:05	JCW Solid Waste Disposal Area, Porewater
23-0934-11	MW-55	Groundwater	10/09/2023 12:45	JCW Solid Waste Disposal Area, Porewater
23-0934-12	OW-57ROUT	Groundwater	10/09/2023 14:24	JCW Solid Waste Disposal Area, Porewater
23-0934-13	MW-58	Groundwater	10/09/2023 16:15	JCW Solid Waste Disposal Area, Porewater
23-0934-14	DUP-JCW-LF-01	Groundwater	10/09/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0934-15	DUP-JCW-LF-02	Groundwater	10/09/2023 00:00	JCW Solid Waste Disposal Area, Porewater
23-0934-16	JCW-MW-18001 MS	Groundwater	10/05/2023 06:17	JCW Solid Waste Disposal Area, Porewater
23-0934-17	JCW-MW-18001 MSD	Groundwater	10/05/2023 06:17	JCW Solid Waste Disposal Area, Porewater
23-0934-18	FB-01	Water	10/09/2023 16:35	JCW Solid Waste Disposal Area, Porewater
23-0934-19	EB-01	Water	10/09/2023 16:30	JCW Solid Waste Disposal Area, Porewater



10/20/23



#### **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 10/05/2023

 Lab Sample ID:
 23-0934-01
 Collect Time:
 06:17 AM

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	otal Metals	з Ехр	Aliquot #: 23-0	934-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	1		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	48		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1620		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	562000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	2		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	3840		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	110		ug/L	10.0	10/12/2023	AB23-1012-04
Magnesium	143000		ug/L	1000.0	10/13/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	3		ug/L	2.0	10/12/2023	AB23-1012-04
Potassium	18200		ug/L	100.0	10/13/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Sodium	225000		ug/L	1000.0	10/13/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	934-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F,	, SO4, Aqւ	ieous	Aliquot #: 23-0	934-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	51100		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	1890000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-01-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3430		mg/L	10.0	10/06/2023	AB23-1006-06
	0.5	0024 Dogo	E of 21			



**Report Date:** 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18001
 Collect Date:
 10/05/2023

 Lab Sample ID:
 23-0934-01
 Collect Time:
 06:17 AM

Alkalinity by SM 2320B			Aliquot #: 23-0	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	684000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Bicarbonate	684000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Carbonate	ND	ug/L	10000.0	10/10/2023	AB23-1010-07

Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18004
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-02
 Collect Time:
 11:45 AM

Metals by EPA 6020B: CCR Rule Appe	enaix ili-iv 10	ital Wetals	s ⊏xp	Aliquot #: 23-0	934-02-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	34		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	319		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	218000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	2		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	36		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	49		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0	934-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	934-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	15800		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	466000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-02-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1160		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18005
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-03
 Collect Time:
 01:34 PM

Metals by EPA 6020B: CCR Rul	ie Appenaix III-IV 10	tai wetais	s ⊏xp	Aliquot #: 23-0	934-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	1		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	74		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1470		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	159000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	948		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	32		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	9		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total,	Aqueous			Aliquot #: 23-0	934-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	934-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	48100		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	154000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-03-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	884		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18006
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-04
 Collect Time:
 03:00 PM

Metals by EPA 6020B: CCR Rul	e Appendix III-IV 10	tai wetais E	хр	Aliquot #: 23-0	934-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Arsenic	17	uç	g/L	1.0	10/12/2023	AB23-1012-04
Barium	342	uç	g/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Boron	2280	uç	g/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND	uç	g/L	0.2	10/12/2023	AB23-1012-04
Calcium	117000	uç	g/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND	uç	g/L	6.0	10/12/2023	AB23-1012-04
Copper	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Iron	5660	uç	g/L	20.0	10/12/2023	AB23-1012-04
Lead	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Lithium	37	uç	g/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND	uç	g/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND	uç	g/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND	uç	g/L	1.0	10/12/2023	AB23-1012-04
Silver	ND	uç	g/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND	uç	g/L	2.0	10/12/2023	AB23-1012-04
Vanadium	2	uç	g/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND	uç	g/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	934-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	uç	g/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aquec	ous	Aliquot #: 23-0	934-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	72300	uç	g/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		g/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	46900	uç	g/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-04-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	738	m	g/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-50
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-05
 Collect Time:
 06:00 AM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai wetais	s ⊏xp	Aliquot #: 23-0	934-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	3		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	135		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	2070		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	205000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	2300		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	59		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	IS			Aliquot #: 23-0	934-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	934-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	37600		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	470000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-05-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-51
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-06
 Collect Time:
 07:38 AM

Metals by EPA 6020B: CCR Rule Appe	naix III-IV IC	otal Metals	Exp	Aliquot #: 23-0	934-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	18		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	141		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1170		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	132000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	2		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	1660		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	34		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	934-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analyt	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	934-06-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	91600		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	267000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-06-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	952		mg/L	10.0	10/11/2023	AB23-1011-02



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457)

Laboratory Project: 23-0934
Collect Date: 10/09/2023
Collect Time: 08:30 AM

Report Date:

10/20/23

Lab Sample ID: 23-0934-07 Matrix: Groundwater

Field Sample ID: MW-52

Metals by EPA 6020B: CCR Rul	e Appendix III-IV 10	tai wetais	= EXP	Aliquot #: 23-0	934-07-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	108		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1140		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	234000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	7560		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	27		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	934-07-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	934-07-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	30200		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	572000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-07-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1440		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



#### **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-53
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-08
 Collect Time:
 09:20 AM

Metals by EPA 6020B: CCR Rul	e Appendix III-IV 10	tai wetais	⊏xp	Aliquot #: 23-0	934-08-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	1	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Barium	719	ι	ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Boron	5530	ι	ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND	ι	ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	136000	ι	ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND	ι	ug/L	6.0	10/12/2023	AB23-1012-04
Copper	ND	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Iron	1080	ι	ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	42	ι	ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND	ι	ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND	ι	ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	2	ι	ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND	ι	ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND	ι	ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND	ι	ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND	ι	ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0934-08-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	ι	ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aque	ous	Aliquot #: 23-0	934-08-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	77400	ι	ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	2280	ι	ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-08-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	722	r	mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-53R
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-09
 Collect Time:
 10:15 AM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai Metais	s Exp	Aliquot #: 23-0	934-09-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	16		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	110		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	2420		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	206000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	834		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	61		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0934-09-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	934-09-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Chloride	35500		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	221000		ug/L	1000.0	10/14/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-09-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1090		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-54R
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-10
 Collect Time:
 11:05 AM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai wetais	s ⊏xp	Aliquot #: 23-0	934-10-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	1		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	113		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	5520		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	165000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	2		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	829		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	70		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	17		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	2		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot #: 23-0934-10-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	934-10-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	45000		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	67400		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-10-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	756		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



#### **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-55
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-11
 Collect Time:
 12:45 PM

Metals by EPA 6020B: CCR Rule Appe	enaix III-IV 10	tai wetais	s ⊏xp	Aliquot #: 23-0	934-11-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	75		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	248		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1200		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	163000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	16800		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	26		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	56		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	3		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueou	IS			Aliquot #: 23-0934-11-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	934-11-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	16700		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	156000		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	934-11-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	846		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

Field Sample ID: OW-57ROUT Collect Date: 10/09/2023
Lab Sample ID: 23-0934-12 Collect Time: 02:24 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp				Aliquot #: 23-0	934-12-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	77		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1790		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	120000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	2		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	40		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	23		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	7		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	15		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0934-12-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	934-12-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	50600		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	94800		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-12-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	758		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



#### **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 MW-58
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-13
 Collect Time:
 04:15 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp				Aliquot #: 23-0	934-13-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	2		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	145		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	147		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	110000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	13600		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	21		ug/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	2		ug/L	2.0	10/12/2023	AB23-1012-04
Selenium	1		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	4		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Ac	queous			Aliquot #: 23-0934-13-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule A	Analyte List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	934-13-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	518000		ug/L	1000.0	10/15/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	18100		ug/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 254	40C			Aliquot #: 23-0	934-13-C03-A01	Analyst: LMC
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1240		mg/L	10.0	10/11/2023	AB23-1011-02

Report Date:

10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

Field Sample ID: DUP-JCW-LF-01 Collect Date: 10/09/2023 Lab Sample ID: 23-0934-14 Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rul	e Appendix III-IV 10	tai wetais i	⊏xp	Aliquot #: 23-0	934-14-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	U	ıg/L	1.0	10/12/2023	AB23-1012-04
Arsenic	3	u	ıg/L	1.0	10/12/2023	AB23-1012-04
Barium	136	u	ıg/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND	U	ıg/L	1.0	10/12/2023	AB23-1012-04
Boron	2060	U	ıg/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND	U	ıg/L	0.2	10/12/2023	AB23-1012-04
Calcium	206000	u	ıg/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND	U	ıg/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND	U	ıg/L	6.0	10/12/2023	AB23-1012-04
Copper	1	U	ıg/L	1.0	10/12/2023	AB23-1012-04
Iron	2340	U	ıg/L	20.0	10/12/2023	AB23-1012-04
Lead	ND	u	ıg/L	1.0	10/12/2023	AB23-1012-04
Lithium	59	U	ıg/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND	u	ıg/L	5.0	10/12/2023	AB23-1012-04
Nickel	2	U	ıg/L	2.0	10/12/2023	AB23-1012-04
Selenium	2	u	ıg/L	1.0	10/12/2023	AB23-1012-04
Silver	ND	U	ıg/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND	U	ıg/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND	U	ıg/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND	u	ıg/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0934-14-C01-A02		Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	U	ıg/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aque	ous	Aliquot #: 23-0	934-14-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	37000	U	ıg/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ıg/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	472000	u	ıg/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-14-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1190	n	ng/L	10.0	10/11/2023	AB23-1011-02



10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 DUP-JCW-LF-02
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-15
 Collect Time:
 12:00 AM

Metals by EPA 6020B: CCR Rul	e Appenaix III-IV 10	tai wetais E	хр	Aliquot #: 23-0	934-15-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	u	g/L	1.0	10/12/2023	AB23-1012-04
Arsenic	18	u	g/L	1.0	10/12/2023	AB23-1012-04
Barium	381	u	g/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND	U;	g/L	1.0	10/12/2023	AB23-1012-04
Boron	2470	u	g/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND	U;	g/L	0.2	10/12/2023	AB23-1012-04
Calcium	119000	u	g/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND	U;	g/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND	u	g/L	6.0	10/12/2023	AB23-1012-04
Copper	1	U;	g/L	1.0	10/12/2023	AB23-1012-04
Iron	5930	U;	g/L	20.0	10/12/2023	AB23-1012-04
Lead	ND	u	g/L	1.0	10/12/2023	AB23-1012-04
Lithium	39	U;	g/L	10.0	10/12/2023	AB23-1012-04
Molybdenum	ND	u	g/L	5.0	10/12/2023	AB23-1012-04
Nickel	3	U;	g/L	2.0	10/12/2023	AB23-1012-04
Selenium	1	u	g/L	1.0	10/12/2023	AB23-1012-04
Silver	ND	U;	g/L	0.2	10/12/2023	AB23-1012-04
Thallium	ND	U;	g/L	2.0	10/12/2023	AB23-1012-04
Vanadium	2	U;	g/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND	u	g/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 23-0	934-15-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND	u	g/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aque	ous	Aliquot #: 23-0	934-15-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	71100	U	g/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		g/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	47600	u	g/L	1000.0	10/13/2023	AB23-1012-01
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	934-15-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	748	m	ng/L	10.0	10/11/2023	AB23-1011-02



10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18001 MS
 Collect Date:
 10/05/2023

 Lab Sample ID:
 23-0934-16
 Collect Time:
 06:17 AM

Metals by EPA 6020B: CCR	Kule Appendix III-IV 10	tai wetais E	xp	Aliquot #: 23-0	934-16-C01-A01	Analyst: EE
Parameter(s)	Result	Flag l	Units	RL	Analysis Date	Tracking
Antimony	102	%		1.0	10/12/2023	AB23-1012-04
Arsenic	99	%		1.0	10/12/2023	AB23-1012-04
Barium	95	%		5.0	10/12/2023	AB23-1012-04
Beryllium	90	%		1.0	10/12/2023	AB23-1012-04
Boron	101	%		20.0	10/12/2023	AB23-1012-04
Cadmium	93.4	%		0.2	10/12/2023	AB23-1012-04
Calcium	106	%		1000.0	10/13/2023	AB23-1012-04
Chromium	89	%		1.0	10/12/2023	AB23-1012-04
Cobalt	88	%		6.0	10/12/2023	AB23-1012-04
Copper	86	%		1.0	10/12/2023	AB23-1012-04
Iron	110	%		20.0	10/12/2023	AB23-1012-04
Lead	90	%		1.0	10/12/2023	AB23-1012-04
Lithium	93	%		10.0	10/12/2023	AB23-1012-04
Magnesium	111	%		1000.0	10/13/2023	AB23-1012-04
Molybdenum	116	%		5.0	10/12/2023	AB23-1012-04
Nickel	88	%		2.0	10/12/2023	AB23-1012-04
Potassium	109	%		100.0	10/13/2023	AB23-1012-04
Selenium	93	%		1.0	10/12/2023	AB23-1012-04
Silver	90.0	%		0.2	10/12/2023	AB23-1012-04
Sodium	117	%		1000.0	10/13/2023	AB23-1012-04
Thallium	85	%		2.0	10/12/2023	AB23-1012-04
Vanadium	93	%		2.0	10/12/2023	AB23-1012-04
Zinc	84	%		10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot #: 23-0	934-16-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag l	Units	RL	Analysis Date	Tracking
Mercury	102	%		0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqueo	ous	Aliquot #: 23-0	934-16-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag l	Units	RL	Analysis Date	Tracking
Chloride	101	%		1000.0	10/13/2023	AB23-1012-01
Fluoride	96	%		1000.0	10/13/2023	AB23-1012-01
Sulfate	109	%		1000.0	10/13/2023	AB23-1012-01



10/20/23



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 JCW-MW-18001 MSD
 Collect Date:
 10/05/2023

 Lab Sample ID:
 23-0934-17
 Collect Time:
 06:17 AM

Antimony 99 % 1.0 10/12/2023 AB23-1012-04 Arsenic 97 % 5.0 10/12/2023 AB23-1012-04 Barium 92 % 5.0 10/12/2023 AB23-1012-04 Beryllium 86 % 1.0 10/12/2023 AB23-1012-04 Borron 105 % 20.0 10/12/2023 AB23-1012-04 Cadmium 91.8 % 0.2 10/12/2023 AB23-1012-04 Caldium 108 % 1000.0 10/13/2023 AB23-1012-04 Colatium 90 % 1.0 10/12/2023 AB23-1012-04 Cobalt 89 % 6.0 10/12/2023 AB23-1012-04 Copper 84 % 1.0 10/12/2023 AB23-1012-04 Copper 84 % 1.0 10/12/2023 AB23-1012-04 Lead 90 % 1.0 10/12/2023 AB23-1012-04 Lead 90 % 1.0 10/12/2023 AB23-1012-04 Lithium 92 % 10.0 10/12/2023 AB23-1012-04 Magnesium 1111 % 1000.0 10/13/2023 AB23-1012-04 Mickel 87 % 2.0 10/12/2023 AB23-1012-04 Mickel 87 % 2.0 10/12/2023 AB23-1012-04 Selenium 89 % 1.0 10/12/2023 AB23-1012-04 Silver 89.3 % 2.0 10/12/2023 AB23-1012-04 Selenium 89 % 1.0 10/12/2023 AB23-1012-04 Sodium 1111 % 1000.0 10/13/2023 AB23-1012-04 Sodium 1111 % 1000.0 10/13/2023 AB23-1012-04 Sodium 1111 % 1000.0 10/13/2023 AB23-1012-04 Sodium 1111 % 1000.0 10/13/2023 AB23-1012-04 Vanadium 103 % 2.0 10/12/2023 AB23-1012-04 Van	Metals by EPA 6020B: CCR	Rule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	934-17-C01-A01	Analyst: EB	
Arsenic         97         %         1.0         10/12/2023         AB23-1012-04           Barlum         92         %         5.0         10/12/2023         AB23-1012-04           Beryllium         86         %         1.0         10/12/2023         AB23-1012-04           Boron         105         %         20.0         10/12/2023         AB23-1012-04           Cadmium         91.8         %         0.2         10/12/2023         AB23-1012-04           Calcium         108         %         1000.0         10/13/2023         AB23-1012-04           Chromium         90         %         1.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Magnesium         111         %         100.0         10/12/2023         AB23-1012-04           Molybdenum         113         %         5.0	Parameter(s)	Result	Flag Unit	ts RL	Analysis Date	Tracking	
Barium         92         %         5.0         10/12/2023         AB23-1012-04           Beryllium         86         %         1.0         10/12/2023         AB23-1012-04           Boron         105         %         20.0         10/12/2023         AB23-1012-04           Cadrium         91.8         %         0.2         10/12/2023         AB23-1012-04           Calcium         108         %         1000.0         10/13/2023         AB23-1012-04           Chomium         90         %         1.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Magnesium         1111         %         100.0         10/13/2023         AB23-1012-04           Macy         10         10/12/2023         AB23-1012-04         AB23-1012-04         AB23-1012-04           Mory         10         10/12/2023 <td>Antimony</td> <td>99</td> <td>%</td> <td>1.0</td> <td>10/12/2023</td> <td>AB23-1012-04</td>	Antimony	99	%	1.0	10/12/2023	AB23-1012-04	
Beryllium         86         %         1.0         10/12/2023         AB23-1012-04           Boron         105         %         20.0         10/12/2023         AB23-1012-04           Cadnium         91.8         %         1.02         10/12/2023         AB23-1012-04           Calcium         108         %         1.00         10/13/2023         AB23-1012-04           Chromium         90         %         6.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Mickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         10	Arsenic	97	%	1.0	10/12/2023	AB23-1012-04	
Boron         105         %         20.0         10/12/2023         AB23-1012-04           Cadmium         91.8         %         0.2         10/12/2023         AB23-1012-04           Calcium         108         %         1000.0         10/13/2023         AB23-1012-04           Chromium         90         %         1.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         100.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Mickel         87         %         2.0         10/12/2023         AB23-1012-04           Nickel         87         %         1.0 </td <td>Barium</td> <td>92</td> <td>%</td> <td>5.0</td> <td>10/12/2023</td> <td>AB23-1012-04</td>	Barium	92	%	5.0	10/12/2023	AB23-1012-04	
Cadmium         91.8         %         0.2         10/12/2023         AB23-1012-04           Calcium         108         %         1000.0         10/13/2023         AB23-1012-04           Chromium         90         %         1.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Mickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         <	Beryllium	86	%	1.0	10/12/2023	AB23-1012-04	
Calcium         108         %         1000.0         10/13/2023         AB23-1012-04           Chromium         90         %         1.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Mickel         87         %         2.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2<	Boron	105	%	20.0	10/12/2023	AB23-1012-04	
Chromium         90         %         1.0         10/12/2023         AB23-1012-04           Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89.3         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Yanadium         103         % <td< td=""><td>Cadmium</td><td>91.8</td><td>%</td><td>0.2</td><td>10/12/2023</td><td>AB23-1012-04</td></td<>	Cadmium	91.8	%	0.2	10/12/2023	AB23-1012-04	
Cobalt         89         %         6.0         10/12/2023         AB23-1012-04           Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/12/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Mickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Vanadium         103         % <t< td=""><td>Calcium</td><td>108</td><td>%</td><td>1000.0</td><td>10/13/2023</td><td>AB23-1012-04</td></t<>	Calcium	108	%	1000.0	10/13/2023	AB23-1012-04	
Copper         84         %         1.0         10/12/2023         AB23-1012-04           Iron         113         %         20.0         10/12/2023         AB23-1012-04           Lead         90         %         1.0         10/12/2023         AB23-1012-04           Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         1.00         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         1111         %         1000.0         10/13/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result<	Chromium	90	%	1.0	10/12/2023	AB23-1012-04	
Iron	Cobalt	89	%	6.0	10/12/2023	AB23-1012-04	
Lead       90       %       1.0       10/12/2023       AB23-1012-04         Lithium       92       %       10.0       10/12/2023       AB23-1012-04         Magnesium       111       %       1000.0       10/13/2023       AB23-1012-04         Molybdenum       113       %       5.0       10/12/2023       AB23-1012-04         Nickel       87       %       2.0       10/12/2023       AB23-1012-04         Potassium       106       %       100.0       10/13/2023       AB23-1012-04         Selenium       89       %       1.0       10/12/2023       AB23-1012-04         Silver       89.3       %       0.2       10/12/2023       AB23-1012-04         Sodium       111       %       1000.0       10/13/2023       AB23-1012-04         Thallium       85       %       2.0       10/12/2023       AB23-1012-04         Vanadium       103       %       2.0       10/12/2023       AB23-1012-04         Mercury by EPA 7470A, Total, Aqueous       Flag       Units       RL       Analysis Date       Tracking         Mercury       113       %       0.2       10/13/2023       AB23-1013-03         Anions by	Copper	84	%	1.0	10/12/2023	AB23-1012-04	
Lithium         92         %         10.0         10/12/2023         AB23-1012-04           Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         **         Aliquot #: 23-0934-17-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride	Iron	113	%	20.0	10/12/2023	AB23-1012-04	
Magnesium         111         %         1000.0         10/13/2023         AB23-1012-04           Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         **         Aliquot #: 23-0934-17-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride </td <td>Lead</td> <td>90</td> <td>%</td> <td>1.0</td> <td>10/12/2023</td> <td>AB23-1012-04</td>	Lead	90	%	1.0	10/12/2023	AB23-1012-04	
Molybdenum         113         %         5.0         10/12/2023         AB23-1012-04           Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tra	Lithium	92	%	10.0	10/12/2023	AB23-1012-04	
Nickel         87         %         2.0         10/12/2023         AB23-1012-04           Potassium         106         %         100,0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis	Magnesium	111	%	1000.0	10/13/2023	AB23-1012-04	
Potassium         106         %         100.0         10/13/2023         AB23-1012-04           Selenium         89         %         1.0         10/12/2023         AB23-1012-04           Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-10	Molybdenum	113	%	5.0	10/12/2023	AB23-1012-04	
Selenium       89       %       1.0       10/12/2023       AB23-1012-04         Silver       89.3       %       0.2       10/12/2023       AB23-1012-04         Sodium       111       %       1000.0       10/13/2023       AB23-1012-04         Thallium       85       %       2.0       10/12/2023       AB23-1012-04         Vanadium       103       %       2.0       10/12/2023       AB23-1012-04         Zinc       81       %       10.0       10/12/2023       AB23-1012-04         Mercury by EPA 7470A, Total, Aqueous       *       Aliquot #: 23-0934-17-C01-A02       Analyst: CLE         Parameter(s)       Result       Flag       Units       RL       Analysis Date       Tracking         Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous       Aliquot #: 23-0934-17-C02-A01       Analyst: KDR         Parameter(s)       Result       Flag       Units       RL       Analysis Date       Tracking         Chloride       101       %       1000.0       10/13/2023       AB23-1012-01         Fluoride       97       %       1000.0       10/13/2023       AB23-1012-01	Nickel	87	%	2.0	10/12/2023	AB23-1012-04	
Silver         89.3         %         0.2         10/12/2023         AB23-1012-04           Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Potassium	106	%	100.0	10/13/2023	AB23-1012-04	
Sodium         111         %         1000.0         10/13/2023         AB23-1012-04           Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Selenium	89	%	1.0	10/12/2023	AB23-1012-04	
Thallium         85         %         2.0         10/12/2023         AB23-1012-04           Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Image: CLE Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Silver	89.3	%	0.2	10/12/2023	AB23-1012-04	
Vanadium         103         %         2.0         10/12/2023         AB23-1012-04           Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0934-17-C01-A02         Analysis CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Sodium	111	%	1000.0	10/13/2023	AB23-1012-04	
Zinc         81         %         10.0         10/12/2023         AB23-1012-04           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Thallium	85	%	2.0	10/12/2023	AB23-1012-04	
Mercury by EPA 7470A, Total, Aqueous         Aliquot #: 23-0934-17-C01-A02         Analyst: CLE           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Vanadium	103	%	2.0	10/12/2023	AB23-1012-04	
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Zinc	81	%	10.0	10/12/2023	AB23-1012-04	
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Mercury         113         %         0.2         10/13/2023         AB23-1013-03           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Mercury by EPA 7470A, Tot	al, Aqueous		Aliquot #: 23-0	934-17-C01-A02	Analyst: CLE	
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 23-0934-17-C02-A01         Analyst: KDR           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Parameter(s)	Result	Flag Unit	ts RL	Analysis Date	Tracking	
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Mercury	113	%	0.2	10/13/2023	AB23-1013-03	
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         101         %         1000.0         10/13/2023         AB23-1012-01           Fluoride         97         %         1000.0         10/13/2023         AB23-1012-01	Anions by EPA 300.0 CCR I	Rule Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 23-0	934-17-C02-A01	Analyst: KDR	
Fluoride 97 % 1000.0 10/13/2023 AB23-1012-01	-	-		-		Tracking	
Fluoride 97 % 1000.0 10/13/2023 AB23-1012-01	Chloride	101	%	1000.0	10/13/2023	AB23-1012-01	
	Fluoride	97	%	1000.0	10/13/2023	AB23-1012-01	
	Sulfate	109	%	1000.0		AB23-1012-01	



10/20/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 FB-01
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-18
 Collect Time:
 04:35 PM

Matrix: Water

Metals by EPA 6020B: CCR	Tule Appendix III-IV 10	nai wetals	⊏xh	Aliquot #: 23-0	934-18-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	ND		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	ND		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Magnesium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Potassium	ND		ug/L	100.0	10/13/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Sodium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot #: 23-0	934-18-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot #: 23-0	934-18-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	ND		ug/L	1000.0	10/13/2023	AB23-1012-01



10/20/23



## **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area, Porewater (395457) Laboratory Project: 23-0934

 Field Sample ID:
 EB-01
 Collect Date:
 10/09/2023

 Lab Sample ID:
 23-0934-19
 Collect Time:
 04:30 PM

Matrix: Water

Metals by EPA 6020B: CCR	Tule Appendix III-IV 10	tai wetais	- Exh	Aliquot #: 23-0	934-19-C01-A01	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	ND		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	ND		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Magnesium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Molybdenum	ND		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Potassium	ND		ug/L	100.0	10/13/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Sodium	ND		ug/L	1000.0	10/13/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot #: 23-0	934-19-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-03
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot #: 23-0	934-19-C02-A01	Analyst: KDF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	ND		ug/L	1000.0	10/13/2023	AB23-1012-01



**Report Date:** 10/20/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

Project Log-In Number: 2		4		4 (3 )		
Inspecțion Date: 10.05.	7278 - I			V 12 W 1 1 1 1		
Sample Origin/Project Name	94-20	23 We	adock to	rewater	Wells	_
Shipment Delivered By: Ente	er the type of	shipment ca	arrier.			
Pony H	FedEx_ nom) <b>TRC</b>	UF	PS	USPS	Airl	orne_
Tracking Number:	t		Shippin	g Form Attac	ned: Yes	N
Shipping Containers: Enter the	he type and n	umber of sh	nipping containers	received.		
Cooler X	Cardboard Bo	x	Custom C	ase	Envelop	e/Mail
Loose/Unpackaged Co			Other			
Condition of Shipment: Enter	r the as-receiv	ved condition	on of the shipmen	container.		
Damaged Shipment O	bserved: No	ne X	Dent	ed	Leal	king_
Other						
Shipment Security: Enter if a	ny of the shir	ping contai	iners were opened	before receir	ot.	
Shipping Containers R				ed 🗸		
			74.557			
Enclosed Documents: Enter the					7.00	
CoC X Wo					Other	_
Temperature of Containers: I				containers.		
As-Received Tempera	ture Range	5.4-5.9	Samples R	eceived on Io	e: Yes X	lo
M&TÉ # and Expiration	on LS628	3757	11.15.23			
Number and Type of Contain	ers: Enter th	e total num	iber of sample con	tainers receiv	red.	
Container Type	Water	Soil	Othe		Broken	1
VOA (40mL or 60mL)	2	Don	Othe		Broken	_
Quart/Liter (g/p)						
9-oz (amber glass jar)		_				
2-oz (amber glass)			-			

PH Strip Lot # 205522 exp. 02.15.25

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page 1 of +2

SAM	PLING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or W	7O#:						ANALYSIS REQUESTED								ST Excludence	6 000
1000	023 Weadock F				23-0934	REQUESTER	R: Hard	old 1	Regi	ster			- 1,	(Atta	ch Li	st if N	Aore Sp		QA REQUIREMENT:			
SAM	PLING TEAM:	5.50	s\$0		TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STA	ANDARD ⊠ 01	THER_														□ NPDES  ⊠ TNI	
SEN	D REPORT TO:	Joseph Firlit			email:	phone:						T									☐ ISO 17025	
	COPY TO:	Harold Register			MATRIX CODES: GW = Groundwater OX = Other			CONTAINERS											☐ 10 CFR 50 APP. B	В		
TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE			VE	tals			>				☐ INTERNAL INFO	0				
LAB SAMPLE COLLECTION 😤		RIX	S = Soil / General Solid WP = Wipe O = Oil WT = General Waste					\$ 7 H			Total Metals	suc		Alkalinity		Ш			□ OTHER			
S	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TOTAL#	None	HNO	H <sub>2</sub> SO <sub>4</sub>	HCI	Other	Tota	Anions	TDS	Alka					REMARKS	
X	23-0934-01	10/8/33	det	GW	JCW-MW-18001		5	4	1				x	x	x	x						
	-02			GW	JCW-MW-18004		3	2	1				x	x	x		/					
	-03			GW	JCW-MW-18005		3	2	1				x	×	X	-		-				
	-04			GW	JCW-MW-18006		3	2	I			_	x	x	x							П
	-05			GW	MW-50		3	2	1				х	x	x							
	-06			GW	MW-51		3	2	1			T	x	x	x	17						
	-07			GW	MW-52		3	2	1		1		x	x	x	П						ī
	-08			GW	MW-53		3	2	1	П			x	x	x			1				
	-09			GW	MW-53R		3	2	1				x	x	x							
	-10			GW	MW-54R		3	2	1			T	x	x	x							
	-11			GW	MW-55		3	2	1			П	x	x	x							
	-12			GW	OW-57ROUT		3	2	1		ī		x	x	x							
				DATE/	ΓΙΜΕ: RE	ECEIVED BY:						+	CO	MME	NTS	:				_		_
1	/		l. l.	ic	15/13 1740 6	um	N	7														
RELINQUISHED BY: DATE						ECEWED BY:	//						Rec	eived	on I	ce? D	Yes I	□ No	M&	TE#:_	LS 028757	
													Ten	pera	ture:	5.4	-5.9	°C	Cal.	Due D	ate: 11-15-2	3

23-0934 Page 27 of 31

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 2 of 2

SAMPLING SITE / CUSTOMER:			П	PROJECT NUMBER:	SAP CC or W	O#:				T			A	NAI	YSI	SRE	QUES	TED	O. Provincia		
Q4-2023 Weadock	Porewater Wells			23-0934	REQUESTER	R: Haro	ld I	Regi	ster						st if N	QA REQUIREMENT:					
SAMPLING TEAM:	J. Jasso			TURNAROUND TIME REQUIRED:	ANDARD ⊠ OT	HER_													□ NPDES  ☑ TNI		
SEND REPORT TO:	Joseph Firlit			email:	phone:														☐ ISO 17025		
COPY TO:	Harold Registe	r		MATRIX CODES:  GW = Groundwater OX = Other		CONTAINERS												1 1	☐ 10 CFR 50 APP. B		
	TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE					Metals			>				☐ INTERNAL INFO		
LAB	LAB SAMPLE COLLECTION		RIX	S = Soil / General Solid WP = Wipe O = Oil WT = General Waste			None HySO <sub>4</sub> NaOH HCI MeOH			ж,		SHO		Alkalinity				□ OTHER			
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TOTAL#	None	HNO H	NaOl	HCI	MeOF	Total	Anions	TDS	Alk				REMARKS		
23-0934-13			GW	MW-58		3	2	1	1			x	x	x							
1-14			GW	DUP-JCW-LF-01		3	2	1				x	x	x							
15			GW	DUP-JCW-LF-02		3	2	1	1			x	x	x							
-16	1015123	0613	GW	JCW-MW-18001 MS		2	1	1	T			x	x								
-17	1 1 2 1 2 1 2 1		GW	JCW-MW-18001 MSD		2	1	1	T			x	x				1				
18	1013125	0612	w	FB-01		2	1	1	T			x	x								
			w	EB-01		2	1	1				х	x								
*																					
								4		Ц							4				
							H	4	4								4				
						-			+	Н							-				
									L												
RELINQUISHED BY:  RELINQUISHED BY:	1. 1	- 1	O/S DATE/	123 1740	ECEIVED BY:							Rec		on Io	e? L	Yes - 5.9			E#:_LSON8757 Due Date:_IV-15-23		

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT AI

#### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inspection Date: 10.11.	23	_ · In	spection	By: LMO		×
Sample Origin/Project Name		23 Wead	ock	Porewater	Well	S
Shipment Delivered By: Ente	er the type of s	hipment carrier.				
Pony X 1 Other/Hand Carry (wh					Air	rborne
Tracking Number:	*		Shipp	ing Form Attached	l: Yes	No
Shipping Containers: Enter t	he type and nu	imber of shippin	g containe	ers received.		
Cooler Coose/Unpackaged Co				Case		pe/Mailer _
Condition of Shipment: Ente	r the as-receiv	ed condition of				
Damaged Shipment O	bserved: Non	e_X	De	ented	Le	aking
Other						
	ork Request		Air Data	Chast	Other	
CoC Wo Temperature of Containers:					Ottlet	
Temperature of Containers:	Measure the te	emperature of se	veral samp	le containers.		No
Temperature of Containers:	Measure the te	emperature of se	veral samp Samples			No
Temperature of Containers: As-Received Tempera  M&TÉ # and Expirati	Measure the teature Range 1.5	5-2.3 °C	Samples	ole containers.  Received on Ice:	Yes_X	No
Temperature of Containers:  As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain	Measure the teature Range 1: Son USG2 8	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	
Temperature of Containers: As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type	Measure the teature Range 1.5	5-2.3 °C	Samples	ole containers.  Received on Ice: ontainers received	Yes_X	
Temperature of Containers: I  As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type  VOA (40mL or 60mL)	Measure the teature Range 1: Son USG2 8	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	
Temperature of Containers: As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type	Measure the tenture Range 1-3 on USG2 8 ners: Enter the Water	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	
Temperature of Containers:  As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)	Measure the tenture Range 1-3 on USG2 8 ners: Enter the Water	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	
Temperature of Containers: As-Received Tempera M&TÉ # and Expirati Number and Type of Contain Container Type VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar)	Measure the tenture Range 1-3 on USG2 8 ners: Enter the Water	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	
As-Received Tempera  As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)  24 mL vial (glass)	Measure the teature Range 1-3 ion USG2 8 ners: Enter the Water	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	Leaki
As-Received Tempera  As-Received Tempera  M&TÉ # and Expirati  Number and Type of Contain  Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)	Measure the teature Range 1-3 ion USG2 8 ners: Enter the Water	emperature of seconds of the second of the seconds of the second of	Samples .23 Fsample c	ole containers.  Received on Ice: ontainers received	Yes_X	

pH strip Lot #: 2055 22 02.15.25

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page 1 of 2

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

SAM	IPLING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or V	VO#:							-	ANA	LYSI	SRE	QUES	TED		01 0001/000
Q4-2	2023 Weadock F	orewater Well	S		23-0934	REQUESTE	R: Haro	old	Reg	ister	Œ					ist if N		QA REQUIREMENT:			
SAM	PLING TEAM:				TURNAROUND TIME REQUIRED:	'ANDARD ⊠ O	THER_														□ NPDES  □ TNI
SEN	D REPORT TO:	Joseph Firlit			email:	phone:															☐ ISO 17025
	COPY TO:	Harold Regi	ster		MATRIX CODES: GW = Groundwater OX = Other			C	ONT	AIN	ER	s									☐ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE					ale.						☐ INTERNAL INFO		
	LAB SAMPLE COLLECTION		RIX	S = Soil / General Solid WP = Wipe O = Oil WT = General	e eral Waste	TOTAL#			7 7		H.	Total Metals	Suc		Alkalinity					OTHER	
S	SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOO	CATION	TOT	None	HNO	H <sub>2</sub> SO	HC	МеОН	Tota	Anions	TDS	Alk					REMARKS
1	23 <del>-0934-01</del>			GW	JCW-MW-18001		-5	4	1		Ī		x	x	x	x					
	-02	10/9/53	nur	GW	JCW-MW-18004		3	2	1		T		x	x	x						
	-03	10/4/53	1334	GW	JCW-MW-18005		3	2	1				x	x	x						
	-04	idalish	150	GW	JCW-MW-18006		3	2	1				x	x	x						
	-05	10/4/52	ow	GW	MW-50		3	2	1				x	X.	x						
	-06	10/9/53	6738	GW	MW-51		3	2	Ĭ				x	x	x						
	-07	16/12	0620	GW	MW-52		3	2	1		l		x	x	x					F)	
	-08	10419/57	0900	GW	MW-53		3	2	1				x	x	x						
	-09	6/1/03	1015	GW	MW-53R		3	2	Ī				x	x	x						
	-10	1614/57	110	GW	MW-54R		3	2	1				x	x	x						
	-11	10/9/3	1245	GW	MW-55		3	2	1				x	x	x						
	-12	10/4/23	1424	GW	OW-57ROUT		3	2	1				x	x	x				J T		
/	NQUISHED BY:		10/10	SATE/	0612	ECEIVED BY:	M	N	0	7			Re	ceive		ce? []		□No	М&	TE#:	LS-28757
													Te	mper	ature:	1.5	-2.3	°C	Cal.	Due D	Date: 11-15-23

23-0934 Page 30 of 31

# **CHAIN OF CUSTODY**



# CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page 2 of 2

SAMPLING SITE / CUSTOMER:  Q4-2023 Weadock Porewater Wells  SAMPLING TEAM: J. JoSSO					PROJECT NUMBER:	SAP CC or WO#:					- 1	ANALYSIS REQUESTED				OA BEO	OA REQUIREMENTS				
					23-0934	REQUESTER: Harold Register					(Attach List if More Space is Needed)					QA REQUIREMENT:					
					TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OT		OTHER											□ NPDES			
SEND REPORT TO: Joseph Firlit email: phone:																		☐ ISO 170	25		
C	OPY TO:	Harold Registe	er		MATRIX CODES: GW = Groundwater OX = Other			CONTAINERS											□ 10 CFR	50 APP. B	
TRC  SAMPLE COLLECTION		TRC	TRC		WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE		VE	Metals				ΠÄ			□ INTER	☐ INTERNAL INFO		
		RIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gener		Waste TVON				HNO <sub>3</sub> H <sub>2</sub> SO <sub>4</sub> NaOH	7 H	Ξ.	al Me	Anions	S	Alkalinity				☐ OTHER		
SA	MPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	D SAMPLE ID / LOCATION			HNC	H <sub>2</sub> SC NaO	HCI	MeO	Total	Ani	TDS	Alk				REN	IARKS
23	3-0934-13	10/9/13	wir	GW	MW-58	MW-58			1				x	x	x						
	-14	10/4/3	_	GW	DUP-JCW-LF-01		3	2	1				x	x	x					*	
	-15	10/4/2	_	GW	DUP-JCW-LF-02		3	2	1				x	x	x					*	
	-16	1015/23	0613	GW	JCW-MW-18001 MS		2	1	1				x	x							
	-17	1015hz		GW	JCW-MW-18001 MSD		2	1	1				x	x							
	-18	10/9/33	1437	W	FB-01		2	1	1				x	X							
+	-19	10/4/23	1436	W	EB-01		2	1	1				x	х							
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-																					
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v,	QUISHED BY:	in hings		OATE/I	123 1240	CEIVED BY:	W	0	)											10/05/23 ( 2 ou 10/10 E#: LSO28	
TODA!	Commo D L	0		ea to the last	N.	0							636.					°C		Due Date: 11-1	

23-0934 Page 31 of 31



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: HMP GROUNDWATER MONITORING – JCW LEACHATE WELLS – 2023 Q4

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 23-0941** 

TRC Environmental, Inc. conducted groundwater monitoring at the JC Weadock site during the week of 10/02/2023 for the 4<sup>th</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The samples were received for analysis by the Chemistry Department of Laboratory Services on 10/05/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements. In order to minimize contamination, the samples submitted for Low Level Mercury analysis were preserved in the Mercury clean-room upon receipt at the laboratory, as specified in the corresponding test method.

