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[1], 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 *known* 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*[2] (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[3] and the Weadock Bottom Ash Pond CCR unit was certified closed[4]. 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[5]. Later, construction of the Weadock Slurry Wall was extended to include the previous

[1] TRC. 2019. Assessment of Corrective Measures – JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company. September.
[2] 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.
[3] 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.
[4] Consumers Energy. 2023. JC Weadock Bottom Ash Pond 40 CFR 257.102(c) Closure by Removal Certification. November 10.
[5] Natural Resource Technology. 2005. Phase II Groundwater Discharge Evaluation, Final Report.

vent[6]. 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*[7], 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;

[6] Golder Associates, Inc. 2018. J.C. Weadock Generating Facility, Slurry Wall Vent Closure Construction Documentation Report. October 30.
[7] 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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cc: Mr. John Ozoga, EGLE Bay City District Office
Mr. Jim Ferritto, EGLE Saginaw Bay District Office
Mr. Mike Quigg, EGLE Bay City District Office
Ms. Margie Ring, EGLE Lansing Office
Mr. Jim Arduin, EGLE Lansing Office
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 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 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 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 [4]
(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 in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report [1]; Section 1.1 Program Summary [2],[3]
(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 [1]; Section 1.1 Program Summary [2],[3]
(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to § 257.94(e):	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 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 constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:	Corrective Action Progress Report [1]; Section 1.1 Program Summary [2],[3]
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an 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 [1]; Section 1.1 Program Summary [3]
(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Corrective Action Progress Report [1]; Section 1.1 Program Summary [2],[3]
(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 [1]; Section 1.1 Program Summary [3]
(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.	Corrective Action Progress Report [1]; Section 1.1 Program Summary [3]

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 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 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 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 [6]; Certified ASD[3][5]
(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 in § 257.94 or the assessment monitoring program in § 257.95;	Corrective Action Progress Report [1]; Section 1.2 Program Summary [2],[3],[4],[5]
(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 [1]; Section 1.2 Program Summary [2],[3],[4],[5]
(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to § 257.94(e):	Section 1.2 Program Summary [2],[3],[4],[5]; Certified ASD [3][5]
(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	Section 1.2 Program Summary [2],[3],[4],[5]; Certified ASD [3][5]
(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 constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:	Corrective Action Progress Report [1]; Section 1.2 Program Summary [2],[3],[4],[5]
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an 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 selection; and	Corrective Action Progress Report [1]; 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

Prepared For:

Consumers Energy Company

Prepared By:

TRC
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Darby Litz
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APPENDICES

1.0 Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90 – 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	Appendix IV	
Boron	Antimony	Mercury
Calcium	Arsenic	Molybdenum
Chloride	Barium	Radium 226/228
Fluoride	Beryllium	Selenium
pH	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

[1] 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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TRC. October 2017. Groundwater Statistical Evaluation Plan – JC Weadock Power Plant, Bottom Ash Pond, Essexville, Michigan. Prepared for Consumers Energy Company.

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TRC. September 2019. Assessment of Corrective Measures – JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company.

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

Tables

Table 1

Summary of Groundwater Elevation Data

JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			May 1, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring 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: Downgradient Monitoring 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: Downgradient Monitoring Wells (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 Headwells							
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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	500	500	4,000	< 20	107	347	211
Calcium	mg/L	NC	NC	NC	500[EE]	48.4	108	175	159
Chloride	mg/L	**250****	**250**[E]	**250**[E]	**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**[E]	**250**[E]	500[EE]	14.9	10.5	**253**	94.2
Total Dissolved Solids	mg/L	**500****	**500**[E]	**500**[E]	**500**	351	**877**	**889**	**1,170**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	7.2	6.6	6.9	6.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300**[E]	**300**[E]	500,000[EE]	**729**	**17,900**	**1,970**	**21,500**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^				
Appendix III[(1)]									
Boron	ug/L	NC	**500**	**500**	4,000	212	170	**1,100**	**508**
Calcium	mg/L	NC	NC	NC	**500[EE]**	207	**526**	199	198
Chloride	mg/L	**250****	**250[E]**	**250[E]**	**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[E]**	**250[E]**	**500[EE]**	175	**1,490**	**273**	122
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	**3,630**	**2,260**	**936**	**2,520**
pH, Field	SU	**6.5 - 8.5****	**6.5 - 8.5[E]**	**6.5 - 8.5[E]**	**6.5 - 9.0**	7.0	**5.8**	7.1	7.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	**1,460**	**13,900**	**417**	**585**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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 5

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

Constituent	Units	GWPS	JCW-MW-15007		JCW-MW-15010	
			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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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

0 1,500 3,000

FEET

1:36,000 1" = 3,000'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

PROJECT:

CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

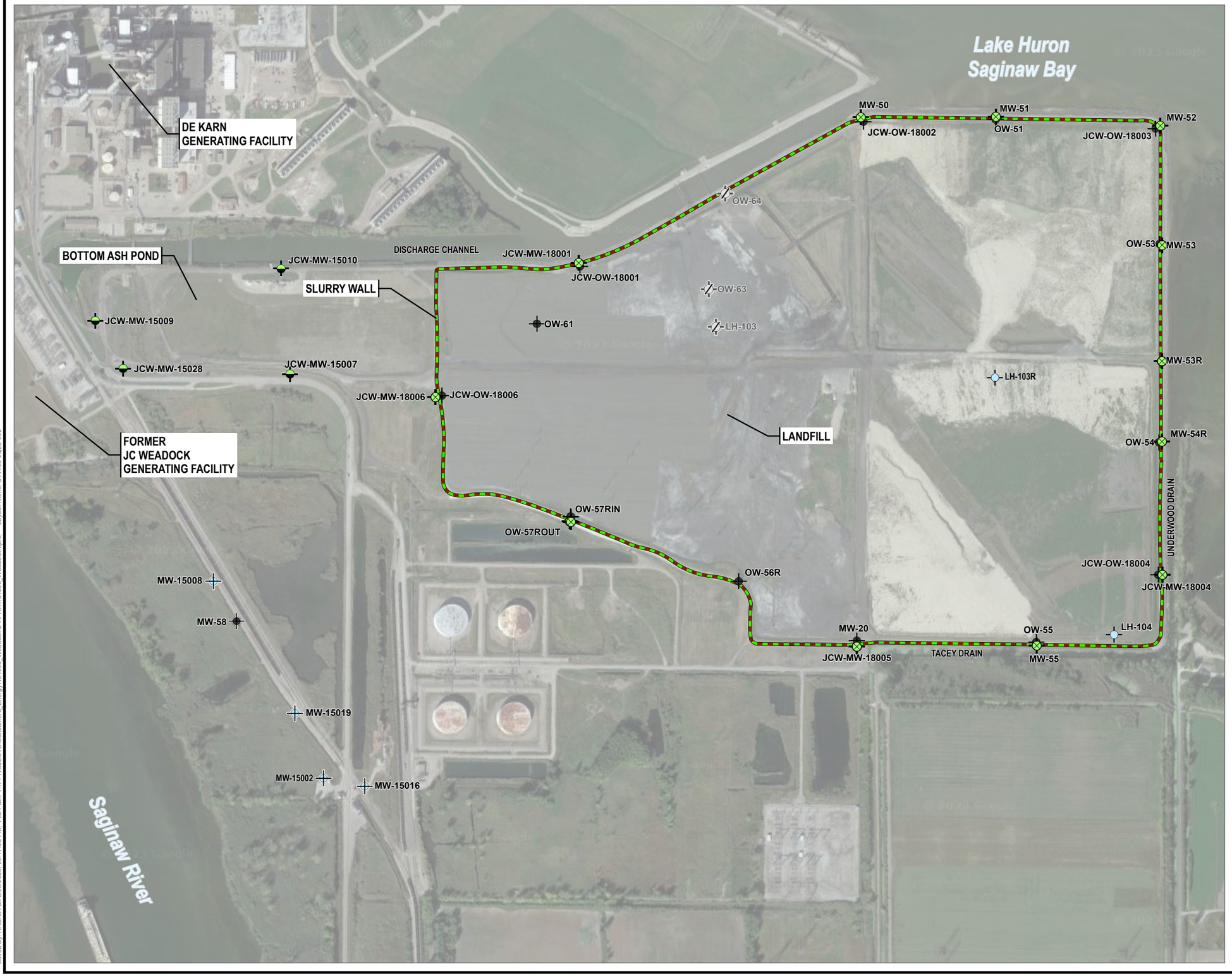
TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0000
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	JULY 2023		

TRC
999 FOURIER DRIVE
SUITE 101
MADISON, WI 53717
PHONE: 608.826.3663

FILE: 464095_DEKARN



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
SITE MAP

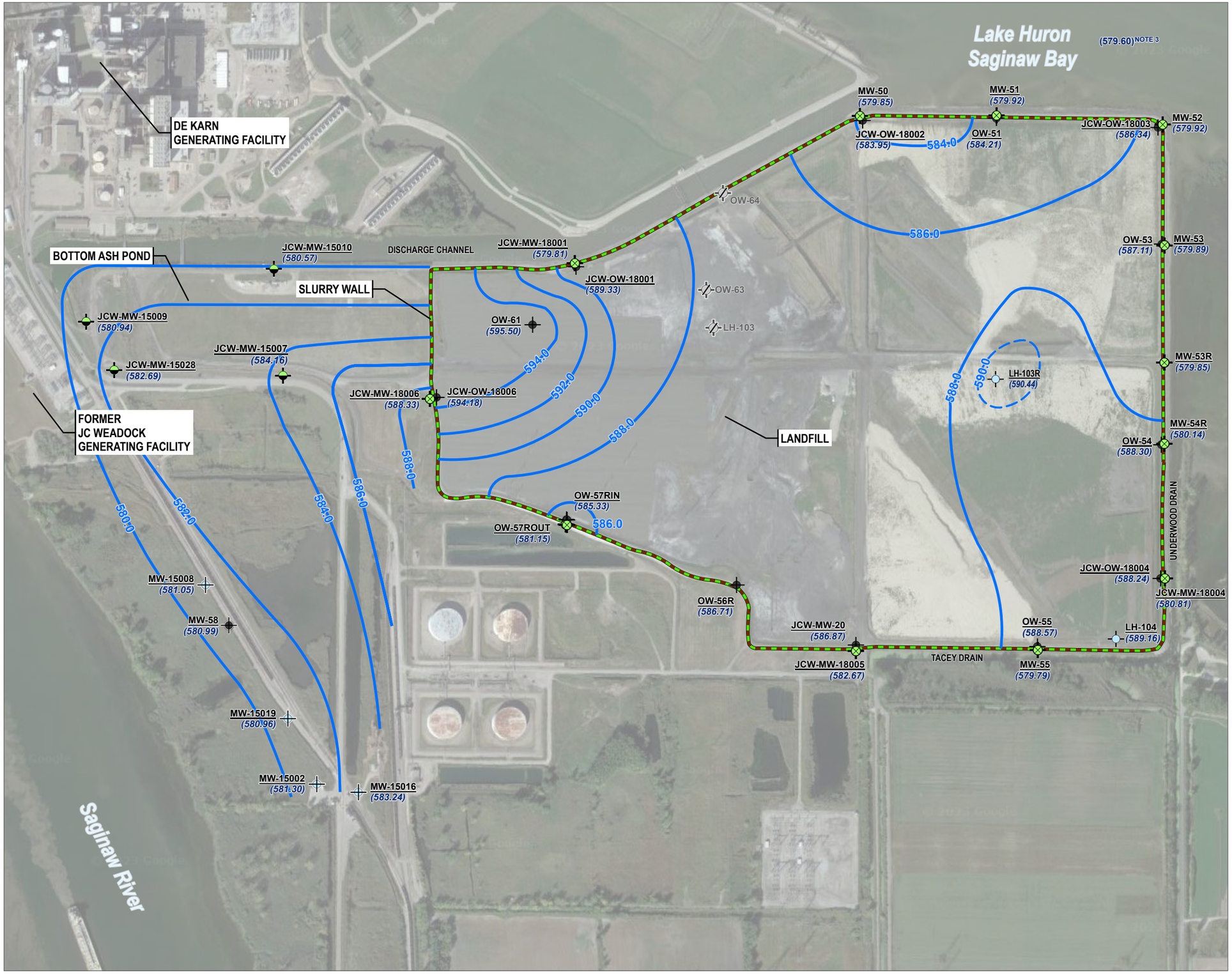
DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	JULY 2023		

FIGURE 2

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 8/25/2023 2:34:35 PM; File Path: T:\PROJECTS\Consumers_Energy\464096_Weadock\2-4\RPX\464096_Weadock.aprx; Layout Name: 514403-2023-002



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (NU) NOT USED TO DEVELOP CONTOURS

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT: CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE: POTENTIOMETRIC SURFACE MAP
MAY 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		FIGURE 3
APPROVED BY:	D. LITZ		
DATE:	JULY 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: ADAIR on 6/14/2023 - 10:43:39 AM; File Path: T:\1 PROJECTS\Consumers_Energy\464096_Weadock\2-APRX\464096_Weadock.aprx; Layout Name: 514403-2023-003

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.
- 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 DUP-BACKGROUND	5/1/2023 5/1/2023	Radium 226	Detected result is potentially a false positive due to method blank contamination.

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.
- 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	Radium 226	Detected result is potentially a false positive due to method blank contamination (normalized absolute difference <1.96).
JCW-MW-15010	5/2/2023		
JCW-MW-15028	5/2/2023		

Appendix B
Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	June 29, 2023
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 May 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[1] 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.

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.

[1] 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[2], 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

[2] 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[3] 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™ 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™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent 8 sampling events. Eight independent sampling events provide the appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-test 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

[3] 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

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

						Sample Location:	JCW-MW-15007									
						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(1)	< 5,000(1)	< 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(1)	< 5,000(1)	< 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.

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

						Sample Location:	JCW-MW-15009						
						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
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.