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

<u>Description</u>
Reporting Limit
Result not detected or below Reporting Limit
Non TNI analyte
Laboratory Control Sample
Laboratory Reagent Blank (also referred to as Method Blank)
Duplicate
Matrix Spike
Matrix Spike Duplicate
Relative Percent Difference
Method Detection Limit
Practical Quantitation Limit
Target Detection Limit
Standard Methods Compendium

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



# **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2023 JCW Part 115 Leachate Wells

**Date Received:** 10/5/2023 **Chemistry Project:** 23-0941

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0941-01	LH-103R	Groundwater	10/04/2023 13:32	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-02	LH-103R Dup	Groundwater	10/04/2023 13:32	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-03	LH-103R MS	Groundwater	10/04/2023 13:32	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-04	LH-103R MSD	Groundwater	10/04/2023 13:32	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-05	LH-104	Groundwater	10/04/2023 13:28	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-06	LH-104 Dup	Groundwater	10/04/2023 13:28	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-07	FB-02	Water	10/04/2023 13:32	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-08	EB-02	Water	10/04/2023 14:15	JCW Solid Waste Disposal Area - Leachate Wells
23-0941-09	TB-01	Water	10/04/2023 00:00	JCW Solid Waste Disposal Area - Leachate Wells



Report Date:

10/20/23



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-103R
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-01
 Collect Time:
 01:32 PM

Mercury, Low Level by EPA 1	631E		Aliquot #: 23-0	0941-01-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking	
Mercury Low Level	1.01	ng/L	0.5	10/12/2023	AB23-1012-03	
Metals by EPA 6020B: CCR R	ule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-	0941-01-C02-A01	Analyst: EB	
Parameter(s)	Result	Flag Unit	•	Analysis Date	Tracking	
Antimony	ND	ug/L	1.0	10/12/2023	AB23-1012-04	
Arsenic	21	ug/L	1.0	10/12/2023	AB23-1012-04	
Barium	180	ug/L	5.0	10/12/2023	AB23-1012-04	
Beryllium	ND	ug/L	1.0	10/12/2023	AB23-1012-04	
Boron	6270	ug/L	20.0	10/13/2023	AB23-1012-04	
Cadmium	ND	ug/L	0.2	10/12/2023	AB23-1012-04	
Calcium	249000	ug/L	1000.0	10/13/2023	AB23-1012-04	
Chromium	ND	ug/L	1.0	10/12/2023	AB23-1012-04	
Cobalt	ND	ug/L	6.0	10/12/2023	AB23-1012-04	
Copper	2	ug/L	1.0	10/12/2023	AB23-1012-04	
Iron	8110	ug/L	20.0	10/12/2023	AB23-1012-04	
Lead	ND	ug/L	1.0	10/12/2023	AB23-1012-04	
Lithium	97	ug/L	10.0	10/12/2023	AB23-1012-04	
Magnesium	62000	ug/L	1000.0	10/13/2023	AB23-1012-04	
Molybdenum	88	ug/L	5.0	10/12/2023	AB23-1012-04	
Nickel	5	ug/L	2.0	10/12/2023	AB23-1012-04	
Potassium	32700	ug/L	100.0	10/13/2023	AB23-1012-04	
Selenium	4	ug/L	1.0	10/12/2023	AB23-1012-04	
Silver	ND	ug/L	0.2	10/12/2023	AB23-1012-04	
Sodium	583000	ug/L	1000.0	10/13/2023	AB23-1012-04	
Thallium	ND	ug/L	2.0	10/12/2023	AB23-1012-04	
Vanadium	5	ug/L	2.0	10/12/2023	AB23-1012-04	
Zinc	ND	ug/L	10.0	10/12/2023	AB23-1012-04	
Mercury by EPA 7470A, Total	, Aqueous		Aliquot #: 23-0	0941-01-C02-A02	Analyst: TMR	
Parameter(s)	Result	Flag Unit		Analysis Date	Tracking	
Mercury	ND	ug/L	0.2	10/17/2023	AB23-1017-04	
Anions by EPA 300.0 CCR Ru	ıle Analyte List, Cl. F.	SO4, Aqueous	Aliquot #: 23-0	0941-01-C03-A01	Analyst: KDR	
Parameter(s)	Result	Flag Unit	-	Analysis Date	Tracking	
Chloride	179000	ug/L	1000.0	10/14/2023	AB23-1011-03	
Fluoride	ND	ug/L	1000.0	10/12/2023	AB23-1011-03	
Sulfate	984000	ug/L	1000.0	10/14/2023	AB23-1011-03	



**Report Date:** 10/20/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-103R
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-01
 Collect Time:
 01:32 PM

Total Dissolved Solids by SM 2540C			Aliquot #: 23-0	941-01-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag Un	ts RL	Analysis Date	Tracking
Total Dissolved Solids	3300	mg/L	10.0	10/11/2023	AB23-1011-02
Alkalinity by SM 2320B			Aliquot #: 23-0	)941-01-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag Un	ts RL	<b>Analysis Date</b>	Tracking
Alkalinity Total	899000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Bicarbonate	899000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Carbonate	ND	ug/L	10000.0	10/10/2023	AB23-1010-07



**Report Date:** 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

Field Sample ID: LH-103R Dup Collect Date: 10/04/2023 Lab Sample ID: 23-0941-02 Collect Time: 01:32 PM

Mercury, Low Level by EPA 1631E		A	Aliquot #: 23-0	Analyst: CLE	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury Low Level	0.82	ng/L	0.5	10/12/2023	AB23-1012-03



**Report Date:** 10/20/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-103R MS
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-03
 Collect Time:
 01:32 PM

Mercury, Low Level by EPA 1631E			Aliquot #: 23-	0941-03-C01-A01	Analyst: CLE	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking	
Mercury Low Level	128	Q %	0.5	10/12/2023	AB23-1012-03	



**Report Date:** 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-103R MSD
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-04
 Collect Time:
 01:32 PM

Mercury, Low Level by EPA 1631E		Ali	quot #: 23-	0941-04-C01-A01	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury Low Level	98.0	%	0.5	10/12/2023	AB23-1012-03



Report Date:

10/20/23



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-104
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-05
 Collect Time:
 01:28 PM

Devemente v/o)	D!	<b>-</b> 1	He-14	Б.	Analysis Det	T 1.1
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury Low Level	ND		ng/L	0.5	10/12/2023	AB23-1012-03
Metals by EPA 6020B: CCR R	ule Appendix III-IV To	tal Metals	Ехр	Aliquot #: 23-0	941-05-C02-A01	Analyst: El
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	44		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	181		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	12100		ug/L	20.0	10/13/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	112000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	817		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	63		ug/L	10.0	10/12/2023	AB23-1012-04
Magnesium	78400		ug/L	1000.0	10/13/2023	AB23-1012-04
Molybdenum	128		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	4		ug/L	2.0	10/12/2023	AB23-1012-04
Potassium	9230		ug/L	100.0	10/13/2023	AB23-1012-04
Selenium	2		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Sodium	62000		ug/L	1000.0	10/13/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total	, Aqueous			Aliquot #: 23-0	941-05-C02-A02	Analyst: TMF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/17/2023	AB23-1017-0
Anions by EPA 300.0 CCR Ru	ıle Analyte List, Cl, F,	SO4, Agu	eous	Aliquot #: 23-0	941-05-C03-A01	Analyst: KDI
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	45400		ug/L	1000.0	10/12/2023	AB23-1011-0
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-0
Sulfate	352000		ug/L	1000.0	10/13/2023	AB23-1011-03



**Report Date:** 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 LH-104
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-05
 Collect Time:
 01:28 PM

Total Dissolved Solids by SM 2540C			Aliquot #: 23-0	0941-05-C04-A01	Analyst: SLK
Parameter(s)	Result	Flag Un	ts RL	Analysis Date	Tracking
Total Dissolved Solids	952	mg/L	10.0	10/05/2023	AB23-1006-03
Alkalinity by SM 2320B			Aliquot #: 23-0	)941-05-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag Un	ts RL	Analysis Date	Tracking
Alkalinity Total	338000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Bicarbonate	338000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Carbonate	ND	ug/L	10000.0	10/10/2023	AB23-1010-07



**Report Date:** 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells

Laboratory Project: 23-0941
Collect Date: 10/04/2023

Field Sample ID: **LH-104 Dup** Lab Sample ID: 23-0941-06

Collect Time: 01:28 PM

Mercury, Low Level by EPA 1631E	Al	Aliquot #: 23-0941-06-C01-A01						
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking			
Mercury Low Level	ND	ng/L	0.5	10/12/2023	AB23-1012-03			



**Report Date:** 10/20/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 FB-02
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-07
 Collect Time:
 01:32 PM

Mercury, Low Level by EPA 1631E				Aliquot #: 23-0	Analyst: CLE		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury Low Level	ND		ng/L	0.2	10/12/2023	AB23-1012-03	



**Report Date:** 10/20/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 EB-02
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-08
 Collect Time:
 02:15 PM

Mercury, Low Level by EPA 1631E		A	Aliquot #: 23-0	0941-08-C01-A01	Analyst: CLE		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking		
Mercury Low Level	ND	ng/L	0.2	10/12/2023	AB23-1012-03		



**Report Date:** 10/20/23

**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: JCW Solid Waste Disposal Area - Leachate Wells Laboratory Project: 23-0941

 Field Sample ID:
 TB-01
 Collect Date:
 10/04/2023

 Lab Sample ID:
 23-0941-09
 Collect Time:
 12:00 AM

Mercury, Low Level by EPA 1631E	Analyst: CLE						
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury Low Level	ND		ng/L	0.2	10/12/2023	AB23-1012-03	



**Report Date:** 10/20/23

Data Qualifiers	Exception Summary
Q = Matrix spike recovery outside acceptance criteria.	No other exceptions occurred.

CONSUMERS ENERGY

# Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

# TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number: 23-			
Inspecțion Date: 10.05.23		Inspection By:	0
Sample Origin/Project Name:	1		
Shipment Delivered By: Enter the	type of shipment ca	rrier.	
Pony FedE	x UP	S USPS _	Airborne
Tracking Number:	-11.5	Shipping Form Att	ached: Yes No
Shipping Containers: Enter the ty			
			Envelope/Mailor
			Envelope/Mailer
		Other	
Condition of Shipment: Enter the	as-received condition	on of the shipment container.	
Damaged Shipment Obser	ved: None	Dented	Leaking
Other			
Shipment Security: Enter if any o	f the shipping contai	ners were opened before rec	eipt.
		Sealed 🗡	
			-
Enclosed Documents: Enter the ty	The second second		
CoC Work R	equest	Air Data Sheet	Other
Temperature of Containers: Meas	sure the temperature	of several sample containers	S.
As-Received Temperature	Range Ambien	F Samples Received or	Ice: YesNo
		. The second of the second	
M&TÉ # and Expiration _	NA	-	
Number and Type of Containers:	Enter the total num	ber of sample containers rec	eived.
Container Type W	ater Soil	Other	Broken Leaking
VOA (40mL or 60mL)			
Quart/Liter (g/p)			
9-oz (amber glass jar)	14		
2-oz (amber glass)			
125 mL (plastic)			
24 mL vial (glass)		4	
500 mL (plastic)			
Other 802 2	- 9		
clear glass jar	Lmo 10.05.3		

# **CHAIN OF CUSTODY**



# CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

Page \_\_\_\_of\_\_\_

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 Count on Us\* SAMPLING SITE / CLISTOMER. PROJECT NUMBER-

SAMPLING SITE / CO	JSTOWIEK.	SAP CC or WO#;						ANALYSIS REQUESTED						D	OA DEOLUDEMENTS						
Q4-2023 Weadock I				23-0941	REQUESTE	R: Haro	ld R	egist	ter			(Attach List if More Space is Needed)						Q	QA REQUIREMENT:		
SAMPLING TEAM:	A. Who T. Josx	TURNAROUND TIME REQUIRED:  Scs □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☑ OTHER													100	NPDES TNI					
SEND REPORT TO:	Joseph Firlit			email:	phone:							7					Ε	☐ ISO 17025			
COPY TO:	Harold Regis	ter		MATRIX CODES:   GW = Groundwater	ludge		CONTAINERS  PRESERVATIVE			Έ	el Mercury								☐ 10 CFR 50 APP, B☐ INTERNAL INFO		
LAB	SAMPLE COLI	LECTION	RIX	S = Soil / General Solid $WP = O = Oil$ $WT = Oil$	Wipe General Waste	#TV.			3 7 7			Level				Е	OTHER				
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / I	LOCATION	ATION TO THE PROPERTY OF THE P		HNO3 H2SO4	NaOl	HCI	Other	Low						REMARKS			
23-0941-01	10/1/23	1335	GW	LH-103R		1				I		x									
-02		-	GW	LH-103R Dup		1				1		x									
-03		1332	GW	LH-103R MS		1				1		x									
-04		1332	GW	LH-103R MSD		1				1		x									
-05		B28	GW	LH-104		1				ī		x									1
-06		-	GW	LH-104 Dup		1				1		x									
-07		1332	W	FB-02		1				1		x									
-08		1415	W	EB-02		i				1		x									
-09	4	-	W	TB-02		1				I		x									
							+			+											_
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RELINQUISHED BY:		1	DATE/	TIME:	RECEIVED BY:											es 🗷	No :		~~	AIA TO THE	
					23-0941 Page 18	of 20															

CONSUMERS ENERGY

# Chemistry Department

PROC CHEM-1,2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

General Standard Operating Procedure

# TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23						
Inspection Date: 10.05.23	3		Inspection	By: LMO		
Sample Origin/Project Name:	Q4-202	3 We	adock	Leach	ate we	115
Shipment Delivered By: Enter	the type of sl	nipment carr	ier.			
Pony F				USPS	Airb	orne
Other/Hand Carry (who						
Tracking Number:			Shipp	ping Form Attac	hed: Yes	No
Shipping Containers: Enter th	e type and nu	mber of ship	ping contain	ers received.		
Cooler 🗶 C					Envelope	e/Mailer
Loose/Unpackaged Co						
Condition of Shipment: Enter						
Damaged Shipment Ob					Leal	king
Other				,		8
Shipping Containers R  Enclosed Documents: Enter the CoC Wor  Temperature of Containers: M  As-Received Temperature of M&TE # and Expiration  Number and Type of Containers	he type of doc k Request Measure the te ture Range on	mperature o	Air Data f several sam Sample	e shipment.  a Sheet  apple containers.  es Received on I	Other ce: Yes_XN	
Container Type					Broken	Leaking
VOA (40mL or 60m).)	4					
Quart/Liter (g/p)						
9-oz (amber glass jar)	4	_				
2-oz (amber glass)		_				
125 mL (plastic)	4_				_	-
24 mL vial (glass)	_	_	-		-	-
23 cmo 500 mL (plastic)	7_	_			-	-
Other		_	-		_	-

# **CHAIN OF CUSTODY**



# CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

Page \_\_\_\_ of \_\_\_\_

SAMPLING SITE / CUSTOMER;		PROJECT NUMBER:	SAP CC or W	O#:						ANALYSIS REQUESTED							o i provincia in			
Q4-2023 Weadock I				23-0941	REQUESTER	REQUESTER: Harold Register						(Attach List if More Space is Needed)								QA REQUIREMENT:
SAMPLING TEAM: A. Whaley J. Jassa				TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER														□ NPDES  ⊠ TNI		
SEND REPORT TO:	Joseph Firlit			email:	il: phone:						7								☐ ISO 17025	
COPY TO:	Harold Regis	ter		MATRIX CODES:  GW = Groundwater OX = Other  WW = Wastewater SL = Slud		CONTAINERS				Meren	S							☐ 10 CFR 50 APP. B☐ INTERNAL INFO		
LAB	F-12-7 F-18-1 W		RIX	W = Water / Aqueous Liquid $A = AirS = Soil / General Solid$ $WP = WipO = Oil$ $WT = General Solid$ $WP = Wip$	neral Waste	TOTAL#	F			- level		Total Metals	Anions	ro.	Alkalinity			□ OTHER		
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION		None	None HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	MeO Othe	Other	Tol	Tot	Ani	TDS	Alk				REMARKS
23-0941-01	10/4/23	1332	GW	LH-103R		A	4	1	+	+		1	x	x	x	x				Low Level Ha on Separate Scoo
-05	1014/23	1328	GW	LH-104		R	4	1	-	1		Į.	x	x	x	x				
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CLANOVISHED BY:	WINN	1	DATE/	15/23 / 0730 FIME: F	ECEIV D BY:												□ N			LS028757  Date: 11-15-23
					23-0941 Page 20 o	f 20														



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q4

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0933R

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 10/02/2023 for the 4<sup>th</sup> Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 10/05/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



# **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2023 DEK-JCW Background Wells

**Date Received:** 10/5/2023 **Chemistry Project:** 23-0933

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0933-01	MW-15002	Groundwater	10/04/2023 09:13	DEK JCW Background
23-0933-02	MW-15008	Groundwater	10/02/2023 11:51	DEK JCW Background
23-0933-03	MW-15016	Groundwater	10/04/2023 09:49	DEK JCW Background
23-0933-04	MW-15019	Groundwater	10/02/2023 12:36	DEK JCW Background
23-0933-05	DUP-Background	Groundwater	10/02/2023 00:00	DEK JCW Background
23-0933-06	FB- Background	Water	10/02/2023 12:36	DEK JCW Background



23-0933-01

A CENTURY OF EXCELLENCE

Sample Site: Laboratory Project: **DEK JCW Background** 23-0933

Collect Date: 10/04/2023 Collect Time: 09:13 AM

Report Date:

10/20/23

Lab Sample ID: Matrix: Groundwater

Field Sample ID: MW-15002

Metals by EPA 6020B: CCR Rule Appe	Aliquot #: 23-0	933-01-C01-A01	Analyst: EB			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	2		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	968		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	205		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	245000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	2		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	2		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	30400		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	27		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	38200		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	5		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	7540		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	1680000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	11		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueous	S			Aliquot #: 23-0	933-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	933-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	3170000		ug/L	1000.0	10/14/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-01-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	5430	-	mg/L	10.0	10/11/2023	AB23-1011-02
	22	0022 Daga	5 of 12			





10/20/23

Report Date:

Sample Site: **DEK JCW Background** Laboratory Project: **23-0933R** 

 Field Sample ID:
 MW-15008
 Collect Date:
 10/02/2023

 Lab Sample ID:
 23-0933-02
 Collect Time:
 11:51 AM

Metals by EPA 6020B: CCR Rule Appo	s Ехр	Aliquot #: 23-0	Analyst: EB			
Parameter(s)	Result Flag U			RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	2	ug/L		1.0	10/10/2023	AB23-1010-09
Barium	94		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	157		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	126000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	2		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	22500		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	20		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19600		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	3		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	3600			100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	222000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	5		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueou	us			Aliquot #: 23-0	933-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	933-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	387000		ug/L	1000.0	10/13/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	89000 ug/L 1000.0					AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-02-C03-A01	Analyst: SLF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1160		mg/L	10.0	10/05/2023	AB23-1006-05
	23-	0933 Page	6 of 13			





A CENTURY OF EXCELLENCE

23-0933-03

Sample Site: Laboratory Project: **DEK JCW Background** 23-0933

Collect Date: 10/04/2023 Collect Time: 09:49 AM

Report Date:

10/20/23

Lab Sample ID: Matrix: Groundwater

Field Sample ID: MW-15016

Metals by EPA 6020B: CCR Rule Appe	Aliquot #: 23-0	933-03-C01-A01	-A01 Analyst: EB			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	28		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	154		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	533		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	244000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	22500		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	54		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	43100		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	8		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	9840		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	109000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueous	s			Aliquot #: 23-0	933-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analyte	e List, CI, F	, SO4, Aqı	ieous	Aliquot #: 23-0	933-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	239000		ug/L	1000.0	10/13/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	149000		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-03-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1340		mg/L	10.0	10/05/2023	AB23-1006-05
		22 0022 Daga	7 of 12			



Report Date:

10/20/23



Sample Site: **DEK JCW Background** Laboratory Project: **23-0933R** 

 Field Sample ID:
 MW-15019
 Collect Date:
 10/02/2023

 Lab Sample ID:
 23-0933-04
 Collect Time:
 12:36 PM

Metals by EPA 6020B: CCR Rule Appe	Aliquot #: 23-0	933-04-C01-A01	1 Analyst: EB				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Arsenic	1	ug/L		1.0	10/10/2023	AB23-1010-09	
Barium	373		ug/L	5.0	10/10/2023	AB23-1010-09	
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Boron	275		ug/L	20.0	10/10/2023	AB23-1010-09	
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Calcium	162000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Chromium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09	
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Iron	21800		ug/L	20.0	10/10/2023	AB23-1010-09	
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Lithium	14		ug/L	10.0	10/10/2023	AB23-1010-09	
Magnesium	38200		ug/L	1000.0	10/11/2023	AB23-1010-09	
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09	
Nickel	3		ug/L	2.0	10/10/2023	AB23-1010-09	
Potassium	2350	~		100.0	10/11/2023	AB23-1010-09	
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Sodium	214000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Vanadium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09	
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	933-04-C01-A02	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10	
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqu	ieous	Aliquot #: 23-0	933-04-C02-A01	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Chloride	368000		ug/L	1000.0	10/13/2023	AB23-1011-03	
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03	
Sulfate	101000 ug/L			1000.0	10/12/2023	AB23-1011-03	
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-04-C03-A01	Analyst: SLF	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Total Dissolved Solids	1400		mg/L	10.0	10/05/2023	AB23-1006-05	
	23-	0933 Page 8	8 of 13				





Field Sample ID: **DUP-Background** 

Sample Site: **DEK JCW Background** Laboratory Project: **23-0933R** 

Collect Date: 10/02/2023 Collect Time: 12:00 AM

Report Date:

10/20/23

Lab Sample ID: 23-0933-05 Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	s Ехр	Aliquot #: 23-0	Aliquot #: 23-0933-05-C01-A01				
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Arsenic	2	ug/l		1.0	10/10/2023	AB23-1010-09	
Barium	92		ug/L	5.0	10/10/2023	AB23-1010-09	
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Boron	154		ug/L	20.0	10/10/2023	AB23-1010-09	
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Calcium	121000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Chromium	1		ug/L	1.0	10/10/2023	AB23-1010-09	
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09	
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Iron	22200		ug/L	20.0	10/10/2023	AB23-1010-09	
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Lithium	19		ug/L	10.0	10/10/2023	AB23-1010-09	
Magnesium	18800		ug/L	1000.0	10/11/2023	AB23-1010-09	
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09	
Nickel	2		ug/L	2.0	10/10/2023	AB23-1010-09	
Potassium	3500			100.0	10/11/2023	AB23-1010-09	
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Sodium	210000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Vanadium	5		ug/L	2.0	10/10/2023	AB23-1010-09	
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09	
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot #: 23-0	933-05-C01-A02	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10	
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqı	ieous	Aliquot #: 23-0	933-05-C02-A01	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Chloride	390000		ug/L	1000.0	10/13/2023	AB23-1011-03	
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03	
Sulfate	89900		ug/L	1000.0	10/12/2023	AB23-1011-03	
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-05-C03-A01	Analyst: SLK	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Total Dissolved Solids	1220	J	mg/L	10.0	10/05/2023	AB23-1006-05	
***		0933 Page					



Report Date:

10/20/23



Sample Site: DEK JCW Background Laboratory Project: 23-0933R

Field Sample ID: FB- Background Collect Date: 10/02/2023
Lab Sample ID: 23-0933-06 Collect Time: 12:36 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp				Aliquot #: 23-0	933-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Barium	ND	ι	ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Boron	ND	ι	ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND	ι	ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	ND	ι	ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND	ι	ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Iron	ND	ι	ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	ND	ι	ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	ND	ι	ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND	ι	ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND	ι	ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	ND	ι	ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND	ι	ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND	ι	ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	ND	ι	ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND	ι	ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	ND	ι	ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND	ı	ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Ac	queous			Aliquot #: 23-0	933-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	ι	ug/L	0.2	10/12/2023	AB23-1011-10



A CENTURY OF EXCELLENCE

# **Analytical Report**

**Report Date:** 10/20/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A

# TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number: 23	3-093	3			
Inspection Date: 10.05.	23	_ *	Inspection By:	10	×
Sample Origin/Project Name:	Q4-20	23 JCW	-DEK Backgro	und Well	s
Shipment Delivered By: Ente	r the type of	shipment car	rier.		
Pony F	edEx	_ UPS	SUSPS_	Airt	oorne
Other/Hand Carry (wh	om) TRO	2			,
Tracking Number:	1		Shipping Form At	tached: Yes	No
Shipping Containers: Enter the	ne type and i	number of shi	pping containers received.		
Cooler 🗶 (	Cardboard B	ox	Custom Case	Envelop	e/Mailer
Loose/Unpackaged Co	ontainers		Other		
Condition of Shipment: Enter	the as-recei	ived condition	n of the shipment container	r,	
			Dented		king
Other					
Shipping Containers R  Enclosed Documents: Enter th  CoC > Woo  Temperature of Containers: M  As-Received Tempera	ne type of do rk Request _ Measure the	temperature	losed with the shipment.  Air Data Sheet of several sample container	Other	
M&TE # and Expiration	on LSo28	252 11	15.23		
Number and Type of Contain				ceived	
			The state of the s		*
Container Type VOA (40mL or 60mL)	Water	Soil	Other	Broken	Leaking
Quart/Liter (g/p)	-				-
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11_				
24 mL vial (glass)		_			
250 500 mL (plastic)	5	_			_
Other					

PH Strup Lot #: 205522 exp. 2.15.25

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

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SAMPLING SITE / C	AMPLING SITE / CUSTOMER:			PROJECT NUMBER:	SAP CC or WO#:								ANALYSIS REQUESTED						1			
Q4-2023 JCW-DEK Background Wells SAMPLING TEAM:		23-0933 REQUESTER: Harold Register						(Attach List if More Space is Needed) QA R							QA REQUIR	QA REQUIREMENT:						
		TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER											1		□ NPDES  ⊠ TNI							
SEND REPORT TO:	Joseph Firlit			email:	phone;														☐ ISO 17025			
COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Other		СО	NT	AINE	ERS									□ 10 CFR 50 A	APP. B			
	TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			PRESERVATIVE				VΕ	als							□ INTERNAL	INFO		
LAB	SAMPLE COLI	LECTION	RIX	S = Soil / General Solid WP = Wipe O = Oil WT = General		TOTAL#			3,3		HNO3 H2SO4 NaOH HCI		I .	Total Metals	Suc						□ OTHER	
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	CATION	TOT	None	HNO	NaOl	HCI	Other	Tota	Anions	TDS					REMAR	KS		
23-0933-01	10-4-23	0913	GW	MW-15002		3	2	ì				x	x	х								
-02	10-2-23	1151	GW	MW-15008		3	2	į				х	x	x			ı İi					
-03	10-4-23	0949	GW	MW-15016		3	2	1				x	x	x								
-04	10-2-23	1236	GW	MW-15019		3	2	1				x	x	x								
-05	10-2-23	_	GW	DUP-Background		3	2	1			Ħ	х	x	x								
-06	10-2-23	1236	W	FB- Background		1						x										
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RELINQUISHED BY:	ly	I	JO-	FIME: RE 5-23/0730	ECEIVED BY:							CON	MME	NTS:								
RELINQUISHED BY:		I	DATE/		CEIVID BY:	f 13													#: LSO 2879			



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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: HMP GROUNDWATER MONITORING – JCWEADOCK ASD – 2023 Q4

CC: HDRegister, P22-521 Darby Litz, Project Manager

BLSwanberg, P22-119 TRC Environmental Corporation

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0935

TRC Environmental, Inc. conducted groundwater monitoring at the JCWeadock site during the week of 10/02/2023 for the 4<sup>th</sup> Quarter requirements, as specified in the Hydrogeological Monitoring Plan for the site. The sample was received for analysis by the Chemistry department of Laboratory Services on 10/05/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

<u>Description</u>
Reporting Limit
Result not detected or below Reporting Limit
Non TNI Analyte
Laboratory Control Sample
Laboratory Reagent Blank (also referred to as Method Blank)
Duplicate
Matrix Spike
Matrix Spike Duplicate
Relative Percent Difference
Method Detection Limit
Practical Quantitation Limit
Target Detection Limit
Standard Methods Compendium

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



#### **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex Work Order ID: Q4-2023 Weadock ASD

**Date Received:** 10/5/2023 **Chemistry Project:** 23-0935

Sample # Field Sample ID Matrix Sample Date Site

23-0935-01 JCW-OW-18001 Groundwater 10/05/2023 07:05 JC Weadock ASD





JC Weadock ASD

23-0935-01

Laboratory Project:

Report Date:

10/20/23

23-0935

Collect Date: 10/05/2023 Collect Time: 07:05 AM

Lab Sample ID: Matrix: Groundwater

Field Sample ID: JCW-OW-18001

Sample Site:

	ndix III-IV To			Aliquot #: 23-0	935-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Arsenic	193		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	107		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	1810		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	251000		ug/L	1000.0	10/13/2023	AB23-1012-04
Chromium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Cobalt	ND		ug/L	6.0	10/12/2023	AB23-1012-04
Copper	1		ug/L	1.0	10/12/2023	AB23-1012-04
Iron	13500		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	65		ug/L	10.0	10/12/2023	AB23-1012-04
Magnesium	56600		ug/L	1000.0	10/13/2023	AB23-1012-04
Molybdenum	8		ug/L	5.0	10/12/2023	AB23-1012-04
Nickel	3		ug/L	2.0	10/12/2023	AB23-1012-04
Potassium	10900		ug/L	100.0	10/13/2023	AB23-1012-04
Selenium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Silver	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Sodium	66200		ug/L	1000.0	10/13/2023	AB23-1012-04
Thallium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Vanadium	ND		ug/L	2.0	10/12/2023	AB23-1012-04
Zinc	ND		ug/L	10.0	10/12/2023	AB23-1012-04
Mercury by EPA 7470A, Total, Aqueous	5			Aliquot #: 23-0	935-01-C01-A02	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/17/2023	AB23-1017-04
Anions by EPA 300.0 CCR Rule Analyte	e List, Cl, F,	SO4, Aqı	ieous	Aliquot #: 23-0	935-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	47800		ug/L	1000.0	10/12/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	572000		ug/L	1000.0	10/13/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	935-01-C03-A01	Analyst: LMO
	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)	rtoourt	ı ıug	Ullita		Allalysis Date	Hacking



A CENTURY OF EXCELLENCE

Field Sample ID: JCW-OW-18001

23-0935-01

#### **Analytical Report**

Report Date: 10/20/23

JC Weadock ASD Sample Site: Laboratory Project: 23-0935

Collect Date: 10/05/2023 Collect Time: 07:05 AM

Lab Sample ID: Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot #: 23-0	935-01-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	437000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Bicarbonate	437000	ug/L	10000.0	10/10/2023	AB23-1010-07
Alkalinity Carbonate	ND	ug/L	10000.0	10/10/2023	AB23-1010-07



# **Analytical Report**

**Report Date:** 10/20/23

Data Qualifiers	Exception Summary
	No exceptions occurred.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 4 ATTACHMENT A!

#### TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inenaction Data III.	23		Inspection By	. 1 M	6	*
Inspection Date: 10.05.		-22:11				
Sample Origin/Project Name	Q4-4	023 W	Ragock	U2h		
Shipment Delivered By: Enter	er the type of	shipment carr	rier.			
PonyI	FedEx	UPS		USPS	Airb	orne
Other/Hard Cary (wh	nom) TR					7
Tracking Number:	1		Shippin	g Form Attac	hed: Yes	_ No
Shipping Containers: Enter t	he type and n	number of ship	ping containers	received.		
Cooler X	Cardboard Bo	ox	Custom C	ase	Envelope	e/Mailer
Loose/Unpackaged Co	ontainers		Other			
Condition of Shipment: Ente	r the as-recei	ved condition	of the shipmen	t container.		
Damaged Shipment O				ted	Leal	king
Other				·	Load	
G1. 16 11 T. 16	Cit 1.1	one contin		L-Consumation		
Shipment Security: Enter if a				2.5	pt.	
	2					
Shipping Containers I	Received: Op	pened	Seal	ed X		
Shipping Containers I  Enclosed Documents: Enter t						
	he type of do	cuments encl	osed with the sh	ipment.	Other	
Enclosed Documents: Enter t	he type of do	ocuments encl	osed with the sh Air Data Sh	ipment.	Other	
Enclosed Documents: Enter to CoC Wo Temperature of Containers:	he type of do ork Request_ Measure the	temperature o	osed with the sh Air Data Sh f several sample	ipment. neete containers.		8
Enclosed Documents: Enter to CoC \( \sum_{\text{CoC}} \) Wo Temperature of Containers:  As-Received Tempera	the type of doork Request _ Measure the ature Range	temperature o	osed with the sh Air Data Sh f several sample Samples R	ipment. neete containers.		8
Enclosed Documents: Enter to CoC \( \sum_{\text{V}} \) Wo Temperature of Containers:  As-Received Temperature of M&TÉ # and Expiration	the type of doork Request _ Measure the ature Range_ ion <b>L502</b> §	temperature o	Air Data Sh f several sample Samples R	ipment. neet e containers. Received on I	ce: Yes <u></u>	8
Enclosed Documents: Enter to CoC \( \sum_{\text{CoC}} \) Wo Temperature of Containers:  As-Received Tempera	the type of doork Request _ Measure the ature Range_ ion <b>L502</b> §	temperature o	Air Data Sh f several sample Samples R	ipment. neet e containers. Received on I	ce: Yes <u></u>	8
Enclosed Documents: Enter to CoC \( \sum_{\text{CoC}} \) Wo Temperature of Containers:  As-Received Temperature of Expiration	the type of doork Request _ Measure the ature Range_ ion <b>L502</b> §	temperature o	Air Data Sh f several sample Samples R	ipment. neet e containers. Received on I	ce: Yes <u></u>	8
Enclosed Documents: Enter to CoC \( \sum_{\text{CoC}} \) Wo Temperature of Containers:  As-Received Temperature # and Expiration    Number and Type of Contain	the type of doork Request _ Measure the ature Range _ ion L502 { ners: Enter t	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \sum_{\text{CoC}} \) Wo Temperature of Containers:  As-Received Temperature of M&TÉ # and Expiration Number and Type of Container Type	the type of doork Request _ Measure the ature Range _ ion L502 { ners: Enter t	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \sum_{\text{VOA}} \) Wo Temperature of Containers:  As-Received Temperature of Container Type  VOA (40mL or 60mL)	the type of doork Request _ Measure the ature Range_ tion L502 for the ature that the later that	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \) Wo Temperature of Containers:  As-Received Temperature of Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)	the type of doork Request _ Measure the ature Range_ tion L502 for the ature that the later that	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \sum \) Wo Temperature of Containers:  As-Received Tempera M&TÉ # and Expiration  Number and Type of Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)	the type of doork Request _ Measure the ature Range_ tion L502 for the ature that the later that	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \sum \) Wo Temperature of Containers:  As-Received Temperature of Container Type  Work (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)  24 mL vial (glass)	the type of doork Request _ Measure the ature Range_ tion L502 for the ature that the later that	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No
Enclosed Documents: Enter to CoC \( \setminus \) Wo Temperature of Containers:  As-Received Tempera M&TÉ # and Expiration  Number and Type of Container Type  VOA (40mL or 60mL)  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)  24 mL vial (glass)	the type of doork Request _ Measure the ature Range_ tion L502 for the ature that the later that	temperature of 3.9	Air Data Short Samples Rocks 23 er of sample con	ipment. neet e containers. Received on I	ce: Yes Y	No

# **CHAIN OF CUSTODY**



#### CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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SAMPLING SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or WC	D#:							A	NAI	YSI	SRF	OUE	STE	ED.		in a difference many
Q4-2023 Weadock A				23-0935	REQUESTER:	Haro	old R	legis	ter		Ţ		(Atta	ch Lis	st if N	fore S	Space	is No	eeded)	- 1	QA REQUIREMENT:
SAMPLING TEAM:	J. Jas	10		TURNAROUND TIME REQUIRED:  □ 24 HR □ 48 HR □ 3 DAYS □ ST	ANDARD ⊠ OTH	HER_															□ NPDES  ⊠ TNI
SEND REPORT TO:	Joseph Firlit			email:	phone:																□ ISO 17025
COPY TO:	Harold Regi	ster		IRNAROUND TIME REQUIRED:  24 HR □ 48 HR □ 3 DAYS □ STANDARD ☒ OTHER	SL = Sludge SL = Sludge PRESERVATIVE				☐ 10 CFR 50 APP. B☐ INTERNAL INFO												
LAB	SAMPLE COL	LECTION	MATRIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gene	ral Waste	TAL#	9	)3	7 H		I I	al Meta	ons	S	alinity						□ OTHER
SAMPLE ID	DATE	TIME	MAT	FIELD SAMPLE ID / LO	CATION	TO	Non	HNC	NaO	HCI	Othe	Tot	Ani	TD	AIk						REMARKS
23-0935-01	10/5/03	6705	GW	JCW-OW-18001		5	4	1				х	х	х	х						
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JOB DESCRIPTION

PREPARED FOR

1540 Eisenhower Place

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Attn: Darby Litz

Karn/Weadock CCR JCW Landfill

TRC Environmental Corporation.

Ann Arbor, Michigan 48108-7080

**ANALYTICAL REPORT** 

**JOB NUMBER** 

240-193278-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



# **Eurofins Cleveland**

#### **Job Notes**

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# **Authorization**

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Authorized for release by Kris Brooks, Project Manager II Kris.Brooks@et.eurofinsus.com

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#### **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

#### **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
CFU Colony Forming Unit
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)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent
POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
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)

TNTC Too Numerous To Count

**Eurofins Cleveland** 

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#### **Case Narrative**

Client: TRC Environmental Corporation.

Job ID: 240-193278-1 Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

**Laboratory: Eurofins Cleveland** 

Narrative

Job Narrative 240-193278-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

#### Receipt

The samples were received on 10/11/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.1°C, 0.2°C and 0.4°C

#### **Gas Flow Proportional Counter**

Method 903.0: Radium-226 prep batch 160-631934:

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.

JCW-MW-18001 (240-193278-1), JCW-MW-18004 (240-193278-2), JCW-MW-18005 (240-193278-3), JCW-MW-18006 (240-193278-4), MW-50 (240-193278-5), MW-51 (240-193278-6), MW-52 (240-193278-7), MW-53 (240-193278-8), MW-53R (240-193278-9), MW-54R (240-193278-10), MW-55 (240-193278-11), OW-57ROUT (240-193278-12), MW-58 (240-193278-13), DUP-01 (240-193278-14), EB-01 (240-193278-15), DUP #02 (240-193278-16), (LCS 160-631934/2-A), (MB 160-631934/1-A) and (240-193278-A-2-A DU)

#### Method 904.0: Radium-228 batch 631941

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.

JCW-MW-18001 (240-193278-1), JCW-MW-18004 (240-193278-2), JCW-MW-18005 (240-193278-3), JCW-MW-18006 (240-193278-4), MW-50 (240-193278-5), MW-51 (240-193278-6), MW-52 (240-193278-7), MW-53 (240-193278-8), MW-53R (240-193278-9), MW-54R (240-193278-10), MW-55 (240-193278-11), OW-57ROUT (240-193278-12), MW-58 (240-193278-13), DUP-01 (240-193278-14), EB-01 (240-193278-15), DUP #02 (240-193278-16), (LCS 160-631941/2-A), (MB 160-631941/1-A) and (240-193278-A-2-B DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### Rad

No additional 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: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL

#### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins Cleveland

# **Sample Summary**

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill Job ID: 240-193278-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193278-1	JCW-MW-18001	Water	10/05/23 06:17	10/11/23 08:00
240-193278-2	JCW-MW-18004	Water	10/09/23 11:45	10/11/23 08:00
240-193278-3	JCW-MW-18005	Water	10/09/23 13:34	10/11/23 08:00
240-193278-4	JCW-MW-18006	Water	10/09/23 15:20	10/11/23 08:00
240-193278-5	MW-50	Water	10/09/23 06:40	10/11/23 08:00
240-193278-6	MW-51	Water	10/09/23 07:38	10/11/23 08:00
240-193278-7	MW-52	Water	10/09/23 08:30	10/11/23 08:00
240-193278-8	MW-53	Water	10/09/23 09:20	10/11/23 08:00
240-193278-9	MW-53R	Water	10/09/23 10:15	10/11/23 08:00
240-193278-10	MW-54R	Water	10/09/23 11:05	10/11/23 08:00
240-193278-11	MW-55	Water	10/09/23 12:45	10/11/23 08:00
240-193278-12	OW-57ROUT	Water	10/09/23 14:24	10/11/23 08:00
240-193278-13	MW-58	Water	10/09/23 16:15	10/11/23 08:00
240-193278-14	DUP-01	Water	10/09/23 00:00	10/11/23 08:00
240-193278-15	EB-01	Water	10/09/23 16:30	10/11/23 08:00
240-193278-16	DUP #02	Water	10/09/23 00:00	10/11/23 08:00

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Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18001

Lab Sample ID: 240-193278-1 Date Collected: 10/05/23 06:17 **Matrix: Water** 

Date Received: 10/11/23 08:00

Method: EPA 903	.0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.103	U	0.0929	0.0934	1.00	0.139	pCi/L	10/13/23 10:18	10/28/23 11:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		30 - 110					10/13/23 10:18	10/28/23 11:54	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.783		0.389	0.395	1.00	0.538	pCi/L	10/13/23 10:38	10/20/23 11:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		30 - 110					10/13/23 10:38	10/20/23 11:33	1
Y Carrier	76.3		30 - 110					10/13/23 10:38	10/20/23 11:33	1

Method: TAL-STL F	Ra226_Ra228 - Con	nbined Radi	ium-226 an	d Radiur	n-228				
	_	Count	Total						
		Uncert.	Uncert.						
Analyte	Result Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.886	0.400	0.406	5.00	0.538	pCi/L		11/10/23 08:13	1

11/10/2023

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18004

Lab Sample ID: 240-193278-2 Date Collected: 10/09/23 11:45 **Matrix: Water** 

Date Received: 10/11/23 08:00

Method: EPA 90		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0579	U	0.0894	0.0896	1.00	0.155	pCi/L	10/13/23 10:18	10/28/23 11:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.5		30 - 110					10/13/23 10:18	10/28/23 11:54	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.24		0.502	0.515	1.00	0.662	pCi/L	10/13/23 10:38	10/20/23 11:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.5		30 - 110					10/13/23 10:38	10/20/23 11:33	1
Y Carrier	78.1		30 - 110					10/13/23 10:38	10/20/23 11:33	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	1.30		0.510	0.523	5.00	0.662	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18005

Lab Sample ID: 240-193278-3 Date Collected: 10/09/23 13:34 **Matrix: Water** Date Received: 10/11/23 08:00

Method: EPA 90		( )	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.221		0.145	0.146	1.00	0.203	pCi/L	10/13/23 10:18	10/28/23 11:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					10/13/23 10:18	10/28/23 11:54	1

	4.0 - Radium	(0	•							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.17		0.442	0.455	1.00	0.554	pCi/L	10/13/23 10:38	10/20/23 11:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					10/13/23 10:38	10/20/23 11:34	1
Y Carrier	82.6		30 - 110					10/13/23 10:38	10/20/23 11:34	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.39		0.465	0.478	5.00	0.554	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: JCW-MW-18006

Lab Sample ID: 240-193278-4 Date Collected: 10/09/23 15:20 **Matrix: Water** 

Date Received: 10/11/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.506		0.157	0.164	1.00	0.137	pCi/L	10/13/23 10:18	10/28/23 11:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	98.0		30 - 110					10/13/23 10:18	10/28/23 11:54	1

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.783		0.368	0.375	1.00	0.500	pCi/L	10/13/23 10:38	10/20/23 11:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	98.0		30 - 110					10/13/23 10:38	10/20/23 11:33	1
Y Carrier	84.1		30 - 110					10/13/23 10:38	10/20/23 11:33	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	nd Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.29		0.400	0.409	5.00	0.500	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-50** Lab Sample ID: 240-193278-5

Date Collected: 10/09/23 06:40 **Matrix: Water** Date Received: 10/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.291		0.131	0.134	1.00	0.145	pCi/L	10/13/23 10:18	10/28/23 11:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.9		30 - 110					10/13/23 10:18	10/28/23 11:55	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.15		0.418	0.431	1.00	0.520	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.9		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	85.6		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.44		0.438	0.451	5.00	0.520	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-51** Lab Sample ID: 240-193278-6

Date Collected: 10/09/23 07:38 **Matrix: Water** Date Received: 10/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.285		0.147	0.150	1.00	0.188	pCi/L	10/13/23 10:18	10/28/23 11:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.5		30 - 110					10/13/23 10:18	10/28/23 11:55	1

Method: EPA 904	4.0 - Radium	-228 (GFP	•							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.23		0.448	0.462	1.00	0.550	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.5		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	80.7		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.52		0.472	0.486	5.00	0.550	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: MW-52 Lab Sample ID: 240-193278-7

Date Collected: 10/09/23 08:30 Matrix: Water Date Received: 10/11/23 08:00

Method: EPA 90		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.444		0.176	0.180	1.00	0.206	pCi/L	10/13/23 10:18	10/28/23 11:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.0		30 - 110					10/13/23 10:18	10/28/23 11:55	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.64		0.522	0.543	1.00	0.653	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.0		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	84.1		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	2.08		0.551	0.572	5.00	0.653	pCi/L		11/10/23 08:13	1

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Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-53** Lab Sample ID: 240-193278-8

Date Collected: 10/09/23 09:20 **Matrix: Water** Date Received: 10/11/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.679		0.208	0.217	1.00	0.214	pCi/L	10/13/23 10:18	10/28/23 11:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.6		30 - 110					10/13/23 10:18	10/28/23 11:55	1

		-228 (GFP	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.72		0.528	0.551	1.00	0.658	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.6		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	82.6		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.40		0.567	0.592	5.00	0.658	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: MW-53R Lab Sample ID: 240-193278-9

Date Collected: 10/09/23 10:15 **Matrix: Water** Date Received: 10/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.174		0.118	0.119	1.00	0.167	pCi/L	10/13/23 10:18	10/28/23 11:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					10/13/23 10:18	10/28/23 11:57	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.968		0.400	0.410	1.00	0.512	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	81.1		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.14		0.417	0.427	5.00	0.512	pCi/L		11/10/23 08:13	1

11/10/2023

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: MW-54R Lab Sample ID: 240-193278-10 Date Collected: 10/09/23 11:05

**Matrix: Water** 

Date Received: 10/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	C) Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.160	·	0.107	0.108	1.00	0.148	pCi/L	10/13/23 10:18	10/28/23 11:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	98.5		30 - 110					10/13/23 10:18	10/28/23 11:57	1

Method. El A 30	4.0 - Radium	-220 (GFF	<b>U</b> )							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.38		0.433	0.451	1.00	0.500	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	98.5		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	82.2		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.54		0.446	0.464	5.00	0.500	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-55** Lab Sample ID: 240-193278-11

Date Collected: 10/09/23 12:45 **Matrix: Water** Date Received: 10/11/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.406		0.179	0.182	1.00	0.207	pCi/L	10/13/23 10:18	10/28/23 11:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					10/13/23 10:18	10/28/23 11:57	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.26		0.518	0.531	1.00	0.668	pCi/L	10/13/23 10:38	10/20/23 11:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					10/13/23 10:38	10/20/23 11:35	1
Y Carrier	83.4		30 - 110					10/13/23 10:38	10/20/23 11:35	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
	_		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	1.67		0.548	0.561	5.00	0.668	pCi/L		11/10/23 08:13	1

11/10/2023

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: OW-57ROUT** 

Lab Sample ID: 240-193278-12 Date Collected: 10/09/23 14:24 **Matrix: Water** 

Date Received: 10/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0938	U	0.0975	0.0978	1.00	0.155	pCi/L	10/13/23 10:18	10/28/23 11:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier			30 - 110					10/13/23 10:18	10/28/23 11:57	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.586		0.326	0.330	1.00	0.461	pCi/L	10/13/23 10:38	10/20/23 11:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	101		30 - 110					10/13/23 10:38	10/20/23 11:36	1
Y Carrier	84.9		30 - 110					10/13/23 10:38	10/20/23 11:36	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.680		0.340	0.344	5.00	0.461	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: MW-58** Lab Sample ID: 240-193278-13

Date Collected: 10/09/23 16:15 **Matrix: Water** Date Received: 10/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.844		0.227	0.239	1.00	0.194	pCi/L	10/13/23 10:18	10/28/23 11:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					10/13/23 10:18	10/28/23 11:57	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.21		0.526	0.538	1.00	0.703	pCi/L	10/13/23 10:38	10/20/23 11:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					10/13/23 10:38	10/20/23 11:36	1
Y Carrier	84.5		30 - 110					10/13/23 10:38	10/20/23 11:36	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	nd Radiur	n-228				
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.06		0.573	0.589	5.00	0.703	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: DUP-01** Lab Sample ID: 240-193278-14

Date Collected: 10/09/23 00:00 **Matrix: Water** Date Received: 10/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.320		0.137	0.140	1.00	0.158	pCi/L	10/13/23 10:18	10/28/23 11:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.6		30 - 110					10/13/23 10:18	10/28/23 11:56	1

Method: EPA 904	4.0 - Radium	-228 (GFP	C)							
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.46		0.437	0.457	1.00	0.476	pCi/L	10/13/23 10:38	10/20/23 11:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.6		30 - 110					10/13/23 10:38	10/20/23 11:36	1
Y Carrier	81.1		30 - 110					10/13/23 10:38	10/20/23 11:36	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.78		0.458	0.478	5.00	0.476	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

**Client Sample ID: EB-01** Lab Sample ID: 240-193278-15

Date Collected: 10/09/23 16:30 **Matrix: Water** Date Received: 10/11/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.105	U	0.0986	0.0990	1.00	0.152	pCi/L	10/13/23 10:18	10/28/23 11:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.9		30 - 110					10/13/23 10:18	10/28/23 11:56	1

Method: EPA 90	4.0 - Radium	-228 (GFP	C)							
		•	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.804		0.368	0.375	1.00	0.488	pCi/L	10/13/23 10:38	10/20/23 11:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.9		30 - 110					10/13/23 10:38	10/20/23 11:37	1
Y Carrier	87.5		30 - 110					10/13/23 10:38	10/20/23 11:37	1

Method: TAL-STL F	Ra226_Ra2	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	0.909		0.381	0.388	5.00	0.488	pCi/L		11/10/23 08:13	1

Client: TRC Environmental Corporation.

Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: DUP #02 Lab Sample ID: 240-193278-16

Date Collected: 10/09/23 00:00 Matrix: Water Date Received: 10/11/23 08:00

Method: EPA 903	3.0 - Radium	-226 (GFP	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.431		0.169	0.173	1.00	0.190	pCi/L	10/13/23 10:18	10/28/23 11:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	100		30 - 110					10/13/23 10:18	10/28/23 11:55	1

mothod: El 7100	4.0 - Radium	-220 (GI F	<b>U</b> )							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.39		0.408	0.427	1.00	0.436	pCi/L	10/13/23 10:38	10/20/23 11:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	100		30 - 110					10/13/23 10:38	10/20/23 11:37	1
Y Carrier	84.1		30 - 110					10/13/23 10:38	10/20/23 11:37	1

Method: TAL-STL F	Ra226_Ra	228 - Com	bined Radi	um-226 an	d Radiur	n-228				
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.82		0.442	0.461	5.00	0.436	pCi/L		11/10/23 08:13	1

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#### **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

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Method: 903.0 - Radium-226 (GFPC)

Matrix: Water Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-193278-1	JCW-MW-18001	102	
240-193278-2	JCW-MW-18004	87.5	
240-193278-2 DU	JCW-MW-18004	95.4	
240-193278-3	JCW-MW-18005	88.8	
240-193278-4	JCW-MW-18006	98.0	
240-193278-5	MW-50	94.9	
240-193278-6	MW-51	89.5	
240-193278-7	MW-52	91.0	
240-193278-8	MW-53	96.6	
240-193278-9	MW-53R	93.9	
240-193278-10	MW-54R	98.5	
240-193278-11	MW-55	95.6	
240-193278-12	OW-57ROUT	101	
240-193278-13	MW-58	93.9	
240-193278-14	DUP-01	96.6	
240-193278-15	EB-01	91.9	
240-193278-16	DUP #02	100	
LCS 160-631934/2-A	Lab Control Sample	77.8	
MB 160-631934/1-A	Method Blank	87.8	
Tracer/Carrier Legen	d		

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-193278-1	JCW-MW-18001	102	76.3	
240-193278-2	JCW-MW-18004	87.5	78.1	
240-193278-2 DU	JCW-MW-18004	95.4	77.4	
240-193278-3	JCW-MW-18005	88.8	82.6	
240-193278-4	JCW-MW-18006	98.0	84.1	
240-193278-5	MW-50	94.9	85.6	
240-193278-6	MW-51	89.5	80.7	
240-193278-7	MW-52	91.0	84.1	
240-193278-8	MW-53	96.6	82.6	
240-193278-9	MW-53R	93.9	81.1	
240-193278-10	MW-54R	98.5	82.2	
240-193278-11	MW-55	95.6	83.4	
240-193278-12	OW-57ROUT	101	84.9	
240-193278-13	MW-58	93.9	84.5	
240-193278-14	DUP-01	96.6	81.1	
240-193278-15	EB-01	91.9	87.5	
240-193278-16	DUP #02	100	84.1	
LCS 160-631941/2-A	Lab Control Sample	77.8	82.2	
MB 160-631941/1-A	Method Blank	87.8	83.7	

Ba = Ba Carrier

**Eurofins Cleveland** 

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# **Tracer/Carrier Summary**

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Y = Y Carrier

Job ID: 240-193278-1

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Client: TRC Environmental Corporation. Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-631934/1-A

Client Sample ID: Method Blank **Prep Type: Total/NA Matrix: Water** Analysis Batch: 633964 Prep Batch: 631934 Count Total

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Analyzed Dil Fac Radium-226 -0.04375 U 0.0777 0.0778 1.00 0.182 pCi/L 10/13/23 10:18 10/28/23 11:53 MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 87.8 30 - 110 10/13/23 10:18 10/28/23 11:53

Lab Sample ID: LCS 160-631934/2-A

**Matrix: Water** 

Analysis Batch: 635862

Prep Batch: 631934 Total LCS LCS %Rec **Spike** Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL %Rec Limits MDC Unit Radium-226 11.3 11.00 1.14 1.00 0.123 pCi/L 75 - 125

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 77.8 30 - 110

Lab Sample ID: 240-193278-2 DU Client Sample ID: JCW-MW-18004

**Matrix: Water** 

**Analysis Batch: 633964** 

Total DU DU **RER** Sample Sample Uncert. Analyte Result Qual Result Qual  $(2\sigma + / -)$ RL **MDC** Unit RER Limit 0.0579 U 0.1183 U Radium-226 0.0945 1.00 0.132 pCi/L 0.33

DU DU Carrier %Yield Qualifier Limits Ba Carrier 95.4 30 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-631941/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA Analysis Batch: 632731 **Prep Batch: 631941** 

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed

Radium-228 0.8284 0.389 0.396 1.00 0.518 pCi/L 10/13/23 10:38 10/20/23 11:33 MB MB

Carrier %Yield Qualifier Limits Prepared Dil Fac Analyzed Ba Carrier 87.8 30 - 110 10/13/23 10:38 10/20/23 11:33 30 - 110 Y Carrier 83.7 10/13/23 10:38 10/20/23 11:33

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 631934

**Eurofins Cleveland** 

#### **QC Sample Results**

Client: TRC Environmental Corporation.

Job ID: 240-193278-1

Project/Site: Karn/Weadock CCR JCW Landfill

LCS LCS

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-631941/2-A Client Sample ID: Lab Control Sample

Matrix: Water Prep Type: Total/NA Analysis Batch: 632840 Prep Batch: 631941

				Total					
	Spike	LCS	LCS	Uncert.					%Rec
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
Radium-228	7.78	6.655		1.49	1.00	1.18	pCi/L	86	75 - 125

 Carrier
 % Yield Ba Carrier
 Qualifier
 Limits

 Y Carrier
 82.2
 30 - 110

Lab Sample ID: 240-193278-2 DU Client Sample ID: JCW-MW-18004

Matrix: Water Prep Type: Total/NA Analysis Batch: 632731 Prep Batch: 631941

					Iotai							
	Sample	Sample	DU	DU	Uncert.						RER	
Analyte	Result	Qual	 Result	Qual	(2σ+/-)	RL	MDC	Unit	 	RER	Limit	
Radium-228	1.24		0.7118		0.366	1.00	0.485	pCi/L		0.60	1	

 DU DU

 Carrier
 %Yield 95.4
 Qualifier Qualifier 30 - 110

 Y Carrier
 77.4
 30 - 110

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# **QC Association Summary**

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

#### **Prep Batch: 631934**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193278-1	JCW-MW-18001	Total/NA	Water	PrecSep STD	
240-193278-2	JCW-MW-18004	Total/NA	Water	PrecSep STD	
240-193278-3	JCW-MW-18005	Total/NA	Water	PrecSep STD	
240-193278-4	JCW-MW-18006	Total/NA	Water	PrecSep STD	
240-193278-5	MW-50	Total/NA	Water	PrecSep STD	
240-193278-6	MW-51	Total/NA	Water	PrecSep STD	
240-193278-7	MW-52	Total/NA	Water	PrecSep STD	
240-193278-8	MW-53	Total/NA	Water	PrecSep STD	
240-193278-9	MW-53R	Total/NA	Water	PrecSep STD	
240-193278-10	MW-54R	Total/NA	Water	PrecSep STD	
240-193278-11	MW-55	Total/NA	Water	PrecSep STD	
240-193278-12	OW-57ROUT	Total/NA	Water	PrecSep STD	
240-193278-13	MW-58	Total/NA	Water	PrecSep STD	
240-193278-14	DUP-01	Total/NA	Water	PrecSep STD	
240-193278-15	EB-01	Total/NA	Water	PrecSep STD	
240-193278-16	DUP #02	Total/NA	Water	PrecSep STD	
MB 160-631934/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-631934/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
240-193278-2 DU	JCW-MW-18004	Total/NA	Water	PrecSep STD	

#### **Prep Batch: 631941**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193278-1	JCW-MW-18001	Total/NA	Water	PrecSep_0	
240-193278-2	JCW-MW-18004	Total/NA	Water	PrecSep_0	
240-193278-3	JCW-MW-18005	Total/NA	Water	PrecSep_0	
240-193278-4	JCW-MW-18006	Total/NA	Water	PrecSep_0	
240-193278-5	MW-50	Total/NA	Water	PrecSep_0	
240-193278-6	MW-51	Total/NA	Water	PrecSep_0	
240-193278-7	MW-52	Total/NA	Water	PrecSep_0	
240-193278-8	MW-53	Total/NA	Water	PrecSep_0	
240-193278-9	MW-53R	Total/NA	Water	PrecSep_0	
240-193278-10	MW-54R	Total/NA	Water	PrecSep_0	
240-193278-11	MW-55	Total/NA	Water	PrecSep_0	
240-193278-12	OW-57ROUT	Total/NA	Water	PrecSep_0	
240-193278-13	MW-58	Total/NA	Water	PrecSep_0	
240-193278-14	DUP-01	Total/NA	Water	PrecSep_0	
240-193278-15	EB-01	Total/NA	Water	PrecSep_0	
240-193278-16	DUP #02	Total/NA	Water	PrecSep_0	
MB 160-631941/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-631941/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
240-193278-2 DU	JCW-MW-18004	Total/NA	Water	PrecSep_0	

Job ID: 240-193278-1

#### Lab Chronicle

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-193278-1

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

Lab Sample ID: 240-193278-4

Job ID: 240-193278-1

Client Sample ID: JCW-MW-18001 Date Collected: 10/05/23 06:17

Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:54
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:33
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Client Sample ID: JCW-MW-18004 Lab Sample ID: 240-193278-2

Date Collected: 10/09/23 11:45 Date Received: 10/11/23 08:00

Dilution Prepared **Batch Batch Batch** Method or Analyzed **Prep Type** Type Run Factor Number Analyst Lab Total/NA Prep PrecSep STD 631934 BMW 10/13/23 10:18 EET SL Total/NA Analysis 903.0 1 633964 FLC **EET SL** 10/28/23 11:54 Total/NA Prep PrecSep 0 631941 BMW EET SL 10/13/23 10:38 Total/NA Analysis 904.0 **EET SL** 10/20/23 11:33 1 632731 FLC Total/NA EET SL 11/10/23 08:13 Analysis Ra226\_Ra228 1 636194 EMH

Client Sample ID: JCW-MW-18005 Lab Sample ID: 240-193278-3

Date Collected: 10/09/23 13:34 Date Received: 10/11/23 08:00

Dilution Batch Batch Batch **Prepared Prep Type** Method Type Run **Factor** Number Analyst Lab or Analyzed 10/13/23 10:18 Total/NA Prep PrecSep STD 631934 BMW EET SL Total/NA Analysis 903.0 633964 FLC **EET SL** 10/28/23 11:54 1 Total/NA Prep PrecSep 0 631941 BMW EET SL 10/13/23 10:38 Total/NA 632731 FLC EET SL Analysis 904.0 10/20/23 11:34 1 Total/NA Analysis Ra226 Ra228 1 636194 EMH EET SL 11/10/23 08:13

Client Sample ID: JCW-MW-18006

Date Collected: 10/09/23 15:20 Date Received: 10/11/23 08:00

Batch Batch Dilution **Batch** Prepared **Prep Type** Type Method Run Factor Number Analyst or Analyzed Lab PrecSep STD 10/13/23 10:18 Total/NA Prep 631934 BMW EET SL Total/NA Analysis 903.0 633964 FLC EET SL 10/28/23 11:54 1 Total/NA Prep PrecSep 0 631941 BMW **EET SL** 10/13/23 10:38 Total/NA Analysis 904.0 632731 FLC EET SL 10/20/23 11:33 Total/NA 11/10/23 08:13 Analysis Ra226 Ra228 1 636194 EMH EET SL

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11/10/2023

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-193278-5

**Matrix: Water** 

Job ID: 240-193278-1

Date Collected: 10/09/23 06:40 Date Received: 10/11/23 08:00

Client Sample ID: MW-50

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:55
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226 Ra228		1	636194	EMH	EET SL	11/10/23 08:13

**Client Sample ID: MW-51** Lab Sample ID: 240-193278-6

Date Collected: 10/09/23 07:38 **Matrix: Water** Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:55
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-7 Client Sample ID: MW-52

Date Collected: 10/09/23 08:30 **Matrix: Water** Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:55
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-8 **Client Sample ID: MW-53** 

Date Collected: 10/09/23 09:20 **Matrix: Water** Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:55
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226 Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Client Sample ID: MW-53R

Date Collected: 10/09/23 10:15

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-9

**Matrix: Water** 

Job ID: 240-193278-1

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:57
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Client Sample ID: MW-54R Lab Sample ID: 240-193278-10

**Matrix: Water** 

Date Collected: 10/09/23 11:05 Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD	<del></del> -		631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:57
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-11 **Client Sample ID: MW-55** 

Date Collected: 10/09/23 12:45 **Matrix: Water** 

Date Received: 10/11/23 08:00

•	Batch	Batch		Dilution	Batch			Prepared	
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed	
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18	
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:57	
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38	
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:35	
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13	

Lab Sample ID: 240-193278-12 **Client Sample ID: OW-57ROUT** 

Date Collected: 10/09/23 14:24 **Matrix: Water** Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:57
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:36
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID: 240-193278-13

**Matrix: Water** 

Job ID: 240-193278-1

**Client Sample ID: MW-58** Date Collected: 10/09/23 16:15 Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:57
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:36
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-14

**Matrix: Water** 

Date Collected: 10/09/23 00:00 Date Received: 10/11/23 08:00

**Client Sample ID: DUP-01** 

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:56
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:36
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-15 Client Sample ID: EB-01

Date Collected: 10/09/23 16:30 **Matrix: Water** 

Date Received: 10/11/23 08:00

	Batch	Batch		Dilution Batch				Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633966	FLC	EET SL	10/28/23 11:56
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:37
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

Lab Sample ID: 240-193278-16 Client Sample ID: DUP #02 Date Collected: 10/09/23 00:00 **Matrix: Water** 

Date Received: 10/11/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631934	BMW	EET SL	10/13/23 10:18
Total/NA	Analysis	903.0		1	633964	FLC	EET SL	10/28/23 11:55
Total/NA	Prep	PrecSep_0			631941	BMW	EET SL	10/13/23 10:38
Total/NA	Analysis	904.0		1	632731	FLC	EET SL	10/20/23 11:37
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

**Laboratory References:** 

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR JCW Landfill

## Job ID: 240-193278-1

# **Laboratory: Eurofins 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
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-24
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-24
Massachusetts	State	M-MO054	06-30-24
MI - RadChem Recognition	State	9005	06-30-24
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-24
New Jersey	NELAP	MO002	06-30-24
New Mexico	State	MO00054	06-30-24
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-24
North Dakota	State	R-207	06-30-24
Oklahoma	NELAP	9997	08-31-24
Oregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-24
Texas	NELAP	T104704193	07-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-24
Virginia	NELAP	10310	06-15-25
Washington	State	C592	08-30-24
West Virginia DEP	State	381	12-31-23

**Eurofins Cleveland** 

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 $<sup>^{\</sup>star} \ \text{Accreditation/Certification renewal pending - accreditation/certification considered valid}.$ 

**Chain of Custody Record** Phone (330) 497-9396 Phone (330) 497-0772 **Eurofins Cleveland** 

180 S. Van Buren Avenue

Barberton, OH 44203

**Environment Testing** 

eurofins :

Na2045 Q-Na2048 Q-Na2803 R-Na28203 S-H2604 T-TSP Dodecahydratt U-Acetone V-MCAA W-PH-4-5 Y-Trizma Special Instructions/Note: かりこと Months Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) COC No. 240-112528-29048.1 Preservation Codes A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
F - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid Page: Page 1 of 2 Archive For 10/10/23 4 Aethod of Shipment 240-193278 Chain of Custody Disposal By Lab State of Origin Analysis Requested Cooler Temperature(s) °C and Other Remarks Special Instructions/QC Requirements: Lab PM:
Brooks, Kris M
E-Mail
Kris Brooks@et.eurofinsus com マクナヤ 903.0 - Standard Target List 15 1 Time: Field Filtered Sample (Yes or No) Company BT-Tissue, A-Air Compara Preservation Code: Water Water Water Water Matrix Water Water Water Water Water Water Water Radiological Type (C=comp, G=grab) Sample 9 0 0 0 JASE 9 745 101 175 Sample から 25.6 101 A Yes 3 1334 15% 0930 In 200 202 Date Poison B Unknown Project #
Eurofins 24024154
SSOW#. (days): Due Date Requested AUTA (6) 10) Sample Date 50/201 ころいろ r816101 4903 04153 (altol) 10/9/37 0(963 <u>लिक</u> 63 10/9/33 0463 PO# 199810 Skin Irritant Deliverable Requested: I, II, III, IV, Other (specify) Custody Seal No. 734-971-9022(Fax) Flammable Karn/Weadock CCR JCW Lanfill **IRC Environmental Corporation** Possible Hazard Identification Krenz@trccompanies.com Empty Kit Relinquished by: Custody Seals Intact: Client Information 540 Eisenhower Place ample Identification '34-971-7080(Tel) Non-Hazard JCW-MW-18006 CW-MW-18005 CW-MW-18004 CW-MW-18001 State, Zip MI, 48108-7080 Jacob Krenz Ann Arbor **MW-53R** MW-54R MW-53 MW-52 MW-51 MW-50 MW-55

10   10   10   10   10   10   10   10		T	Lab PM	Carrier Trackion No/e)	
Progress   Progress	Client Information	フ		To low Rivors	2528-29048
File Composition	Client Contact:	188 70	2	State of Origin	
Place   Arabidos Requested   Arabidos   Ar	Company:	Md	Special Consumer Service Control Service Contr		rage z or z
17   17   17   17   17   17   17   17	I RC Environmental Corporation		Analysis R	equested	
73.4-97 - 50.20   50.00   70	vooress 1540 Eisenhower Place	Due Date Requested:			des:
10 Table 3	City Ann Arbor	TAT Requested (days):			
17.54-07-18022(Fa)   199810	State, Zip: MI, 48108-7080	A Yes			
Figure   Proposed	Phone 734-971-7080(Tel) 734-971-9022(Fax)		(4		
Control   Cont	Email JKrenz@trccompanies.com	#OM			I - Ice J - Di Water
Sample Date (Purch)  Out   Cut	Project Name Karn/Weadock CCR JCW Lanfill	Eurofins Project # 24024154	s or f		K - EDTA L - EDA
Sample Date   Sample Date   Sample Date   Sample   Mutrix   Sample   Mutrix   Sample   Mutrix   Sample   Samp	Site	\$SOW#	SI GF		Other:
1 Clq lb 3	sample Identification	Sample	Matrix (wwwater, Sevalus, Sevalus, O-wosteon, MS/MS)		
1 (1/4/6 > 1/4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4   C Water   U /4 /4 /4 /4   C Water   U /4 /4 /4 /4   C Water   U /4 /4 /4 /4   C Water   U /4 /4 /4 /4   C Water   U /4 /4 /4 /4   C Water   U /4 /4 /4 /4 /4 /4 /4 /4 /4 /4 /4 /4 /4		X	ation Code: XXD		
1 (1/4/2) (1/4	W-57ROUT	スペテン	74.2		
16463 — Co Water LLFF F F F F F F F F F F F F F F F F F	AW-58	15151	Water U		7
Content   Cont	JUP-01				
Sample Disposal (A fee may be assessed if samples are retained tonger than 1 n	B-01	7	3		
Sample Disposal (A fee may be assessed if samples are retained longer than 1n Sample Disposal (A fee may be assessed if samples are retained longer than 1n Secular Instructions/OC Requirements.    Page   P	X0#0X	~	3.		7
Sample Disposal (A fee may be assessed if samples are retained longer than 1 n  Sample Disposal (A fee may be assessed if samples are retained longer than 1 n  Sequested 1, II, III, IV, Other (specify)  Inquished by:  Date:  Date:  Date:    Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Received by   Company   Company   Received by   Company   Company   Company   Received by   Company   Company   Received by   Company					
2ard Identification       Sample Disposal (A fee may be assessed if samples are retained longer than 1 n Land Land Land Land Land Land Land La					
Special Instructions/OC Requirements:   Time:   Time:   Date:   Date:   Date:   Time:   Date	ossible Hazard Identification Non-Hazard	Unknown		assessed if samples are reta	ained longer than 1 month) Months
A No A No A No A No A No A No A No A No	eliverable Requested: I, II, III, IV, Other (specify)			nents	
Date/Time / Company Received by Contract Custody Seal No.    Contract   Custody Seal No.   Contract	mpty Kit Relinquished by:	H	Time:	Method of Shipment	
Custody Seal No.:  Cooler Temperature(s) °C and Other Remarks:	refinquished by, refinquished by, refinquished by,		Receivedby Co.	2201	745 3 8CD
			Cooler Temperature(s) °C and Other		
					Ver. 01/16/2019