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

						Sample Location:	JCW-MW-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					Field Dup				Field Dup		
Appendix III																
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.
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

						Sample Location:	JCW-MW-15028								
						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				Field Dup						
Appendix III															
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

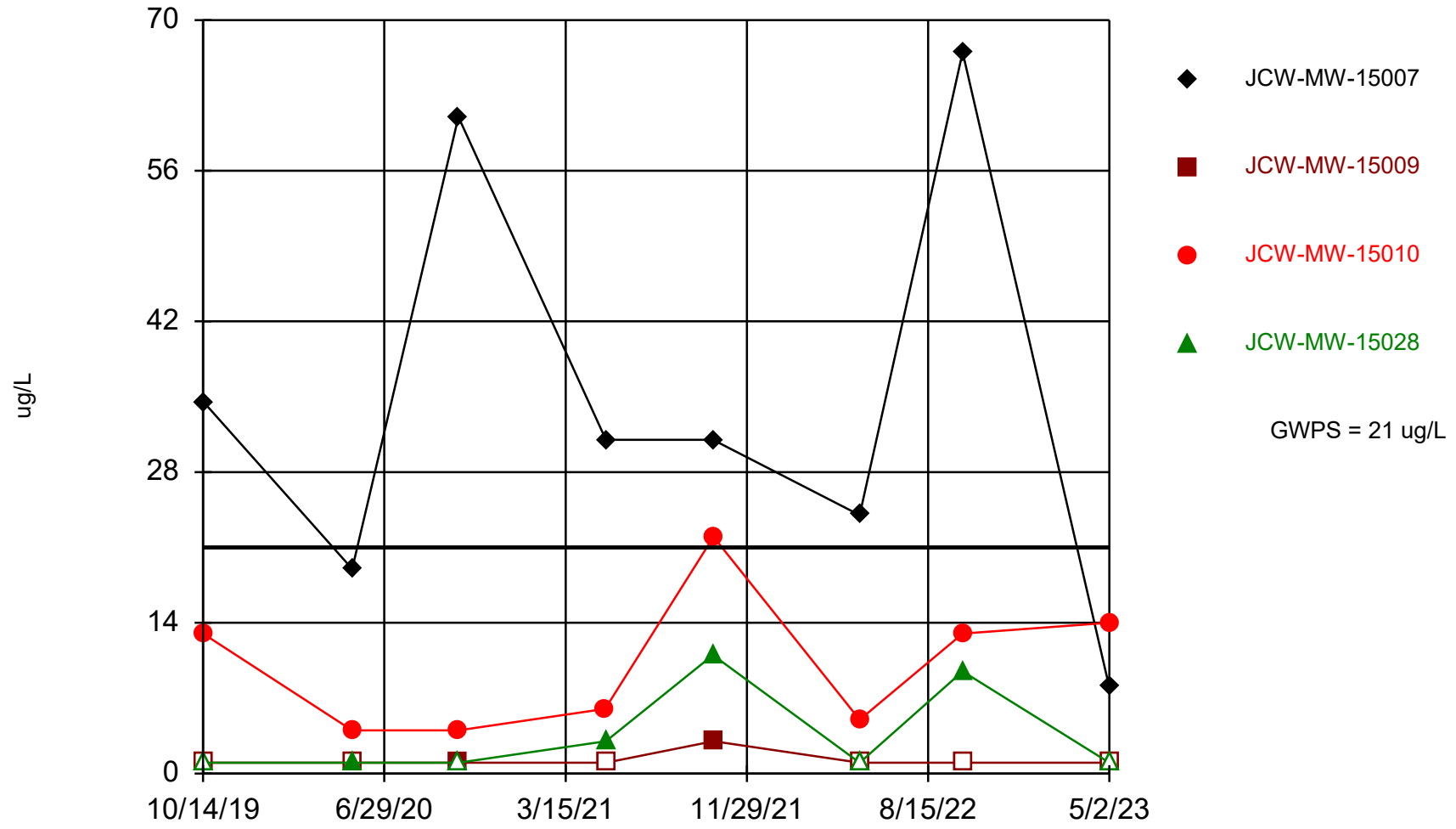
Notes:

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.
-- - 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

Hollow symbols indicate censored values.

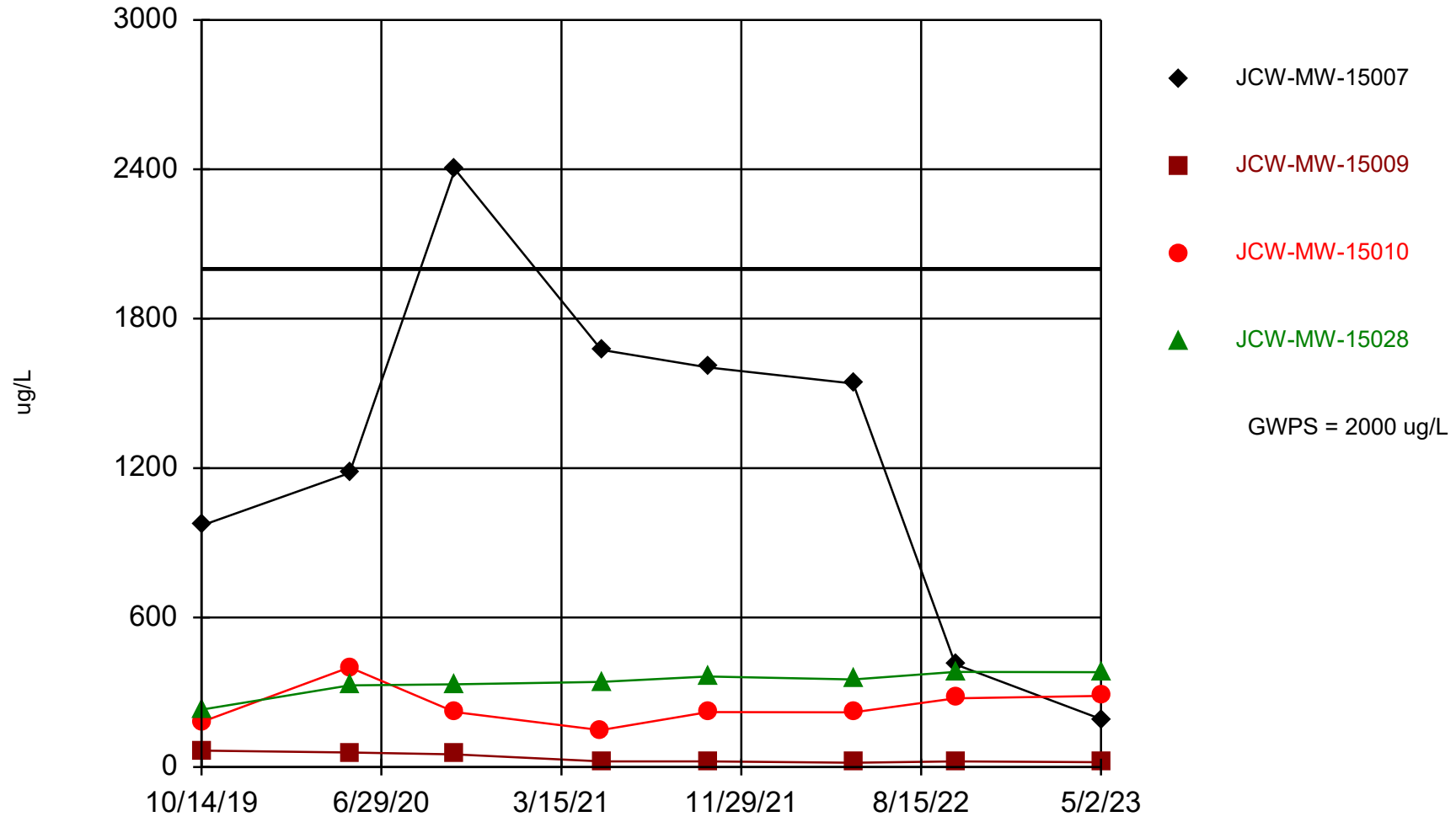
Arsenic Comparison to GWPS



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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Barium Comparison to GWPS

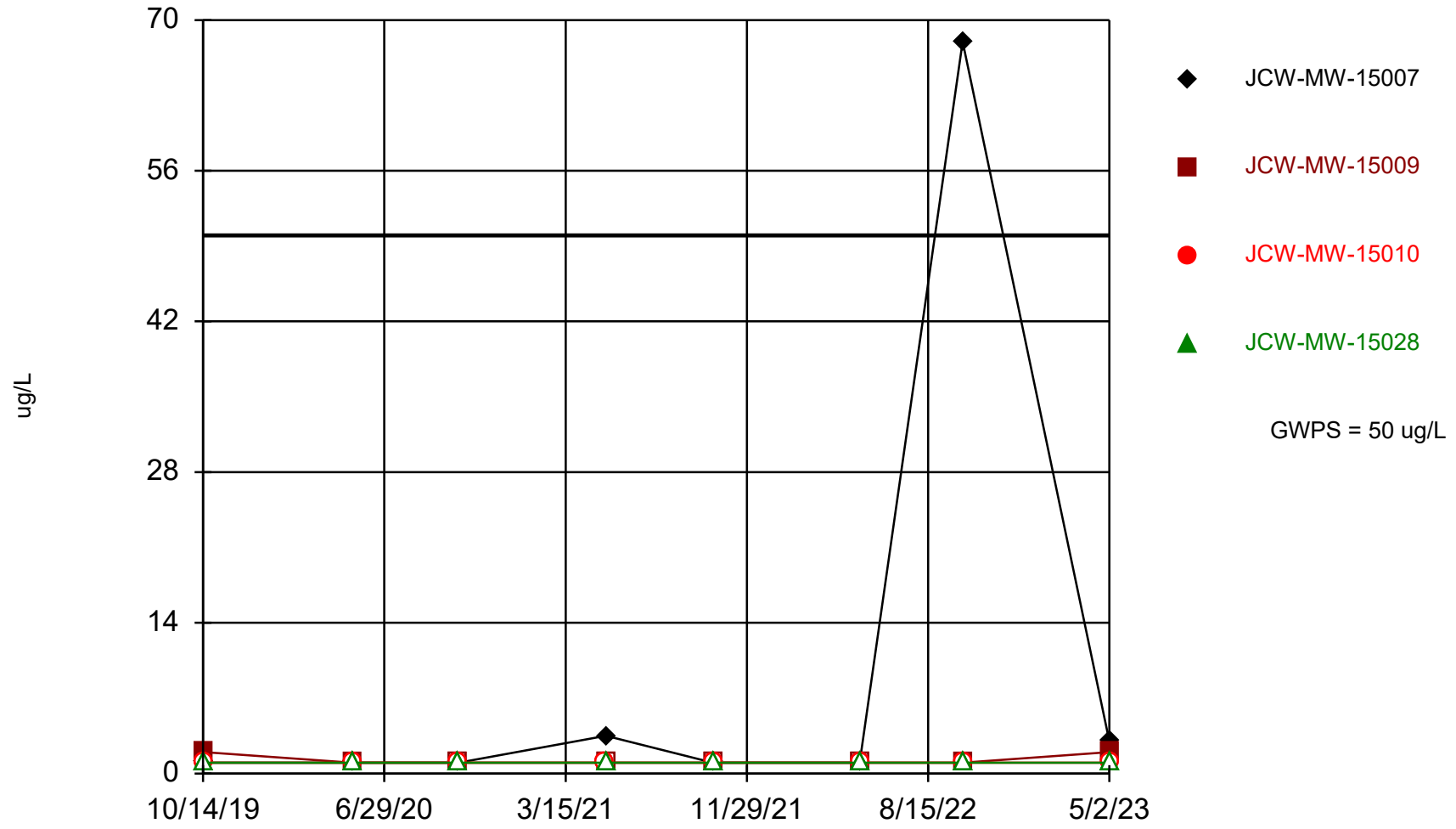


Time Series Analysis Run 5/30/2023 11:36 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Selenium Comparison to GWPS



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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

Constituent: Selenium, Total Analysis Run 5/30/2023 11:38 AM
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

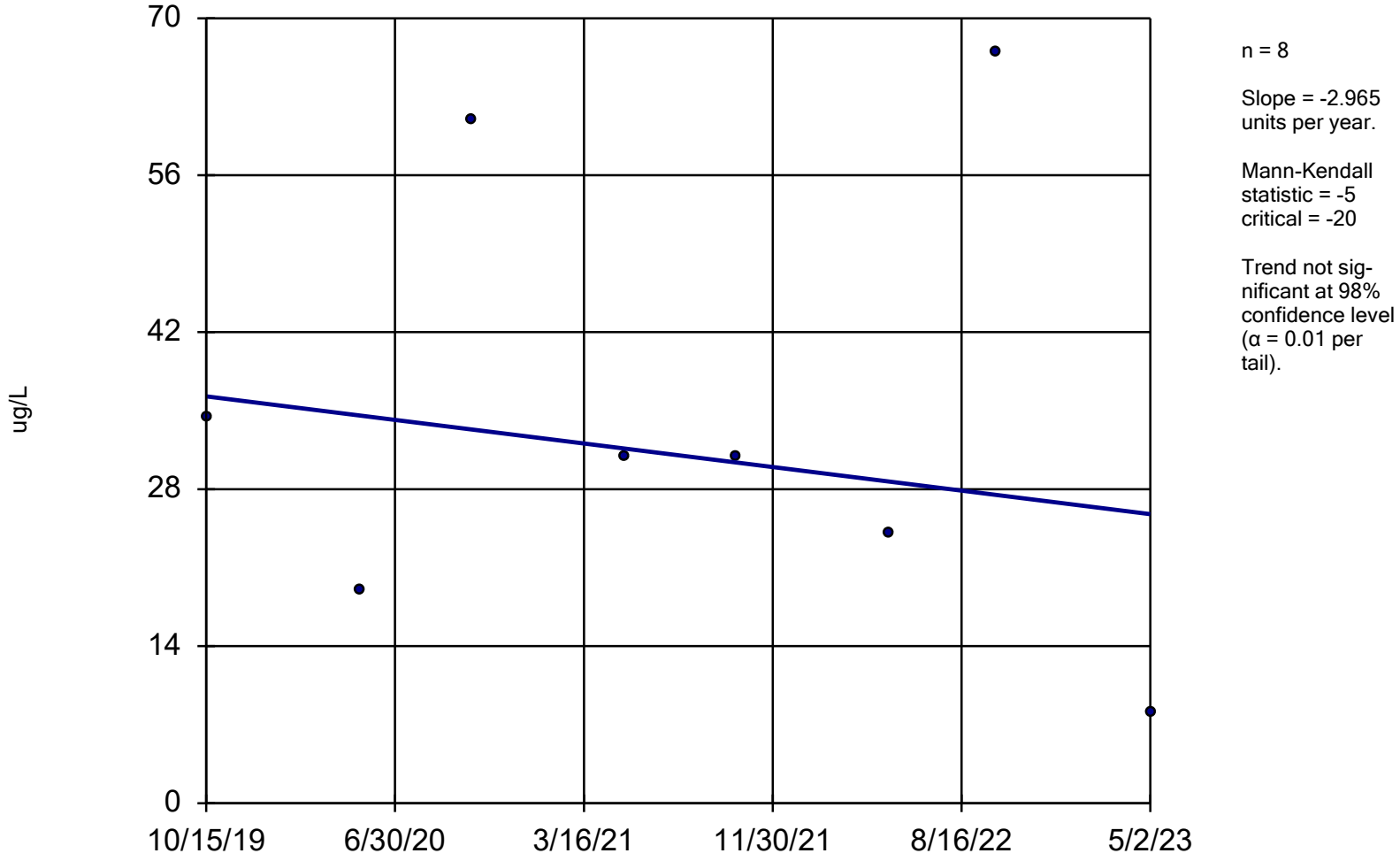
For observations made between 10/14/2019 and 5/2/2023, a summary of the selected data set:

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	Min	Max	Mean	Median	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

Arsenic, Total

JCW-MW-15007



n = 8

Slope = -2.965 units per year.