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Chain of Custody Record

Eurofins Cleveland 180 S. Van Buren Avenue

10222	
Eurofins - Cleveland Sample Receipt Form/Narrative  Barberton Facility  Login #: 1932 + 5	
Client TRC EN COMENTA (Site Name Cooler unpacked by:	,
Cooler Received on 10 11 23 Opened on 10 11 23 YAChelle HAIde	4
FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other	-
Receipt After-hours: Drop-off Date/Time Storage Location	$\neg$
Eurofins Cooler # E 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 # (CF-O-\ °C) Observed Cooler Temp °C Corrected Cooler Temp °C	
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity  -Were the seals on the outside of the cooler(s) signed & dated?  -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  -Were tamper/custody seals intact and uncompromised?  3. Shippers' packing slip attached to the cooler(s)?  4. Did custody papers accompany the sample(s)?  5. Were the custody papers relinquished & signed in the appropriate place?  6. Was/were the person(s) who collected the samples clearly identified on the COC?  7. Did all bottle labels (ID/Date/Time) be reconciled with the COC?  9. For each sample, does the COC specify preservatives (N), # of containers (N), and sample type of grab/comp(N)?  10. Were correct bottle(s) used for the test(s) indicated?  11. Sufficient quantity received to perform indicated analyses?  12. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  13. Were all preserved sample(s) at the correct pH upon receipt?  14. Were VOAs on the COC?  15. Were air bubbles >6 mm in any VOA vials?  16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	
Contacted PM Date by via Verbal Voice Mail Other	
Concerning	
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES  additional next page  Samples processed by:	
Samplingtime for MW-55 = 1245 Confirmed on Containers, En	112
19. 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)	
20. SAMPLE PRESERVATION	-
Sample(s) were further preserved in the laboratory.	
Sample(s) were further preserved in the laboratory.  Time preserved: Preservative(s) added/Lot number(s):	
VOA Sample Preservation - Date/Time VOAs Frozen:	

1		Eurofins - Cant	on Sample Receipt I	Multiple Cooler Form	
Cooler De	escription	IR Gun#	Observed	Corrected	2 Coolant
(Ci	rcle)	(Circle)	Temp °C	Temp °C	(Circle)
Client	Box Other	IR GUN #;	0.5	0.40 660	
EC Cleni	Box Other	IR GUN 9:	0-3	0.2	Welte Blue Ice By ice Weler None
( BC Client	Box Other	IR GUN #:	0.2	0-	Weller Sive Sce Byice
IC Clent	Box Other	IR GON #:			Wellice Blue Ice Bylce Water Mass
IC Clent	Box Other	IR GUN F:			Wellice Blue Ice Bylce Water Mane
BC Client	Sex Other	IR GUN F:			Wellice Moe Sce Bylce Water Mose
BC Client	Box Other	IR GUN #:			Wellice Blue Ice Byte Violer None
BC Client	Bex Other	IR GUN F:			Walter Blue too bytee
RC Clent	Bex Other	IR GUN F:			Welter Blue See Bylee Water Mone
BC Cleat	Sex Other	12 GUN #:			Wellice Mos Sos Bytes Water Moss
BC Cloud	Bex Other	M COM F:			Well be Slee See By be
BC Cleat	Best Other	12 GUN 6:			Wellie Nee In Byte
BC Cloud	Bex Other	IR CON 6:			Wellie Nee Inc. Byte
BC Cloud	Best Other	# 64H f:			Wellto Nee too Sylto
BC Cloud	Bex Other	IR 60H 6:			Wellice Blue lice Byte
BC Client	Box Other	1K GON 8:			Well to Mee to By to
BC Client	Box Other	ir con f:			Well to She ice By to
BC Clont	Box Other	IR GON 8:		100	Well to the to Byte
BC Cleat	Box Other	R 60H 6:			Wellice Sive Ice Byte Weller Mane Wellice Sive Ice Byte
BC Client	Ben Other	12 OON 6:			Water_Mage
BC CBent	Bek Other	12 GUN 9:			Water Mann .
BC Clent	Bex Other	IR GUN 9:			Wellie Sho tee Style Welle Sho tee Style
BC CBent	Jex Other	R GW 6:			Well to She to Byte
BC CSoint		R 60H 6:			Weller Mane Weller Stee See Brytes
BC Clerk		R 6W F:		. ]	Weller Mone Nel ice Sive ice Bry ite
BC Clent	Sex Other	R GUN F:	,		Helico She ico Styles
SC CSon/		R GWI #:			Vet ice Sive ice By to
SC CSent	Bax Other	IR GON 6:		1	Maker Mana
	Box Other	R GW #:			Woler Hone
	Best Other	R GUN #:			let ice the ice by ice
	Best Other	R GUN #:			let toe thee toe try to
	Best Other	IR GUN #:			of ice life ice Dry to
EC Client	Bex Other	R GUN F:			of ice the ice Bry ice
EC Client	Beex Other	R GUN F:			Hiles Nostes Bytes
-				☐ See Tempera	ture Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 - Multiple Coolen

4

Temperature readings:					
Client Comple ID	Lab ID	Compain on Ton-		ainer	Preservative
Client Sample ID	<u>Lab ID</u>	Container Type	рH	Temp	Added (mls) Lot #
JCW-MW-18001	240-193278-A-1	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18001	240-193278-B-1	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18004	240-193278-A-2	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18004	240-19327 <b>8-</b> B-2	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18005	240-193278-A-3	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18005	240-193278-B-3	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18006	240-193278-A-4	Plastic 1 liter - Nitric Acid	<2		
JCW-MW-18006	240-193278-B-4	Plastic 1 liter - Nitric Acid	<2		
MW-50	240-193278-A-5	Plastic 1 liter - Nitric Acid	<2		
MW-50	240-193278-B-5	Plastic 1 liter - Nitric Acid	<2		
MW-51	240-193278-A-6	Plastic 1 liter - Nitric Acid	<2		
MW-51	240-193278-B-6	Plastic 1 liter - Nitric Acid	<2		
MW-52	240-193278-A-7	Plastic 1 liter - Nitric Acid	<2		
MW-52	240-193278-B-7	Plastic 1 liter - Nitric Acid	<2		
MW-53	240-193278-A-8	Plastic 1 liter - Nitric Acid	<2		
MW-53	240-193278-B-8	Plastic 1 liter - Nitric Acid	<2		
MW-53R	240-193278-A-9	Plastic 1 liter - Nitric Acid	<2		
MW-53R	240-193278-B-9	Plastic 1 liter - Nitric Acid	<2		
MW-54R	240-193278-A-10	Plastic 1 liter - Nitric Acid	<2		
MW-54R	240-193278-B-10	Plastic 1 liter - Nitric Acid	<2		
MW-55	240-193278-A-11	Plastic 1 liter - Nitric Acid	<2		
MW-55	240-193278-B-11	Plastic 1 liter - Nitric Acid	<2		
OW-57ROUT	240-193278-A-12	Plastic 1 liter - Nitric Acid	<2		
OW-57ROUT	240-193278-B-12	Plastic 1 liter - Nitric Acid	<2		
MW-58	240-193278-A-13	Plastic 1 liter - Nitric Acid	<2		
MW-58	240-193278-B-13	Plastic 1 liter - Nitric Acid	<2		
DUP-01	240-193278-A-14	Plastic 1 liter - Nitric Acid	<2		
DUP-01	240-193278-B-14	Plastic 1 liter - Nitric Acid	<2		
EB-01	240-193278-A-15	Plastic 1 liter - Nitric Acid	<2		
EB-01	240-193278-B-15	Plastic 1 liter - Nitric Acid	<2		
DUP#02	240-193278-A-16	Plastic 1 liter - Nitric Acid	<2		
DUP #02	240-193278-B-16	Plastic 1 liter - Nitric Acid	<2		

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# **Chain of Custody Record**

180 S. Van Buren Avenue Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772

Client Information (C.th Contract   ph)								5	Carrier Tracking No(s):	40(5):		COC No	
CHETT HINDINGTON (SUD CONTRACT LAD)			Brooks, Kris M	M SU								240-175077.1	
Client Contact:	Phone:		E-Mail:		,			State	State of Origin:			Page:	
Simple Control of the			Kns.Brooks@et.eurofinsus.com	ks@et.	eurofins	sus.com		Σ	Michigan			Page 1 of 2	
Company: TestAmerica Laboratories, Inc.			Accr	editations	Required	Accreditations Required (See note):						Job #:	
Addrass			1									240-193278-1	
13715 Rider Trail North,	11/9/2023					Anal	Analysis Requested	eque	ited			ration Code	M - Hexane
City:	TAT Requested (days):	l						_	E				N - None
State, Zic: MO, 63045												tate cid	P - Na204S Q - Na2SO3
Phone: 314-296-8566(Tel) 314-298-8757(Fax)	PO #:		(0	18∐ 1¢	1si								S - M2SSZU3 S - M2SO4 T - TSP Dodecahydrate
Email:	WO#:				rget L							I - Ice V - V - J - DI Water	U - Acetone V - MCAA
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				sT brei	_					nenist		W - pH 4-5 Y - Trizma 7 - other (specify)
Site.	SSOW#:				-							Other:	(specify)
		181		_	_						) Ji		
		Sample Type	enediji b	SM mnol ječser9\0	0/PrecSep						edmuN l		
Sample Identification - Client ID (Lab ID)	Sample Date Time	(G=grab)		- 1	-			$\dashv$			stoT	Special Instructions/Note:	ctions/Note:
	\ \	Preservation Code:		Y							X		
JCW-MW-18001 (240-193278-1)	10/5/23 06:17 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/l	+228 action limit at
JCW-MW-18004 (240-193278-2)	10/9/23 11:45 Fastern		Water	×	×			H			2	TVA protocol - Ra-226+228 action limit at	-228 action limit at
JCW-MW-18005 (240-193278-3)	10/9/23 13:34 Fastern		Water	×	×			-			2	TVA protocol - Ra-226+228 action limit at	-228 action limit at
JCW-MW-18006 (240-193278-4)	10/9/23 15:20 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	-228 action limit at
MW-50 (240-193278-5)	10/9/23 06:40 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	228 action limit at
MW-51 (240-193278-6)	10/9/23 07:38 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	-228 action limit at
MW-52 (240-193278-7)	10/9/23 08:30 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	228 action limit at
MW-53 (240-193278-8)	10/9/23 09:20 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	-228 action limit at
MW-53R (240-193278-9)	10/9/23 10:15 Eastern		Water	×	×						2	TVA protocol - Ra-226+228 action limit at	228 action limit at
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratores. 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/Rests/matrix being analyzed, the shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central LLC attentions and accreditation status should be brought to Eurofins Environment Testing North Central LLC attentions will be provided. Any changes to	nt Testing North Central, LLC pove for analysis/tests/matrix t	places the ownership of me being analyzed, the sample	thod, analyte &	accredit	ation com to the Eur	pliance upo ofins Enviro	n our sub	contract l	aboratories.	This sample LC laborator	shipment v or other	is forwarded under chain	of-custody. If the

Possible Hazard Identification

Possible Hazard Identification		County Diagram of the Co.		
To come garden		Sample Disposal ( A ree may be asses	Ä	1 month)
Oncommitted		Return To Client Dispo	Disposal By Lab Archive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2	Requ	1	Month
Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:	
Relinguisher by		1		
1 Colours Alcolo	193 - 193 LE	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Received by	Date (Time)	
100			Cate III.	Company
Kelinquished by:	Date/Time:	Received by:	Date/Time:	Company
Custoday Spale latent: Trustaday Spale Mai				
A Yes A No		Cooler Temperature(s) °C and Other Remarks.		

Phone: 330-497-9396 Fax: 330-497-0772

**Eurofins Cleveland** 

180 S. Van Buren Avenue

Barberton, OH 44203

**Environment Testing** 💸 eurofins

Carrier Tracking No(s)

Chain of Custody Record

5.0 pc/VL.
TVA protocol - Ra-226+228 action limit at 5.0 pc/VL. TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at 5.0 pCi/L. TVA protocol - Ra-226+228 action limit at aboratory does not currently maintain accreditation in the State of Origin listed above for analysis/eats/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central. LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC. TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at NA protocol - Ra-226+228 action limit at TSP Dodecahydrate Vote: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the Special Instructions/Note: Z - other (specify) R - Na2S2O3 S - H2SO4 0 - AsNaO2 P - Na2O4S Q - Na2SO3 W - pH 4-5 Y - Trizma Months U - Acetone M - Hexane V - MCAA Company Company Company Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon Preservation Codes: H - Ascorbic Acid 240-193278-1 COC No: 240-175077.2 C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor Page 2 of 2 I - Ice J - DI Water K - EDTA L - EDA A - HCL B - NaOH 5.0 pCi/L 5.0 pCi/L 5.0 pCi/L 5.0 pCi/L 2 2 7 2 7 2 8 Total Number of containers Date/Time: Date/Time: Date/Time Method of Shipment State of Origin: Michigan **Analysis Requested** Cooler Temperature(s) °C and Other Remarks: Special Instructions/QC Requirements: Accreditations Required (See note) Kris.Brooks@et.eurofinsus.com × × × × × × × SAZZERaZZ8\_GFPC Received by: Received by Received by 13 × × × × × × 18LJ 19gra 1 brandard 1 arget List × × × × × × × Lab PM: Brooks, Kris M 903.0/PrecSep\_STD Standard Target List Time: Perform MS/MSD (Yes or No) id Filtered Sample (Yes or No.) 加 N N E-Mail: Preservation Code: (Winwater, Sisolid, Oinwaste/oil, BTeTissue, Water Water Water Water Water Water Water A=AF) Company (C=comp, Sample G=grab) Type (SC) Primary Deliverable Rank: 2 Sample Eastern 12:45 Eastern 14:24 Eastern 16:15 Eastern Eastern Eastern Eastern Time Date: 分三の AT Requested (days) Due Date Requested: 11/9/2023 Sample Date 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 Project #: 24024154 Date/Time # 0,0 Creace Deliverable Requested: I, II, III, IV, Other (specify) Client Information (Sub Contract Lab) Karn/Weadock CCR Groundwater Monitoring Custody Seal No. Sample Identification - Client ID (Lab ID) 314-298-8566(Tel) 314-298-8757(Fax) Possible Hazard Identification OW-57ROUT (240-193278-12) estAmerica Laboratories, Inc. Empty Kit Relinquished by: DUP #02 (240-193278-16) MW-54R (240-193278-10) DUP-01 (240-193278-14) Custody Seals Intact: MW-55 (240-193278-11) MW-58 (240-193278-13) EB-01 (240-193278-15) 3715 Rider Trail North, A Yes A No Shipping/Receiving elinquished by: Unconfirmed State, Zip: MO, 63045 Earth City

**Eurofins Cleveland** 180 S. Van Buren Avenue Barberton, OH 44203

	oampier.								Carrier 11d	Camer Tracking No(s):		50 NO	
Cilent Information (Sub Contract Lab)				Brooks	Brooks, Kns M							240-175077.1	
Client Contact: Shinning/Receiving	Phone:			E-Mail:	opho (	t or the fact	E-Mail: Kris Brooks@et eurofineus com		State of Origin	igin:		Page:	
Simple of the stat				113.DI	OONS (GO	1.50101	IIIOO:COIII		MICE			5	
Company:				<u> </u>	creditation	s Requir	Accreditations Required (See note):					Job #:	
I commence Legoratories, Inc.						1						240-1932/8-1	
Address: 13715 Rider Trail North	Due Date Requested:	#		-			Analy	Analysis Reguested	potooi			Preservation Codes:	odes:
	0303011											A - HCL	DI INVENTORIA
City: Earth City	TAT Requested (days):	/s):										B - NaOH C - Zn Acetate	O - AsNaO2
State, Zip: MO, 63045												D - Nitric Acid E - NaHSO4	C - Na2O43 Q - Na2SO3 R - Na2S2O3
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			(6	tel.13t	jei						G - Amchlor	S - H2SO4 T - TSP Dodecahydrate
Email:	WO#:			N.A.	(0	J jef							U - Acetone
					N,	) Tar					210	J - DI Water	W - pH 4-5
Project Name:  Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			N) = 1	10 80	l basb					nistri	_	Y - Trizma Z - other (specify)
Site:	SSOW#:			diweg	N) as	nst2 (	Эd				oo to	Other:	
			F	Matrix	PV!	) d	49				190		
			Sample	Warwater, Sasolid,	ill in	8291	822e;				dmul		
And the first section of the section		Sample	_	O-waste/oil. BT-Tissue.	iohi	¶(0.≱(	922e				f isto		
Sample Identification - Cheff ID (Lab ID)	Sample Date	alline	G-grap)	Ī	1	6	Я				1		Special Instructions/Note:
	X	X	Preservation Code:	Code:	X						× -		
JCW-MW-18001 (240-193278-1)	10/5/23	06:17 Eastern		Water	×	×	×				2	_	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18004 (240-193278-2)	10/9/23	11:45 Eastern		Water	×	×	×				2		TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18005 (240-193278-3)	10/9/23	13:34 Eastern		Water	×	×	×				2	-	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18006 (240-193278-4)	10/9/23	15:20 Eastern		Water	×	×	×				2	_	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-50 (240-193278-5)	10/9/23	06:40 Eastern		Water	×	×	×				2	-	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-51 (240-193278-6)	10/9/23	07:38 Eastern		Water	×	×	×				2		TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-52 (240-193278-7)	10/9/23	08:30 Eastern		Water	×	×	×				2	_	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-53 (240-193278-8)	10/9/23	09:20 Eastern		Water	×	×	×				2	-	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-53R (240-193278-9)	10/9/23	10:15 Eastern		Water	×	×	×				2		TVA protocol - Ra-226+228 action limit at 5.0 pc.id
Note: Since Jaboratory accreditations are empired to chance. Europee Environment Traction Mark Control 110	Tooting Modb Contra	accela C 1 1	1										

Inder Sinch abovalory acceptations are subject to change, Eurorins Environment 1 esting North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory or other instructions will be provided. Any changes to accreditation in the State of Origin listed above for analysis/lests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC. Possible Hazard Identification

	Possible Hazard Identification		Sample Disposal ( A fee may be asses	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	month)
	Unconfirmed		Return To Client Dispo	Disposal By Lab Archive For	Months
	Deliverable Requested: I, III, IV, Other (specify)	Primary Deliverable Rank: 2	Special Instructions/QC Requirements:		
	Emply Kit Relinquished by:	Date:	Time:	Method of Shipment:	
11		Palatine: 1200 Company 1	TELLEY		Company
/10/		Date/Time: Company	Received by:	ONSO 2707 7 September 2 2023 OSO	S. F. S.
202	Relinquished by:	Date/Time: Company	Received by:	Date/Time:	Company
3	Custody Seals Intact: Custody Seal No.:	·	Cooler Temperature(s) °C and Other Remarks:		
			10 11 12 13	<ul><li>4</li><li>5</li><li>6</li><li>7</li><li>8</li><li>9</li></ul>	

Camier Tracking No(s)

**Environment Testing** 

# Chain of Custody Record

Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772

**Eurofins Cleveland** 

180 S. Van Buren Avenue

TVA protocol - Ra-226+228 action limit at 5.0 pCi/L. TVA protocol - Ra-226+228 action limit at 5.0 pCi/L. TVA protocol - Ra-226+228 action limit at 5.0 pCi/L. Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratory or other instructions will be provided. Any changes to laboratory does not currently maintain accreditation in the State of Origin isted above for analysis/Rests.matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC. TVA protocol - Ra-226+228 action limit at 5.0 pCi/L. TVA protocol - Ra-226+228 action limit at TVA protocol - Ra-226+228 action limit at VA protocol - Ra-226+228 action limit at T. TSP Dodecahydrate Special Instructions/Note: Z - other (specify) From S Months N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 V - MCAA W - pH 4-5 Y - Trizma U - Acetone Company S - H2SO4 Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Horive For Mon Preservation Codes: A - HCL
B - NaOH
C - Zn Acetate
C - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid 240-175077.2 240-193278-1 Page 2 of 2 J - DI Water K - EDTA 5.0 pCi/L 5.0 pCi/L L - EDA I - Ice 2023 7 2 2 0 N Total Number of containers 2 Date/Time Jate/Time Method of Shipment: State of Origin: Michigan **Analysis Requested** Cooler Temperature(s) °C and Other Remarks: Special Instructions/QC Requirements: M FED Accreditations Required (See note) Return To Client E-Mail: Kris.Brooks@et.eurofinsus.com × × × × × × × 39226Ra228\_GFPC Received by: eceived by: Received by: 13 × × × × × × × 04.0/PrecSep\_0 Standard Target List × × × × × Lab PM: Brooks, Kris M 903.0/PrecSep\_STD Standard Target List Ime: erform MS/MSD (Yes or Ho) (of to set) elgmas ber THE STATE OF THE S S=solid, O=wests/oil, BT=Tissue, Preservation Code: Water Water Water Water Water Water Water A=Ak) Company (C=comp, G=grab) Sample Type (2C) Primary Deliverable Rank: 2 Eastern 14:24 Eastern Eastern 16:15 Eastern 12:45 Eastern Eastern Eastern 16:30 Z Date: AT Requested (days) Due Date Requested: 11/9/2023 Sample Date 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 10/9/23 Project #: 24024154 SSOW#: Date/Time: Phone: # ON # 0 C, EBD-PA FED EX Deliverable Requested: I, II, III, IV, Other (specify) Client Information (Sub Contract Lab) Kam/Weadock CCR Groundwater Monitoring Custody Seal No. Sample Identification - Client ID (Lab ID) 314-298-8566(Tel) 314-298-8757(Fax) Possible Hazard Identification OW-57ROUT (240-193278-12) estAmerica Laboratories, Inc. mpty Kit Relinquished by: MW-54R (240-193278-10) DUP #02 (240-193278-16) DUP-01 (240-193278-14) Custody Seals Intact: MW-55 (240-193278-11) MW-58 (240-193278-13) EB-01 (240-193278-15) 3715 Rider Trail North, Shipping/Receiving linquished by: Unconfirmed State, Zip: MO, 63045 Client Contact Earth City

# **Login Sample Receipt Checklist**

Client: TRC Environmental Corporation.

Job Number: 240-193278-1

Login Number: 193278
List Source: Eurofins St. Louis
List Number: 2
List Creation: 10/12/23 12:17 PM

Creator: Worthington, Sierra M

Creator: Worthington, Sierra M		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	N/A	
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?	True	
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.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **ANALYTICAL REPORT**

# PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Generated 11/7/2023 2:58:27 PM

# **JOB DESCRIPTION**

Karn/Weadock CCR Background Well

# **JOB NUMBER**

240-193059-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



# **Eurofins Cleveland**

# **Job Notes**

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

# **Authorization**

Generated 11/7/2023 2:58:27 PM

Authorized for release by Kris Brooks, Project Manager II Kris.Brooks@et.eurofinsus.com (330)966-9790

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# **Definitions/Glossary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Job ID: 240-193059-1

#### **Qualifiers**

Qualifier **Qualifier Description** 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

Percent Recovery %R CFL Contains Free Liquid CFU Colony Forming Unit **CNF** Contains No Free Liquid

DER Duplicate Error Ratio (normalized absolute difference)

Dil Fac **Dilution Factor** 

Detection Limit (DoD/DOE) DL

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)

Estimated Detection Limit (Dioxin) EDL LOD Limit of Detection (DoD/DOE) Limit of Quantitation (DoD/DOE) LOQ

EPA recommended "Maximum Contaminant Level" MCL MDA Minimum Detectable Activity (Radiochemistry) MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit ML Minimum Level (Dioxin) MPN Most Probable Number MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent POS Positive / Present

PQL Practical Quantitation Limit

**PRES** Presumptive **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)

**TNTC** Too Numerous To Count

**Eurofins Cleveland** 

#### Case Narrative

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Job ID: 240-193059-1

**Laboratory: Eurofins Cleveland** 

Narrative

Job Narrative 240-193059-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

#### Receipt

The samples were received on 10/6/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.4°C

#### **Gas Flow Proportional Counter**

Method 903.0: Radium-226 batch 631370

Based upon client request, 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-15008 (240-193059-2), MW-15016 (240-193059-3), MW-15019 (240-193059-4), DUP-BACKGROUND (240-193059-5), EQ-BACKGROUND (240-193059-6), (LCS 160-631370/2-A), (MB 160-631370/1-A) and (240-193059-B-6-A DU)

Method 903.0: Radium-226 prep batch 160-631370:

The following sample has activity above the RL. The sample was re-counted after 21 days of in-growth. The re-count results are above the RL and are reported as is. MW-15002 (240-193059-1)

Method 904.0: Radium-228 batch 631371

The sample duplicate (DUP) precision (DER) is outside the control limits. However the original sample and DUP activity is below the MDC / RL making the measurement of precision less critical. The lab does not believe this discrepancy to have a negative impact on the data being reported.

(240-193059-B-6-B DU)

Method 904.0: Radium-228 batch 631371

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-15002 (240-193059-1), MW-15008 (240-193059-2), MW-15016 (240-193059-3), MW-15019 (240-193059-4), DUP-BACKGROUND (240-193059-5), EQ-BACKGROUND (240-193059-6), (LCS 160-631371/2-A), (MB 160-631371/1-A) and (240-193059-B-6-B DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### Rad

No additional 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: Karn/Weadock CCR Background Well

Method **Method Description** Laboratory Protocol 903.0 Radium-226 (GFPC) EPA EET SL Radium-228 (GFPC) 904.0 EPA EET SL Ra226\_Ra228 Combined Radium-226 and Radium-228 TAL-STL EET SL PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) None EET SL PrecSep\_0 Preparation, Precipitate Separation None EET SL

#### Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

### Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Job ID: 240-193059-1

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# **Sample Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193059-1	MW-15002	Water	10/04/23 09:13	10/06/23 08:00
240-193059-2	MW-15008	Water	10/02/23 11:51	10/06/23 08:00
240-193059-3	MW-15016	Water	10/04/23 09:49	10/06/23 08:00
240-193059-4	MW-15019	Water	10/02/23 12:36	10/06/23 08:00
240-193059-5	DUP-BACKGROUND	Water	10/02/23 00:00	10/06/23 08:00
240-193059-6	EQ-BACKGROUND	Water	10/04/23 10:02	10/06/23 08:00

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Lab Sample ID: 240-193059-1 Client Sample ID: MW-15002

Date Collected: 10/04/23 09:13 Matrix: Water

Date Received: 10/06/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.18		0.208	0.233	1.00	0.112	pCi/L	10/10/23 12:33	11/06/23 08:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		30 - 110					10/10/23 12:33	11/06/23 08:01	1

Method: EPA 904.0	0 - Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	3.30		0.754	0.813	1.00	0.777	pCi/L	10/10/23 12:35	10/16/23 12:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		30 - 110					10/10/23 12:35	10/16/23 12:05	1
Y Carrier	80.7		30 - 110					10/10/23 12:35	10/16/23 12:05	1

Method: TAL-STL Ra	1226_Ra228	- Combined	d Radium-226	and Radiur	n-228					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	4.48		0.782	0.846	5.00	0.777	pCi/L		11/07/23 15:17	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Lab Sample ID: 240-193059-2 **Client Sample ID: MW-15008** 

Date Collected: 10/02/23 11:51 Matrix: Water Date Received: 10/06/23 08:00

Method: EPA 903.0	- Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.352		0.139	0.143	1.00	0.145	pCi/L	10/10/23 12:33	10/24/23 09:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		30 - 110					10/10/23 12:33	10/24/23 09:20	1

Method: EPA 904.	0 - Radium-228	(GFPC)	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.67		0.597	0.617	1.00	0.736	pCi/L	10/10/23 12:35	10/16/23 12:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		30 - 110					10/10/23 12:35	10/16/23 12:05	1
Y Carrier	80.4		30 - 110					10/10/23 12:35	10/16/23 12:05	1

Method: TAL-STL Ra	226_Ra228	- Combined	Radium-226	and Radiun	n- <b>228</b>					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.02		0.613	0.633	5.00	0.736	pCi/L		11/07/23 15:17	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

**Client Sample ID: MW-15016** Lab Sample ID: 240-193059-3

Date Collected: 10/04/23 09:49 Matrix: Water Date Received: 10/06/23 08:00

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.182		0.0977	0.0991	1.00	0.107	pCi/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.1		30 - 110					10/10/23 12:33	10/24/23 09:22	1

Method: EPA 904.0	0 - Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.438	U	0.437	0.438	1.00	0.700	pCi/L	10/10/23 12:35	10/16/23 12:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.1		30 - 110					10/10/23 12:35	10/16/23 12:04	1
Y Carrier	74.4		30 - 110					10/10/23 12:35	10/16/23 12:04	1

Method: TAL-STL Ra2	26_Ra228	- Combined	l Radium-226	and Radiur	n-228					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226	0.620	U	0.448	0.449	5.00	0.700	pCi/L		11/07/23 15:17	1
+ 228										

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Lab Sample ID: 240-193059-4 Client Sample ID: MW-15019

Date Collected: 10/02/23 12:36 Matrix: Water

Date Received: 10/06/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			<u>`                                 </u>					<u></u> -		
Radium-226	0.543		0.167	0.174	1.00	0.126	pCI/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.9		30 - 110					10/10/23 12:33	10/24/23 09:22	

	- Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.23		0.565	0.577	1.00	0.758	pCi/L	10/10/23 12:35	10/16/23 12:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.9		30 - 110					10/10/23 12:35	10/16/23 12:04	1
Y Carrier	84.1		30 - 110					10/10/23 12:35	10/16/23 12:04	1

Method: TAL-STL Ra	226_Ra228 ·	- Combined	I Radium-226	and Radiur	n-228					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	1.77		0.589	0.603	5.00	0.758	pCi/L		11/07/23 15:48	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

**Client Sample ID: DUP-BACKGROUND** 

Date Collected: 10/02/23 00:00

Lab Sample ID: 240-193059-5

Matrix: Water

Job ID: 240-193059-1

Date Received: 10/06/23 08:00

Method: EPA 903.0	) - Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.454		0.148	0.154	1.00	0.120	pCi/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					10/10/23 12:33	10/24/23 09:22	1
_										

Method: EPA 904.0	- Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.614	U	0.498	0.502	1.00	0.776	pCi/L	10/10/23 12:35	10/16/23 12:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					10/10/23 12:35	10/16/23 12:04	1
Y Carrier	81.1		30 - 110					10/10/23 12:35	10/16/23 12:04	1

Method: TAL-STL Ra	a226_Ra228 -	- Combined	Radium-226	and Radiun	n-228					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.07		0.520	0.525	5.00	0.776	pCi/L	_	11/07/23 15:48	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

**Client Sample ID: EQ-BACKGROUND** 

Lab Sample ID: 240-193059-6 Date Collected: 10/04/23 10:02

Matrix: Water

Job ID: 240-193059-1

Date Received: 10/06/23 08:00

Method: EPA 903.0 -	- Radium-226	(GFPC)								
		,	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0139	U	0.0579	0.0579	1.00	0.112	pCi/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.9		30 - 110					10/10/23 12:33	10/24/23 09:22	1

_ Ba Garrier	0 1.0		00 - 110					10/10/20 12:00	7072 1720 00:22	•
Method: EPA 904.	0 - Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.393	U	0.368	0.369	1.00	0.584	pCi/L	10/10/23 12:35	10/16/23 12:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.9		30 - 110					10/10/23 12:35	10/16/23 12:04	1
Y Carrier	71.4		30 - 110					10/10/23 12:35	10/16/23 12:04	1

Method: TAL-STL Ra2	26_Ra228	- Combined	Radium-226	and Radiur	n-228					
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.407	U	0.373	0.374	5.00	0.584	pCi/L		11/07/23 15:48	1

# **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Job ID: 240-193059-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-193059-1	MW-15002	91.2	
240-193059-2	MW-15008	91.2	
240-193059-3	MW-15016	94.1	
240-193059-4	MW-15019	81.9	
240-193059-5	DUP-BACKGROUND	88.5	
240-193059-6	EQ-BACKGROUND	94.9	
240-193059-6 DU	EQ-BACKGROUND	95.4	
LCS 160-631370/2-A	Lab Control Sample	101	
MB 160-631370/1-A	Method Blank	101	
Tracer/Carrier Legend			

Method: 904.0 - Radium-228 (GFPC)

**Matrix: Water** Prep Type: Total/NA

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-193059-1	MW-15002	91.2	80.7	
240-193059-2	MW-15008	91.2	80.4	
240-193059-3	MW-15016	94.1	74.4	
240-193059-4	MW-15019	81.9	84.1	
240-193059-5	DUP-BACKGROUND	88.5	81.1	
240-193059-6	EQ-BACKGROUND	94.9	71.4	
240-193059-6 DU	EQ-BACKGROUND	95.4	79.3	
LCS 160-631371/2-A	Lab Control Sample	101	84.9	
MB 160-631371/1-A	Method Blank	101	84.9	

Ba = Ba Carrier

Y = Y Carrier

Job ID: 240-193059-1

## Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-631370/1-A

**Matrix: Water** 

Analysis Batch: 633137

Client Sample ID: Method Blank

Prep Type: Total/NA

**Prep Batch: 631370** 

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.01000	U	0.0400	0.0400	1.00	0.0929	pCi/L	10/10/23 12:33	10/24/23 09:19	1

MB MB

%Yield Qualifier Limits Prepared Dil Fac Carrier Analyzed Ba Carrier 101 30 - 110 10/10/23 12:33 10/24/23 09:19

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

**Prep Batch: 631370** 

Lab Sample ID: LCS 160-631370/2-A **Matrix: Water** 

Analysis Batch: 633137

Total LCS LCS Spike Uncert. Added Analyte Result Qual

10.93

11.3

%Rec Limits  $(2\sigma + / -)$ RL MDC Unit %Rec 1.00 75 - 125 1.13 0.0948 pCi/L 97

LCS LCS Carrier %Yield Qualifier Limits Ba Carrier 101 30 - 110

Lab Sample ID: 240-193059-6 DU Client Sample ID: EQ-BACKGROUND

**Matrix: Water** 

Radium-226

Analysis Batch: 633137

Prep Type: Total/NA

**Prep Batch: 631370** 

Total

	Sample	Sample	DU	DU	Uncert.						RER	
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit		RER	Limit	
Radium-226	0.0139	U	-0.03237	U	0.0368	1.00	0.102	pCi/L	 	0.49	1	

DU DU %Yield Qualifier

Carrier Limits Ba Carrier 95.4 30 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-631371/1-A

**Matrix: Water** 

Analysis Batch: 632123

Client Sample ID: Method Blank

Prep Type: Total/NA

**Prep Batch: 631371** 

	МВ	МВ	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.2227	U	0.292	0.293	1.00	0.488	pCi/L	10/10/23 12:35	10/16/23 12:05	1

MB MB

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		30 - 110	10/10/23 12:35	10/16/23 12:05	1
Y Carrier	84.9		30 - 110	10/10/23 12:35	10/16/23 12:05	1

**Eurofins Cleveland** 

# **QC Sample Results**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Job ID: 240-193059-1

# Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-631371/2-A

**Matrix: Water** 

Analysis Batch: 632123

Client Sample ID: Lab Control Sample

**Prep Type: Total/NA** 

**Prep Batch: 631371** 

				Total						
	Spike	LCS	LCS	Uncert.					%Rec	
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-228	7.79	8.365		1.15	1.00	0.475	pCi/L	107	75 - 125	

LCS LCS

Carrier	%Yield	Qualifier	Limits
Ba Carrier	101		30 - 110
Y Carrier	84.9		30 - 110

Lab Sample ID: 240-193059-6 DU Client Sample ID: EQ-BACKGROUND

**Matrix: Water** 

Analysis Batch: 632125

**Prep Type: Total/NA** 

**Prep Batch: 631371** 

Total Sample Sample DU DU Uncert. RER Analyte Result Qual RL MDC Unit Limit Result Qual RER (2σ+/-) Radium-228 0.393 U -0.09251 U 0.416 pCi/L 0.86 0.193 1.00

DU DU

Carrier	%Yield	Qualifier	Limits
Ba Carrier	95.4		30 - 110
Y Carrier	79.3		30 - 110

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Rad

# **Prep Batch: 631370**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193059-1	MW-15002	Total/NA	Water	PrecSep STD	
240-193059-2	MW-15008	Total/NA	Water	PrecSep STD	
240-193059-3	MW-15016	Total/NA	Water	PrecSep STD	
240-193059-4	MW-15019	Total/NA	Water	PrecSep STD	
240-193059-5	DUP-BACKGROUND	Total/NA	Water	PrecSep STD	
240-193059-6	EQ-BACKGROUND	Total/NA	Water	PrecSep STD	
MB 160-631370/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-631370/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
240-193059-6 DU	EQ-BACKGROUND	Total/NA	Water	PrecSep STD	

# **Prep Batch: 631371**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193059-1	MW-15002	Total/NA	Water	PrecSep_0	_
240-193059-2	MW-15008	Total/NA	Water	PrecSep_0	
240-193059-3	MW-15016	Total/NA	Water	PrecSep_0	
240-193059-4	MW-15019	Total/NA	Water	PrecSep_0	
240-193059-5	DUP-BACKGROUND	Total/NA	Water	PrecSep_0	
240-193059-6	EQ-BACKGROUND	Total/NA	Water	PrecSep_0	
MB 160-631371/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-631371/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
240-193059-6 DU	EQ-BACKGROUND	Total/NA	Water	PrecSep_0	

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Client Sample ID: MW-15002

Date Collected: 10/04/23 09:13 Date Received: 10/06/23 08:00 Lab Sample ID: 240-193059-1

Matrix: Water

Job ID: 240-193059-1

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	635431	SCB	EET SL	11/06/23 08:01
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17

Client Sample ID: MW-15008

Date Collected: 10/02/23 11:51

Date Received: 10/06/23 08:00

Matrix: Water

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:20
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17

**Client Sample ID: MW-15016** 

Date Collected: 10/04/23 09:49

Date Received: 10/06/23 08:00

Lab Sam	ple ID:	240-193059-3	

**Matrix: Water** 

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17

Client Sample ID: MW-15019

Date Collected: 10/02/23 12:36

Date Received: 10/06/23 08:00

Lab Sample	ID: 240-193059-4
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Matrix: Water

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

**Eurofins Cleveland** 

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Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

**Client Sample ID: DUP-BACKGROUND** 

Date Collected: 10/02/23 00:00

Date Collected: 10/02/23 00:00 Date Received: 10/06/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Client Sample ID: EQ-BACKGROUND

Date Collected: 10/04/23 10:02

Date Received: 10/06/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Laboratory References:

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Job ID: 240-193059-1

Matrix: Water

**Matrix: Water** 

Lab Sample ID: 240-193059-5

Lab Sample ID: 240-193059-6

11/7/2023

**Eurofins Cleveland** 

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Background Well

Job ID: 240-193059-1

## **Laboratory: Eurofins 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
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
lowa	State	373	12-01-24
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-24
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-24
Massachusetts	State	M-MO054	06-30-24
MI - RadChem Recognition	State	9005	06-30-24
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-24
New Jersey	NELAP	MO002	06-30-24
New Mexico	State	MO00054	06-30-24
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-24
North Dakota	State	R-207	06-30-24
Oklahoma	NELAP	9997	08-31-24
Oregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-24
Texas	NELAP	T104704193	07-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-24
Virginia	NELAP	10310	06-15-25
Washington	State	C592	08-30-24
West Virginia DEP	State	381	12-31-23

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 $<sup>^{\</sup>star} \ \text{Accreditation/Certification renewal pending - accreditation/certification considered valid}.$ 

Eurofins Cleveland

Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone (330) 497-9396 Phone (330) 497-0772	MICHIGAN Chain of Custody Record	Chair Shair	of Cus	tody R	ecor	75	5	41/2	***	🔆 eurofins	Environment Testing
Client Information	Sampler	t Krent		Lab PM Brooks	Lab PM: Brooks, Kris M		Carrier Tracking No(s)	cking No(s)	COC No 240-11	COC No. 240-112524-33282	32.1
Client Contact: Jacob Krenz	Phone: 734-3	4	100	E-Mail Kris.	Brooks@	E-Mail: Kris Brooks@et.eurofinsus.com	State of Origin	gin:	Page	Page Page 1 of 1	
Company: TRC Environmental Corporation.			PWSID				Analysis Requested		# qof		
Address. 1540 Eisenhower Place	Due Date Requested:	ed:							Pres		S: M - Heyene
Gity. Ann Arbor	TAT Requested (days):	ays):							A 80 O	A - HCL B - NaOH C - Zn Acetate	N - None O - AsNaO2
State, Ztp. MI, 48108-7080	Compliance Project:	A Yes	∆ No						2 2 .		P - Na2O4S Q - Na2SO3 R - Na2S2O3
Phone 734-971-7080(Tel) 734-971-9022(Fax)	PO# 199813				(0				Z O I		S - H2SO4 T - TSP Dodecahydrate
Email JKrenz@trccompanies.com	**OM				or No						U - Acetone V - MCAA
Project Name: Kam/Weadock CCR Background Well	Eurofins Project # 24024154				88			_		K - EDTA L - EDA	Y - Trizma Z - other (specify)
Site	**MOSS				as as				noo to Other:		
Sample Identification	Sample Date	Sample	Sample Type (C=comp,	Matrix (w-water, S=solid, O=wastefoll,	ield Filtered Serform MS/M 03.0, Ra226Ra3	04.0 - Standard			otal Number o		
	Name and and	X	Preserva	Preservation Code:	×	+-			1>	Special ins	Special Instructions/Note:
MW-15002	10-4-23	0913	5	Water	2	×			ત	1	
MW-15008	10-1-13	1121		Water	_	*			~		
MW-15016	10-4-23	6949		Water	×	_			7		
MW-15019	10-2-23	1236		Water	×	×			~		Λρο
DUP-Background	10-2-23	1		Water	×	×			68		isu O
EQ-Backgroud	10-4-33	1007	>	Water	<b>₹</b>	×			ಡ		ìo ni
				Water							3029 Cha
											540-16
Possible Hazard Identification  Non-Hazard Flammable Skin Irritant	ant Poison B Unknown		Radiological		Samp	le Disposal ( A 1	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	if samples are	retained long	nger than 1	nonth)
V. Other					Specia	I Instruction	Requirement			5	SIGNORIS
Empty Kit Relinquished by:		Date:			Time		Metho	Method of Shipment			
Relinquished by	Date/Time: [0-5-2]	41/	25	Company		Received by	W. W.C.	Date/Time	15/03	1455	Company
Relinquished by MCC.	Date/Time: [ ()	5/03		+	+	Received by			-23	800	Company
Custody Seals Intact: Custody Seal No.	Alexandra (Alexandra)			Company	ž 8	Received by:	Keceived by  Cooler Temperature(s) *C and Other Remarks	Date/Time			Company
Δ Yes Δ No			1								

## **Login Container Summary Report**

240-193059

Temperature readings: \_ Container **Preservative** Client Sample ID Temp Added (mls) Lot # Lab ID Container Type pН MW-15002 240-193059-A-1 Plastic 1 liter - Nitric Acid <2 MW-15002 240-193059-B-1 Plastic 1 liter - Nitric Acid <2 MW-15008 240-193059-A-2 Plastic 1 liter - Nitric Acid <2 MW-15008 240-193059-B-2 Plastic 1 liter - Nitric Acid <2 MW-15016 240-193059-A-3 Plastic 1 liter - Nitric Acid <2 MW-15016 240-193059-B-3 Plastic 1 liter - Nitric Acid <2 MW-15019 240-193059-A-4 Plastic 1 liter - Nitric Acid <2 MW-15019 240-193059-B-4 Plastic 1 liter - Nitric Acid <2 Plastic 1 liter - Nitric Acid **DUP-BACKGROUND** 240-193059-A-5 <2 **DUP-BACKGROUND** 240-193059-B-5 Plastic 1 liter - Nitric Acid <2 **EQ-BACKGROUND** 240-193059-A-6 Plastic 1 liter - Nitric Acid <2 **EQ-BACKGROUND** Plastic 1 liter - Nitric Acid 240-193059-B-6 <2

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# **Chain of Custody Record**

Phone: 330-497-9396 Fax: 330-497-0772

180 S. Van Buren Avenue Barberton, OH 44203

Environment Testing

💸 eurofins

Comparison   Com	Client Information (Sub Contract Lab)			3 60	Brooks, Kris M	_		Camer Tracking No(s):	COC No:	COC No:
Fig. 2015   State   Company   Comp	Client Contact:	Phone:			Mail				240-1	4009.1
Control	Shipping/Receiving			<u>i                                    </u>	nall. is.Brooks@	et.eurofins	sus.com	State of Ongin:	Page:	1 of 1
The Part Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The Received to the City   The C	Company.				Accreditati	ons Required	(See note):	À	* 40	
The Date Requested   The Date Requested   Th	TestAmerica Laboratories, Inc.								240-1	33059-1
116/2023   Analysis Requested (49th)   116/2023   Analysis Requested (49th)   116/2023   Analysis Requested (49th)   116/2023   Early Character (49th)   116/2023   Early Ch	Address:	Due Date Requested:							Drage	vation Codes:
The Property   The	13715 Rider Trail North,	11/6/2023					Analysis F	equested		M - Hexane
Sample   January   Control   Contr	City. Earth City	TAT Requested (days):							B . B .	
Propert Name   Propert	State, Ztp: MO, 63045	T							EN-N	
Freet Hame   Proper	Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:							F-Med	
Project Name   Proj	Email:	WO #:			(0)				-	
Sample   Identification - Client ID (Lab ID)   Sample   Carpon   Avairable   Carpon   Ca	Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			1 10 81				-	
Sample   Sample   Water   Sample   Sample   Sample   Sample   C=comp.   Type   Sample   C=comp.   Type   Sample   C=comp.   Type   Sample   C=comp.   Type   Sample   C=comp.   Type   Sample   C=comp.   Sample   C=comp.   Sample   C=comp.   Sample   C=comp.   Sample   C=comp.   Sample   Sa	Site:	SSOW#:			N) as	bnst2 (			_	Z - Offer (Specify)
Sample Identification - Client ID (Lab ID)         Sample Date Date Date Date Date Date Date Dat			Samı		Men	g-dəs			pet c	
Nample Infantification - Client ID (Lab ID)         Sample Date Sample Date (Lab ID)         Time (G=grab)         Ann.)         Lab. (S. S. S. S. S. S. S. S. S. S. S. S. S. S					Hd Filte Homi	:oe1¶(0.4			muN ls:	
MW-15002 (240-193059-1)         10/4/23         Eastern DUP-BACKGROUND (240-193059-5)         X<	_	4	7	3p) v=vk)	E P	06				pecial Instructions/Note:
MW-15002 (240-193059-1)         10/4/23         Eastern Eastern DUP-BACKGROUND (240-193059-5)         Water Rock Rock Rock Rock Rock Rock Rock Rock	-			ervation Code	XX				X	
MW-15008 (240-193059-2)         10/2/23         Eastern Eastern (240-193059-3)         Water (240-193059-3)         X X X X X         X X X X X X         X X X X X X         X X X X X X         X X X X X X <td>_</td> <td></td> <td>:13</td> <td>Water</td> <td>^</td> <td>×</td> <td></td> <td></td> <td>_</td> <td>otocol - Ra-226+228 action limit</td>	_		:13	Water	^	×			_	otocol - Ra-226+228 action limit
MW-15016 (240-193059-3)         10/4/23         Eastern Lo. 10/2/23         Water Lo. 193059-4)         X X X X X X X X X X X X X X X X X X X		_	:51 tern	Water	Î.	×				otocol - Ra-226+228 action limit
10/2/23			:49	Water	Î	×				otocol - Ra-226+228 action limit
5) 10/2/23 Eastern Water X X X X	MW-15019 (240-193059-4)		:36 tern	Water	Î	×			_	otocol - Ra-226+228 action limit
10.4/23 10:02 Water X X X X 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	DUP-BACKGROUND (240-193059-5)		tem	Water	Î	×			-	btocol - Ra-226+228 action limit
	EQ-BACKGROUND (240-193059-6)		:02 tem	Water		×			_	L. stocol - Ra-226+228 action limit a
									-28	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central. LLC attention immediately if all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC attention immediately if all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC Possible Hazard Identification

Possible Mazard Identification			Ö	Annaly Olympia / A feet and				
La constitución de la constituci			<u> </u>	miple Disposal ( A ree may be	assessed II S	Secretary of the may be assessed it samples are retained longer than 1 month)	month)	
Orcommitted				Return To Client	Disposal By Lah	th Ambina For	Mande	
Deliverable Requested: I, II, III, IV, Other (specify)		Primary Deliverable Rank: 2	ľ	Redu	ents:	1	MORITIS	
Empty Kit Relinquished by:		Date:	Time:		Method of Shipment	Shipment:		
Relinquista by	đ	71	Company	Received by:	V	Date/Time		
		のようこのよう	/ PERM		6000		Company	
So paukinhumay 11/		Date/Time:	Company	Recomplete	Ŧ	Popularion of 1013 ABLIS Company	Company	
Relinquished by:	Dat	Date/Time:	Company	Received by:	de	Date/Time:	Company	
202								
Custody Seals Intact: Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks:	Remarks:			

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### **Login Sample Receipt Checklist**

Client: TRC Environmental Corporation.

Job Number: 240-193059-1

List Source: Eurofins St. Louis
List Number: 2
List Creation: 10/09/23 01:16 PM

Creator: Pinette, Meadow L

Creator: Pinette, Meadow L		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	N/A	
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?	True	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Appendix F Field Records**

# TRC

PROJECT NAME: _	CEC Weadock LF: 2023 GW Compliance
PROJECT NUMBER:	514403.0000.0000
PROJECT MANAGER: _	Darby Litz
SITE LOCATION: -	2742 Weadock Hwy
-	Essexville, MI 48732
	16/2
DATES OF FIELDWORK:	10/2/2023 TO ! ( Yのよう
_	Fourth Quarter HMP Sampling Event
PURPOSE OF FIELDWORK:	
_	
_	
·	Javier Jasso
, 	
WORK PERFORMED BY:	
_	
·	

SIGNED DATE

CHECKED BY DATE

**REVISED 04/2019** 



# **GENERAL NOTES**

	CEC Weadock LF: 2023	GVV COIII	DATE O	19100	TIME ARRIVED: 53
PROJECT NUMBER			AUTHOR:		TIME LEFT: 074 (
			WEATHER		
TEMPERATURE:	°F WIND:	10	MPH	VISIBIL	LITY: OURV Cout
			MPLING PE		
M104, J	Cie - M- 180	70 (ch	129 W	so bowo	w 15001,
			-u	, to	
	4 4 4 4				
PROE	BLEMS ENCOUNTERE	D		CORRECT	IVE ACTION TAKEN
	-				
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
		COM	MUNICATI	ON	
NAME	REPRESENTING	COM	MUNICATI	ON SUBJECT / COM	MENTS
NAME Darby Litz	REPRESENTING TRC	CON PM - U		· · · · · · · · · · · · · · · · · · ·	MENTS
<del> </del>			pdates	· · · · · · · · · · · · · · · · · · ·	MENTS
Darby Litz	TRC	PM - U <sub>1</sub>	pdates	· · · · · · · · · · · · · · · · · · ·	MENTS
Darby Litz	TRC Consumers	PM - U <sub>1</sub> Site Con	pdates ntact	SUBJECT / COM	/MENTS
Peter M.	TRC Consumers	PM - U <sub>1</sub> Site Con	pdates ntact	SUBJECT / COM	
Darby Litz	TRC Consumers	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	
Darby Litz Peter M.  WASTE MATRIX	TRC Consumers  INVESTIGE QUANTITY	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	
Darby Litz Peter M.  WASTE MATRIX	TRC Consumers  INVESTIGE QUANTITY	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	
Darby Litz Peter M.  WASTE MATRIX	TRC Consumers  INVESTIGE QUANTITY	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	
Darby Litz Peter M.  WASTE MATRIX	TRC Consumers  INVESTIC QUANTITY NM	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	TS
Darby Litz Peter M.  WASTE MATRIX	TRC Consumers  INVESTIGE QUANTITY	PM - U <sub>1</sub> Site Con	pdates ntact DERIVED W	SUBJECT / COM	



### **GENERAL NOTES**

PROJECT NAME:	CEC Weadock LF: 2023	3 GW Com DATE:	101963	TIME ARRIVED 555
PROJECT NUMBER	: 514403.0000.	0000 AUTH		TIME LEFT: 16 45
<u></u>				
		WEATH		
TEMPERATURE: 3	°F WIND:	15 MPH	VISIBILIT	YOUR Car
	We	ORK / SAMPLING	PERFORMED	
MW-500	Dupte I, M.	U-50, MC	SPERFORMED USD, MWS3, SS, SCW-MW SOCO, DUP +	MW-53L
MW. SYR.	Jaw mu 18	004 mill	55 , Sau-Mu	18005
Ow- 57 Rd	out Male	mu 1	3006, Dup +	402 mm 50
F.B*01, 1	= B+OI			
,				
		, ·		
-	<u></u>			·
PRO	BLEMS ENCOUNTERE	D	CORRECTIV	E ACTION TAKEN
	-1			
		COMMUNIC	CATION	
NAME	REPRESENTING		SUBJECT / COMM	ENTS
Darby Litz	TRC	PM - Updates		
Peter M.	Consumers	Site Contact		
	INVESTI	GATION DERIVE	D WASTE SUMMARY	
WASTE MATRIX	QUANTITY		COMMENTS	
Groundwater	NM	To Ground		
				<b>/</b>
				/ /
	10/10/12		alle L	Mul 10/27/
SIGNED	100	DATE	CHECKED BY	DATE

**REVISED 04/2019** 



## **EQUIPMENT SUMMARY**

PROJECT NAME: CEC Weadock LF: 2023 GW	v Cd SAMPLER NAME: Javier Jasso
PROJECT NO.: 514403.0000.0000	CANNI LEININAUNE. SUNISI SUSSE
MATTER LEVEL ME AQUIDEMENTO COLLECTED MIT	1.
WATER LEVEL MEASUREMENTS COLLECTED WITH	1:
HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)
PRODUCT LEVEL MEASUREMENTS COLLECTED W	лтн:
NA	NA NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)
DEPTH TO BOTTOM OF WELL MEASUREMENTS CO	DLLECTED 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 POLY TUBING	LOW-FLOW SAMPLING EVENT
TUBING TYPE	
PURGE WATER DISPOSAL METHOD	
☑ GROUND ☐ DRUM ☐ POTV	V POLYTANK OTHER
DECONTAMINATION AND FIELD BLANK WATER SO	DURCE
STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
10/10/13	colon which 10/27/23
SIGNED DATE	
REVISED 04/2019	

# ← → TRC

# WATER QUALITY METER CALIBRATION LOG

r												
PROJECT NAME:		CEC Weadock LF: 2023 GV	V Complian	ce	MODEL	: YSI Pro	DSS		SAMPL		111	
PROJECT NO.:		514403.0000.0000			SERIAL	#: RE	NTA	\L	DATE:	10/9	<u>193</u>	
		CALIBRATION CHECK				5	SPE	CIFIC CONDU	CTIVIT	Y CALIBE	RATION C	HECK
PH 7 (LOT #): 3 6 8 3 5 (EXP. DATE):  POST-CAL. READING / STA	11	pH 4 / 10 (LOT #): 3 - 19 (Lot #): 3 - 19 (Lot #): 9 (L	CAL. RANGE	TIME		(LOT #): (EXP. DAT	3 <i>G</i> E): ?	READING CULLY ADING/STANDARD		RATURE	CAL. RANGE	TIME
700 1700	シ	400 1400	WITHIN RANGE	Slow	1	ોર્વા	3	/1413	25	20	WITHIN RANGE	<u> </u>
1		1	WITHIN RANGE					1			WITHIN RANGE	
1		1	WITHIN RANGE					1			WITHIN RANGE	
1		1	WITHIN RANGE					1			WITHIN RANGE	
	ORP	CALIBRATION CHECK			_			D.O. CAL	IBRATI	ON CHEC	CK	
CAL. READING (LOT #): 7) K (COT #): 7) K (COT #): 10 10 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	မူပ )	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME				READING  ING /SATURATED AIR		ERATURE	CAL. RANGE	TIME
		260	WITHIN	electi.		78		1789	21	2.0	WITHIN RANGE	ررون
) ラブロ シ	30	a Q.C	☐ WITHIN	all the contraction of the contr		1,0	'	1		2 .C	RANGE WITHIN RANGE	
/			RANGE WITHIN RANGE					1			WITHIN	•
1			WITHIN RANGE					1			WITHIN	
TL	JRBIDI	TY CALIBRATION CHEC			J	L			COMM	ENTS		
		READING (NTU)			1	AUT	OCAL	SOLUTION		TANDARD	SOLUTION	(S)
(LOT #): A 30977 (EXP. DATE): 4/7)	-	(LOT#): (EXP. DATE):	CAL. RANGE	TIME		(LOT#): (EXP. DAT	E):				ND EXPIRATION CHEC	
POST-CAL. READING / STA	ANDARD	POST-CAL. READING / STANDARD				CALIBR	RATED	PARAMETERS		CALIBRATIO	ON RANGES (1	)
0 / 0	)	1	WITHIN RANGE	مصافان			рΗ		pH:	+/- 0.2 S.I	J.	
100/10	ンと	1	WITHIN RANGE	Coce	]		СО	DND	COND:	+/- 1% OF	CAL. STAN	DARD
1		1	WITHIN RANGE				OR	RP.	ORP:	+/- 25 mV	,	
1		1	WITHIN RANGE				D.C	D.	D.O.:	VARIES		
		NOTES			-		ΤU	RB	TURB:	+/- 5% OF	CAL. STAN	DARD
							_				IGES ARE SPE VATER QUALI	
	Pl	ROBLEMS ENCOUNTERED						CORRECTE	VE ACTIO	ws		
	_	10/30	( <sub>) 2</sub>						do	L	101	z 71
SIGNED	7	— / U   101 —	DATE			CHI	ECKE	ED BY	C	7	100	DATE

# TRC

## **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 10 12/23
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

TROSECT NOMBER:	011100.00			7.0.11.0		
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW-MW-18001	0628	TOC	17.09	23.75	NA	NM
JCW-MW-18004	0714	TOC	12.75	14.73	NA	NM
JCW-MW-18005	0738	TOC	916	14.28	. NA	NM
JCW-MW-18006	1756	TOC	13,53	22.6%	NA	NM
JCW-OW-18001	0630	TOC	6.97	2005	NA	NM
JCW-OW-18002	(ste3)	TOC	11.78	19.41	NA	NM
JCW-OW-18003	ال لوالور	TOC	6.70	(8.48	NA	NM
JCW-OW-18004	0719	TOC	6.71	1485	NA	NM
JCW-OW-18006	0758	TOC	7.77	7345	NA .	NM
LH-103R	0)00	TOC	2239	3346	··· NA	NM
LH-104	0778	TOC	9,54	1400	NA	NM
Jehr-MW-20	0740	TOC	5.95	14.00	NA	NM
<b>MW</b> -50	1633	TOC	13.70	19.40	NA	NM
MW-51	(de3)	тос	14.38	70.00	NA	NM
MW-52	1644	тос	19.31	19.74	NA	NM
MW-53	Olege	TOC	13.95	(8,1%	NA	NM
<b>M</b> W-53R	070	тос	14.51	(8.80	NA	NM
MW-54R	07/2	тос	14.07	(7.27	NA	NM
MW-55	0733	TOĆ	14.20	16.38	NA	NM
MW-58	0677	TOC	5.70	18-28	<sup>1</sup> NA	NM
OW-51	0439	тос	9.24	17.78	NA	NM
OW-53	0657	TOC	785	(800	NA	NM
OW-54	0713	TOC	7.45	16.48	NA	NM
OW-55	0734	TOC	7.83	18.43	NA	NM
OW-56	しつてろ	TOC	6.10	19.27	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

REVISED 04/201



## **WATER LEVEL DATA**

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: (C() 1) 3
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
OW-56R	0745	TOC	5.14	20.55	NA	NM
OW-57 IN	075}	TOC	5.29	19-60	NA	NM
OW-57R IN	0753	TOC	6.10	20.16	NA	NM
OW-57 OUT	ひつらく	TOC	9.00	14.40	NA	NM
OW-57R OUT	0751	TOC	8.3	26.70	NA	NM
JCW-MW-15007		TOC			NA	NM
JCW-MW-15009		TOC			NA	NM
JCW-MW-15010		TOC			NA	NM
JCW-MW-15028		TOC			NA	NM
MW-15002		TOC			NA	NM
MW-15008		TOC			NA	NM
MW-15016		TOC			NA	NM
MW-15019		TOC			NA	NM
nu-lel	m433		8.55	37.10		
(Cooperation)	0647		15.53	DNW		
Ywhu1502C	1001	ý	1435	Dum		
MW-16R	0714		14.40	19.67		
1502(	6559		15-74	DUM		
Mw-19	0800		8.97	2063		
Mu 15000	0830		5.34	17.17		
154 116B	৩৮৯५		5.13	33.76		
Me 15024	0847		le-2le	17.17		
MUISUIE	0905		629	994		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR

(E.G., 1.1 + 0.00 T/PVC).

DATE

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| CHECKED | DATE



### **WATER LEVEL DATA**

PROJECT NAME:	CEC WEA	KOCK BAP LF 2	023 GW COMLI	PIANCE	DATE:	10/2/23	
PROJECT NUMBER:	514403.00	01.0000			AUTHO	R: JJASSO	- ·- ·
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPT BOT (FE	TOM	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW=MW 15007	1690		3.65	89	15		
JCW-MW-15009	ve i>		9,12	13.	00	***	
JCW-MW-15010	(3080)		19.39	19.	57	10 miles	
JCW-MW-15028	dolle		616	25,	10		
MW-15002	0909		7.6c	168	0		
MW-15008	<b>UB</b> 36		468	17.	40		-
MW-15016	0914		4.33	8.1	(U		1
MW-15019	C090		5.90	16-	67		
JCW-MW-15003	0613		9.24	Du	$\sim$		
MW-106B	08180	: ************************************	7.95	41.1	. ن		
MU-15008	0960		880	DN	W	·	
	-						
<del> </del>							
							```
						:	

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

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ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

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DATE

REVISED 04/2019

PAGE 9 OF 359 WH

# ク T R C

# WELL INSPECTION REPORT

SAMPLER NAME: Javier Jasso DATE: (C(S) D2 CEC Weadock LF: 2023 GW Compliance 514403.0000.0000 PROJECT NAME: PROJECT NO .:

								:		31 nch highla chan							
COMMENT		0.000								well is 3 nonth							
 SEDIMENT IN WELL	Ć	>	<i>\( \)</i>	5	$\mathcal{O}_{0}$	$\sim$		~	$\overline{}$		, √k		<u>~</u>	7	$\bigcirc$	$\sim$	$\sim$
EASE OF INSERTING / REMOVING BAILER	5	ye	.J	<u>)</u>	Z	Les	(fa)	Mer	3	ر د	3	Ge	3	Les	Yar	<u>.</u> 3	ż
WELL	راهم	<u>2</u>	Gen S	g S	<u>ځ</u> و۔	3	You	<u>3</u>	<del>કે</del>	S.	क्र	7	J.	, de	Les .	,2 <u>a</u>	.એ
LOCK	ches	3	. ৰ্	, g	3	2	-3	<u>ر</u> م	· 7 <sup>2</sup>	3	- ব্ৰ	3	. <u>ક</u>	3	<u>ş</u>	<del>ક</del>	<u>2</u>
PERMANENT LEGIBLE LABELS	yen	, Se	j	3	- <b>ఫ</b>	5, e	7	رم ک	2 3	Ger	. <u>a</u>	<u>(</u>	2	3	کی کی	Z	Ź
DEGREE OF IMMOBILITY OF PROTECTIVE CASING	discordi		50 7	NOR	New	DOC	Noro	NON	non	loc	000	DOU	Done	noc	NONO	noce	Rose
SURFACE SEAL	3	ر م - ک	3	<u>a</u>	3	ع ج	5	حال در	.त्रे	do G	<u></u>	3	3	Les	13	<u>ક</u>	3
PROTECTIVE CASING	43	-2 2	<u>.</u> 3	E	3	3	-3	Je Pe	<u> </u>	Cles	<u>ş</u>	المرام	رعال	9	Ç	. કુ	3
WELL ID	Scummille	\0003) 30 000	Screen least	500 BOT	Sum l'Eag	Scie (Multera)	\coa\) 40 ma	1000 ( Carl	متهامین سر	1.4-103T)	16年169年	Mer.20	MWKO	Mw7(	MW 50	MW 53	MUSSE

REVISED 06/2011

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# ク T R C

# **WELL INSPECTION REPORT**

CEC Weadock LF: 2023 GW Compliance PROJECT NAME:

SAMPLER NAME: Javier Jasso DATE: (O() (57

PROJECT NO.:		514403.0000.0000					DATE	DATE: (O() (5.7	
WELL ID	PROTECTIVE CASING	SURFACE SEAL	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	PERMANENT LEGIBLE LABELS	LOCK	WELL	EASE OF INSERTING / REMOVING BAILER	SEDIMENT IN WELL	COMMENT
The soll	<u>න</u>	ಶ್ರ	non	40	草	st.	421	Y	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	કુ 5	Nor	3	<u>કુ</u>	ब्रे	yes	( )	
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Smo	Jay 5	Ger	hoy	Z	3	3	Les ,	0	
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0c56	<u>5</u>	40	Now	J J	R	You	Yer	$\bigcap$	
68 56R	- <del>2</del> 9	す	NON	Tho	ئى كى	te de	Se		
OT 25 mo	2	de	nou	Les	19	9	God		
STYLE MO	5	<u>چ</u>	Non	jes	<u></u>	Jen 1	, La	<b>○</b>	
ow 57 and	<u>5</u>	3	NOK	Yes	Mer c	to the	Gar	$\bigcirc$	
6 w 97 MOct	5	'2 '3	NOC	Ger	Les Les	2 Z	Ke	つ	
) a) a) Q	3	ک	NOK	Ver	Çe	Sep	Yes	<	
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PAGE 11 OF 39 44

# ク T R C

# **WELL INSPECTION REPORT**

CEC Weadock LF: 2023 GW Compliance PROJECT NAME:

PROJECT NO .:

514403.0000.0000

SAMPLER NAME: Javier Jasso DATE: 10 (3 153

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	COMMENT																		
2 2	SEDIMENT IN WELL	$\cap$		$\cap$	7	$\bigcirc$	<u>つ</u>	$\bigcirc$	$\bigcirc$	C	C	<u></u>	$\supset$	2	0	$\mathcal{C}^{i}$		1	/
	EASE OF INSERTING / REMOVING BAILER	ye	Les	5	Ye	Çe	E	4	Ya	26	رهي -	Les.	Z	3	3	Yes	Z	Year	
	WELL E	ર્જુ	9	3	J B	3	ير	Z	Ye	400	Ze B	Z	Ž.	3	3	<u>ځ</u>	Ž	for	•
	ГОСК	loh	3	E	- <del>2</del>	<u>3</u>	3	Ja	200	40	40	. Ş	<u>'</u> §	Ž Ž	Ger	Ž	Le Se	<i>2</i>	•
	PERMANENT LEGIBLE LABELS	40)	3	5	Le.	3	- 3	, 3 3	Ger	Year	yer	Ze Ze	Los Los	200	Yer	Z.	3	yer	_
	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	neach	Joic	NOU	Noc	NOU	Non	NOT	NON	NOV	NOR	NON	NOK	NOK	NOK	NOK	NOK	you	
	SURFACE SEAL	<u>ঠ</u>	- <del>2</del> 8	3	z	9 8	Z	3	Les C	yar	ر گر	Zer Zer	Ster	Ze Ze	5	Z	3	స్త	,
	PROTECTIVE CASING	20	2	5	2	2	je je	3	) J	2	9	, <u>2</u>	Nec	ž,	ger	18/1 18/1	3	<u>5</u>	
	WELL ID	150210 musch	Mw.19	Mulsox	MC 16B	Mussoll	Kumu Ka	Kenno (905)	Scamulsolc	Scoting isols	(305) m M	2005 June	Mulsoll	5105) m/m	Scene Keez	me 1000	から、こので	310517W	

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10/27/23

REVISED 06/2014

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# **WELL INSPECTION REPORT**

well is a little higher the cashy COMMENT Javier Jasso SEDIMENT IN WELL SAMPLER NAME: DATE: 10 (3 153 WELL EASE OF INSERTING / CAP REMOVING BAILER LOCK PERMANENT LEGIBLE LABELS Med Je Je Z SURFACE DEGREE OF IMMOBILITY
SEAL OF PROTECTIVE CASING CEC Weadock LF: 2023 GW Compliance NON DONG nonc 514403.0000.0000 ş 3 <u>3</u> PROTECTIVE CASING 5 PROJECT NAME: PROJECT NO .: MW 1500 ( mul solle WELL ID

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10/27/28 DATE

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**REVISED 06/2011** 

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De la companya di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di santa di san	四 3	AV ASSESS

PROJECT NAME: CEC Karn BAP/LI: 2023 GW						PRE	PARED	CHECKED			
PROJECT	NUMBER	: 514404	1.0001.0000		BY: A	w, <b>@</b> , w	مـوم: DATE	1-23 BY: A (	سالم	DATE WILLS	
SAMPLE I	D: M	w- 150	07	WELL [	DIAMET	ER: 🗸 2	"	6" OTHER			
WELL MAT	ERIAL:	√ PVC	ss 🗌	IRON 🗌	GALVA	NIZED ST	EEL	OTHER			
SAMPLE T	/PE:	☑ GW	□ww □	sw 🗌	DI		EACHATE	OTHER	<del></del>		
PURC	SING	TIME: Ø	<b>900</b> DA	TE: 10-4	-23		MPLE	TIME: 09/3		TE: 10-4-23	
PURGE METHOD	_	PUMP BAILER	PERISTALTIC P	UMP					1TY:		
DEPTH TO	WATER:	7.67	T/ PVC			TURBID		NTU			
DEPTH TO	воттом:	16.87	T/ PVC			мои 🔀			DERATE	☐ VERY	
WELL VOL	UME:	NA	LITERS	GALLO	NS	TEMPER			HER:		
VOLUME F	REMOVED:		LITERS	GALLO		COLOR:				none	
COLOR:		lear	OD(	OR: <u><b>ho</b></u>	ne_	FILTRAT	E (0.45 um)		NO		
	<b>⊡</b> 7 - ∶		BIDITY	<b>□</b> 1	D.V.		E COLOR:		TRATE ODG	DR:	
NONE	X SLI		MODERATE	· U VEI		QC SAM		/MSD L	DUP-		
DISPOSAL	METHOD:	✓ GROUN	ND DRUM	U OTHER	·	COMME	N15:		T :::::	1	
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	PURGE VOLUME	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)	
0803	200	6.80	3956	~5°.	3 0	9.9	25.8	15.3	7.90	INITIAL	
3030	200	6.94	3502	-94.6	<b>,</b> ,	2.5	7.4	15.4	7.97	1	
0813	300	6.98	3442	-/07.	<b>ී</b> ල	.4	5.3	15.3	8.02	2	
0818	200	6.89	4354	- 10617	1 0	.3	5.1	15.3	8.08	3	
0823	200	6.70	5734	-98,7	' 0	. 3	4.9	15.2	8.10	4	
0828	200	6.64	6645	- 95,9	/ e	۶. ۲	4.7	15.2	2.12	5	
0833	200	6.64	6751	-95,5	٠ و	>. 3	4.5	15.2	8.12	6	
0838	200	6.62	7103	-94.9		2,2	4.5	15,2	2,12	7	
0843	200	6.62	7407	-94.4		7.2	4.5	15.2	8.12	8	
0848	200	6,63	7360	-4510		0.2	4.5	15.2	8.12	9	
	OTE: STAB		TEST IS COMPL	ETE WHE! +/- 10	N 3 SUC			ARE WITHIN THE		IG LIMITS: TEMP.: +/-	
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	В	- HNO3	C - H2SO4	D - NaOH	E - H(	CL F	
NUMBER	SIZE	TYPE	PRESERVATI	VE FILT	ERED	NUMBE	R SIZE	TYPE PI	RESERVAT	IVE FILTERED	
1	125mL	plastic	A	☐ Y	У					☐ Y ☐ N	
1	125mL	i de	В	Υ	X N					□ Y □ N	
	250:nL		A	□ Y	ΧN					□ Y □ N	
2	1L	V	ß	Y	X N					Y N	
				□ Y	□ N					☐ Y ☐ N	
SHIPPING	METHOD:	lab 0	wo off Di	ATE SHIPP	ED:	10-5	-33	AIRBILL NU	MBER:		
COC NUM	BER:		SI	GNATURE:		be	gly	DATE SIGNE	ED:	10-13-23	
			<u> </u>		7	7	Ð	-			



(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Co		PREPARED		CHECKED
PROJECT NUMBER:	514404.0001.0000	BY:	AW. GR JJ DATE: 10-4-23	BY: AL	DATE ON 1123

SAMPLE ID: MW-15002 CUMULATIVE WATER **PURGE** TEMPERATURE CONDUCTIVITY TURBIDITY РΗ ORP D.O. TIME LEVEL PURGE VOLUME RATE (°C) (FEET) (GAL OR L) ( mg/L) (NTU) (SU) (umhos/cm) (mV) (ML/MIN) 8.12 10 -94.2 4.0 15.1 6.60 0.2 0853 200 8012 8,12 495.9 11 3.9 0858 200 6.63 7777 0,2 15.3 12 8.12 -96.4 0.2 4.7 1513 7441 200 6.64 0903 8,12 7486 4.3 15.3 13 -96.6 0.2 0908 200 6.65 7538 212 14 3.7 15.3 200 6.65 -96.7 0.2 0913

SIGNATURE:

Je My

DATE SIGNED: 10-13-23

# 3 TRC

PROJECT	NAME:	CEC K	(am BAP/LI: 20	23 GW C	PR	EPARED		CHECKED			
PROJECT	NUMBER	R: 51440	4.0001.0000	BY:	AW, OK).	IJ DATE	2-27 BY: AL	)	DATE: 10/31/27		
SAMPLE I	D: M	w - 15	008	WELL DIAM	METER: 🗸	2" 4"	6" OTHER				
WELL MATE		✓ PVC		IRON GAL	VANIZED S	STEEL	OTHER				
SAMPLE TY	PE:	☑ GW		SW DI		LEACHATE	OTHER				
PURG	SING	TIME: į	20 DA	TE: \$ 10-2-		AMPLE	TIME: 1151		ATE: 10-2-23		
PURGE METHOD		BAILER	PERISTALTIC F	PUMP	PH: ORP:		U CONDUCTIV				
DEPTH TO	WATER:	6:4.6	T/ PVC		TURBI	DITY: 2.7	NTU				
DEPTH TO	воттом:	17,44	T/ PVC		ОИ 🗶	NE 🗌 SLI	GHT MO	DERATE	☐ VERY		
WELL VOL	JME:	NA	LITERS	GALLONS	TEMPE	RATURE:	<u>15.7</u> ℃ ОТІ	HER:			
VOLUME R	REMOVED:	6	X LITERS	GALLONS	COLO	R: <u>4.67</u>	OD	OR:			
COLOR:		lew	OD	OR: Nonc	FILTRA	TE (0.45 um)	☐ YES 🔀	NO			
		TUR	BIDITY		FILTRA	TE COLOR:	FIL	TRATE ODG	DR:		
<b>™</b> NONE	SLI	GHT 🗌	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP- Bo	ckground		
DISPOSAL	METHOD:	☑ GROUI	ND DRUM	OTHER	COMM	IENTS:					
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME		
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L) INITIAL		
1121	200	6.31	1807	-21.9	1.4	6.9	15.8	<del> </del>	INITIAL		
1126	800	6.34	1760	-52.1	0.5	2.4	16.1	4.67			
11 31	200	6.39	1662	~66.3	0.3	3,3	15.8	4.67	2		
1176	200	6.43	1580	-74.2	Ø. J	2.3	15.8	4.67	3		
1141	2පව	6.45	1540	-79.8	0.1	3.3	15.7	4.67	4		
1146	200	6.47	1525	-24.3	ø. l	2.8	15.7	4.67	5		
1151	200	6.48	1506	-87.4	6.1	2.7	15.7	4.67	6		
									I :		
							4		<u> </u>		
NO pH: +/-		: I <b>LIŽATION</b> COND.: +/-			:UCCESSIV .O.: +/- 0.3		ARE WITHIN THE		G LIMITS: TEMP.: +/-		
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E-HC	CL F		
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE	D NUMB	ER SIZE	TYPE P	RESERVAT	VE FILTERED		
2	250mL	<i>flashi</i>	A	K Y	N				□ Y □ N		
2	125mL		A	□ Y <b>X</b>	N				□ Y □ N		
2	125mL		ß	□ Y <b>X</b>	N				□ Y □ N		
4	j L		в	□ Y <b>K</b> Ø	N		:		□ Y □ N		
		· · · · · · · · · · · · · · · · · · ·	:		N				□Y □N		
SHIPPING	METHOD:	lab Dre	y off DA	ATE SHIPPED:	10-9	5-23	AIRBILL NUN	/BER:			
COC NUME				GNATURE:	Je:	Zry	DATE SIGNE	:D:	10-13-23		