Mann-Kendall statistic = -5
critical = -20

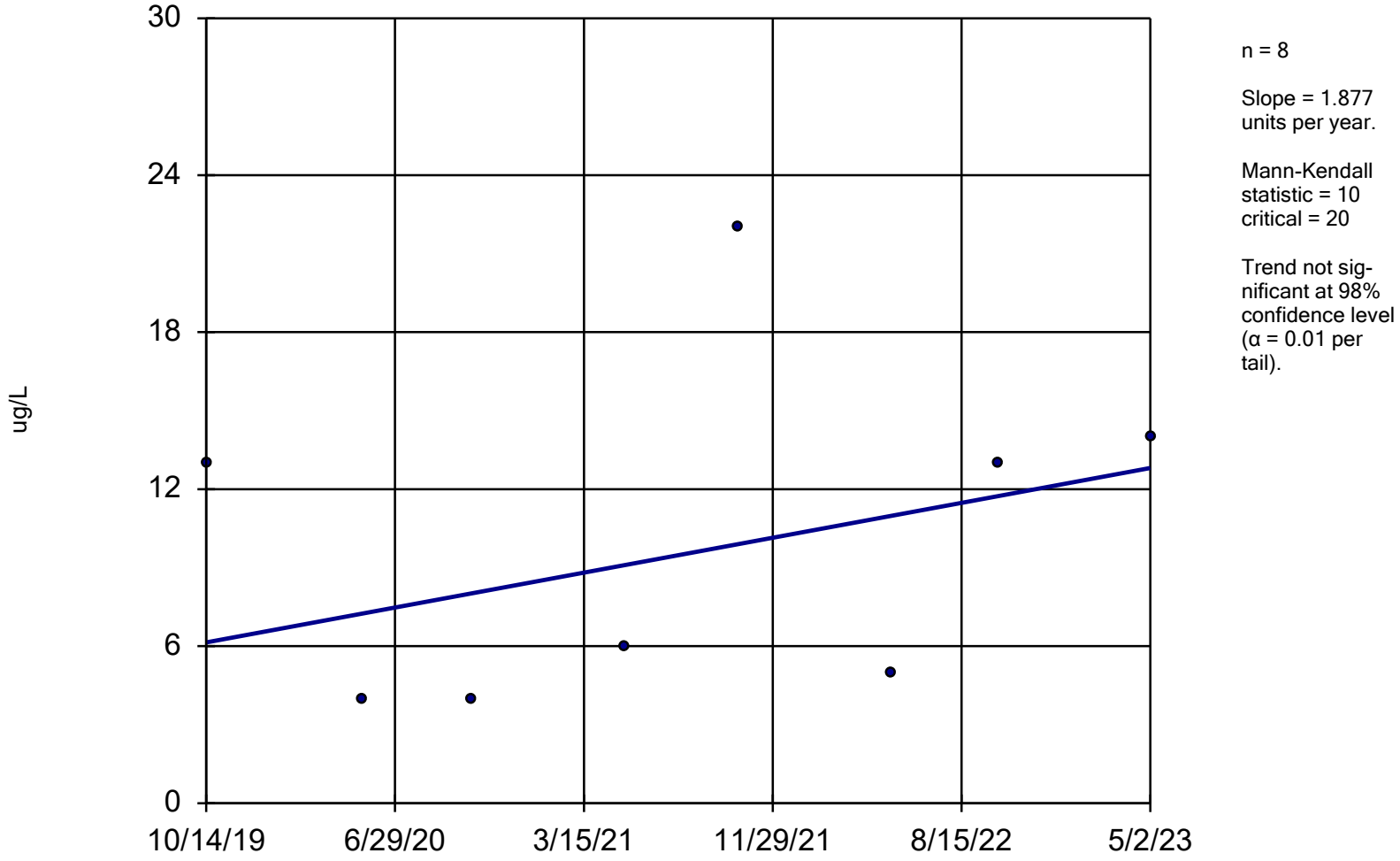
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Arsenic, Total

JCW-MW-15010



n = 8

Slope = 1.877 units per year.

Mann-Kendall statistic = 10
critical = 20

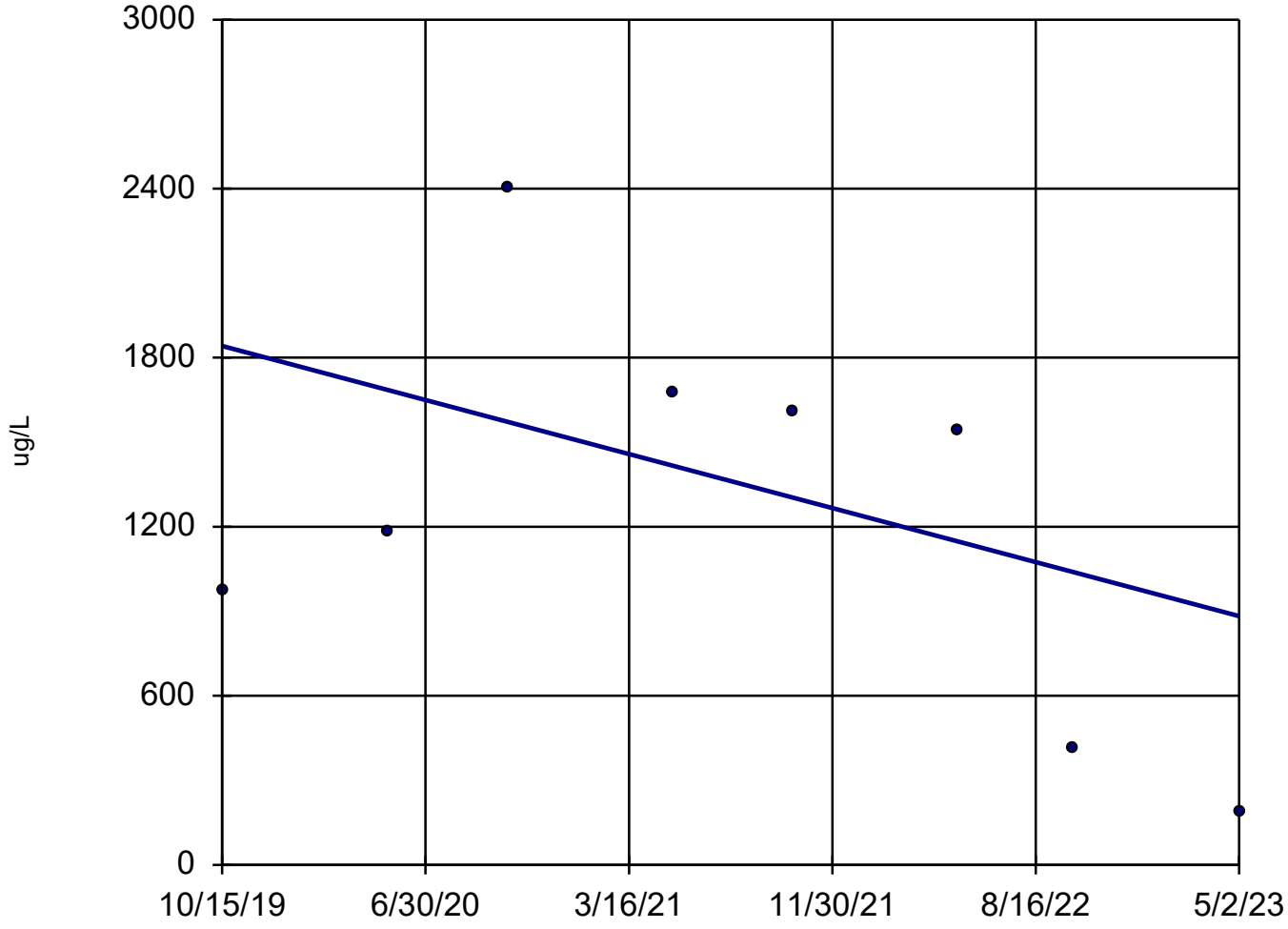
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Barium, Total

JCW-MW-15007



n = 8

Slope = -270.2 units per year.

Mann-Kendall statistic = -10
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

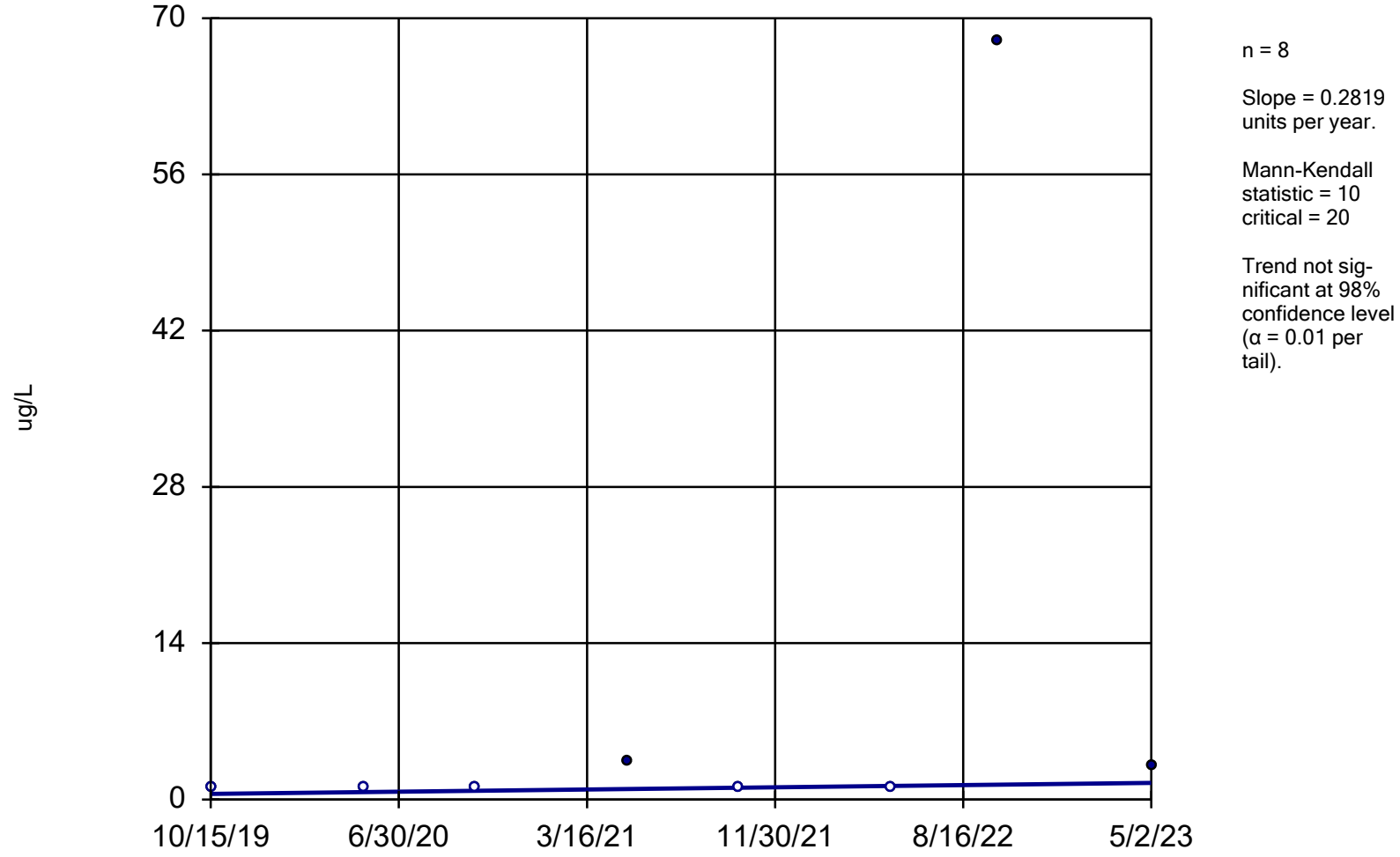
Sen's Slope Estimator Analysis Run 5/30/2023 11:39 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Selenium, Total

JCW-MW-15007



n = 8

Slope = 0.2819 units per year.

Mann-Kendall statistic = 10
critical = 20

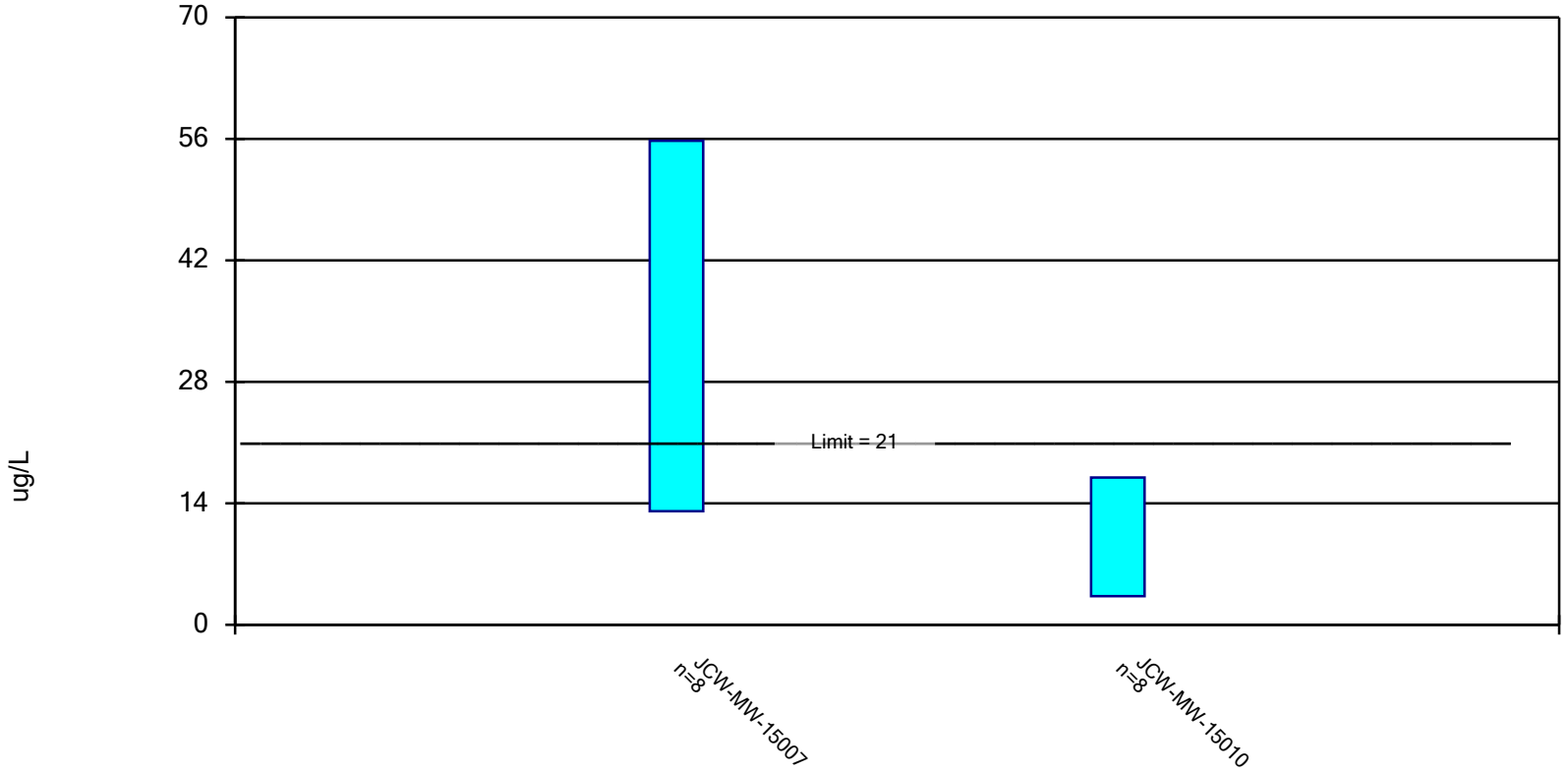
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