		7	
4	25	<b>₩</b>	Section 2

PROJECT	NAME:	CEC K	am BAP/LI: 20	23 GW C		PRI	EPARED		CHEC	KED
PROJECT	NUMBER	: 514404	.0001.0000	E	BY: A	.W, <b>(J</b> R, J	J DATE	1-23 BY: A	<b>W</b>	DATE: ICASILE)
SAMPLE II	D: ¡Mı	w- 15c	016	WELL D	IAMET	ER: 🗸	2"	6" OTHE	R	
WELL MATE	ERIAL:	√ PVC	ss [	IRON 🔲	GALVA	NIZED S	TEEL	OTHE	R	
SAMPLE TY	PE:	√ GW	□ ww □	sw 🔲 ı	DI .		LEACHATE	OTHE	R	
PURG	ING	TIME: 07	32 DA	TE: 10-4-	23		AMPLE	TIME: 094		ATE: 10-4-23
PURGE METHOD:	. =	PUMP I BAILER	PERISTALTIC F	PUMP		PH: ORP:	-122.4 n	IV DO:	TVITY: 186 0,3 mg	
DEPTH TO	WATER:	4.39	T/ PVC			TURBII	OITY: 5.8	NTU `		
DEPTH TO	воттом:	7.15	T/ PVC			NOI			MODERATE	☐ VERY
WELL VOLU	JME:	NA [	LITERS	GALLO	NS	TEMPE	RATURE:	7.7 ℃ €	THER:	
VOLUME R			LITERS	GALLO	NS	COLOF	e: <u>clear</u>			none
COLOR:		err	OD	OR: <u>101</u>	٢	FILTRA	TE (0.45 um)	YES	<b>X</b> NO	
	*	TURE	BIDITY				TE COLOR:		FILTRATE OD	OR:
NONE	✓ SLI	GHT 🔲	MODERATE	VER	Υ		MPLE: MS		DUP-	
DISPOSAL	METHOD:	✓ GROUN	ID DRUM	OTHER		сомм	ENTS: EQ -	Background	collected	after their sa
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)		D.O. mg/L)	TURBIDITY (NTU)	TEMPERATUR	E WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0934	<b>200</b>	7.21	2010	-(19.1		1.3	33.2	18.2	4.69	INITIAL
0939	200		1853	- 121.0		2,5	6.9	17.8	4.89	ì
0944	200	6.90	1846	- 123.0	<del></del>	7, 3	6.1	17.7	4.94	2
0949	200	6.89	1844	- 122.		),7	5.8	7,7	4.96	3
0111		0.01	1011							
				<u> </u> 						
		į								
	.,			ļ						
				ļ						
1										1
<b>NO</b> pH: +/-		ILIZATION T	TEST IS COMPL	.ETE WHEN +/- 10		CESSIV : +/- 0.3			HE FOLLOWIN = 10</td <td>IG LIMITS: TEMP.: +/-</td>	IG LIMITS: TEMP.: +/-
BOTTLES			ATIVE CODES			- H <b>N</b> O3	C - H2SO	4 D - NaOH	E- H	CL F
NUMBER	SIZE	TYPE	PRESERVATI	<u> </u>	ERED	NUMB		TYPE	PRESERVAT	
		plastic	<u> </u>		N N	<u> </u>				Y
1		ا المام المام	A		N X				and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	
	125mb		<u>B</u>		X N	<u> </u>				
	250-nL	1	<u> </u>							
A.	i L	Ψ	<u> </u>	Y □Y	□ N	<del></del>				Y
				3 [ST	IN		:	:		الأوليسان وليسو
			CO. 1-	ATE OURSE			~ 03	AIDBILL	IIIMRED:	
SHIPPING	METHOD:	lab Dr	<del></del>	ATE SHIPPE	D:	10~	5-23	AIRBILL N	_	10-13-23

	7	C
200	 -	-43834-1

PROJECT	NAME:	CEC I	(arn BAP/LI: 20	23 GW C	PR	EPARED		CHECKED			
PROJECT	NUMBER	t: 51440	4.0001.0000	BY:	AW, <b>J</b> K)	JJ DATE:	1-23 BY: A	۷	DATE: IOS 1/23		
SAMPLE	D: Mi	v- 15	219	WELL DIAM	IETER: 🗸	2" 4"	6" OTHE	₹			
WELL MAT	ERIAL:	√ PVC	ss	IRON GAL	VANIZED S	STEEL	OTHE	₹			
SAMPLE T	/PE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE	OTHE	R			
PURC	SING	TIME:	218 DA	TE:10-2-23	ß s	AMPLE	TIME: 123		ATE: 10-2-23		
PURGE METHOD	_	PUMP BAILER	PERISTALTIC F	PUMP	PH: ORP:	6.55 S -92.9 m		IVITY: 16'	g/L umhos/cm		
DEPTH TO	WATER:	5.95	T/ PVC		TURBI	DITY: <b>2.6</b>	NTU				
DEPTH TO	воттом:	16.86	T/ PVC		<b>⋈</b> NO	NE SLI	GHT □ M	ODERATE	VERY		
WELL VOL	• • •	NA	LITERS	GALLONS	TEMPE	ERATURE: <u>I</u>	<b>ઽ.૧</b> ℃ ૦	THER:			
VOLUME F	REMOVED:	3	X LITERS	GALLONS	COLO	R: <u>Clea</u>	<u>r</u> c	DOR:	none		
COLOR:		Clear	OD.	OR: <b>1012</b>	_ FILTRA	TE (0.45 um)	YES 2	<b>₹</b> NO	·		
		TUF	RBIDITY		FILTRA	TE COLOR:		ILTRATE OD	OR:		
NONE	SLI	днт □	MODERATE		QC SA	MPLE: MS	/MSD [	DUP-			
DISPOSAL	METHOD:	✓ GROU	ND 🗌 DRUM	OTHER	CÓWM	MENTS: FB	- backgro	and Co	llected		
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATUR (°C)	E WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)		
12.21	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU) 4.0	15.5	5,95			
1221	200	6.87	1656	-88.0	6.8	<del></del>			1		
1226	200	6.55	1	- 88.1	0.6	3.5	15.8	5.95	3		
1231	200	6.55	1689	-91.0	0.4	2.9	- 15,8	5.95			
1236	200	6.55	1691	-92.9	0.3	2.6	1519	5.95	3		
									10		
						1					
					<u> </u>						
		<u> </u>		1							
		1 2 2		<u> </u>	<u>                                     </u>						
N( pH: +/-	0.1	COND.: +/-		+/- 10	).O.: +/- <b>0.3</b>	TURB: +/-	10 % or <	:/= 10	TEMP.: +/-		
BOTTLE	S FILLED	PRESER!	/ATIVE CODES	A - NONE	B - HNO3	C - H2SO4		E - H			
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE	D NUME	BER SIZE	TYPE	PRESERVA			
1	125mL	Plastic	A	□ Y <b>X</b>	N j	125mL	Plastic		☐ Y 🗷 N		
1	125mL		ß	☐ Y <b>X</b>	N	A			YN		
. 1	250mb		A	□ y <b>K</b>	N	FB Bottle			□ Y □ N		
2	1L	V	ß	□ Y [X]		-V-06*1-&			☐ Y ☐ N		
	; ;	<del> </del>		□ Y :□	N				☐ Y ☐ N		
SHIPPING	METHOD:	lab D	op e <del>CS</del> D	ATE SHIPPED:	10-5	- 27	AIRBILL N	UMBER:			
COC NUM		1		GNATURE:	Te	My	DATE SIG	NED:	10-13-23		
L			<del> </del>		//	0					

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<b>'</b>		1

PROJECT NAME:	CEC	Weadock LF	: 2023 GW C		PRE	PARED			CHEC	KED
PROJECT NUMBE	R: 51440	03.0000.0000	)	BY:	JJ	DATE: (G)	olつう <sup>B</sup>	M: AL	7	DATE: lolz 7/2)
SAMPLE ID:	H-10	QΨ	WELL	DIAMET	ER: 🗸 2	"	6" 🗌	OTHER		
WELL MATERIAL:	☑ PVC	□ss [	] IRON [	GALV <b>A</b>	NIZED ST	EEL		OTHER		
SAMPLE TYPE:	☑ GW	□ww [	」sw □	DI	Li	EACHATE		OTHER		
PURGING	TIME: (	30と	DATE; C(4)	133		MPLE	TIME:	13 =		TE: (Olilly)
PURGE METHOD:	] PUMP ] BAILER	PERISTALTI	C PUMP				SU CON nV DO:	الا الا الا الا الا الا الا الا الا الا	TY: <u>【ひ`</u> うこ mg	<u>전역</u> umhos/cm /L
DEPTH TO WATER:		_ T/ PVC			TURBIDI		DTM C			
DEPTH TO BOTTOM	1: j 400	_ T/ PVC			NONE		IGHT	_	DERATE	VERY
WELL VOLUME:	NA -	LITERS	GALLO		TEMPER		<u> </u>	C OTH	IER:	
VOLUME REMOVED	):	LITERS	☐ GALLO		COLOR:	<u>((@</u>	<u>~</u>	ODC		10116
COLOR:	M CON		DDOR: 1)C	<u>ال</u>	FILTRAT	E (0.45 um)	YES	7	-04-	
<u>_</u>		RBIDITY	_			COLOR:			TRATE ODC	DR:
NONE LSI		MODERATE			QC SAM		MSD	Ш	DUP-	
DISPOSAL METHOD	O:[ GROU	IND DRU	M   OTHER	<u> </u>	COMME	NTS:				
TIME PURGE RATE	PH	CONDUCTIVI	TY ORP		D.O	TURBIDITY	TEMPER	RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
(ML/MIN)	(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	(°(	C)	(FEET)	(GAL OR L)
1306 100	799	1330	56.5	7.	.લ	40	23	38	647	INITIAL
1313	7.39	1191	- 53	0	97	3.ブ	17.	ר	9.10	
1318	7.45	1117	-02	5 (	) ig3	2.2	ાક	. 0	9.15	
1373	7.46	1091	. 89.0		57	20	17.		9.15	1,5
1328	7.40	1089	- 59.	3 C	, 50	3-7	18	Ú	9.11	<u> </u>
1375		MATERIAL PROPERTY.								<i>フ</i> -ケ
										3
77,745										
				1.						
NOTE: STAF	II IZATION	TEST IS COM	PLETE WHEN	3 SUC	CESSIVE	READINGS A	RF WITH	IN THE E	OI LOWING	G LIMITS:
pH: +/- <b>0.1</b>	COND.: +/-		P: +/- <b>10</b>		+/- 0.3	TURB: +/-		or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
BOTTLES FILLED	DDESED!	ATIVE CODE	S A NONE	·	HNO3	C - H2SO4	D - N	InOU	E- HC	L F
NUMBER SIZE	TYPE	PRESERVA	<del>-</del>	ERED	NUMBER	1	TYPE		ESERVATI)	
_	<del>-</del>	A		M N	NOMBEL	SIZE	1156	-	LOLIVAII	VE TIETERED
2 1) 5	PI	B		N N						
1 11 -	971	,Δ								
	P	1 Y		JE N		1		1		
	YI	P		IJ N						
SHIPPING METHOD:	Drop	044	DATE SHIPPE	D:	10/5/	2 }	AIRB	ILL NUMI	BER:	
COC NUMBER:			SIGNATURE:			$\lambda$	DATE	SIGNE	): Y/	10/x 3
		:	- to		U/	$\mathcal{T}$			,	

		_
<b>→</b>	72	_
<b>&gt;</b>	157	

DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE     DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE   DATE	PROJECT	T NAME:	CEC V	Veadock LF:	: 2023 GW C		PRE	EPARED			CHEC	KED
WELL MATERIAL   PVC   SS	PROJECT	T NUMBER	R: 51440	3.0000.0000		BY:	JJ	DATE: UU	oly BY	AW		DATE [dz7[2]
SAMPLE TYPE	SAMPLE	SAMPLE ID: YOU . MUL (SOO) WELL'DIAMETER: 2" 4" 6" OTHER										
PURGING	WELL MAT	ΓERIAL:	☑ PVC	□ss [	RON _	GÄLVA	NIZED S	TEEL		THER _		
PURGE	SAMPLE T	YPE:	☑ GW	□ww [	□ sw □	DI		LEACHATE		THER		
METHOD:   BAILER	PUR	GING	TIMEOS	47	DATE (US)	53						
DEPTH TO WATER:   DOS_ T/ PVC				PERISTALTI	C PUMP				7			
WELL VOLUME: NA   LITERS   GALLONS   TEMPERATURE:   S   "C OTHER   VOLUME REMOVED   LITERS   GALLONS   COLOR:   CLOCK   ODOR   VIC   V   V   V   V   V   V   V   V   V	DEPTH TO	O WATER:		T/ PVC			<del></del>		·			
VOLUME REMOVED:				T/ PVC			HON F	NE SLI	gнт [	MODE	RATE	☐ VERY
COLOR:	WELL VOL	.UME:	NA	LITERS	☐ GALLO	NS	TEMPE			OTHE		
NONE	VOLUME	REMOVED:		<b>T</b>	☐ GALLO	NS	COLOR	: <u>Ç</u> a	X			<u>&amp; Ku</u>
NONE	COLOR:		1000 do	<del>\</del>	DDOR:	_	FILTRA	TE (0.45 um)	YES	- DN	0	
DISPOSAL METHOD:   GROUND   DRUM   OTHER   COMMENTS:		_										PR:
TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL (CMUNITATIVE PURGE VOLUME (MINIM) (SU) (umhos/cm) (my) (mg/L) (NTU) (NTU) (CO) (EET) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (GALORI) (G								7	/MSD	DI	UP	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:   PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or    OR   OR   OR   OR   OR   OR   OR   OR	DISPOSAI	L METHOD:	✓ GROU	ND DRU	M   OTHER	₹	СОММІ	ENTS:				
MALMIN   SU   (umhos/cm)   (mV)   (mg/L)   (NTU)   (*C)   (FEET)   (GAL OR L)	TIME		PH	CONDUCTIVE	TY ORP		D.O.	TURBIDITY	TEMPERA	111HZF 1		
C353		•	,									(GAL OR L)
Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Com	0547	JOP	400				76		18.	) [7	718	∋INITIAL
C557   C2   1775   -4.6   C47   38   (5.6   7.7)   2   C602   L50   2810 - 150   030   4.0   15.7   7.7)   3   C602   L600   2830   -15.7   C34   3.2   156   7.7)   4   C47   28.77   -14.6   C2   3.2   156   7.7)   5   C417   L600   24.6   C2   -14.2   C6   3.2   15.6   7.7)   5   C417   L600   24.6   C2   -14.2   C6   3.2   15.6   7.7)   5   C417   L600   24.6   C2   -14.2   C6   3.2   15.6   7.7)   5   C417   C500   C6   C6   C6   C6   C6   C6   C6	0552		6.43	ACC & )	10-9						799	\
CLOOD   CLOOD   2816 - 150   U30   4.0   15.7   (7))   3   CLOOT   CLOOD   2830   -15.7   CAC   3.2   156   170)   4   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD   5   CLOOD			6.45	275	1 ~4.6	C	47	38	150	$\mathcal{I}$	$\mathcal{C}(\mathcal{C})$	2
	I i			2818	0 -150	2 (	130	4.0	15.フ		7))	3
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1			levio	2830	-15.	TC	alo	ふえ		1	$\mathcal{CC}$	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  ph: +/- 0.1	deld				T - 16.	) ر	XC	3)	150		CCT	_
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1	cie in		wip	24,60			18	3)	15.	ا ق	765	Þ
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F							Total Section (					
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F												
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F												
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F	NC	TE: STAB	LIZATION 1	TEST IS COM	PLETE WHEN	3 SUC	CESSIVE	READINGS A	RE WITHIN	N THE FO	LLOWING	G LIMITS:
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED    1)												
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED    1)	BOTTI F	S FILL FD	PRESERV	ATIVE CODE:	S A-NONE	R -	HNO3	C - H2SO4	D - Na	OH	E - HO	L F-
350 P  A		т			<del></del> _				1			
350 P  A	2	761	9/45	()	□ Y	N						□Y □N
3 137 P1 A	ĺ		PI		□ Y	<b>/</b> N					···	□ Y □ N
3 1) 1 2 1 2 1 N 1 N 1 N 1 N 1 N N N N N N N	マ		อไ		□ Y	N				gi <sup>2</sup>		□ Y □ N
SHIPPING METHOD: DATE SHIPPED: 10-5-73 AIRBILL NUMBER:	3	7 Ci	70					4				□ Y □ N
					□ Y	□N						□ Y □ N
	SHIPPING	METHOD:	Prop	of f	DATE SHIPPE	D: <b>[C</b>	>-5-	7 2	AIRBIL	L NUMBE	:R:	
							H	-			<i>,</i> ∪ <i>,</i> +	117

<b>&lt;&gt;</b>	TRC	
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PROJEC	T NAME:	CEC V	Veadock LF:	2023 GW C		PRE	PARED			CHEC	KED
PROJEC*	T NUMBE	R: 51440	3.0000.0000	E	3Y:	JJ	DATE: (U	(ol)3B)	Au	ل	DATE: 10-27-2
WELL MAT		✓ PVC	ss [	IRON [	GALVA	NIZED S	2" 4" TEEL		THER THER		
SAMPLE T		☑ GW	w [		) 					<u> </u>	
PURGE METHOI		PUMP BAILER	PERISTALTIC	DATE <b>IC (S/)</b> C PUMP	3	PH: (	<u> </u>	TIME: CONE  OU CONE  OU DO:	76 DUCTIV <u>C</u>		ATEM (1)3 C umhos/cm
	O WATER:	<u>6.97</u>	T/ PVC			TURBIC			<b>¬</b>		
	о воттом:		T/ PVC			NON		GHT [		DERATE	☐ VERY
WELL VOL		NA f i	LITERS	GALLON			RATURE: <u>l</u>	<u>5.5</u> °c	- 1	HER:	1010
	REMOVED:	GALLON DOOR: YOU	COLOR			<del></del>	OR:	1010			
COLOR:			BIDITY  MODERATE	DOR: <b>VE</b> R		<b>————</b>	ΓΕ (0.45 um) ΓΕ COLOR:  MPLE:	∐ YES	7	TRATE ODG	DR:
<u>/</u>	L METHOD:					СОММ	ENTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVIT		İ	D.O.	TURBIDITY (NTU)	TEMPERA (°C		WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1645	Dod	693	1512	-3.9	7	9	Cc.o	(E)		7.18	INITIAL
der		G58	1370	-46	1)	60	7. 2	16	Ì	7-30	10
OLE IT		(v.55	1361	-55-8	ŕ	345	7.6	lie	೮	>3C	20
0700		417	1380			36	7.0	150		730	3.0
070 T		6-51	1381	- 56.3		34	70	19.		730	910
6716					100	ST A TOWN TO A TOWN					30
											GO
	-				- t t-						
<b>NC</b> pH: +/-		LIZATION TO		PLETE WHEN P: +/- 10		CESSIVE	EREADINGS A		N THE		G LIMITS: TEMP:: +/-
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	н <b>N</b> О3	C - H2SO4	D - Na	юн	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILTE	RED	NUMBE	R SIZE	TYPE	PR	RESERVATI	VE FILTERED
				□ Y [	N						□ Y □ N
				Y [	] N				_		YN
				□ Y □	N						☐ Y ☐ N
					] N						
			1	<u></u>	_  N				· ·		L Y L N
SHIPPING	METHOD:	Doop	·OFF	DATE SHIPPE	D: <u>}C</u>	<u> </u>	-23	AIRBII	L NUM	IBER:	
COC NUMI	BER:			SIGNATURE:		<u> </u>		DATE	SIGNE	D: <b>[_(</b>	0/10/83
										•	

<b>;</b> }	Ti	2	C
_			

PROJEC1	ΓNAME:	CEC V	Veadock LF: 20	023 GW C		PRE	PARED		CHEC	(ED
PROJEC1	r number	R: 51440	3.0000.0000		BY:	JJ	DATE:	eじカ BY:	AW	DATE:10-27-2
SAMPLE	iD: Mc	11-50	0	WELL D	DIAMET	ER: 🗸	2"	6" OTH	ER	
WELL MAT	ERIAL:	✓ PVC	SS	IRON [	GALVA	NIZED S	TEEL	ОТН	ER	
SAMPLE T	YPE:	☑ GW	□ ww □	sw 🔲	DI	1	EACHATE	ОТН	ER	
PUR	GING	TIME:	ie ( DA	TE: 6/9/	53	SA	AMPLE	TIME: 66		TEK 1917
PURGE METHOI	_	PUMP BAILER	PERISTALTIC F	PUMP			7.00 s -100/√ m		TIVITY: <u>\}}</u> O. <b>UC</b> mg/	
DEPTH TO	D WATER:		T/ PVC				OITY: 3.0	NTU	<u> </u>	
DEPTH TO	BOTTOM:	1940	T/ PVC			MON T	_		MODERATE	☐ VERY
WELL VOL		NA	LITERS	GALLO	NS	TEMPE	RATURE:	(.) °C	OTHER:	
VOLUME I	REMOVED:	<u> </u>	LITERS	☐ GALLO		COLOR	: <u>cl</u>			010
COLOR:	(	101	. OD	OR: <b>11(2) (</b>	<u> </u>	FILTRA	TE (0.45 um)	YES	NO NO	
			BIDITY				E COLOR:		FILTRATE ODO	
NONE			MODERATE	VER		QC SAI		/MSD <	DUP- H	<u> </u>
DISPOSAL	_ METHOD:	☑ GROUN	ND DRUM	OTHER		СОММ	ENTS:			
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPERATU	RE WATER	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
100	200	ya	803	200		64	19.0	11.4	1371	INITIAL
Jel X		(k.73)	1307	-18	0	03	48	thi	1360	
7(90)		495	1249	-100	C	(2)	પં <sub>Č</sub>	11.9	1380	) J
0630		7.W	(237)	-100-3	· (	340	3.5	118	1380	3
1647		7.00	1237	-100	0 7	40	3.0	11.7	1380	4
rioue		7.ci	() 20	-1003	- 1	190	30	11.7	1380	7
					-	1				4
	l l									
					-					
<b>NC</b> pH: +/-		LIZATION 1	TEST IS COMPL	ETE WHEN +/- 10		CESSIVE	E READINGS A			ELIMITS:
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - NaOH	E - HCI	L F
NUMBER	SIZE	TYPE	PRESERVATIV	/E FILTE	RED	NUMBE	R SIZE	TYPE	PRESERVATIV	/E FILTERED
7	740	ان	A	□\Y	Ź N					□ Y □ N
7	125	र्रे।	1		N					□Y □N
2	125	PI	A		S <sub>N</sub>					□Y □N
H	LL	DΙ	B		J) N		7 Handay 1			Y N
	•	1		□ Y [	N					□Y □N
SHIPPING	METHOD:	Drop	OFF DA	TE SHIPPE	D: <b>[</b> [	0-10	-23	AIRBILL N	IUMBER:	
COC NUM	BER:		_ SIG	GNATURE:		_<	$\supset$	DATE SIG	NED:	110/13
							<i>}</i>		•	107

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PAGE 17 OF 39

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PROJECT NAME:	CEC V	Veadock LF	: 2023 GW C		PRE	PARED			CHEC	KED
PROJECT NUMBER	R: 51440	3.0000.000	0	BY:	JJ	DATE	0137 E	BY: /4	W	DATE: 1027-2
SAMPLE ID:	W-5		WELL	DIAMET	ER: 🗸 2	"	6"	OTHER		
WELL MATERIAL:	✓ PVC	SS	IRON [	GALVA	NIZED ST	EEL		OTHER		
SAMPLE TYPE:	☑ GW	□ww	□ sw □	Di		EACHATE		OTHER		
PURGING	TIME	しろ	DATE: (c)(4)	3_		MPLE		<u>)</u> 734		TE: 6 (6/2)
PURGE	PUMP BAILER	PERISTALT	TC PUMP		PH: _	<u> </u>	U CON		1TY: <u>US</u>	
DEPTH TO WATER:					TURBIDI	•	NTU			
DEPTH TO BOTTOM	20.u	T/ PVC			NONE		GHT	мо	DERATE	☐ VERY
WELL VOLUME:	NA	LITERS		NS	TEMPER	711,011L. <u>1</u>	<u>。</u> 。	с отн	HER:	
VOLUME REMOVED		LITERS			COLOR:	Clear		ODO		or_
COLOR:(	(OC)		ODOR: NOV	<u></u>	FILTRATI	E (0.45 um)	YES		NO NO	
		BIDITY	_		FILTRATE			FIL	TRATE ODC	)R:
7		MODERATE			QC SAM	PLE: MS	/MSD		DUP-	
DISPOSAL METHOD	: GROUN	ND   DRI	JM OTHER	₹	СОММЕ	NTS:				
TIME PURGE RATE	PH	CONDUCTIV			Ι.	TURBIDITY		RATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
(ML/MIN)	(SU) 714	(umhos/cn			mg/L)	9.C		C) }.	140	INITIAL
	/		1 - 90	<u>`</u>	<del></del>			9	17.91	1
016	7.08				3	6.0			<del></del>	
0733	7.09	117			70	5.0		<u>.)</u>	1415	<u></u>
360	7.18	1160			) SO	4,8		<u>5.2</u>	14,61	
(733)	7.14	116		50	40	4.8	ιj		ivil	<del>,</del>
c736	7.16	1159	0 - 100	0 0	)40	4.	()	-3	1411	
					1			·		
9					en wet straight					
NOTE: STAB	ILIZATION 1	TEST IS CO	MPLETE WHEN	1 3 SUC	CESSIVE	READINGS A	RE WITH	IIN THE I	FOLLOWIN	G LIMITS:
	COND.: +/-		RP: +/- <b>10</b>		+/- 0.3	TURB: +/-		or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
BOTTLES FILLED	PRESERV	ATIVE CODE	ES A - NONE	. В-	HNO3	C - H2SO4	D - N	NaOH	E - HC	L F
NUMBER SIZE	TYPE	PRESERV	ATIVE FILT	ERED	NUMBER	R SIZE	TYPE	E PR	RESERVATI	VE FILTERED
1 22	PI	B	☐ Y	□ N				And the same		□Y □N
1 175	Di	Ŋ	☐ Y	N						□Y □N
7(1)	7	B	Y	ĮΝ						☐Y ☐N
2 16	51	В	□ Y	□ N						□Y □N
		• • • • • • • • • • • • • • • • • • • •	☐ Y	N						□Y □N
SHIPPING METHOD:	Drop	off	DATE SHIPPE	ED: (	0-10-	2 \	AIRE	BILL NUM	IBER:	
COC NUMBER:			SIGNATURE:			\	DAT	E SIGNE	D: ( () 10	1/13
			!	7	//	+	1		<u>.   /                                  </u>	<del>                                      </del>

<b>{</b> >	TR	C
	11/	

PROJECT NAME: CEC Weadock LF: 20	123 GW C	PREPARED		CHECKE	D
PROJECT NUMBER: 514403.0000.0000	BY:	JJ DATE	uliz BY: AL	ر ا	ATE:10-27-23
SAMPLE ID: MW 50	WELL DIAMETI	ER: 🗸 2" 🔲 4" 🔲	6" OTHER		
WELL MATERIAL: PVC SS	IRON GALVAI	NIZED STEEL	OTHER		
SAMPLE TYPE:	SW 🗌 DI	LEACHATE	OTHER		
PURGING TIME: USO T DA	TE:(0[9]3	SAMPLE	TIME: 0830		10/9/13
PURGE ☑ PUMP PERISTALTIC F METHOD: ☐ BAILER	UMP	PH: الله عنه S ORP: اله له عنه S	U CONDUCTIVI		umhos/cm
DEPTH TO WATER: \(\frac{5.1}{1.00}\) T/ PVC			NTU	mg/L	
DEPTH TO BOTTOM: (9-) 9 T/ PVC			<del>_</del> ···	DERATE	☐ VERY
WELL VOLUME: NA LITERS	GALLONS		J. ) °C OT⊦		
VOLUME REMOVED: TLITERS	GALLONS		9 ODG		<i>y</i>
		FILTRATE (0.45 um)	☐ YES [7]		
TURBIDITY    TANONE   SLIGHT   MODERATE	☐ VERY	FILTRATE COLOR: QC SAMPLE: MS		DUP-	<u> </u>
MODERATE  DISPOSAL METHOD: ☐ GROUND ☐ DRUM	OTHER	COMMENTS:	71413D		
		COMMENTS.			
TIME PURGE PH CONDUCTIVITY	ORP	D.O. TURBIDITY	TEMPERATURE		CUMULATIVE URGE VOLUME
(ML/MIN) (SU) (umhos/cm)	(mV) (	mg/L) (NTU)	(°C)	(FEET)	(GAL OR L)
000 200 701 1324	11030 C	oc 7.3	10.9	15)	INITIAL
0810 16.70 1430	-610 00	70 4.T	119	1540	(
USIT 47- 1447	_ (")	60 3C	j.Gi	(540	J
080 4.76 1454		50 2.T	19.7	1340	3
000		50 7.1	17.1	isuc	4
			1	7546	
de30 (4.77 146)	- 44.5	UT 2.1	12.3	1,5-0	
					***************************************
	1		4		
NOTE: STABILIZATION TEST IS COMPL	ETE WHEN 3 SUC	CESSIVE READINGS A	ARE WITHIN THE F	OLLOWING I	LIMITS:
		+/- <b>0.3</b> TURB: +/-			MP.: +/-
		11100 0 110004	D. N-OU		_
BOTTLES FILLED PRESERVATIVE CODES		HNO3 C - H2SO4	<del></del>	E - HCL	F
NUMBER SIZE TYPE PRESERVATIV		NUMBER SIZE	TYPE PR	ESERVATIVE	
1 290 PI A	□ Y A N				Y
1 171 PI A	□Y J N				☐ Y
1 /91 01 13	☐ Y 🖆 N				□ Y □ N
DIL PIB	□ Y [ N				□ Y □ N
	□ Y □ N				□ Y □ N
SHIPPING METHOD: DOP OFF DA	TE SHIPPED:	0-10-23	AIRBILL NUM	BER:	-
	ONATURE:		DATE SIGNEI		12
				10110	<del>)                                    </del>
70F7 0 1/2010		$\mathcal{A}$			

	<b>{</b>	T	F	2	C
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PROJECT NAME:	CEC V	Veadock LF: 2	023 GW C	PR	EPARED		CHEC	KED
PROJECT NUMBE	R: 51440	3.0000.0000	BY:	JJ	DATE	dr3 BY: Au	لد	DATE 10-21-2
SAMPLE ID: M	W- 6	53	WELL DIAN	METER: 🗸		6" OTHER		
WELL MATERIAL:	☑ PVC	ss 🗆	IRON GAI	VANIZED S	STEEL	OTHER		
SAMPLE TYPE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE	OTHER		
PURGING	TIME: U	55 D	ATE: 10/9/2	, - )	AMPLE	TIME: 0930		ATE: 1014133
PURGE  METHOD:	PUMP BAILER	PERISTALTIC	PUMP			O CONDUCTIV	<del>-</del>	
DEPTH TO WATER:	1391	T/ PVC		TURBI	DITY: 30	NTU		
DEPTH TO BOTTOM	1: 18.19	T/ PVC		Mo			DERATE	☐ VERY
WELL VOLUME:	NA	LITERS	GALLONS	TEMPE		<mark>3.Ч</mark> °с отн	HER:	
VOLUME REMOVED		T LITERS	GALLONS	COLO	r: <u>clea</u>	OD	OR: <u>Y</u>	ION
COLOR:	ow		OOR: NOV	_ FILTRA	TE (0.45 um)	YES	-NO	
	TUR	BIDITY		FILTRA	TE COLOR:	FIL	TRATE ODG	DR:
NONE SI	LIGHT 🗌	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP-	
DISPOSAL METHO	D: GROUI	ND 🗌 DRUM	OTHER	COMM	IENTS:			
TIME PURGE RATE	PH	CONDUCTIVITY	ŀ	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
(ML/MIN)		(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L) INITIAL
001 24	746	५४३	-153.5	9.0	7.0	(1.7	1348	INITIAL
(Geo	776	980	-1900	1.4	₹. \	13-0	1401	
090 S	776	993	-130.1	0.70	3.0	17.1	1405	٤
6910	730	1003	- 13QC	Olik	<b>マ・</b> て	13.4	1402	3
0415	730	1007	-114.5	O50	2.0	13.4	1461	4
0976	7.30	1009	-119.5	050	20	13.4	1405	Γ
NOTE: STAE	BILIZATION COND.: +/-			UCCESSIV		ARE WITHIN THE		G LIMITS: TEMP.: +/-
	-			· · · · · · · · · · · · · · · · · · ·				1 F_
BOTTLES FILLED	1	ATIVE CODES		B - HNO3	C - H2SO4	· · · · · · · · · · · · · · · · · · ·	E - HC	
NUMBER SIZE	TYPE	PRESERVAT			ER SIZE	TYPE PR	RESERVATI	VE FILTERED
1 250	PI	A		<del></del>				
161	191	B 3		<del></del>				
1 131	171	B		<del> </del>				LIY LIN
2 11	PI	В		N				UY UN
	100		□ Y □	N				☐ Y ☐ N
SHIPPING METHOD	400A	off D	ATE SHIPPED:	10-10	-23	AIRBILL NUM	IBER:	_
COC NUMBER:		s	IGNATURE:		7	DATE SIGNE	D: //	16/17
			****	-c		1		<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>

<b>{</b> }	TA	?
	1 1 7	, <u> </u>

PROJEC1	NAME:	CEC V	Veadock LF: 2	023 GW C		PRE	PARED			CHEC	KED
PROJECT	NUMBE	R: 51440	3.0000.0000	В	Y:	JJ	DATE	113	вч: Д	<u> </u>	DATE: 6-27-23
SAMPLE WELL MAT		<b>U</b> - 5 ☑ PVC	312   ss			ER: 🕡 NIZED S	2"	6" [	OTHER OTHER		
SAMPLE T	YPE:	☑ GW	□w □	SW 🗆 🗆	)I	L	EACHATE		OTHER		
PUR	GING	TIME: 6	14 ( DA	TE: 0 4b	3		MPLE	TIME:	1015	DA	TEK (4/2)
PURGE METHOI	_	PUMP BAILER	PERISTALTIC F	PUMP		PH:		iV DO	NDUCTIVI	ITY: <u>ا۲۲</u> نو <i>ن</i> mg,	
DEPTH TO	WATER:	14.01	T/ PVC			TURBIC		NT			
		1880				HON		GHT		DERATE	∐ VERY
WELL VOL		NA .	LITERS	GALLON			RATURE (3.	<del></del>	·	IER:	.44
VOLUME I			LITERS	GALLON		COLOR	<u></u>	<del></del> _	ODO		)NO
COLOR:	191	Mac N.		OR: <u><b>101</b></u>			ΓΕ (0.45 um)	☐ YE		-7	
NONE		_	BIDITY	Ø VERY		FILTRAT QC SAM	E COLOR:	/MSD	FIL1	TRATE ODO DUP-	R:
NONE		IGHT ∐ :☑ GROUI	MODERATE ND DRUM	OTHER		COMME		UNIOD		DOP	
DISPOSAL		: [v] GROUI	AD DROW			COMM	=IN 1 S.	r		Г	
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	- 1	D.O.	TURBIDITY		ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
.0.0	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)	j 1	(°C)	(FEET)	(GAL OR L) INITIAL
Offer	300	7.13	657	-105.0	<del></del>	ان	2000	ι'	~ <del>~</del>	(478	INITIAL
2910		4.64	1479	- 30	1,		976	17		14.90	
0451		6.93	1421	2.1	l.	3	27	13		1490	
1000		4.93	1411	150	0	90	47	13	ンタ	1490	3
7001		495	1389	_9.1		80	50	13	3.3	1490	4
1010		6.95	1351	-100	()	76	4.1	13	. 5	1490	7
1012		691	1345	-10.0	_	60	4.5	13	. 4	144.	6
				***************************************	400			We wanted			
<b>NC</b> pH: +/-		ILIZATION COND.: +/-	TEST IS COMPL 3 % ORP:	.ETE WHEN 3 +/- 10		CESSIVE +/- 0.3	E READINGS A TURB: +/-		or =</td <td></td> <td>G LIMITS: TEMP.: +/-</td>		G LIMITS: TEMP.: +/-
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTER	RED	NUMBE	R SIZE	TYF	PE PR	ESERVATI	VE FILTERED
	DÚ	Pi	A	□Y E	₽N						□ Y □ N
Ì	135	PI	A	□ Y [-	₽N						□ Y □ N
1	761	16	$\mathcal{B}$		N		1				Y
À	16	PI	Ã		₽N						□ Y □ N
		7			N						□Y □N
SHIPPING	METHOD:	Drop	off DA	TE SHIPPED	): <u></u>	0-10	-23	AIR	BILL NUM	BER:	
COC NUM	BER:			GNATURE:				DA	TE SIGNÈI	D: 10	110/13
						<del></del>					· · · · · · · · · · · · · · · · · · ·