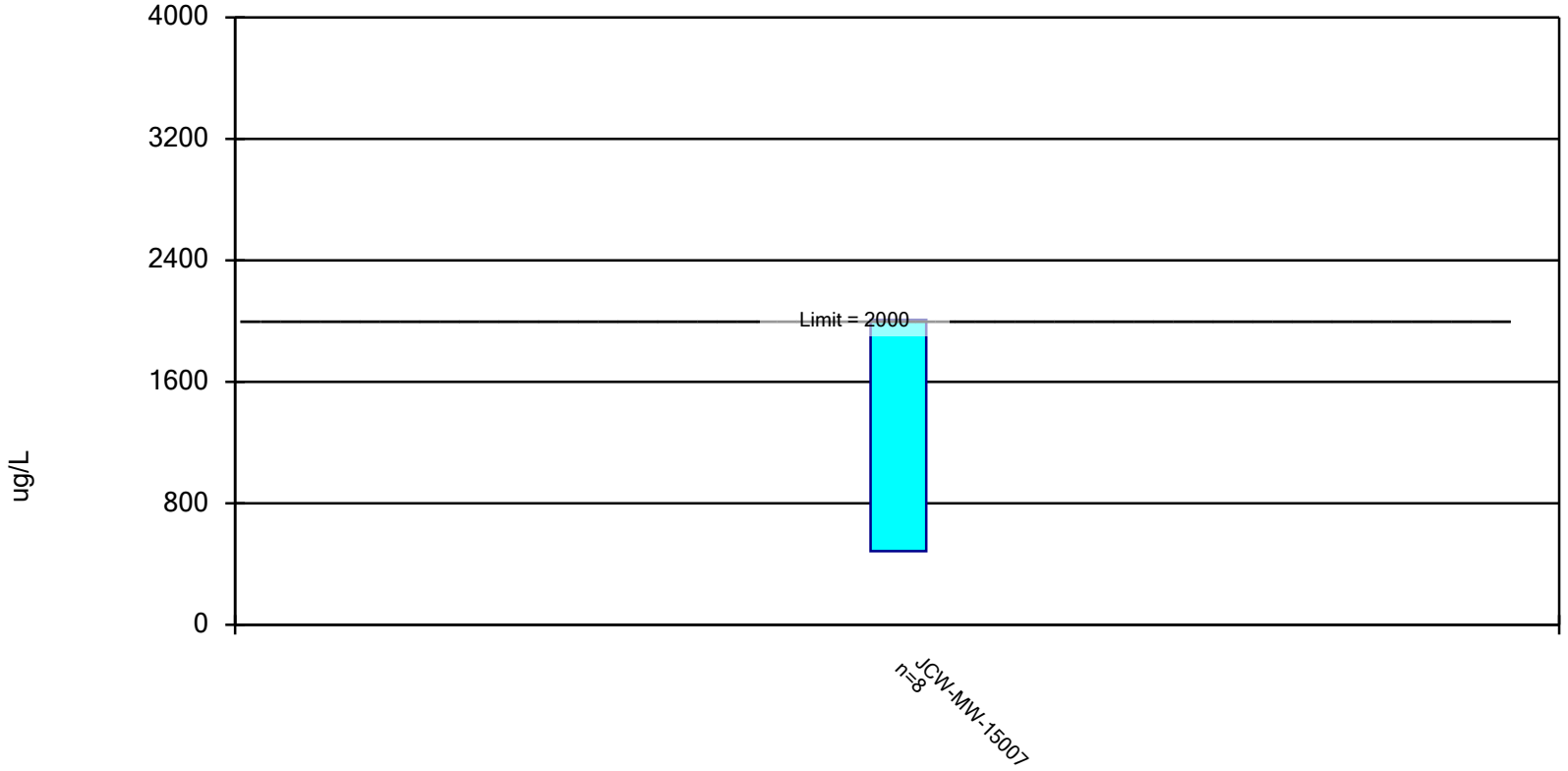
Constituent: Arsenic, Total (ug/L) Analysis Run 5/30/2023 11:41 AM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

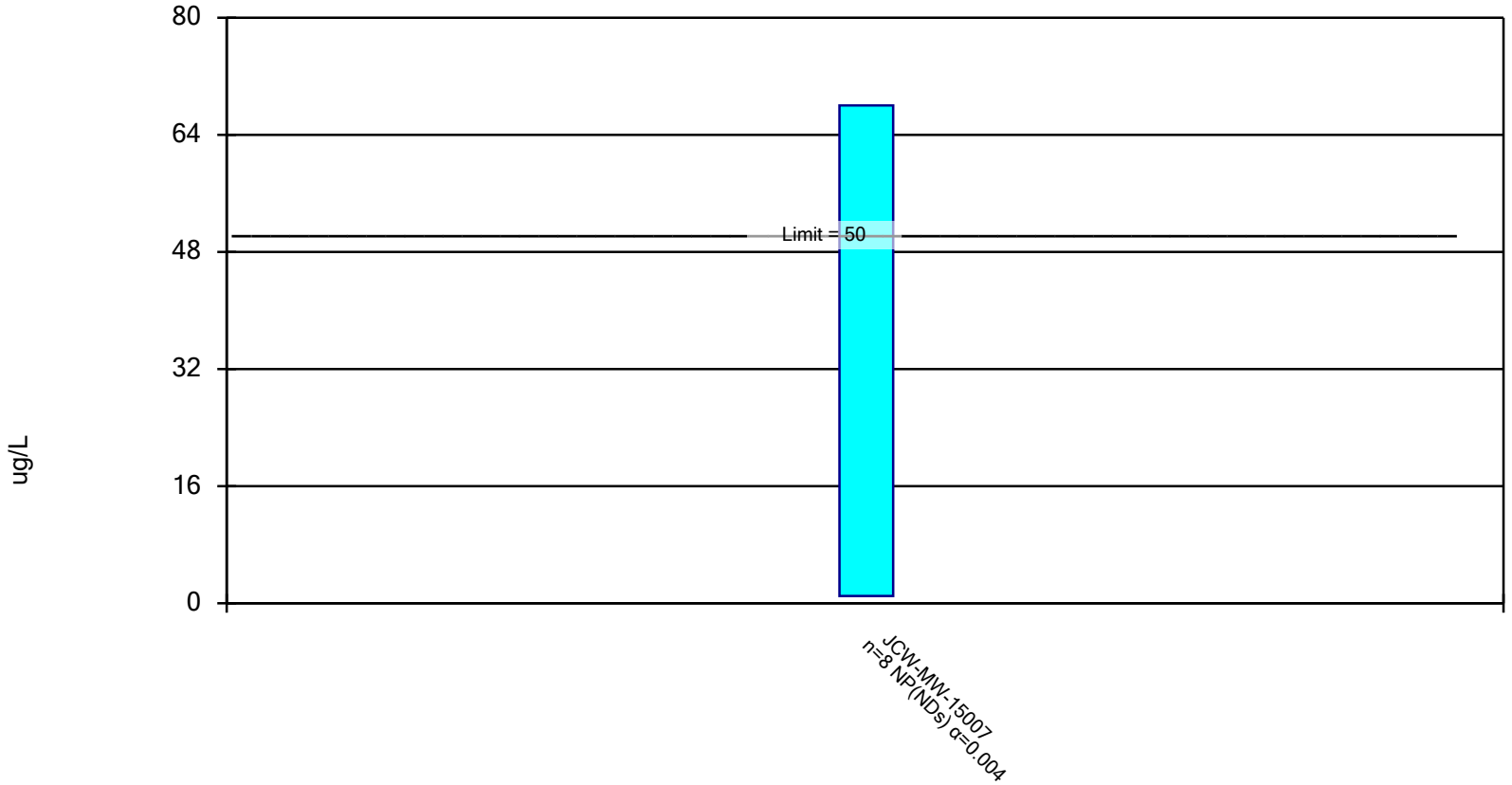
Constituent: Barium, Total (ug/L) Analysis Run 5/30/2023 11:41 AM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

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

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 2nd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0404-01
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 03:01 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-01-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	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, 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, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-01-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 #: 23-0404-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	351		mg/L	10.0	05/04/2023	AB23-0504-07

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0404-02
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 12:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-02-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	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, Aqueous

Aliquot #: 23-0404-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-02-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 #: 23-0404-02-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	877		mg/L	10.0	05/04/2023	AB23-0504-07

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0404-03
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 08:40 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-03-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	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

Aliquot #: 23-0404-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-03-C02-A01 **Analyst: KDR**

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 #: 23-0404-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	889		mg/L	10.0	05/04/2023	AB23-0504-07

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0404-04
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 01:43 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-04-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, Aqueous

Aliquot #: 23-0404-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-04-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 #: 23-0404-04-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0404-05
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-05-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, Aqueous

Aliquot #: 23-0404-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-05-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 #: 23-0404-05-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

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Analytical Report

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: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-06-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, Total, Aqueous

Aliquot #: 23-0404-06-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0404

Inspection Date: 5.04.23 **Inspection By:** LMO

Sample Origin/Project Name: Q2-2023 JCW-DEK Background Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: ~~3977 8026 0844~~ LMO 5.4.23 3977 7534 7119 Shipping Form Attached: Yes x No ____

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

Cooler _____ Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None _____ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed _____

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC _____ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 0.4 - 2.3 Samples Received on Ice: Yes X No ____

M&TE # and Expiration 27723 5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
250 500 mL (plastic)	5				
Other LMO 5.4.23					

pH strip
Lot # 205522
exp. 2.16.25

CHAIN OF CUSTODY

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q2-2023 JCW-DEK Background Wells

PROJECT NUMBER: **23-0404**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed): Total Metals; Anions; TDS

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	REMARKS
23-0404-01	5-1-23	1501	GW	MW-15002	3	2	1						x	x	x	
-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	x	x	
-04	5-1-23	1343	GW	MW-15019	3	2	1						x	x	x	
-05	5-1-23	—	GW	DUP-Background	3	2	1						x	x	x	
-06	5-1-23	1240	W	FB- Background	1								x			

RELINQUISHED BY: [signature] — DATE/TIME: 5-2-23 1600 — RECEIVED BY: Fed Ex

RELINQUISHED BY: Fed Ex — DATE/TIME: 05-03-23 10:20 — RECEIVED BY: [signature]

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: 27723

Temperature: 0.4 - 2.3 °C — Cal. Due Date: 5-25-23

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

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 2nd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15007**
Lab Sample ID: 23-0405-01
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 08:33 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-01-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, Aqueous

Aliquot #: 23-0405-01-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, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-01-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 #: 23-0405-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3630		mg/L	10.0	05/05/2023	AB23-0505-05

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15007**
Lab Sample ID: 23-0405-01
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 08:33 AM

Alkalinity by SM 2320B

Aliquot #: 23-0405-01-C04-A01 **Analyst: DLS**

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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15009**
Lab Sample ID: 23-0405-02
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 10:57 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-02-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, Aqueous

Aliquot #: 23-0405-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-02-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 #: 23-0405-02-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2260		mg/L	10.0	05/05/2023	AB23-0505-05

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15009**
Lab Sample ID: 23-0405-02
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 10:57 AM

Alkalinity by SM 2320B

Aliquot #: 23-0405-02-C04-A01 **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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15010**
Lab Sample ID: 23-0405-03
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 12:12 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-03-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, Aqueous

Aliquot #: 23-0405-03-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-03-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 Dissolved Solids by SM 2540C

Aliquot #: 23-0405-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	936		mg/L	10.0	05/05/2023	AB23-0505-05

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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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0405-03-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15028**
Lab Sample ID: 23-0405-04
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 09:43 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-04-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	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, Aqueous

Aliquot #: 23-0405-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-04-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 #: 23-0405-04-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2520		mg/L	10.0	05/05/2023	AB23-0505-05

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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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0405-04-C04-A01 **Analyst: DLS**

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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **DUP-JCW-BAP**
Lab Sample ID: 23-0405-05
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-05-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	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

Aliquot #: 23-0405-05-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-05-C02-A01 **Analyst: KDR**

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 #: 23-0405-05-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3680		mg/L	10.0	05/05/2023	AB23-0505-05

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **DUP-JCW-BAP**
Lab Sample ID: 23-0405-05
Matrix: Groundwater

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 12:00 AM

Alkalinity by SM 2320B

Aliquot #: 23-0405-05-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

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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

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-06-C01-A01 **Analyst: EB**

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, Aqueous

Aliquot #: 23-0405-06-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0405-06-C02-A01 **Analyst: KDR**

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 #: 23-0405-06-C03-A01 **Analyst: DLS**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	96.4		%	10000.0	05/10/2023	AB23-0510-02

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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

Aliquot #: 23-0405-06-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

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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

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-07-C01-A01 **Analyst: EB**

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, Aqueous

Aliquot #: 23-0405-07-C01-A02 **Analyst: CLE**

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, Aqueous

Aliquot #: 23-0405-07-C02-A01 **Analyst: KDR**

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 #: 23-0405-07-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

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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**

Parameter(s)	Result	Flag	Units	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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **EB-JCW-BAP**
Lab Sample ID: 23-0405-08
Matrix: Water

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 12:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-08-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	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	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 #: 23-0405-08-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **FB-JCW-BAP**
Lab Sample ID: 23-0405-09
Matrix: Water

Laboratory Project: **23-0405**
Collect Date: 05/02/2023
Collect Time: 12:45 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0405-09-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, Total, Aqueous

Aliquot #: 23-0405-09-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0405

Inspection Date: 5.04.23 **Inspection By:** LMO

Sample Origin/Project Name: Q2-2023 JCW Bottom Ash Pond

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet_____ Other_____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.7 - 5.9 Samples Received on Ice: Yes X No____

M&TE # and Expiration LS 027723

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	14				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	16				
24 mL vial (glass)					
~~500~~ 250 mL (plastic)	5				
Other					

prf Strip
Lot # 205522
Exp. 2.15.25

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SAMPLING SITE / CUSTOMER: Q2-2023 JCW Bottom Ash Pond

PROJECT NUMBER: **23-0405**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0405-01	5/2/23	0833	GW	JCW-MW-15007	5	4	1						x	x	x	x	
-02	"	1057	GW	JCW-MW-15009	5	4	1						x	x	x	x	
-03	"	0920	GW	JCW-MW-15010	5	4	1						x	x	x	x	
-04	"	0943	GW	JCW-MW-15028	5	4	1						x	x	x	x	
-05	"	—	GW	DUP-JCW-BAP	5	4	1						x	x	x	x	
-06	"	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	
-08	"	1240	W	EB-JCW-BAP	1		1						x				
-09	"	1245	W	FB-JCW-BAP	1		1						x				

RELINQUISHED BY: [signature] DATE/TIME: 5/4/23 6:40 RECEIVED BY: [signature]

RELINQUISHED BY: [signature] DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS027727

Temperature: 1.7-5.9 °C Cal. Due Date: 5-25-23

eurofins | Environment Testing

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

See page two for job notes and contact information.

Job Notes

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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

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Revision 2

Authorized for release by
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Table of Contents

Definitions/Glossary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Qualifiers

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
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

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 0.3º 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/ 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/ 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.

Method Summary

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

Sample Summary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
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	FB-BACKGROUND	Water	05/01/23 12:40	05/05/23 08:00

Client Sample ID: MW-15002 — Lab Sample ID: 240-184759-1

Date Collected: 05/01/23 15:01 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.200	U	0.322	0.322	5.00	0.547	pCi/L		06/08/23 14:39	1

Client Sample ID: MW-15008 — Lab Sample ID: 240-184759-2

Date Collected: 05/01/23 12:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.286	U G	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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.388	U	0.674	0.674	5.00	1.16	pCi/L		06/08/23 14:39	1

Client Sample Results

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: MW-15016 Lab Sample ID: 240-184759-3

Date Collected: 05/02/23 08:40 **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.201	U G	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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.134	U	0.529	0.529	5.00	1.01	pCi/L		06/08/23 14:39	1

Client Sample ID: MW-15019 — Lab Sample ID: 240-184759-4

Date Collected: 05/01/23 13:43 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.134	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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.792	U	0.546	0.547	5.00	0.859	pCi/L		06/08/23 14:39	1

Client Sample ID: DUP-BACKGROUND
Lab Sample ID: 240-184759-5
Date Collected: 05/01/23 00:00
Matrix: Water
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.981**		0.570	0.574	5.00	0.883	pCi/L		06/08/23 14:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.226	U	0.354	0.355	5.00	0.593	pCi/L		06/08/23 14:39	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
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 Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
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

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-611074/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	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	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:08*	*06/08/23 06:45*	*1*

Lab Sample ID: LCS 160-611074/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

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

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

Lab Sample ID: LCSD 160-611074/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226			11.3	10.42		1.12	1.00	0.131	pCi/L	92	75 - 113	0.42	1

Carrier	*LCSD %Yield*	*LCSD 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**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.4069	U	0.333	0.335	1.00	0.512	pCi/L	05/11/23 12:51	06/01/23 12:31	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*
Y Carrier	*79.2*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*

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

Lab Sample ID: LCS 160-611088/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 614160 — **Prep Batch: 611088**

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

Carrier	*LCS %Yield*	*LCS 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**

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

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

QC Association Summary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Rad

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. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: MW-15002 — Lab Sample ID: 240-184759-1

Date Collected: 05/01/23 15:01 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-184759-2

Date Collected: 05/01/23 12:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-15016 — Lab Sample ID: 240-184759-3

Date Collected: 05/02/23 08:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-184759-4

Date Collected: 05/01/23 13:43 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: DUP-BACKGROUND — Lab Sample ID: 240-184759-5

Date Collected: 05/01/23 00:00 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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. Job ID: 240-184759-1
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
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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

MICHIGAN 190

0-3 / 0-3

Chain of Custody Record

MICHIGAN 190

eurofins | Environment Testing

Client Information	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-107203-33282.1
Client Contact: Jacob Krenz	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: TRC Environmental Corporation.	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: TBD			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR Background Well	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, Ra226Ra228_GFPC	904.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
MW-15002	5-1-23	1501	G	Water	N	N	X	X		
MW-15008	5-1-23	1240	G	Water	N	N	X	X		
MW-15016	5-2-23	0840	G	Water	N	N	X	X		
MW-15019	5-1-23	1343	G	Water	N	N	X	X		
DUP-Background	5-1-23	—	G	Water	N	N	X	X		
~~EQ-Background~~				~~Water~~						
FB-Background	5-1-23	1240	G	Water	N	N	X	X		

240-184759 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	[signature]	5-4-23 1417	TRC	[signature]	5/4/23 1417	EETA
2	[signature]	5/4/23 1418	EETA	[signature]	5-5-23 800	EETNC
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins - Canton Sample Receipt Form/Narrative Login # : 184759
Barberton Facility

Client TRC Site Name

Cooler Received on 5-5-23 Opened on 5-5-23

Cooler unpacked by:

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

Eurofins Cooler # EC ~~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 1	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels (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?	Yes	No
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?	Yes	No
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

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM Date by via Verbal Voice Mail Other

Concerning

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

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.

Time preserved: Preservative(s) added/Lot number(s):

VOA Sample Preservation - Date/Time VOAs Frozen:

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
MW-15002	240-184759-A-1	Plastic 1 liter - Nitric Acid	<2			
MW-15002	240-184759-B-1	Plastic 1 liter - Nitric Acid	<2			
MW-15008	240-184759-A-2	Plastic 1 liter - Nitric Acid	<2			
MW-15008	240-184759-B-2	Plastic 1 liter - Nitric Acid	<2			
MW-15016	240-184759-A-3	Plastic 1 liter - Nitric Acid	<2			
MW-15016	240-184759-B-3	Plastic 1 liter - Nitric Acid	<2			
MW-15019	240-184759-A-4	Plastic 1 liter - Nitric Acid	<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			
DUP-BACKGROUD	240-184759-B-5	Plastic 1 liter - Nitric Acid	<2			
FB-BACKGROUND	240-184759-A-6	Plastic 1 liter - Nitric Acid	<2			
FB-BACKGROUND	240-184759-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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-167649.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-184759-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-15002 (240-184759-1)	5/1/23	15:01 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15008 (240-184759-2)	5/1/23	12:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15016 (240-184759-3)	5/1/23	08:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15019 (240-184759-4)	5/1/23	13:43 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-BACKGROUD (240-184759-5)	5/1/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
FB-BACKGROUND (240-184759-6)	5/1/23	12:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
										12	

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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 5523 1101	Company EETNC	Received by: fedex
Relinquished by: fedex	Date/Time:	Company	Received by:
Relinquished by:	Date/Time:	Company	Received by:

Received by:	Date/Time:	Company
	Date/Time: 5/8/23 0910	Company ETASTL
	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-184759-1

Login Number: 184759
List Number: 2
Creator: Sharkey-Gonzalez, Briana L

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

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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	

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

See page two for job notes and contact information.

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

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

Table of Contents

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.
¤	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

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.

Method Summary

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

Sample Summary

Client: TRC Environmental Corporation. Job ID: 240-184760-1
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	05/05/23 08:00
240-184760-2	JCW-MW-15009	Water	05/02/23 10:57	05/05/23 08:00
240-184760-3	JCW-MW-15010	Water	05/02/23 12:12	05/05/23 08:00
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

Client Sample ID: JCW-MW-15007 — Lab Sample ID: 240-184760-1

Date Collected: 05/02/23 08:33 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.419	U	0.357	0.358	5.00	0.579	pCi/L		06/08/23 14:39	1

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

Date Collected: 05/02/23 10:57 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.652	U	0.597	0.600	5.00	0.944	pCi/L		06/08/23 14:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.613	U	0.453	0.455	5.00	0.740	pCi/L		06/08/23 14:39	1

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 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.42		0.640	0.647	5.00	0.916	pCi/L		06/08/23 14:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.0200	U	0.265	0.265	5.00	0.502	pCi/L		06/08/23 14:39	1

Tracer/Carrier Summary

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

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
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

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-611074/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	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	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:08*	*06/08/23 06:45*	*1*

Lab Sample ID: LCS 160-611074/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

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

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

Lab Sample ID: LCSD 160-611074/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226			11.3	10.42		1.12	1.00	0.131	pCi/L	92	75 - 113	0.42	1

Carrier	*LCSD %Yield*	*LCSD 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**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.4069	U	0.333	0.335	1.00	0.512	pCi/L	05/11/23 12:51	06/01/23 12:31	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*
Y Carrier	*79.2*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*

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

Lab Sample ID: LCS 160-611088/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 614160 — **Prep Batch: 611088**

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

Carrier	*LCS %Yield*	*LCS 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**

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

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

Rad

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	

Lab Chronicle

Client: TRC Environmental Corporation. Job ID: 240-184760-1
Project/Site: Karn/Weadock CCR JCW Bottomn Ash Pond

Client Sample ID: JCW-MW-15007 — Lab Sample ID: 240-184760-1

Date Collected: 05/02/23 08:33 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-15010 — Lab Sample ID: 240-184760-3

Date Collected: 05/02/23 12:12 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-184760-4

Date Collected: 05/02/23 09:43 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 12:43
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. Job ID: 240-184760-1
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	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
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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

MICHIGAN 190

Chain of Custody Record

2.4/2.4

MICHIGAN 190

eurofins | Environment Testing

Client Information	Sampler: JAVIER JASSO	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-107204-29049.1
Client Contact: Jacob Krenz	Phone: 734 901 3310	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: TRC Environmental Corporation.	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 178829			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR JCW Bottom Ash Pond	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, Ra226Ra228_GFPC	904.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
JCW-MW-15007	5/2/23	0833	G	Water	N	N	X	X	2	
JCW-MW-15009	" "	1057	G	Water	N	N	X	X	2	
JCW-MW-15010	" "	1313		Water	N	N	X	X	2	
JCW-MW-15028	" "	0943	G	Water	N	N	X	X	2	
DUP-JCW BAP	" "	—	G	Water	N	N	X	X	2	
EB-JCW-BAP	" "	1346	G	Water	N	N	X	X	2	
				Water						

240-184760 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		5/4/23 0800	EC		5/4/23 800	EETA
2		5/4/23 800	EETA		5-5-23 800	EETC
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins - Canton Sample Receipt Form/Narrative Login # : 184760
Barberton Facility

Client TRC Site Name _____ Cooler unpacked by: Jenny Ryan

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 # ES 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 1	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels (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?	Yes	No
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?	Yes	No
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

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

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.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative 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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-167649.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-184760-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Tnzma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
JCW-MW-15007 (240-184760-1)	5/2/23	08:33 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-15009 (240-184760-2)	5/2/23	10:57 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-15010 (240-184760-3)	5/2/23	12:12 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-15028 (240-184760-4)	5/2/23	09:43 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-JCW BAP (240-184760-5)	5/2/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EB-JCW-BAP (240-184760-6)	5/2/23	12:40 Eastern		Water			X	X	X	2	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 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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		5/5/23 1611	EEINC	fedex	5/6	
2	fedex					
3					5/8/23 0910	ETALTC

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-184760-1

Login Number: 184760
List Number: 2
Creator: Sharkey-Gonzalez, Briana L

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

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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.	True	

July 2023 Assessment Monitoring Data Summary and Statistical Evaluation

JC Weadock, Bottom Ash Pond CCR Unit

Essexville, Michigan

January 2024

Prepared For:

Consumers Energy Company

Prepared By:

TRC
1540 Eisenhower Place
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Darby Litz
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Project Geologist

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APPENDICES

1.0 Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90 – 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 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; 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	Appendix IV	
Boron	Antimony	Mercury
Calcium	Arsenic	Molybdenum
Chloride	Barium	Selenium
Fluoride	Beryllium	Thallium
pH	Cadmium	
Sulfate	Chromium	
Total Dissolved Solids (TDS)	Cobalt	
	Fluoride	
	Lead	

Lithium	

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

[1] 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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TRC. 2019b. Assessment of Corrective Measures – JC Weadock Bottom Ash Pond and Landfill Coal Combustion Residual Units. Prepared for Consumers Energy Company. September.

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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

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			July 24, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring 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		Sand with clay				5.58	580.86
Bottom Ash Pond: Downgradient Monitoring 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: Downgradient Monitoring Wells (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 Headwells							
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 (°C)	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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	**500**	**500**	4,000	205	157	**533**	275
Calcium	mg/L	NC	NC	NC	500[EE]	245	126	244	162
Chloride	mg/L	**250****	**250[E]**	**250[E]**	**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[E]	250[E]	500[EE]	< 1	89	149	101
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	**5,430**	**1,160**	**1,340**	**1,400**
pH, Field	SU	**6.5 - 8.5****	**6.5 - 8.5[E]**	**6.5 - 8.5[E]**	**6.5 - 9.0**	6.7	**6.5**	6.9	6.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	**30,400**	**22,500**	**22,500**	**21,800**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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}.

[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) addtional 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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^				
Appendix III[(1)]									
Boron	ug/L	NC	**500**	**500**	4,000	**1,280**	**957**	**1,050**	**987**
Calcium	mg/L	NC	NC	NC	500[EE]	71.7	125	143	52.5
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	500[EE]	50.2	**290**	**446**	158
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	**596**	**892**	**926**	**551**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	7.3	7.7	7.7	7.4
Appendix IV[(1)]									
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[(2)]									
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	< 20	**1,360**	**1,860**	**720**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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	5,000[E]	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}.

[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) addtional 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 5
Summary of Assessment Monitoring Statistical Evaluation – July 2023
JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program
Essexville, Michigan

Constituent	Units	GWPS	JCW-MW-15007		JCW-MW-15010	
			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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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

0 1,500 3,000

FEET

1:36,000 1" = 3,000'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

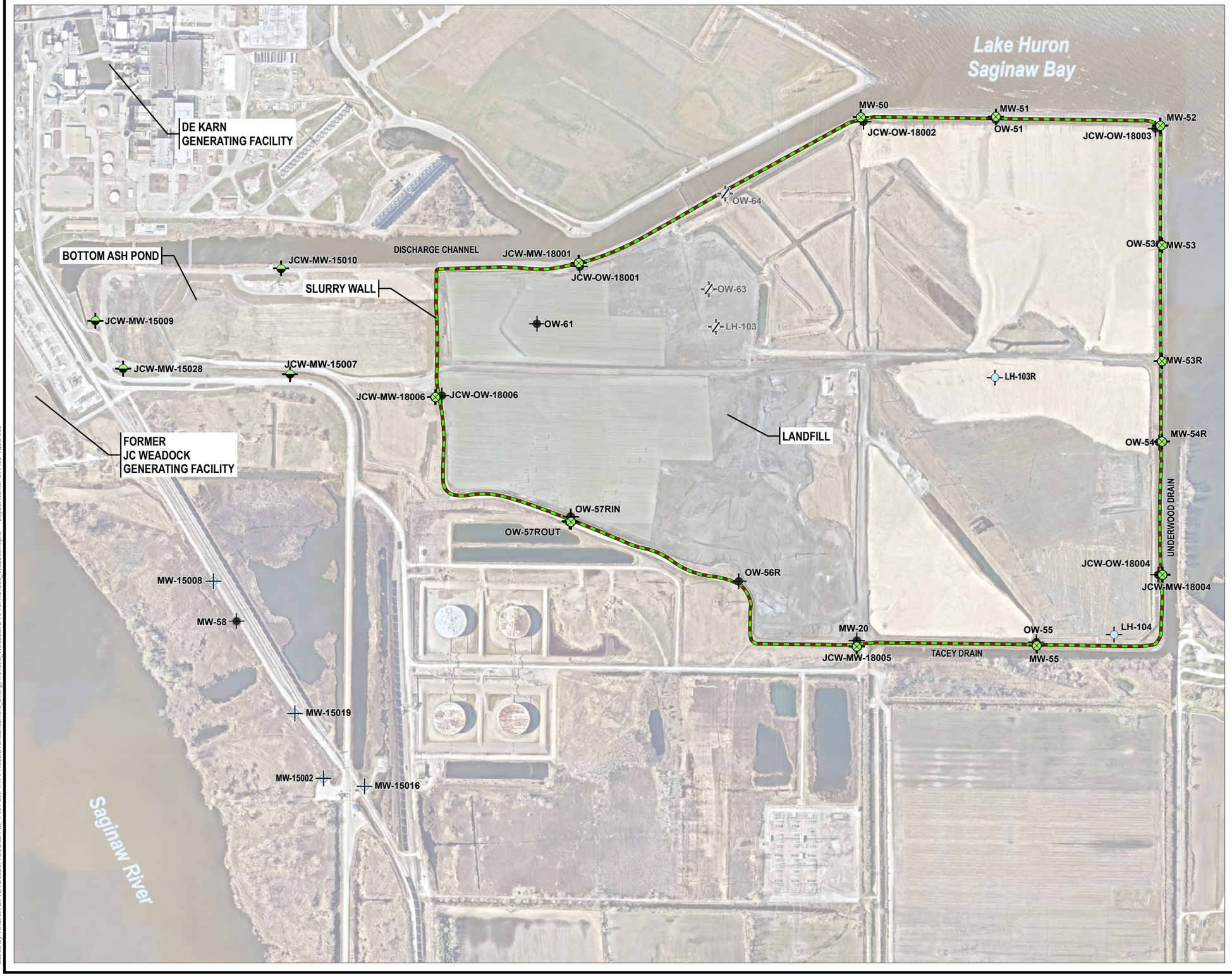
PROJECT:
CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		FIGURE 1
DATE:	JANUARY 2024		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_WEADOCK