♦ TRO	_				1
PROJECT NAME:	CE	C V	Vead	lock L	.F: 2
PROJECT NUMBE	R: 514	440	3.000	00.00	00
SAMPLE ID: M	U	` `	5 L	12	,
WELL MATERIAL:	√ PV	С		SS	
SAMPLE TYPE:	☑ GV	٧	□ V	w	
PURGING	TIME:	10	40	)	D
PURGE METHOD:	PUMP BAILER	₹	PER	ISTAL	TIC
DEPTH TO WATER:	jut	7	T/ F	PVC	
<b>DEPTH TO BOTTOM</b>	:/7:	<u>)</u>	_T/_F	VC	
WELL VOLUME:	NA		□ L	ITERS	3
VOLUME REMOVED			ĮĮ L	.ITER	3
COLOR:	Bra	U	151	_	OE
□ NONE □ SL	IGHT	TUR	BIDIT MOD	Y ERAT	E
DISPOSAL METHOD	:☑ GR	OU	ND [	DF	RUM
PURGE	T				

PROJECT NUMBER: 514403.0000.0000 BY: JJ DATE ICHOLO BY: AU	DATE:10-27-27
SAMPLE ID: MU) - 542 WELL DIAMETER: 2" 4" 6" OTHER	
WELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER	
SAMPLE TYPE:	
	DATE: 10 (9/53
[ 49] 2 ON CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF	
	umhos/cm <u>&amp;C</u>
DEPTH TO WATER: (U6) T/ PVC TURBIDITY: 5. NTU	
DEPTH TO BOTTOM: 77-79 T/ PVC NONE SLIGHT MODER	ATE VERY
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 13.1 °C OTHER:	·
VOLUME REMOVED: GALLONS COLOR: CLOW ODOR:	-noil
COLOR: Braunish ODOR: DOL FILTRATE (0.45 um) YES ANO	
TURBIDITY FILTRATE COLOR: FILTRAT	TE ODOR:
NONE ☐ SLIGHT ☐ MODERATE ☐ VERY QC SAMPLE: ☐ MS/MSD ☐ DUF	P
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:	
TIME RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LE	ATER CUMULATIVE EVEL PURGE VOLUME
	GAL OR L)  (GAL OR L)  (INITIAL
	446
Q. (1)	
	446 2
	446 3
	446 4
1105 646 9 79 -13.1 060 5.5 13.5 1	446 1
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLL	OWING LIMITS:
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % or = 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH	E-HCL F
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESE	ERVATIVE FILTERED
1 250 PI A DY 11 N	□ Y □ N
1 12 DI A DY BN	□Y □N
1 12 T DI B DY DN	□ Y □ N
DI B DY DN	□ Y □ N
	□ Y □ N
SHIPPING METHOD: Drop of DATE SHIPPED: 10-20-23 AIRBILL NUMBER	₹: <u> </u>
COC NUMBER: SIGNATURE: DATE SIGNED:	10/10/10
	141101)

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PROJECT NAME:	CEC V	Veadock LF: 2	:023 GW C	PR	EPARED		CHEC	KED
PROJECT NUMBE	R: 51440	3.000.0000	BY:	IJ	DATE: (oli	claz BY:	AW	DATE:10-27-23
SAMPLE ID: )CO	v- Mer	-18004	WELL DIAM	METER: 🗸	2"	6" OTH	ER	
WELL MATERIAL:	✓ PVC	ss 🗆		LVANIZED S	STEEL	ОТНІ	ER	
SAMPLE TYPE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE	□ отні	ER	
PURGING	TIME: \	30 D	ATE(U/Gl)?	/ I	AMPLE			ATE: (0/9/13)
PURGE METHOD:	PUMP BAILER	PERISTALTIC	PUMP		<u>زداری</u> ه	U CONDUC		g/L umhos/cm
DEPTH TO WATER:	アント	T/ PVC		TURBI		<u>1</u> NTU		
DEPTH TO BOTTOM	1:14.7	T/ PVC		₩ NO			MODERATE	☐ VERY
WELL VOLUME:	NA	LITERS	GALLONS	TEMPE	TO THORIES		OTHER:	
VOLUME REMOVED	<u>: لذ</u>	HTERS	GALLONS	COLO	R: Clea		7	none
COLOR:C	<u>Neas</u>		DOR: MONG	FILTRA	TE (0.45 um)	YES	NO NO	
r	TUR	BIDITY		FILTRA	TE COLOR:		FILTRATE OD	OR:
MONE SI	JGHT 🗌	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP-	
DISPOSAL METHOD	D:☑ GROUI	ND DRUM	OTHER	COMM	IENTS:			_
TIME PURGE	РН	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATU	RE WATER	CUMULATIVE PURGE VOLUME
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	LEVEL (FEET)	(GAL OR L)
1130 100	201	514	43.5	9.0	9	13.9	1765	INITIAL
1135	698	f	60.9	5.4	50	(58	12.90	15
1140	6.47	1268	610	5.3	5.0	158	1310	
1145	697	19 21	663	5.2	4.9	15.7	1320	160
	Q. V	(5 / 1	<u> </u>		100	1 )* '	137	2
1150								3,6
	1							3,1
	-							
	<u> </u>							
L								
					_			
NOTE: STAE	BILIZATION .	TEST IS COMPI	LETE WHEN 3 S	UCCESSIV	E READINGS A	RE WITHIN TI	HE FOLLOWIN	IG LIMITS:
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORP:	+/- <b>10</b> D	.O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E - H(	CL F
NUMBER SIZE	TYPE	PRESERVATI	VE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVAT	IVE FILTERED
1 250	ρi	A	□ v <b>∄</b>	N			,	□ Y □ N
1 125	ρι	1	□ v of	N				☐Y ☐ N
761	חו	B	□ y Ø	N			,	□Y □N
1 1V	PI	B						□Y □N
		•		N				□Y □N
SHIPPING METHOD:	DOOP-	off D	ATE SHIPPED:	10-1	0-23	AIRBILL N	UMBER:	
COC NUMBER:			GNATURE:			DATE SIG	NED: 1/	1/16/2
								<del>"[V]")</del>

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PROJECT NAM	IE: CEC	Neadock LF: 2	023 GW C	PR	EPARED		CHEC	KED .
PROJECT NUM	IBER: 51440	3.000.0000	BY:	JJ	DATE O	1)3 BY: A	<del>ಟ</del>	DATE: 10-21-23
SAMPLE ID:	W- 5	5	. WELL DIAM	ETER: 🗸	2"	6" OTHER	₹	
WELL MATERIAL	<u> </u>	ss 🗆	IRON GAL	VANIZED S	STEEL	OTHER	?	
SAMPLE TYPE:	☑ GW	□ww □	SW □ DI		LEACHATE	OTHER	R	
PURGING	TIME: 13	DA DA	TE: 101915	3 S	AMPLE	TIME: 124		TE: 10/9/13
PURGE METHOD:	✓ PUMP  □ BAILER	PERISTALTIC I	PUMP	PH: ORP:		U CONDUCTI	VITY: <u>\                                   </u>	
DEPTH TO WAT	ER: 14,20	T/ PVC		TURBI		NTU		
DEPTH TO BOT	гом: <u>16-3</u> 2	T/ PVC		) NO			ODERATE	☐ VERY
WELL VOLUME:	NA	LITERS	GALLONS	TEMPE			THER:	
VOLUME REMO		LITERS	GALLONS	COLO	R: UCC			010
COLOR: _	( Voue	ky OD	OR: <u>1014</u>	FILTRA	TE (0.45 um)	YES F	<u></u>	
		BIDITY			TE COLOR:		LTRATE ODC	R:
	SLIGHT	MODERATE	VERY	_		/MSD	DUP-	
DISPOSAL METI	HOD:[✓] GROU	ND   DRUM	OTHER	COMM	IENTS:			
TIME PUR	I PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
(ML/I		(umhos/cm)	(mV) .	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
1990 30	716	570	-1912	9.5	16	15.6	14.20	INITIAL
1225	7.00	1136	-1130	10	10	153	(4)3	١
1930	7.00	1150	-110.8	.070	40	15.6	1423	يُ
1235	7.00	1147	1146	040	40	15.5	1403	3
1240	7.00	(151	7	<b>0</b> 50	3. T	156	1423	4
1245	7.00	1150		050	3.	13-5	1403	٢
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Parket California			and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t					
NOTE: S pH: +/- 0.1	TABILIZATION COND.: +/-		ETE WHEN 3 SU	JCCESSIV D.: +/- 0.3				S LIMITS: TEMP.: +/-
BOTTLES FILLE	ED PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E - HCI	L F-
NUMBER SIZ		PRESERVATIV				1	RESERVATI	
1 25		A	□ Y tt I	<del>-</del>				YN
13	<del> </del>	H		N				□ Y □ N
1 12		B	□ Y ∰					□ Y □ N
àli	Pi	3	□ Y 🗗 I	<del></del>				Y
								□ Y □ N
SHIPPING METH	OD: Drop	OFF DA	TE SHIPPED:	60-10·	-23	AIRBILL NU	MBER:	
COC NUMBER:					eg	DATE SIGNE	======================================	11/12
		1	·		~		- l	<del>,, 67 / 7</del>

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PROJECT NAME:	CEC \	Weadock LF: 2	:023 GW C	PR	EPARED		CHEC	KED
PROJECT NUMBE	R: 51440	3.000.0000	BY:	: 11	DATE: (C	(6)3 BY: A	W	DATE: 10 -27-2
SAMPLE ID:	e-Mu	18005	WELL DIA	METER: 🗸	2"	6" OTHER		
WELL MATERIAL:	✓ PVC	ss 🗌		LVANIZED S	STEEL	OTHER	!	
SAMPLE TYPE:	☑ GW	□ww □	SW DI		LEACHATE	OTHER		
PURGING	TIME: 1	309 0	ATE Wab=		AMPLE	TIME: 133	, <del>(</del> )	ATE: WOLG 1/3
PURGE METHOD:	] PUMP ] BAILER	PERISTALTIC	PUMP			U CONDUCTI	VITY: 114 -76 mg	
DEPTH TO WATER:	9,18	T/ PVC		TURBI	DITY: <u>ליל</u>	NTU		
DEPTH TO BOTTOM	1: <u>[[</u> 206	T/ PVC		<u>∏</u> NO	NE SLI	GHT M	DDERATE	☐ VERY
WELL VOLUME:	· NA	LITERS	GALLONS	TEMPE	RATURE: LY		HER:	
VOLUME REMOVED		LITERS	GALLONS	COLO	R: C 10 48	)OI	OOR:	1010
COLOR:	rang.	<u> </u>	OOR: <b>no 1</b> 0	_ FILTRA	NTE (0.45 um)	YES 🔄	NO NO	
		BIDITY	, , , , , , , , , , , , , , , , , , ,	FILTRA	TE COLOR:	FI	LTRATE ODG	DR:
☐ NONE ☐ SI	івнт 🛱	-MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP-	
DISPOSAL METHO	):☑ GROU	ND DRUM	OTHER	COMM	IENTS:			
TIME PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
1309 100	7.03	597	-42.5	8.7	50°	14.3	912	INITIAL
1314	690	1174	-24.6	1.1	15	(4.)	10.0	4.3
1319	6.90	1145	-20.9	080	9.5	13.9	10.00	į.
1324	690	1149	-218	070	8.0	14.6	10/2	7.8
1329	6.90	1149	.21.8	020	7.5	145	1075	Á
1334	6.40	1144	-21.5	0.70		14.5	1100	77
1321	Q. W			<b>Q.</b>	/	1 (*		
-	-							2 3 3 4 6 7
							T Agents	
						RE WITHIN THE		
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORP:	+/- <b>10</b> D	0.O.: +/- <b>0.3</b>	TURB: +/-	10 % or =</td <td>= 10</td> <td>TEMP.: +/-</td>	= 10	TEMP.: +/-
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E-HC	L F
NUMBER SIZE	TYPE	PRESERVATI	VE FILTERE	D NUMB	ER SIZE	TYPE P	RESERVATI	VE FILTERED
1 250	171	A	Y	N	a y			□ Y □ N
1/1/	19	A	□ v Đ	N	1			□ Y □ N
161	15)	В		N				□Y □N
2 16	PI	B		- N	And the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of the case of th			□ Y □ N
	•		Y	N	or complete state of			□Y □N
SHIPPING METHOD	Drop	off D	ATE SHIPPED:	10-10	-23	AIRBILL NUI	MBER:	
COC NUMBER:			GNATURE:			DATE SIGNI	D: / C	110/3
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PROJECT NAME: CEC Weadock LF: 2023 GW C						PREPARED				CHECKED			
PROJECT NUMBER: 514403.0000.0000 BY: JJ DATE; CLICA) BY: AW DATE: 6-27-2													
SAMPLE ID: 100- 57 ROUT WELL DIAMETER: 2" 4" 6" OTHER													
WELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER													
SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER													
100										TE: 106(153			
METHOD: BAILER ORP: 59.\ mv DO: O.GO mg/L													
DEPTH TO	WATER:	6.35	T/ PVC		TURBIDITY: W NTU								
DEFINITO BOTTOM: 2000 TO TO TO TO TO TO TO TO TO TO TO TO TO										☐ VERY			
WELL VOL	.UME:	NA	LITERS	GALLO	TEMPE	RATURE: 1	43 ·	с оті	HER:				
VOLUME	REMOVED:		LITERS	GALLO	COLO	R: <u>Cla</u>	$\mathcal{L}$	OD	OR: 🔟	<u> </u>			
COLOR: ODOR: ODOR: ODOR: FILTRATE (0.45 um) YES									Z <sub>1</sub>	<b>₹</b> NO			
			) BIDITY		FILTRATE COLOR: FILTRATE ODOR:								
NONE	<b>∄</b> s⊔		MODERATE	VEF	QC SAMPLE: MS/MSD DUP-								
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:													
TIME	PURGE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPE	RATURE	WATER LEVEL	CUMÚLĄTĮVE PURGE VOLUME		
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	(°	C)	(FEET)	(GAL OR L)		
1404	(00)	7.37	712	260	C	4.0	21	15.	6	8.2	INITIAL		
1409		7.00	1089	39,5		ルン	٤.	13.	9	905	. 1		
1414		698	1085	59.0		990	4.5	14.	<u>)</u>	995	(		
1419		1098	1078	59.5	- (	70	4.0	14		11.00	1.6		
1424		6.99	1068	595		160	4.0	14		1195	)		
11.00		7.7.							***************************************		3.1		
									····				
								! 					
pH: +/-		COND.: +/-	TEST IS COMPL 3 % ORP:	+/- 10		+/- 0.3			or =</td <td></td> <td>TEMP:: +/-</td>		TEMP:: +/-		
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - N	laOH	E-HC	L F		
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	RED	NUMB	ER SIZE	TYPE	PF	RESERVATI	VE FILTERED		
	250	Pl	A	ΠY	N P						□ Y □ N		
	192	PI	A		J N						☐ Y ☐ N		
( 125 P1 B □Y #N					A COMMISSION OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF	1				□ Y □ N			
2 L PI B DY DN								□ Y □ N					
SHIPPING	METHOD:	Prop	o <b>€</b> \$ DA	TE SHIPPE	.D:	0-1	0-23	AIRB	ILL NUM	IBER:			
COC NUM				GNATURE:			$\gamma$	DATI	E SIGNE	D: 10/1	6/53		
						/	1		~	$\tau$			

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PROJECT NAME: CEC Weadock LF: 2023 GW C					PREPARED				CHECKED			
PROJECT NUMBER: 514403.0000.0000						IJ	DATECLO	107	BY: AW		DATE: 10-27-23	
SAMPLE ID: \CW -WCLBOOL WELL DIAMETER: 2"   4"   6"   OTHER												
WELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER												
SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER												
PUR	GING	TIME: ( 5	560	DATEIOGE	ر <del>د</del> و					TE(C/C/)3		
	METHOD: DRP: 79 mV DO: O.C mg/L											
<b>L</b>	O WATER		T/ PVC			TURBIDITY: 40 NTU						
DEPTH TO	о воттом:	<u> 7760</u>	T/ PVC			NONE SLIGHT MODERATE VERY						
WELL VOL	UME:	NA NA	LITERS	GALLO		TEMPE	TEMPERATURE:					
VOLUME	REMOVED:		LITERS	GALLO		COLOR: COLOR: NON						
COLOR:	COLOR: COLOR: ODOR: SLIGHT FILTRATE (0.45 um) YES TONO											
			BIDITY			FILTRAT	TE COLOR:			RATE ODC		
NONE	<b>∏</b> SLI	GHT 🔲	MODERATE	☐ VEI	RY	QC SA	MPLE: MS	/MSD	<u> </u>	ĐUP- 🛱	<u> 2}                                   </u>	
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:												
TIME	PURGE RATE	PH	CONDUCTIVI	ry ORP		D.O.	TURBIDITY	TEMPE	RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)		°C)	(FEET)	(GAL OR L)	
154	200	724	1017	< 107.0	) c	7.6	14.5	13	(c)	1322	INITIAL	
1567		705	985	-91	ר 📗	.3	5.0	13	. <	1306		
1510		6.99	978	-78	<i></i>	380	4.0	1).	4	1340	2	
1515		6.99	967	- 79.		v	40		.4	1340	3	
1570		6.99	945	= 79.	S Ó	40	4.0	り	.3	1346	4	
						1						
				4								
						1					1	
						and the second						
					1	Ì						
							E READINGS A					
pH: +/-	0.1	COND.: +/-	3 % OR	P: +/- <b>10</b>	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-	
BOTTLES	S FILLED	PRESERV	ATIVE CODE	S A - NONE	В-	HNO3	C - H2SO4	D-	NaOH	E - HC	L F	
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILT	ERED	NUMBE	ER SIZE	TYP	E PRI	ESERVATI	VE FILTERED	
2	DSU	7	A		ДN				ar comment		☐Y ☐N	
3	761	71	A		ΦN						□Y □N	
3	761	Di	B		n 🗇				The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		□Y □N	
ŭ	iL	171	B	<del></del>	ľΝ						□Y □N	
SHIPPING	METHOD:	AOD	off	DATE SHIPPE		10-1	0-23	AIRI	BILL NUME	BER:	_	
COC NUM				SIGNATURE:				DAT	TE SIGNED	1//1/	0/173	
						1			***	1	7)//	

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PROJECT NAME: CEC Weadock LF: 2023 GW C						PR	EPARED		CHECKED			
PROJECT	Г NUMBEF	R: 51440	3.0000.0000		BY:	IJ	JJ DATE: Cliding BY: AW			DATE: 10-27-23		
SAMPLE ID: MW- 59 WELL DIAMETER: 2" 4" 6" OTHER												
WELL MATERIAL:         ☑ PVC         ☐ SS         ☐ IRON         ☐ GALVANIZED STEEL         ☐ OTHER           SAMPLE TYPE:         ☑ GW         ☐ WW         ☐ SW         ☐ DI         ☐ LEACHATE         ☐ OTHER												
PUR	GING	TIME: 15		ATE: 1019	133	SAMPLE TIME: (6 ( DA				ATE: 10(9/52		
METHOD: BAILER ORP:-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\												
	O WATER:		T/ PVC	-		TURBI	·	DTN				
DEPTH TO	о воттом:	18.36	T/ PVC	•		NONE SLIGHT MODERATE VERY						
WELL VOL	.UME:	NA	LITERS	GALLO	NS	TEMPE						
VOLUME	REMOVED:	<u>u</u>	LITERS	GALLO		COLO	one_					
COLOR:ODOR: FILTRATE (0.45 um) YES NO												
TURBIDITY FILTRATE COLOR: FILTRATE OD									DR:			
THONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP-												
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:												
TIME	TIME PURGE RATE		CONDUCTIVITY	Y ORP		D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME		
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)		
1515	200	200 7.29 1836 -106.C		5 (	હેલ 10		15.C	561	INITIAL			
( leice		695	1937	-100.	i	is (	4.0	14.8	568	ţ		
(405		(,99	1929	-110.5	- (	280	3. €	149	465	2		
1610		6.99	1900	_111.0		7/	3.5	150	(4)	3		
KeIT		700	1897	-111.3	3	45	30	150	561	4		
		7							Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of th	Ϋ́		
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		LIZATION	FEST 10 00MD	ETE MAISE	12.0110	OFCCIV	E DEADINGS A	DE MITUNITUE	FOLL OWARN	C.LIMITE.		
pH: +/-			3% ORP			+/- 0.3		ARE WITHIN THE 10 % or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-		
BOTTLE	SFILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - NaOH	E - HC	L F		
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTI	ERED	NUMB	ER SIZE	TYPE PF	RESERVATI	VE FILTERED		
1 25 PI A DY IN DY IN												
1 125 P1 A ロY 田N ロY ロN												
į	704	PI	B	□ Y	Ø,v							
JIU PI B □Y 母N □Y□									□ Y □ N			
SHIPPING	METHOD:	Drop	off D	ATE SHIPPE	D: <u>1</u> 4	>-10	-23	AIRBILL NUM	IBER:			
COC NUM	BER:		- s	GNATURE:				DATE SIGNE	D: ]	0/1/12		
									· · · · · ·	<del>-                                    </del>		

<b>&lt;&gt;</b>	TRC

### **WATER SAMPLE LOG**

PROJEC <sup>-</sup>	ΓNAME:	CEC	Neadock Ll	=: 2023 GW C		PRE	EPARED		CHE	CKED
PROJEC <sup>-</sup>	Γ NUMBE	R: 51440	3.0000.000	0	BY:	IJ	DATE	idy y BY:	AW	DATE: 10-27-23
SAMPLE	ID: E	3 AC		WELL I	DIAMET	ΓER: 🗸	2"	] 6" ☐ OTHE	R	
WELL MAT	ERIAL:	✓ PVC	ss	☐ IRON ☐	GALVA	NIZED S	TEEL	OTHE	R	
SAMPLE T	YPE:	☑ GW	□ww	□ sw □	DI	I	LEACHATE	ОТНЕ	R	
PUR	GING	TIME:		DATE:			AMPLE	TIME: 143		PATE: 101913
PURGE METHOI		PUMP BAILER	PERISTALT	TIC PUMP		PH: 1	. (1)		TIVITY: <u>//</u> m	g/L umhos/cm
DEPTH TO	WATER:	<del></del>	_T/ PVC			TURBIC	ыту: <u>"<b>Д/</b>/</u>	NTU		
DEPTH TO	воттрм	1:	T/ PVC			NOM-			MODERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	☐ GALLO	NS	TEMPER		<del>. ,                                     </del>	OTHER: _	
VOLUME	REMOVED	:	LITERS	GALLO	NS	COLOR	: Clea		£	nor
COLOR:				ODOR:		FILTRAT	ΓΕ (0.45 um)	YES 1	∬ NO	
			BIDITY			FILTRAT	E COLOR:		FILTRATE OD	OR:
NONE		IGHT 🗌	MODERATE	VEF	RY	QC SAN	MPLE: MS	MSD [	DUP-	
DISPOSAL	METHOD	: GROU	ND DRI	JM OTHER		COMME	ENTS:			
TIME	PURGE RATE (MIL/MIN)	PH (SU)	CONDUCTIV			D.O. mg/L)	TURBIDITY (NTU)	TEMPERATUR	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
	(**************************************	(30)		, ()			()	( )	( == 1)	INITIAL
			The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa				_/			
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NC pH: +/-		ILIZATION T		MPLETE WHEN		CESSIVE +/- 0.3	READINGS A		E FOLLOWIN	IG LIMITS: TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODE	S A-NONE	В-	HNO3	C - H2SO4	D - NaOH	E - H0	CL F
NUMBER	SIZE	TYPE	PRESERVA	ATIVE FILTE	RED	NUMBE	R SIZE	TYPE	PRESERVAT	
(	シャ	71	A	Y	<b>∄</b> N					□Y □N
ĺ	125	171	В		d N					□Y □N
3	1L	PI	Po	□ Y	ΔN					□ Y □ N
					N	-				□Y □N
				Y	N					□Y □N
SHIPPING	METHOD:	Drop	ott	DATE SHIPPE	D: <b>1</b>	  O- O∙	-22	AIRBILL N	JMBER:	- ;
COC NUME	BER:			SIGNATURE:				DATE SIGN	NED:	10/10/2
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### **WATER SAMPLE LOG**

PROJEC <sup>*</sup>	T NAME:	CEC '	Weadock LF: 2	2023 GW C		PRE	PARED		CHEC	CKED
PROJEC	T NUMBE	R: 51440	03.0000.0000	ВУ	<b>/</b> :	JJ	DATEIN	01)3 BY:	AW	DATE: 10-27-23
SAMPLE	ID: F	B#0	21	WELL DIA	METER	· 🗸 2	"	] 6" 🔲 ОТН	ER	
WELL MA	TERIAL:	☑ PVC	ss 🗆	IRON G	ALVANIZ	ED ST	EEL	□ отн	ER	
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗌 DI		re	EACHATE	□ отн	ER	
PUR	GING	TIME:	D	ATE:		SA	MPLE	TIME: (62	, ī	ATGC19 13
PURGE METHOI		PUMP BAILER /	PERISTALTIC	PUMP	PI	d: <u>∠</u> RP: <u>r</u>	/ · A	ONDUC	111	/ // umhos/cm
DEPTH 7	WATER:		_ T PVC		Τι	JRBIDI	TY: N	NTU		
DEPT# TO	о воттом:	: / F	T/ PVC			NONE	⊑ ∐.sĻi	 gнт 🔲	MODERATE	☐ VERY
WELL VOL	.UME:	/ NA	LITERS	GALLONS	TE	MPER	ATURE	A .c	OTHER:	
VOLUME	REMOVED:	1	LITERS	GALLONS	<del></del>	DLOR:	<del></del>	2	ODOR:	not
COLOR:		J	OD	OR: _	FIL	TRATE	= (0.45 um)	YES	MO -	
		TUR	RBIDITY				COLOR:		FILTRATE OD	OR:
NONE	SLI	GHT 🔲	MODERATE	☐ VERY	<b>—</b>	SAMI		/MSD	DUP-	OIV.
DISPOSAL	METHOD:	☑ GROU	ND DRUM	OTHER	C	MME	NTS:		<del>-</del>	
TIME	PURGE	PH	CONDUCTIVITY	ORP	D.C	T .		TEMPERATU	WATER	CUMULATIVE
1 1141	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)			TURBIDITY		LEVEL	PURGE VOLUME
	(IAIDIAIIA)	(30)	(utrinos/cm)	(1114)	( mg/	L) <u> </u>	(NTU)	(°C)	(FEET)	(GAL OR L) INITIAL
					1					HAITIVE
					1					
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	and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th					_				
					1	-		<del> </del>	į	
pH: +/-		COND.: +/-	TEST IS COMPL 3 % ORP:		O.O.: +/-		TURB: +/-			G LIMITS: TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	B - HN	Э3	C - H2SO4	D - NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	/E FILTERE	D NU	MBER	SIZE	TYPE	PRESERVATI	VE FILTERED
	171	01	A		N		American Property of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of	o respective		☐Y ☐N
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SHIPPING I	METHOD:	Dro SS	P-OFF DA	TE SHIPPED:	10-	10-	2۲	AIRBILL N	UMBER:	
COC NUME				SNATURE:			<u> </u>	DATE SIGI	NED: 10	10/12
					$\overline{}$		-	1		<del>/                                    </del>

TAC	Wedock LE	TER SA	AMPLE LO	G		
	Karn BAP/LI: 2023 GI	N C	PREPARED			CHECKED
PROJECT NUMBER: 514	40 <b>3</b> 00@0000	BY: (A	W, JK, JJ DATE:	14/23	BY: 5K	DATE 10-71-23
SAMPLE ID: L 4-103	R W	ELL DIAMET	ER: 🗸 2" 🗌 4"	6"	OTHER	
WELL MATERIAL: V PVC		GALVA	NIZED STEEL		OTHER	
SAMPLE TYPE:	□ww □sw	□ DI	LEACHATE		OTHER	
PURGING TIME:	1307 DATELO	14/23	SAMPLE	TIME:	1332	DATE: 10/4/23
PURGE PUMP	PERISTALTIC PUMP		PH: 7.04		ONDUCTIVITY:	31/3.5 umhos/cm
METHOD: BAILER	-		ORP: -167.6	mV DO		mg/L
DEPTH TO WATER: 1980	T/ PVC			€ <mark>}</mark> NT	_	
DEPTH TO BOTTOM: NA	T/ PVC			SLIGHT	MODER	ATE VERY
WELL VOLUME: NA		ALLONS	TEMPERATURE: 1		°C OTHER:	
VOLUME REMOVED: 3.0	LITERS GA	ALLONS	COLOR: LIE	<u>cov</u>	ODOR:	Non-e
COLOR: <u>LIEGS</u>	ODOR:^_ <b>_</b>	vone_	FILTRATE (0.45 um	)   YE	s 💢 NO	
	JRBIDITY		FILTRATE COLOR:			TE ODOR:
NONE TY SLIGHT	MODERATE	VERY	QC SAMPLE:			P- L H-1932DUA
DISPOSAL METHOD: GRO	UND DRUM 01	THER	COMMENTS: F	3-07	. 巨豆.	-02 1415
TIME PURGE PH	CONDUCTIVITY	DRP	D.O. TURBIDIT	TEMP		ATER CUMULATIVE EVEL PURGE VOLUME
(ML/MIN) (SU)			mg/L) (NTU)		. ,	EET) (GAL OR L)
1307 200 7.0	3050.3 -13	22.5 1.	75 23.41	16		9-80 INITIAL
1312 1007,03	3130.1 -14	Z,5).	69 3.55	1-	7.82 2	2,50 1,0
1317 7.03	3130.8 -1	49.01.	69 2.50	17	.87	1.5
1322 7.04	13110.3 -4	04 1	62 1.25	רו !	65	e.o
1327 / 7.0	13123.2 -16	3,2 1.	65 0.48	1	65	2.5
1332 7.09		- )	60 0.68		47	3.0
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NOTE: STABILIZATION	N TEST IS COMPLETE W	HEN 3 SUC	CESSIVE READING	S ARE WIT	THIN THE FOLI	LOWING LIMITS:
pH: +/- <b>0.1</b> COND.: +	/- 3 % ORP: +/- 10	D.O.:	+/- <b>0.3</b> TURB: -	-/- 10 %	or = 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLED PRESER	VATIVE CODES A - NO	ONE B-	HNO3 C - H2S	04 D -	NaOH	E-HCL F-
NUMBER SIZE TYPE	PRESERVATIVE I	FILTERED	NUMBER SIZE	TYF	<u> </u>	RVATIVE FILTERED
4 250 Glas	E	Y <b>X</b> N		4	<b> </b>	□Y □N
2 60 VOA	4 -	Y 😿 N		1		□ Y □ N
1 250 Dlast		YN				□ Y □ N
1 125	4	Y 😥 N				N
1 125	<u>`</u> 8 □	YZN				□ Y □ N
	p of C DATE SH	IPPED:	017/23	AIR	BILL NUMBER	: · —
COC NUMBER:	SIGNATU		AW	DA <sup>-</sup>	TE SIGNED:	10/11/23

**Eurofins Cleveland** 

80 S. Van Buren Avenue

**Chain of Custody Record** MINITURAL 190 o

eurofins | Environment Testing

76 23 of O - AsNaO2
P. Na2O45
Q. Na2SO3
R. Na2SSO3
S. H2SO4
T. TSP Dodecabydrate
U. Acetone
W. pH 4-5
Y. Ticma
Z. other (specify) Sompany Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon Special Instructions/QC Requirements: COC No: 240-112528-29048.1 reservation Codes: Page: Page 1 of 2 I - Ice J - D! Water K - EDTA L - EDA Method of Shipment: arrier Tracking No(s) State of Origin: **Analysis Requested** Cooler Temperature(s) °C and Other Remarks: Kris.Brooks@et.eurofinsus.com Received by: <u>ک</u> ۲ Lab PM: Brooks, Kris M E-Mall: ナる Company Water Water Water Water Water Water Water Water Water Matrix Water Water Sompany Radiological 3316 Type (C=comp, G=grab) 9 0 C **O** 55 1246 94 اورا Sample Time asio) <u>3</u> Of Di 7011 50,000 **15**な (334 = Date: Poison B Unknown Project #: Eurofins 24024154 SSOW#: TAT Requested (days): Due Date Requested: A Dive 10/R/53 Sample Date 10/4/27 10 64153 1dab3 0(93 10/4/53 (दिविधित्र 10963 びをい Jate/Time: Po#: 199810 Skin Irritant Deliverable Requested: I, II, III, IV, Other (specify) Barberton, OH 44203 Phone (330) 497-9396 Phone (330) 497-0772 Custody Seals Intact: Custody Seal No.:
△ Yes △ No <sup>hone;</sup> 734-971-7080(Tel) 734-971-9022(Fax) Flammable Possible Hazard Identification Karn/Weadock CCR JCW Lanfill RC Environmental Corporation. JKrenz@trccompanies.com Empty Kit Relinquished by: 540 Eisenhower Place Client Information Sample Identification Non-Hazard State, Zip: MI, 48108-7080 JCW-MW-18004 JCW-MW-18005 ICW-MW-18006 JCW-MW-18001 acob Krenz Ann Arbor MW-54R MW-53R MW-50 MW-52 MW-53 MW-55 MW-51

Ver: 01/16/2019

MICHIGAN 190

**Eurofins Cleveland** 

180 S. Van Buren Avenue

Barberton, OH 44203

Phone (330) 497-9396 Phone (330) 497-0772

**Chain of Custody Record** 

eurofins | Environment Testing

37<del>340f 44</del> O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2SO3
S - H2SO4
I - TSP Dodecahydrate
U - Acetone Ver: 01/16/2019 Special Instructions/Note: other (specify) V - MCAA W - pH 4-5 Y - Trizma Months Company Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Q Disposal By Lab Archive For Mon
Special Instructions/QC Requirements: COC No: 240-112528-29048.2 Page: Page 2 of 2 Preservation Codes C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA 4 N Total Number of containers Date/Time: Method of Shipment arrier Tracking No(s) State of Origin: **Analysis Requested** Cooler Temperature(s) °C and Other Remarks: Lab PM:
Brooks, Kris M
E-Mall:
Kris. Brooks@et eurofinsus.com Received by: <u>し</u> る Preservation Code: (W=water, S=solid, O=waste/oil, Water Water Matrix Water Water 3 Sompany Radiological Sample Type (C=comp, G=grab) 3766 SACIO JASS 3 ر Sample Time *ነ*ላየ ኮነ tolal23 1015 い、スペッと Date: Unknown TAT Requested (days): Due Date Requested: Eurofins Project #: 24024154 SSOW#: Sample Date IO((C)() Sate/Time: 10/4/32 10/9/23 10/4/52 12962 Date/Time: Po#: 199810 Poison B Skin Irritant Olon-Hazard Flammable Skin Irrit
Deliverable Requested: I, III, IV, Other (specify) Custody Seals Intact: | Custody Seal No.: Phone: 734-971-7080(Tel) 734-971-9022(Fax) Kam/Weadock CCR JCW Lanfill Possible Hazard Identification TRC Environmental Corporation. JKrenz@trccompanies.com Empty Kit Relinquished by: 1540 Eisenhower Place Client Information Sample Identification 10 to to State, Zip: MI, 48108-7080 OW-57ROUT Relinquished by: elinquished by: elinquished by: acob Krenz Ann Arbor MW-58 DUP-01 EB-01

# CHAIN OF CUSTODY

QA REQUIREMENT: ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO REMARKS  $_{\text{of}}$ ☐ ISO 17025 □ OTHER □ NPDES INI ⊠ Page ANAL YSIS REQUESTED (Attach List if More Space is Needed) CONSUMERS ENERGY COMPANY - LABORATORY SERVICES Alkalinity × LDS × × × × × × × × **snoinA** × × × × × × × × × × × Total Metals × × × × × × × × × × × 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 Other PRESERVATIVE MeOH CONTAINERS HCI NaOH REQUESTER: Harold Register <sup>†</sup>OS<sup>t</sup>H HMO³ -2 1 \_ уоле 4 7 7 7 ~ 7 7 7 7 7 7 # TVLOT ☐ STANDARD ☒ OTHER SAP CC or WO#: FIELD SAMPLE ID / LOCATION phone: A = Air WP = Wipe WT = General Waste OX = Other SL = Sludge TURNAROUND TIME REQUIRED: ☐ 48 HR ☐ 3 DAYS MATRIX CODES:

GW = Groundwater

WW = Wastewater

W = Water / Aqueous Liquid

S = Soil / General Solid

O = Oil 23-0934 JCW-MW-18004 JCW-MW-18005 ICW-MW-18001 JCW-MW-18006 OW-57ROUT PROJECT NUMBER: MW-53R MW-54R MW-50 MW-52 MW-53 MW-55 MW-51 □ 24 HR email: ĞΜ ĞΨ Ğ% GΨ ß₩ Ğ₩ Ğ₩ ß₩ Ğ₩ ß₩ ß₩ Ğ₩ MATRIX Chall 6738 77.7 1334 50 ocho Edalos TIME 35 SAMPLE COLLECTION 150 <u>ک</u> ジジ Harold Register Q4-2023 Weadock Porewater Wells Joseph Firlit らなられ 10(9b3 <u>िब्रि</u>डिन्टे لاكاهمانا Count on Us® DATE [0]q[33 10/96/52 5 国なわか 10/9/32 696/01 SAMPLING SITE / CUSTOMER: Consumers Energy TRC SEND REPORT TO: SAMPLING TEAM: -02 -03 -05 -10 SAMPLE ID 23-0934-01 -04 90--07 -08 69 -1 -12 COPY TO:

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## CHAIN OF CUSTODY

Count on Us® Consumers Energy

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES 135 WEST TRAIL ST., JACKSON, MI 49201 · (517) 788-1251

Page 2 of 2

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# CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

Consumers Energy

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### **Eurofins Cleveland**

80 S. Van Buren Avenue Barberton, OH 44203

Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

Environment Testing

eurofins eurofins

P - Na2045 Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetane O - AsNaO2 V - MCAA W - pH 4-5 Preservation Codes H - Ascorbic Acid COC No: 240-174889.1 240-193059-1 A - HCL
B - NaOH
C - Zn Acetale
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor Page: Page 1 of 1 I - Ice J - DI Water K - EDTA Carrier Tracking No(s) State of Origin: Michigan **Analysis Requested** Lab PM: Brooks, Kris M E-Malt: Kris.Brooks@et.eurofinsus.com Accreditations Required (See note): Sep\_STD Standard Target List FAT Requested (days): Due Date Requested: 11/6/2023 Project #: 24024154 Phone: # OM Client Information (Sub Contract Lab) Project Name: Karn/Weadock CCR Groundwater Monitoring 314-298-8566(Tel) 314-298-8757(Fax) FestAmerica Laboratories, Inc. ddress: 13715 Rider Trail North, Shipping/Receiving State, Zip: MO, 63045 Earth City

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Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC 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 Isleed above for analysis/lests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC altertion immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC altertion for the compliance to Eurofins Environment Testing North Central, LLC altertion for the compliance to Eurofins Environment Testing North Central, LLC altertion for the compliance to Eurofins Environment Testing North Central, LLC altertion for the compliance to Eurofins Environment Testing North Central, LLC altertion for the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the complex of the co Possible Hazard Identification

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### QA REQUIREMENT: ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO REMARKS ☐ ISO 17025 Cal, Due Date: N/A 4)7 □ OTHER □ NPDES INI ⊠ M&TE#: ANALYSIS REQUESTED (Attach List if More Space is Needed) Received on Ice? | Yes IN No ပွ CONSUMERS ENERGY COMPANY – LABORATORY SERVICES Temperature: N(R COMMENTS: Low Leyel Mercury × × × × × × × × × 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 Other CHAIN OF CUSTODY PRESERVATIVE MeOH CONTAINERS HCI HOBN REQUESTER: Harold Register <sup>t</sup>OS<sup>z</sup>H FONH None # TVLOT ☐ STANDARD ☒ OTHER SAP CC or WO#: 23-0941-Page 18-of-20 RECEIVED BY: RECEIVED BY: FIELD SAMPLE ID / LOCATION phone: A = Air WP = Wipe WT = General Waste OX = Other \_\_ SL = Sludge TURNAROUND TIME REQUIRED □ 24 HR □ 48 HR □ 3 DAYS W = Water / Aqueous Liquid S = Soil / General Solid O = Oil 23-0941 GW = Groundwater WW = Wastewater LH-103R MSD PROJECT NUMBER: LH-103R Dup 05.6-2-27/0730 LH-103R MS LH-104 Dup LH-103R MATRIX CODES: LH-104 EB-02 FB-02 TB-02 email: DATE/I'IME: DATE/!'IME: ĕ ĕ βM Ğ Ø Ø **MATRIX** ≥ ≥ ≥ 323 17 15 TIME 332 SAMPLE COLLECTION 2 333 SAMPLING TEAM: A. LIBOLE, T. 50555 Harold Register Q4-2023 Weadock Leachate Wells Joseph Firlit 10 14/B DATE SAMPLING SITE / CUSTOMER: Consumers Energy TRC SEND REPORT TO: RELINQUISHED BY: RELINQVISHED BY: LAB SAMPLE 1D 23-0941-01 -02 Ö **.**04 -05 90--07 80 60 COPY TO:



### Appendix G Alternate Source Demonstration Supporting Information



A CMS Energy Company

Date: January 30, 2024

To: Operating Record

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

RE: Alternate Source Demonstration Professional Engineer Certification, §257.94(e)2

JC Weadock Landfill CCR Unit

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

I hereby certify that the alternative source demonstration presented within this Fourth Quarter 2023 Hydrogeological Monitoring Report for the JC Weadock Landfill CCR unit has been prepared to meet the requirements of Title 40 CFR §257.94(e)2 of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.94(e)2.