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
SITE MAP

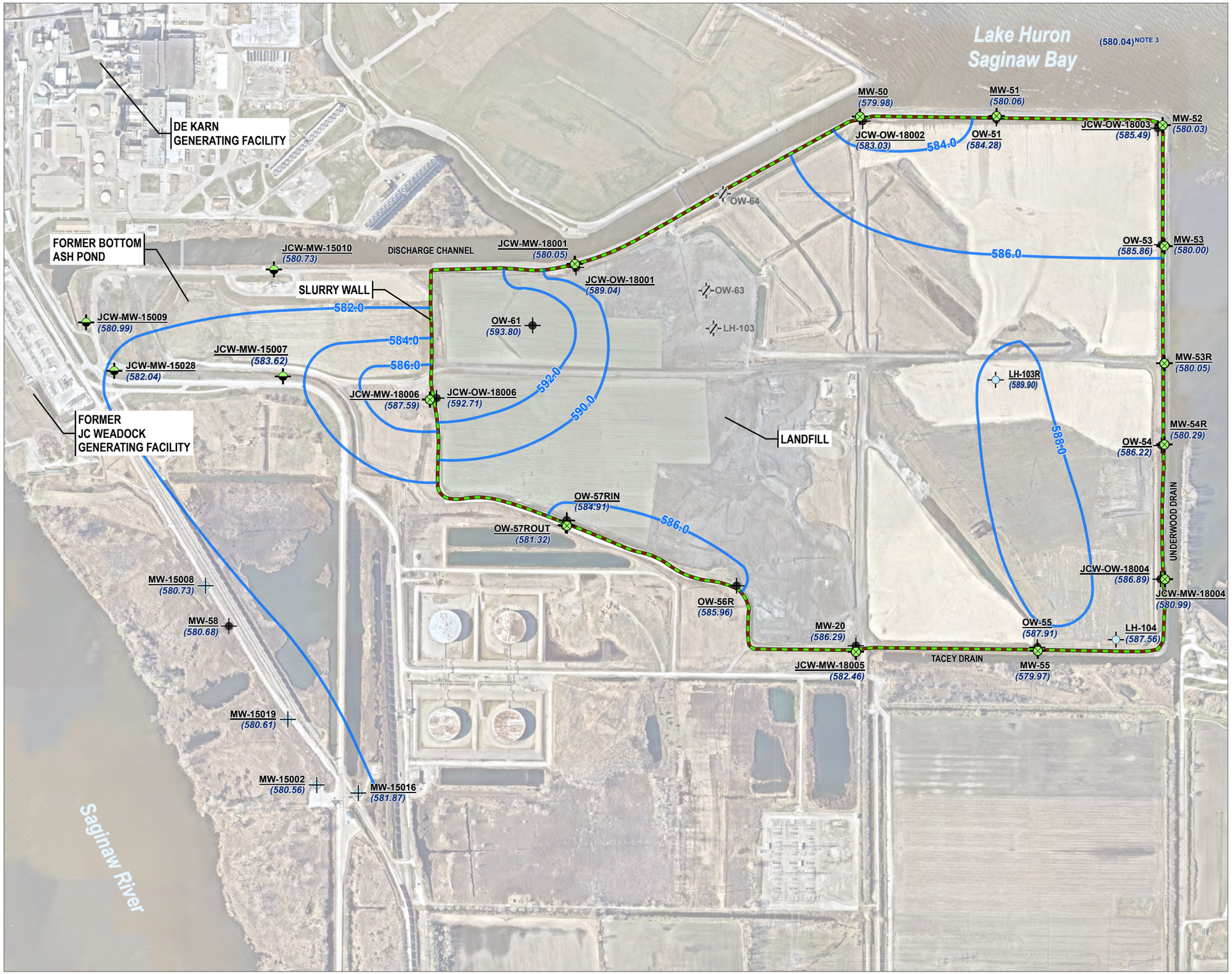
DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2024		

FIGURE 2

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 12/13/2023 - 12:28:32 PM; File Path: T:\1_PROJECTS\Consumers_Energy\464096_Weadock\2-aRPKs\464096_Weadock.aprx; Layout Name: 514403-AQ23-002



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
1" = 600'
0 600 1,200 FEET

PROJECT: CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE: POTENTIOMETRIC SURFACE MAP
JULY 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0001
CHECKED BY:	J. KRENZ		FIGURE 3
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2024		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 1/24/2024 - 13:56:38 PM; File Path: T:\PROJECTS\Consumers_Energy\464096_Weadock\2-APRX\464096_Weadock.aprx; Layout Name: 514403-3Q23-003

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	Chromium	Field duplicate variability (absolute difference equal to reporting limit); potential uncertainty exists for the listed results.
MW-15008	7/24/2023		
MW-15016	7/26/2023		
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

1540 Eisenhower Pl.
Ann Arbor, MI 48108

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Technical Memorandum

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[1] 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™ 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.

[1] 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[2], 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™ 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

[2] 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[3] 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™ 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™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent 8 sampling events. Eight independent sampling events provide the appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-test 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.

[3] 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

						Sample Location:	JCW-MW-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.
(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

						Sample Location:	JCW-MW-15009						
						Sample Date:	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	5/14/2020							
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

						Sample Location:	JCW-MW-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.
(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

						Sample Location:	JCW-MW-15028							
						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

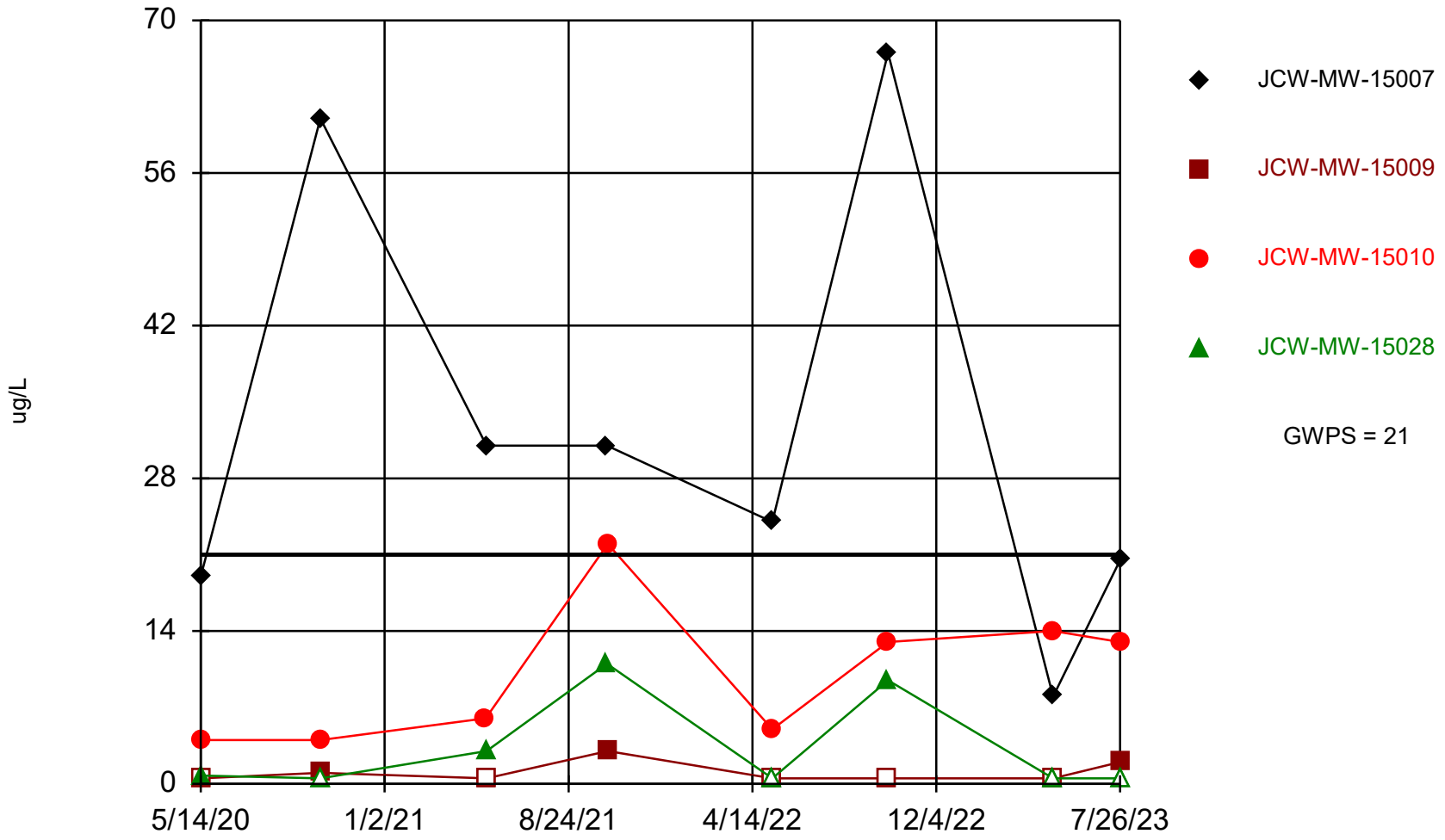
Notes:

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

Hollow symbols indicate censored values.

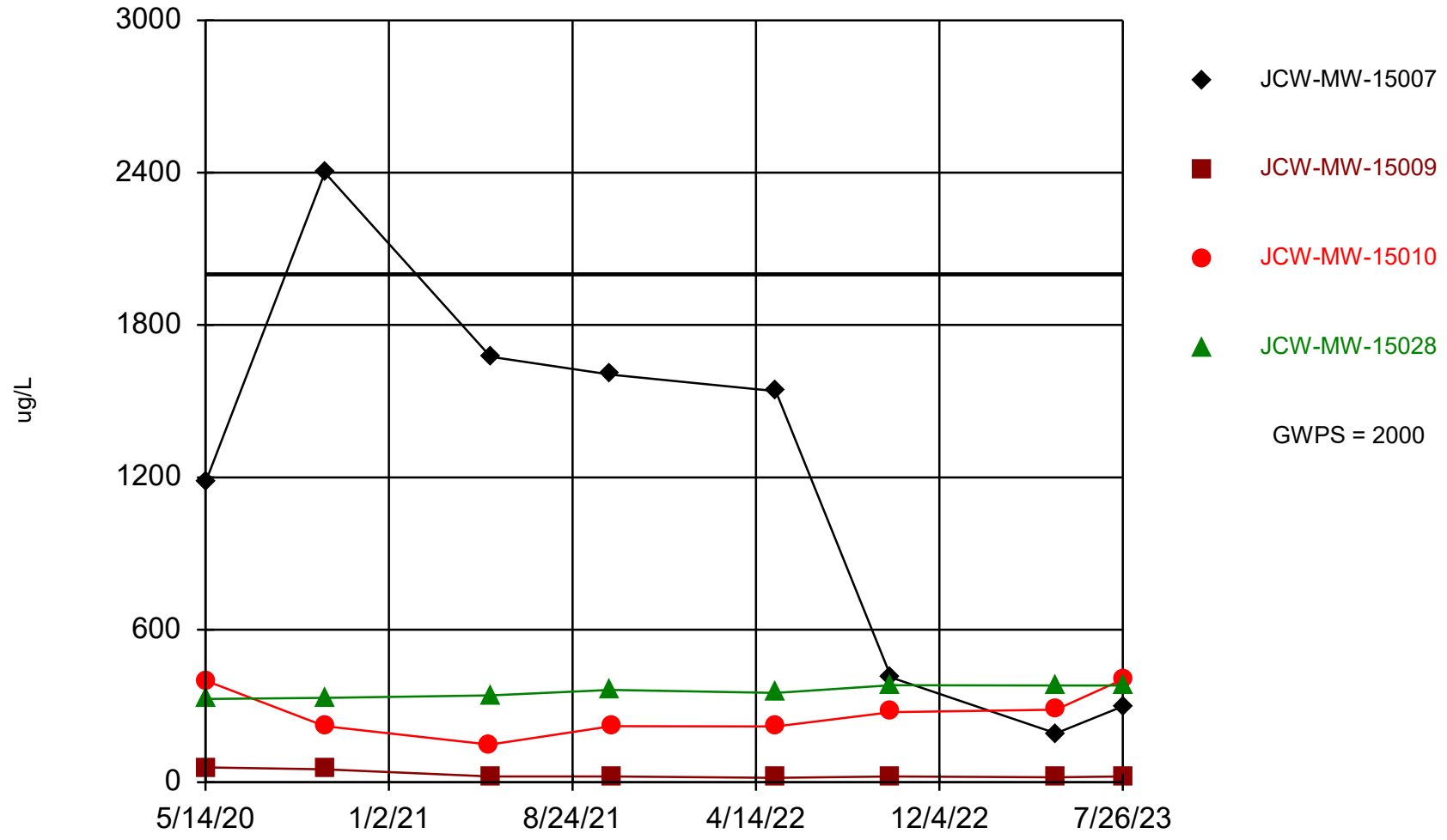
Arsenic Comparison to GWPS



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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Barium Comparison to GWPS

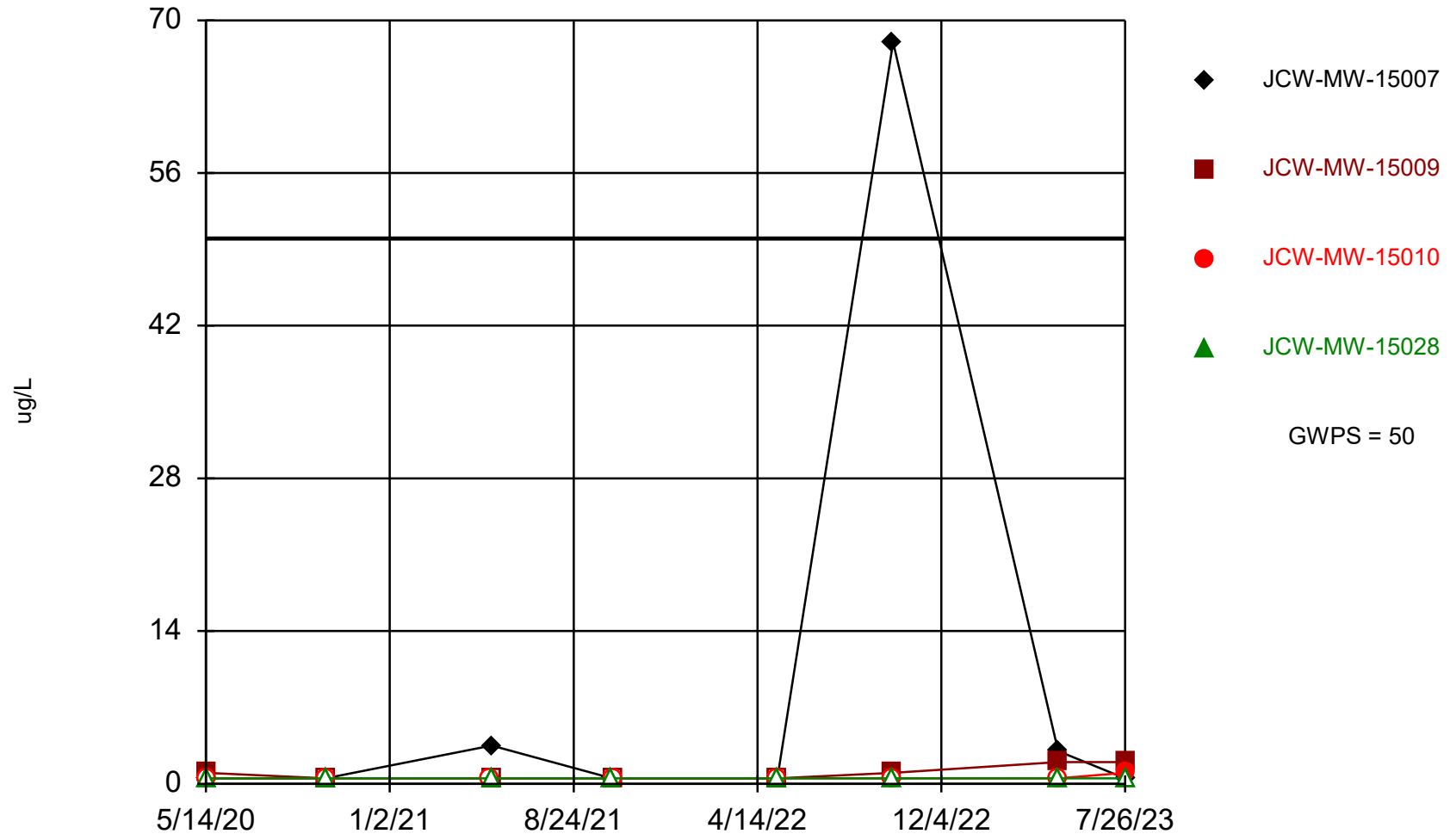


Time Series Analysis Run 9/21/2023 1:39 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Hollow symbols indicate censored values.