Signature Signature

January 30, 2024

Date of Certification

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

Name

6201056266

Professional Engineer Certification Number

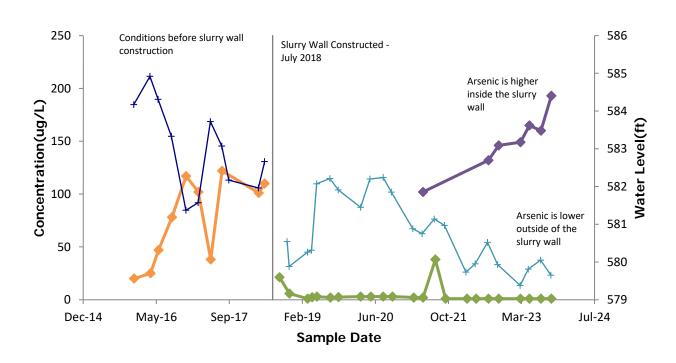


### References

TRC (January 2024). <u>2023 Semiannual Groundwater Monitoring Report/Fourth Quarter 2023</u> <u>Hydrogeological Monitoring Report, JC Weadock Landfill Solid Waste Disposal Area,</u> <u>Essexville, Michigan</u>

Figure G1: Time Series Plots for JCW-MW-18001 ASD





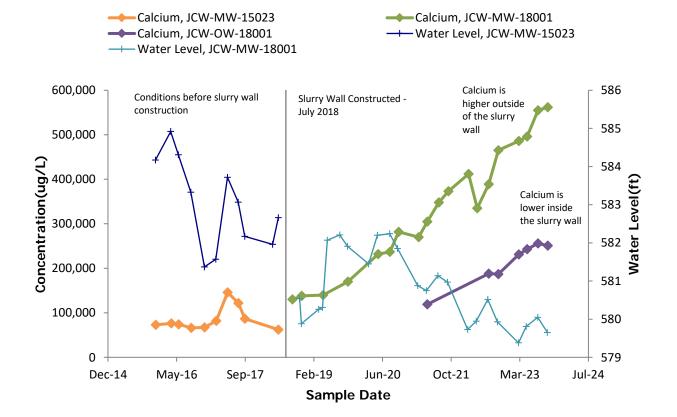
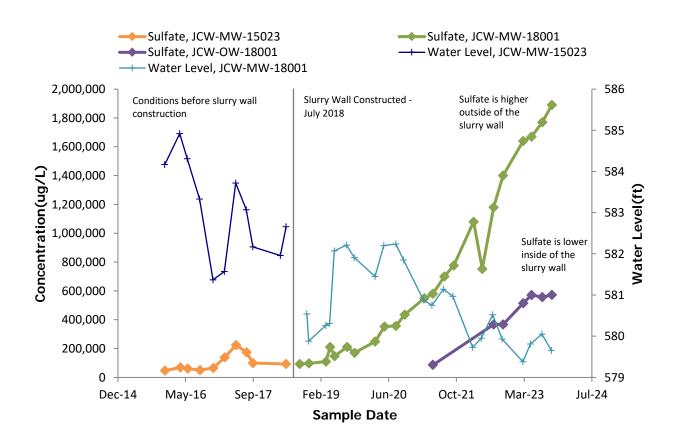


Figure G1: Time Series Plots for JCW-MW-18001 ASD



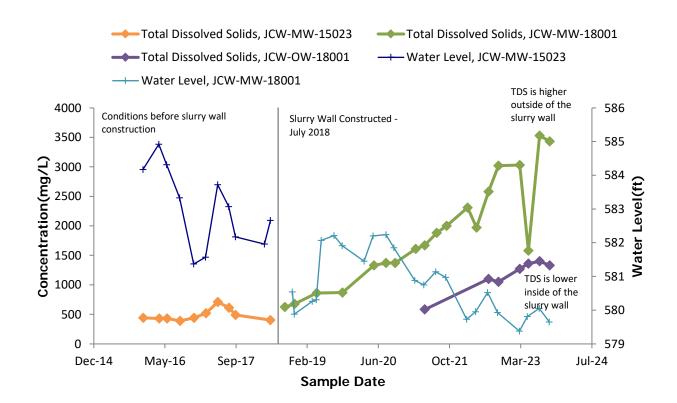


Figure G1: Time Series Plots for JCW-MW-18001 ASD

Oxidation Reduction Potential, Field, JCW-MW-15023
Oxidation Reduction Potential, Field, JCW-MW-18001
Oxidation Reduction Potential, Field, JCW-OW-18001

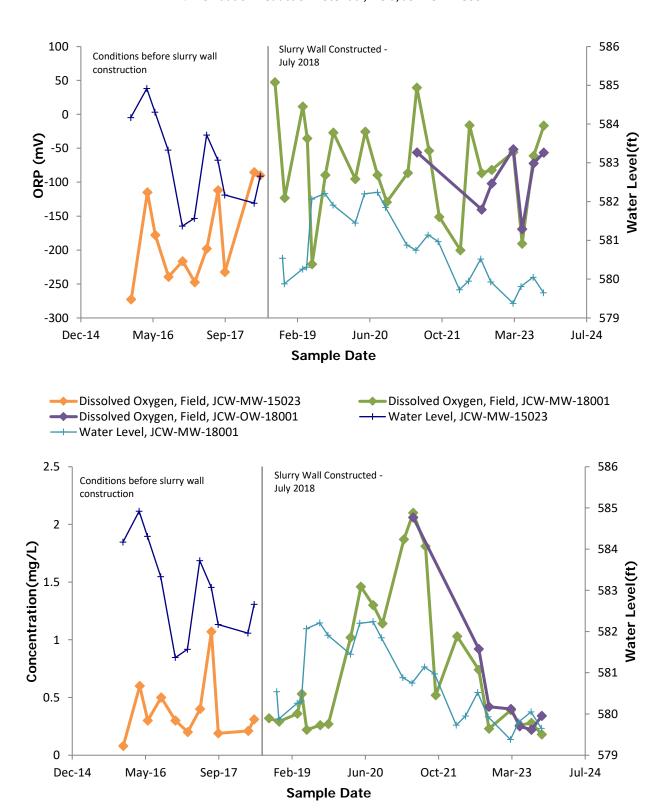
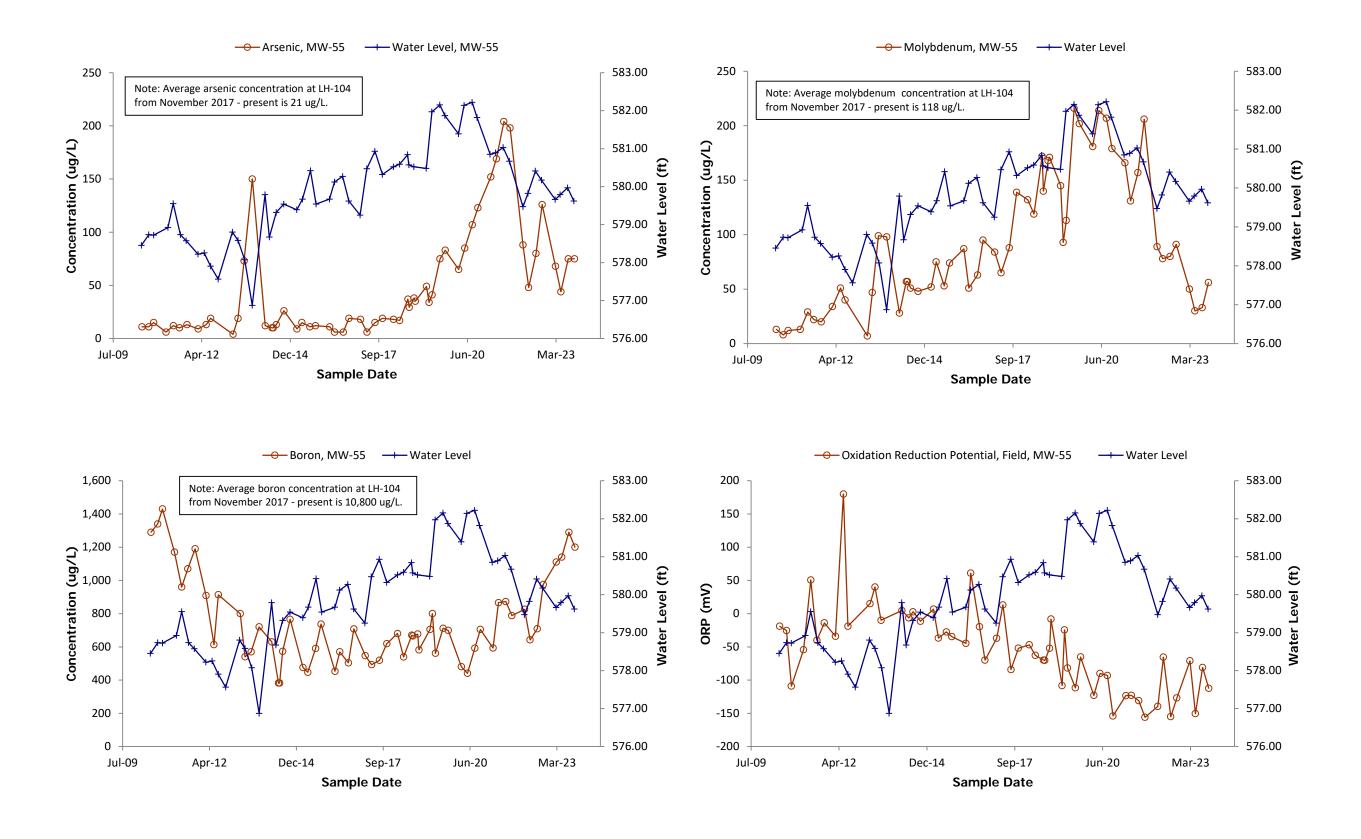


Figure G2: Time Series Plots for MW-55 ASD





**Date:** January 29, 2024

**To:** J.R. Register, Consumers Energy

From: Darby Litz, TRC

Kristin Lowery, TRC

**Project No.:** 514403.0000.0000 Phase 2 Task 2, 514403.0001.0000 Phase 2 Task 2

**Subject:** Second Semiannual 2023 Nature and Extent Data Summary, JC Weadock,

Consumers Energy, Essexville, Michigan

### Introduction

In response to the United States Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) Coal Combustion Residual rule ("CCR Rule") promulgated on April 17, 2015, as amended, Consumers Energy Company (Consumers Energy) has conducted groundwater monitoring at the JC Weadock Bottom Ash Pond and Landfill CCR Units. During the statistical evaluation of the initial assessment monitoring event (May 2018), arsenic was present in one downgradient monitoring well at statistically significant levels exceeding the Groundwater Protection Standard (GWPS) at the Weadock Landfill<sup>1</sup> and beryllium and lithium were present in one downgradient monitoring well at statistically significant levels exceeding the GWPSs at the Weadock Bottom Ash Pond<sup>2</sup>.

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)<sup>3</sup> was initiated on April 14, 2019 and was certified and submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on September 11, 2019 in accordance with the schedule in §257.96.

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 characterization was performed using data collected from existing site wells. Installation of additional monitoring wells at locations downgradient of the CCR units was not necessary or feasible due to the proximity of the surface water bodies and the lack of a

<sup>&</sup>lt;sup>1</sup> TRC. 2019. Statistical Evaluation of Initial Assessment Monitoring Sampling Event, JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan. January 14.

<sup>&</sup>lt;sup>2</sup> TRC. 2019. Statistical Evaluation of Initial Assessment Monitoring Sampling Event, JC Weadock Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan. January 14.

<sup>&</sup>lt;sup>3</sup> TRC. 2019. Assessment of Corrective Measures – JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company. September 11.

shallow water-bearing unit to the south demonstrated by site hydrogeological investigations. Monitoring wells are shown on Figure 1.

### **Approach**

Given the proximity of the Weadock Bottom Ash Pond to the Weadock Landfill at the Weadock property, the nature and extent of contamination was assessed from a site-wide perspective rather than on a per CCR unit basis. The nature and extent of groundwater impacted by a release from the Weadock Bottom Ash Pond overlaps with groundwater impacted by operation of the Weadock Landfill. Additionally, looking at impacted groundwater on a site-wide basis was more practical from a risk mitigation standpoint, given:

- the likely age of the release(s);
- a long operational history of ash management;
- the historical use of CCR as fill; and
- The influence of geochemistry on several of the Appendix IV constituent concentrations in groundwater.

### Groundwater Nature and Extent Relative to Groundwater Protection Standards

As discussed in the ACM, the nature and extent of contamination (e.g. arsenic, beryllium, and lithium) in groundwater relative to GWPSs has been defined per the RCRA CCR Rule requirements based on the site-specific hydrogeology. Although arsenic, beryllium, and lithium concentrations have previously exceeded the GWPS within the groundwater monitoring system wells, these constituents are 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 the Weadock Bottom Ash Pond or Weadock Landfill. The property is owned and operated by Consumers Energy and groundwater is not used for drinking water. There are no on-site drinking water wells and there are no surface water potable water intakes within 3 miles of the site, so the drinking water pathway is not complete. A shallow water-bearing unit is not observed to the south of the landfill, which prevents offsite migration of Appendix III and Appendix IV constituents.

Graphs depicting concentrations versus time for arsenic, beryllium, and lithium observed within the Weadock Bottom Ash Pond and Weadock Landfill groundwater monitoring system wells are included in Attachment A.

Beryllium and lithium were the only Appendix IV constituents to exceed their respective GWPSs at a statistically significant level during assessment monitoring of the Weadock Bottom Ash Pond groundwater compliance well network, and the exceedances were limited to monitoring well JCW-MW-15009. The JC Weadock Bottom Ash Pond Remedy Selection Report<sup>4</sup> identified Source Removal with Post Remedy Monitoring as the final remedy for the former bottom ash pond to address the potential for residual beryllium and lithium. Beryllium and lithium concentrations in groundwater samples collected from JCW-MW-15009 have decreased following the cessation of hydraulic loading to the bottom ash pond in April 2018 and have remained below the GWPS at each well within the certified compliance monitoring well network since the removal activities were completed in July 2020 (Attachment A).

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<sup>&</sup>lt;sup>4</sup> Consumers Energy. 2023. *JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit, 40 CFR 257.97(a) Selection of Remedy Letter Report.* July 21.

Groundwater data collected post-CCR removal demonstrate that the remedy is complete per the criteria set forth in §257.98(c) and the remedy is protective of human health and the environment as presented in the Completion of Remedy Letter Report<sup>5</sup> and the Weadock Bottom Ash Pond CCR unit was certified closed<sup>6</sup>. Concentrations of beryllium and lithium at monitoring wells for the Weadock Landfill have remained below the GWPSs for the entire monitoring program.

Since beryllium and lithium have remained below the GWPS and the Weadock Bottom Ash Pond is certified as closed, the nature and extent evaluation focuses on the distribution of arsenic relative to the Weadock Landfill in the shallow water-bearing unit as compared to the GWPS (Figure 1). Three categories were assigned to the arsenic groundwater data collected from May 2020 to October 2023 (i.e., a minimum of 8 semi-annual data points) to develop Figure 1, as follows:

- White No Exceedances: all concentrations were below the GWPS
- Yellow Two or More Exceedances: individual observations above the GWPS<sup>7</sup>
- Orange Statistically Significant GWPS Exceedances<sup>8</sup>

The following is a summary of the RCRA Appendix IV nature and extent evaluation for arsenic.

### Arsenic

Arsenic concentrations at the Weadock Bottom Ash Pond have not triggered corrective action (i.e., lower confidence limit has not exceeded the GWPS). Arsenic concentrations have occasionally exceeded the GWPS at two wells near the Weadock Bottom Ash Pond: JCW-MW-15007 and JCW-MW-15010. Arsenic concentrations at JCW-MW-15007 fluctuate, but overall are not present at statistically significant levels. Since sluicing to the Weadock Bottom Ash Pond ceased in April 2016, concentrations of arsenic at JCW-MW-15010 appear to exhibit a downward trend and the arsenic concentrations at JCW-MW-15010 have remained below the GWPS of 21 ug/L other than a slight exceedance of 22 ug/L observed in October 2021.

Additionally, arsenic concentrations have at times exceeded the GWPS in three groundwater monitoring wells located along the Weadock Landfill perimeter (MW-53R, MW-55, and JCW-MW-18006), although these exceedances of the GWPS are not statistically significant. These areas of elevated arsenic concentrations are limited in extent and are dependent upon geochemical conditions, which are changing either due to lake levels rising or in the case of JCW-MW-18006, activities related to the Weadock Bottom Ash Pond closure. Also, an Alternate Source Demonstration (ASD) for arsenic at MW-55 was included in Appendix G of the 2019 *Annual Groundwater Monitoring and Corrective Action Report for the Weadock Landfill* 

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<sup>&</sup>lt;sup>5</sup> Consumers Energy. 2023. JC Weadock Bottom Ash Pond Coal Combustion Residual (CCR) Unit, 40 CFR 257.98(e) Completion of Remedy Letter Report. November 10.

<sup>&</sup>lt;sup>6</sup> Consumers Energy. 2023. JC Weadock Bottom Ash Pond 40 CFR 257.102(c) Closure by Removal Certification. November 10.

<sup>&</sup>lt;sup>7</sup> Although an exceedance is defined as a single detection above the GWPS, confidence intervals will be used to determine compliance per the CCR Rule, using the statistical procedures and performance standards in § 257.93(f) and (g)

<sup>&</sup>lt;sup>8</sup> Lower confidence limit is above the GWPS based upon most recent assessment monitoring statistical evaluation using the past eight compliance sampling events.

(2019 Annual Report)<sup>9</sup>. The basis for this ASD is summarized below and updated time series plots in support of this ASD are included in the *2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report* (23Q4 HMP Report)<sup>10</sup>.

Data collected from the 2018 investigation at MW-55 as well as data collected during routine sampling events for Part 115 and Federal CCR groundwater compliance show the following:

- Distinct Chemistry from Leachate The leachate chemistry from a monitoring well screened at the base of the ash fill (LH-104) is distinctly different from the groundwater chemistry near MW-55 and the temporary monitoring wells installed by TRC in the investigation area, as illustrated Appendix G of the 2019 Annual Report. Additionally, concentrations of arsenic and molybdenum are generally much lower, and concentrations of boron are much higher within the landfill (LH-104) than outside of the landfill at MW-55 (Figure G2: 23Q4 HMP Report).
- Conservative Tracer Boron is a metalloid known to be present in coal ash and can be used as a conservative tracer in groundwater. The average concentration of boron in Leachate Headwell LH-104 (10,800 ug/L: November 2017- October 2023) is significantly higher than concentrations observed at any of the other locations sampled as a part of this monitoring program. Additionally, recently observed boron concentrations at MW-55 are similar to or lower than historical concentrations, which further supports that the water quality at MW-55 is not directly affected by groundwater migrating from the landfill.
- Reducing Conditions and Groundwater Head Levels Water levels observed at MW-55, as shown in Appendices A and G of the 23Q4 HMP Report, increased over 4-ft between 2010 and 2020. The oxidation-reduction potential (ORP) at MW-55 has generally decreased (i.e., is more reducing) since 2010. The lowering of ORP over time as a result of increased water levels has changed the geochemical conditions in the vicinity of MW-55 and has resulted in increased solubility of arsenic and molybdenum. Since 2021, water levels have been generally decreasing, resulting in a slight increase in ORP (i.e., is less reducing) and decreases in concentrations of both arsenic and molybdenum, which further illustrates the relationship between groundwater elevations, redox state, and concentration of arsenic and molybdenum in groundwater.

### **Summary**

The nature and extent of arsenic, beryllium, and lithium in the shallow water-bearing unit is defined in accordance with the Federal CCR rule based on the site-specific hydrogeology. Beryllium and lithium concentrations in groundwater have been addressed as a part of the Weadock Bottom Ash Pond closure. Although arsenic concentrations at times exceed the GWPS within the groundwater monitoring system wells, the concentrations are not present at statistically significant levels. 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 the Weadock Bottom Ash Pond or Weadock Landfill. Risk from potential exposure to groundwater is managed.

<sup>&</sup>lt;sup>9</sup>TRC. 2020. 2019 Annual Groundwater Monitoring Report – JC Weadock Power Plant Landfill CCR Unit. Prepared for Consumers Energy Company. January 30.

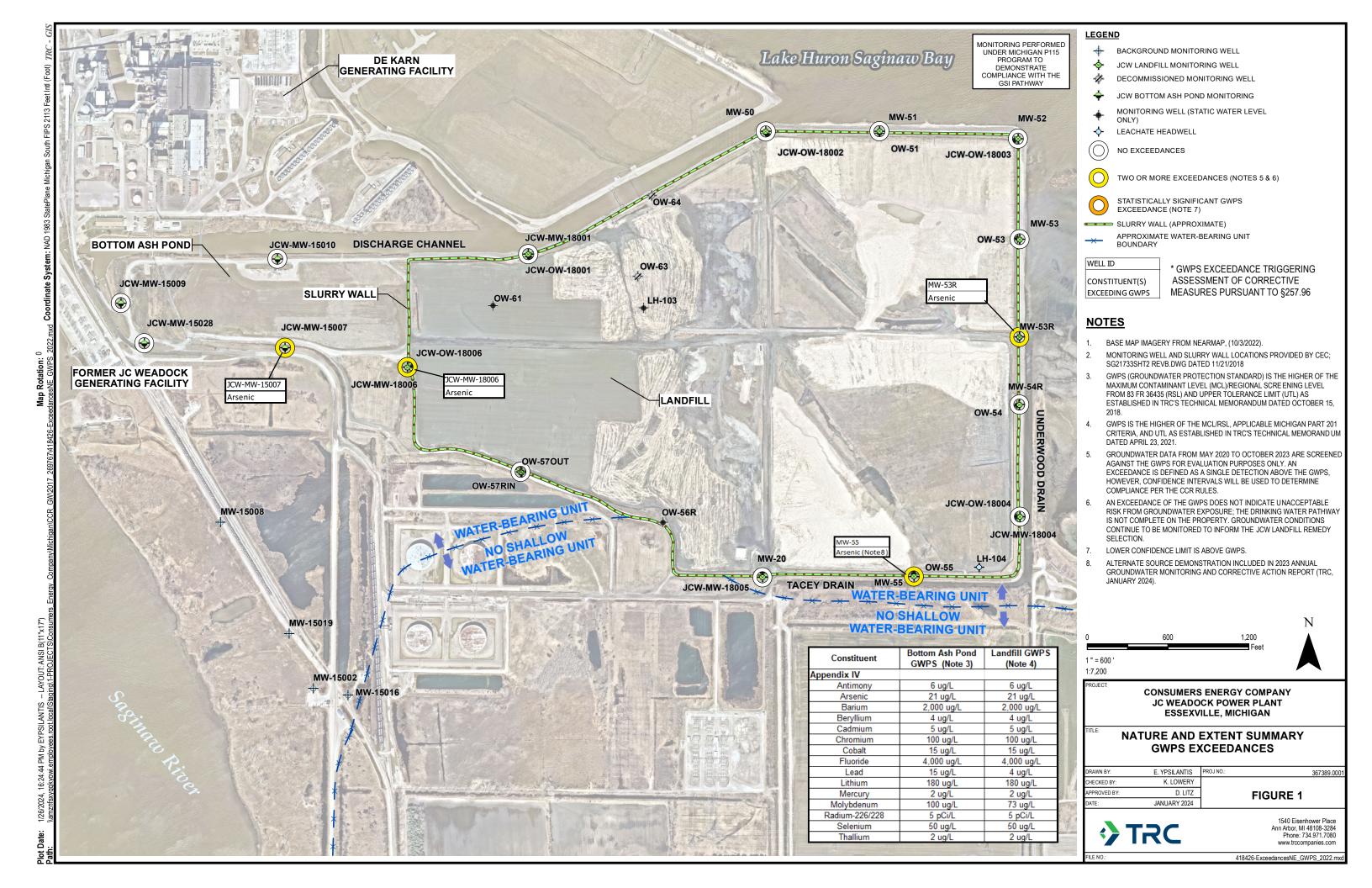
<sup>&</sup>lt;sup>10</sup> TRC. 2024. 2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2024 Hydrogeological Monitoring Report – JC Weadock Solid Waste Disposal Area. January 30.

### **Attachments**

Figure 1 Nature and Extent Summary: GWPS Exceedances

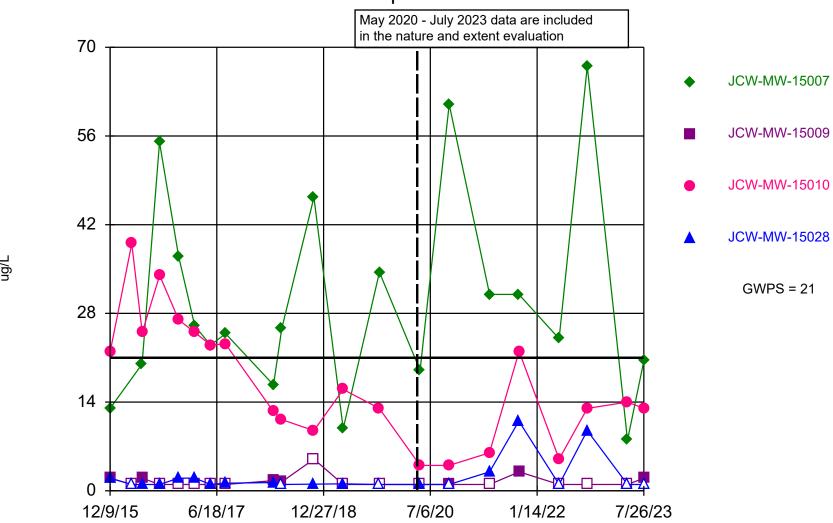
Attachment A Time Series Graphs

### **Figure**



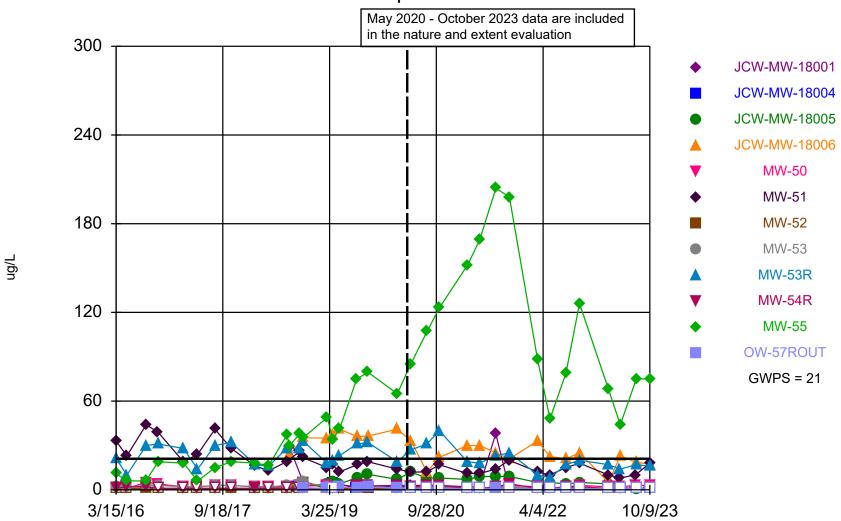
### Attachment A Time Series Graphs

### Arsenic Comparison to GWPS



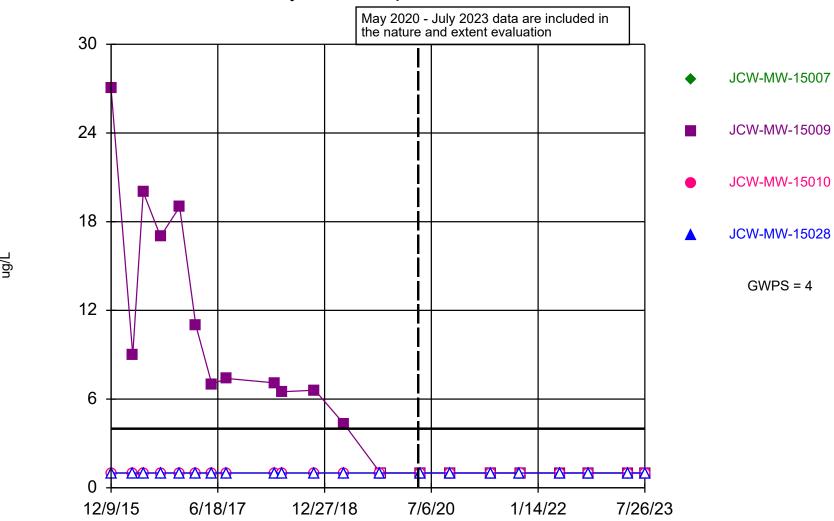
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### Arsenic Comparison to GWPS



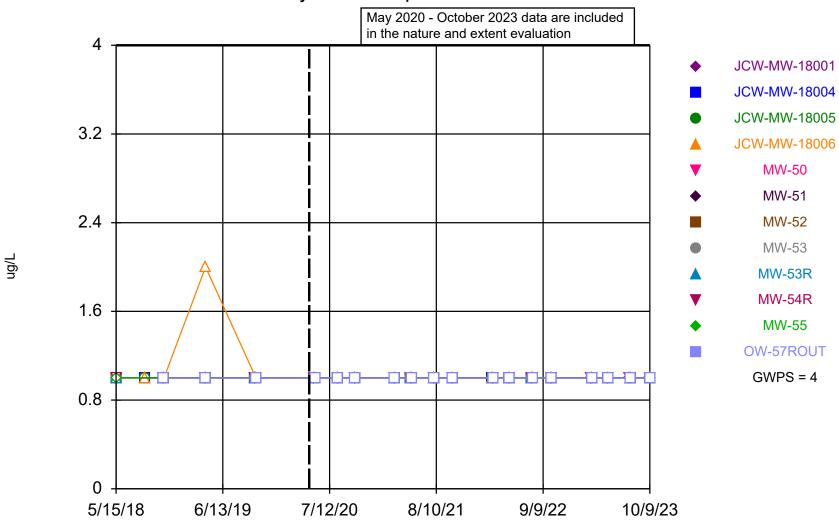
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### Beryllium Comparison to GWPS



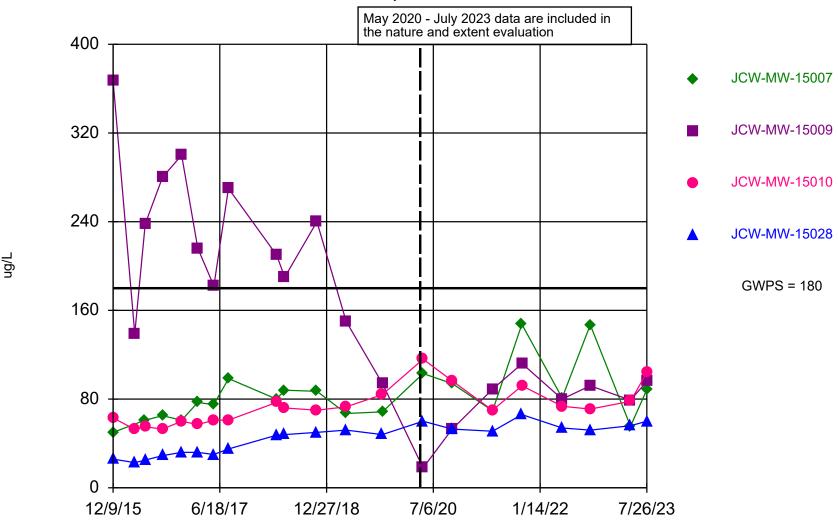
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### Beryllium Comparison to GWPS



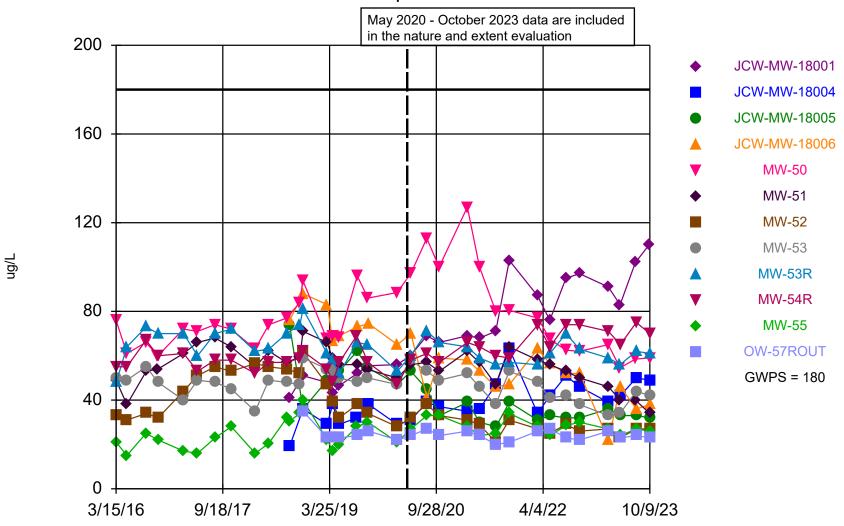
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### Lithium Comparison to GWPS



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### Lithium Comparison to GWPS



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