Selenium Comparison to GWPS



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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

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	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

Constituent: Selenium, Total Analysis Run 9/21/2023 1:42 PM
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

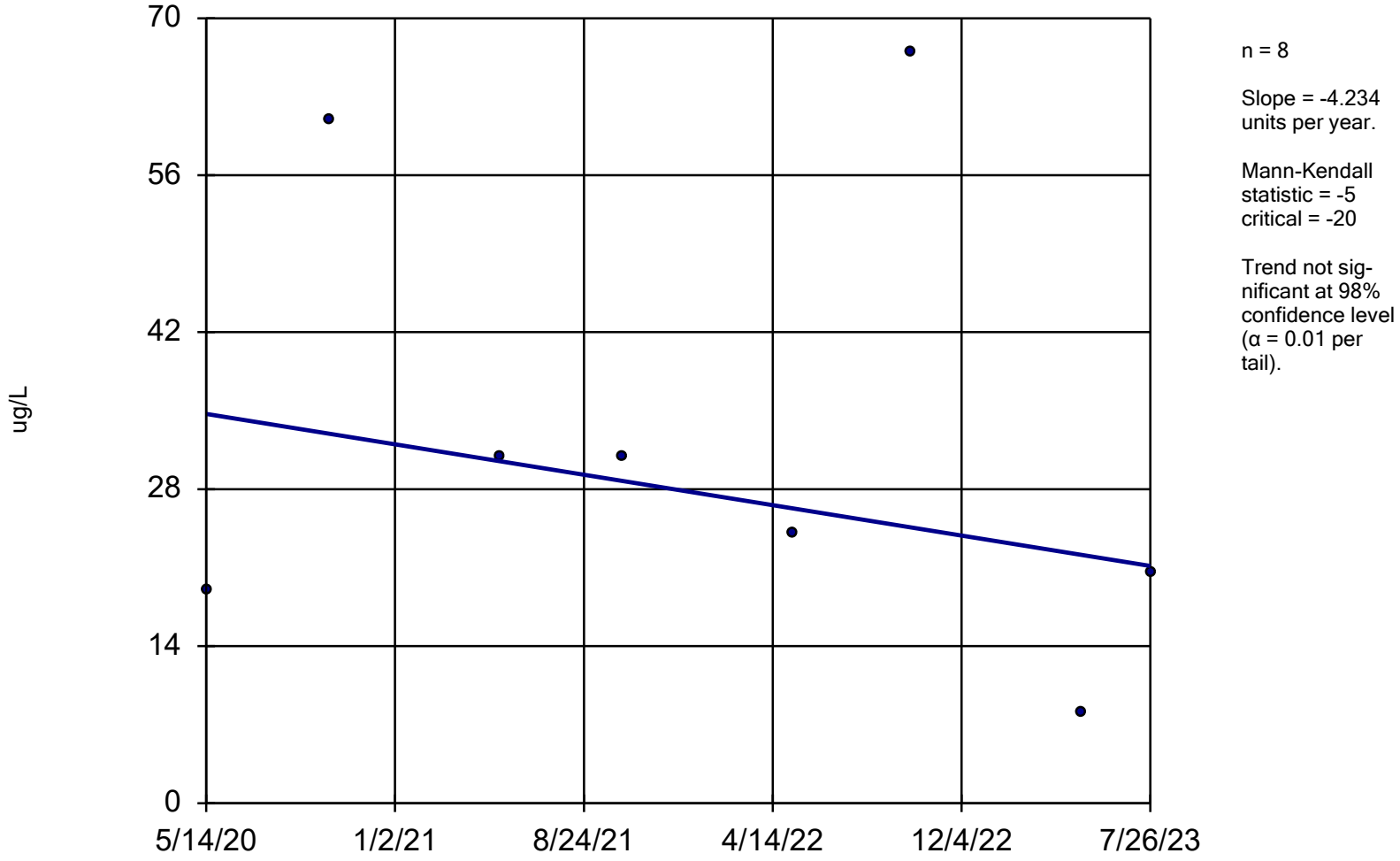
For observations made between 5/14/2020 and 7/26/2023, a summary of the selected data set:

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Arsenic, Total

JCW-MW-15007



n = 8

Slope = -4.234 units per year.

Mann-Kendall statistic = -5
critical = -20

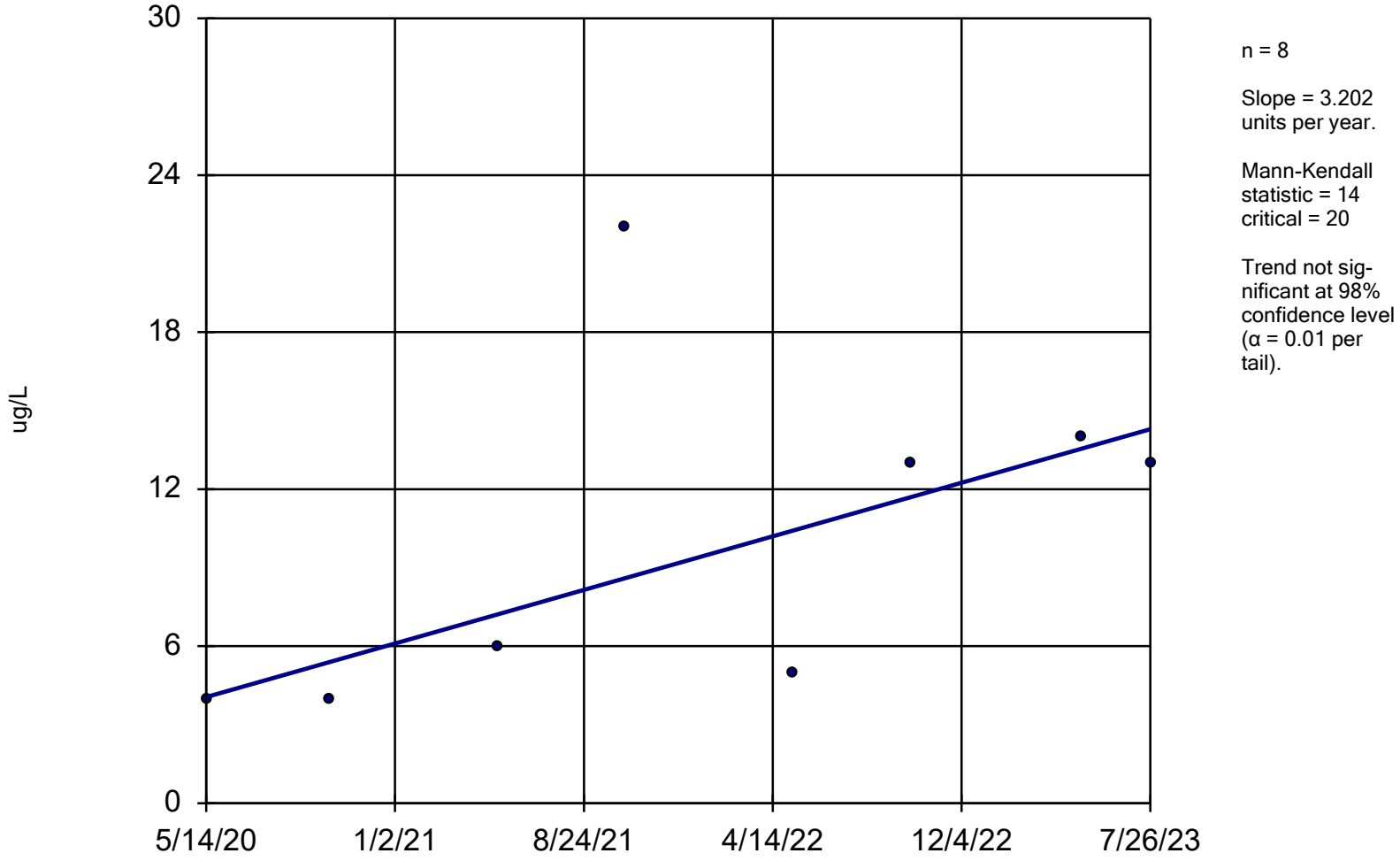
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Arsenic, Total

JCW-MW-15010



n = 8

Slope = 3.202 units per year.

Mann-Kendall statistic = 14
critical = 20

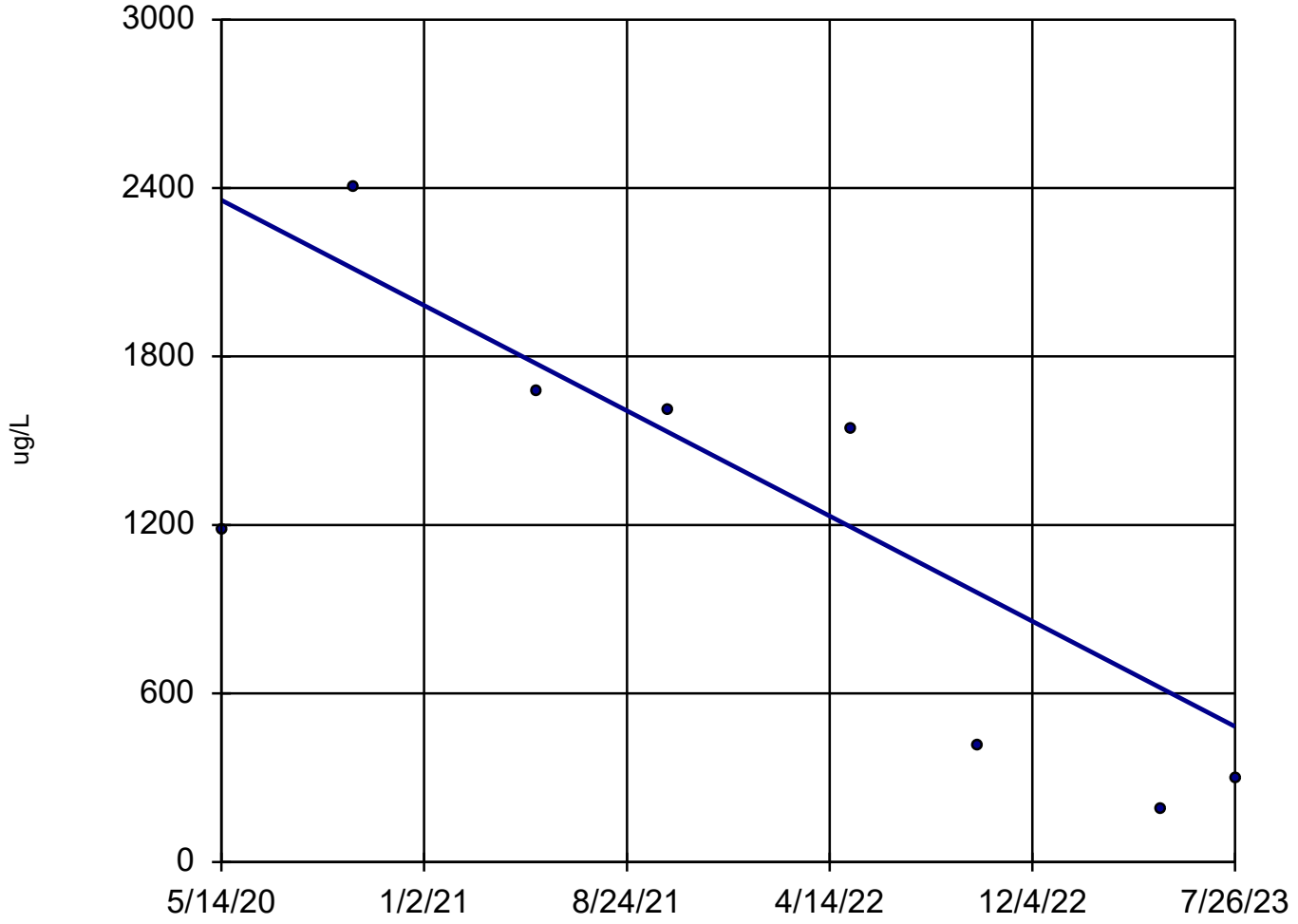
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Barium, Total

JCW-MW-15007



n = 8

Slope = -585.6 units per year.

Mann-Kendall statistic = -18
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

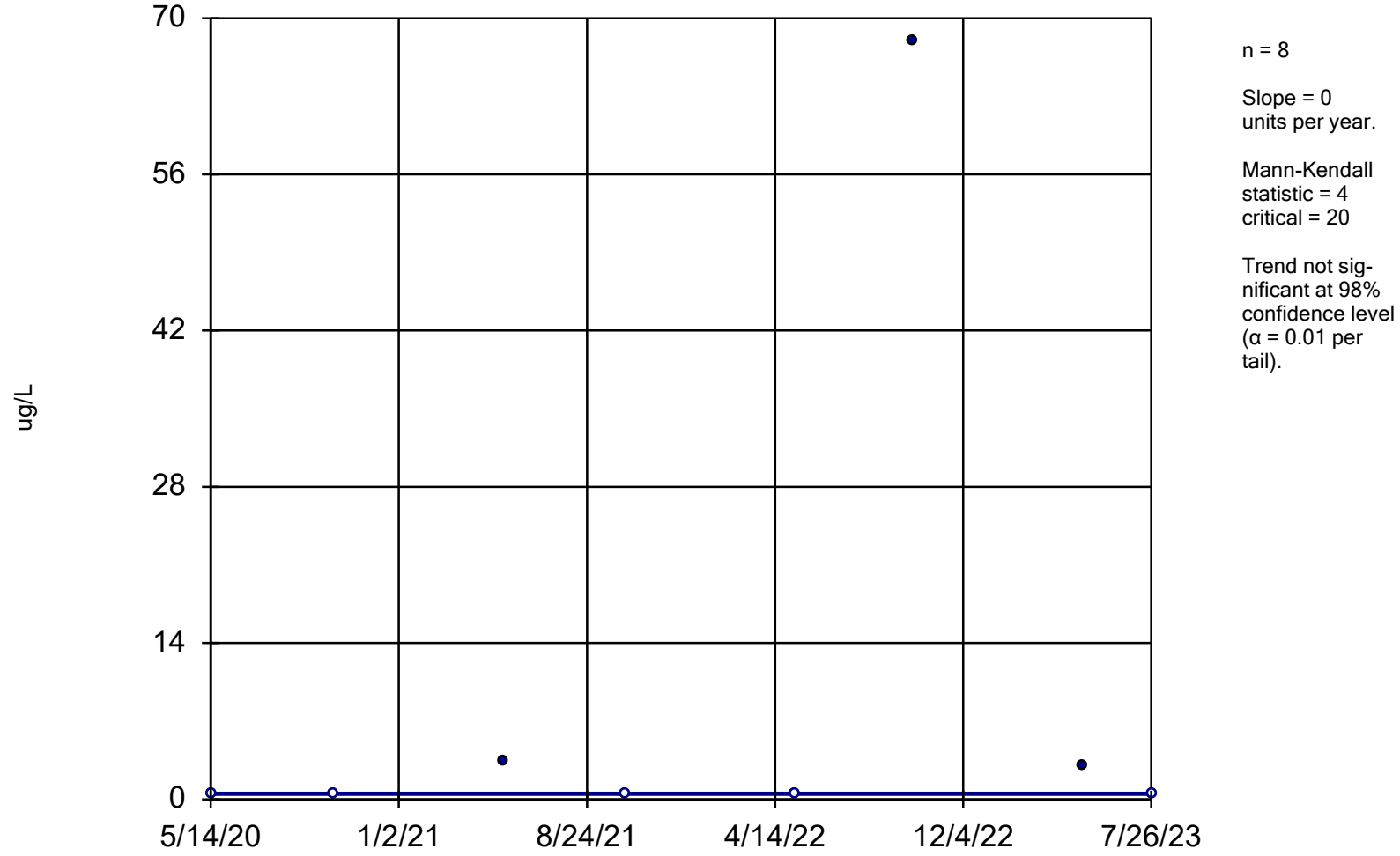
Sen's Slope Estimator Analysis Run 9/21/2023 1:44 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Hollow symbols indicate censored values.

Selenium, Total

JCW-MW-15007



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 4
critical = 20

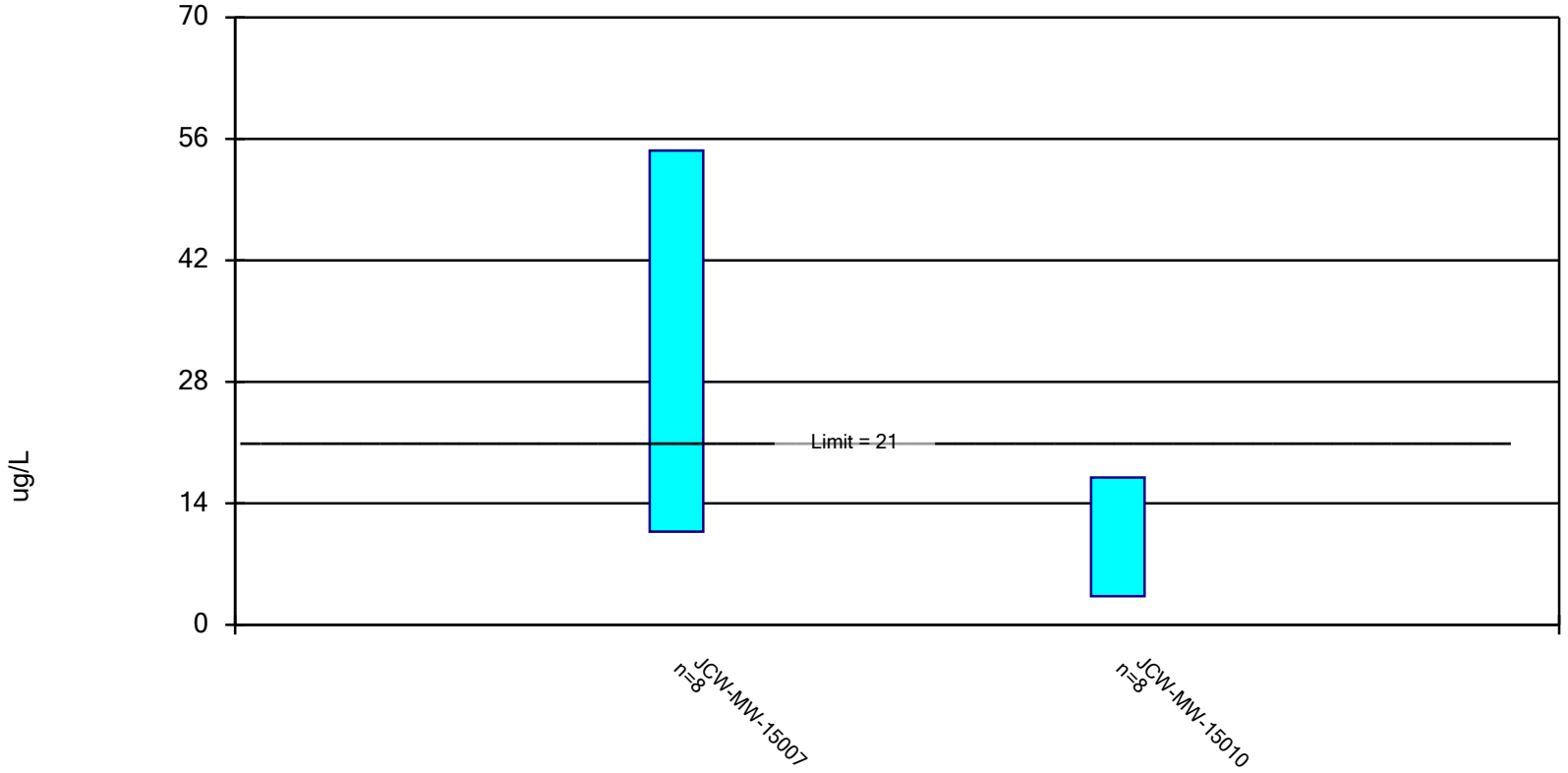
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Sen's Slope Estimator Analysis Run 9/21/2023 1:44 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 9/21/2023 1:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

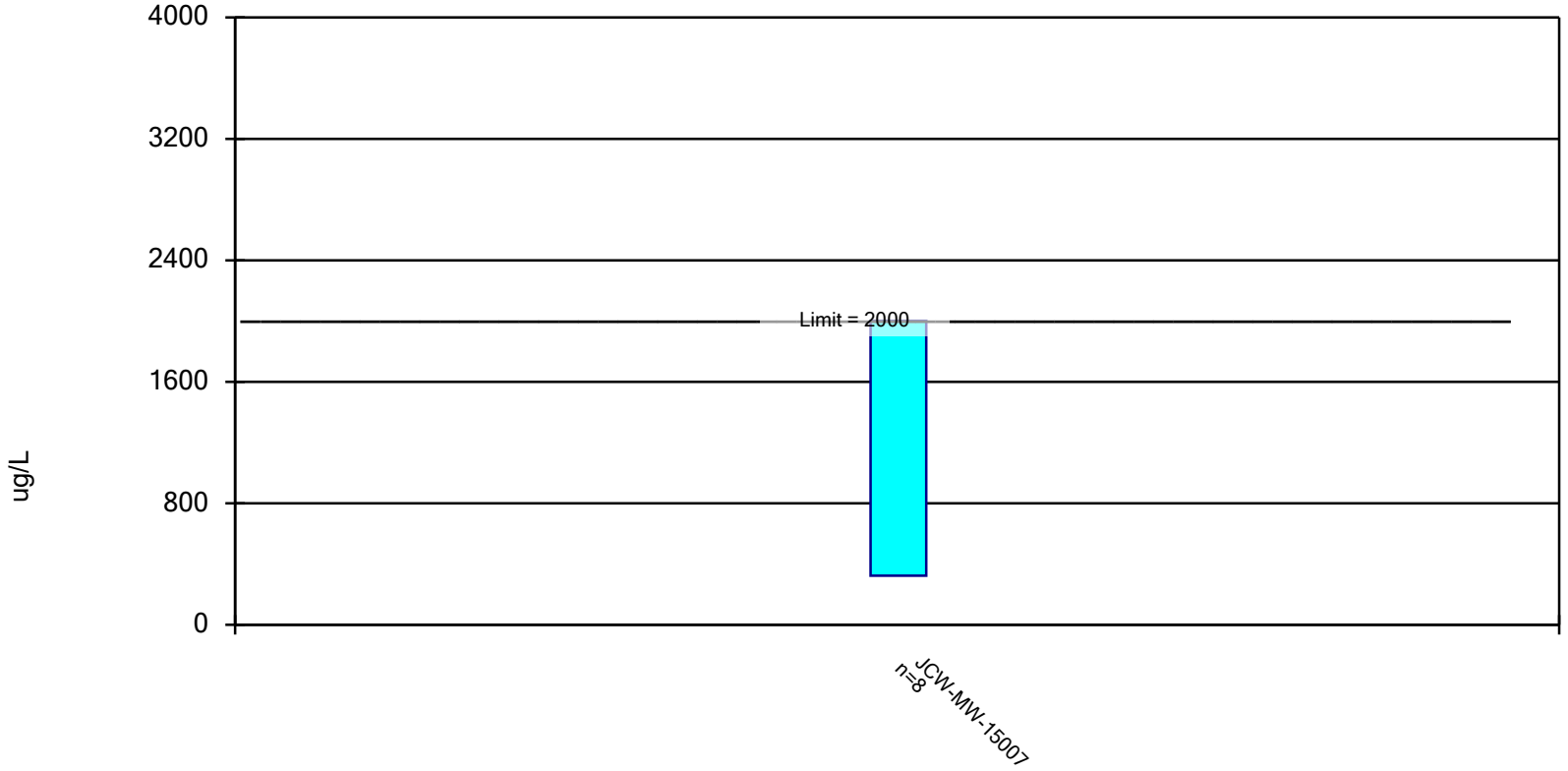
Constituent: Arsenic, Total (ug/L) Analysis Run 9/21/2023 1:46 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

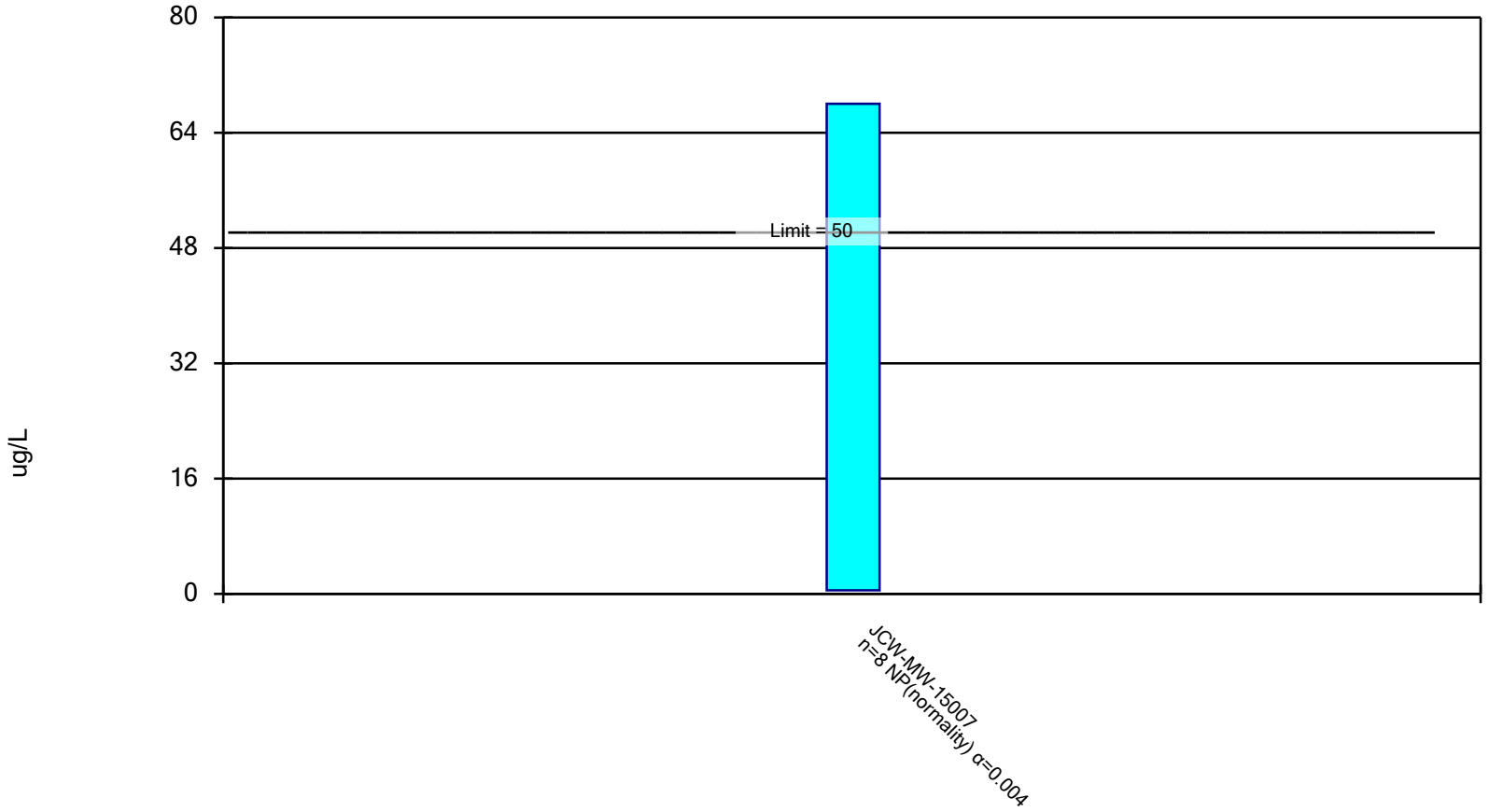
Constituent: Barium, Total (ug/L) Analysis Run 9/21/2023 1:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

	JCW-MW-15007
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)
7/26/2023	298 (D)
Mean	1163
Std. Dev.	791.5
Upper Lim.	2002
Lower Lim.	323.8

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

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

To: 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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15007**
Lab Sample ID: 23-0722-01
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 06:50 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-01-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	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

Aliquot #: 23-0722-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-01-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 #: 23-0722-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2220		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15007**
Lab Sample ID: 23-0722-01
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 06:50 AM

Alkalinity by SM 2320B

Aliquot #: 23-0722-01-C04-A01 **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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15009**
Lab Sample ID: 23-0722-02
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 08:35 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-02-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	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

Aliquot #: 23-0722-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-02-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	21700		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	1370000		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0722-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1230		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15009**
Lab Sample ID: 23-0722-02
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 08:35 AM

Alkalinity by SM 2320B

Aliquot #: 23-0722-02-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

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15010**
Lab Sample ID: 23-0722-03
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 09:23 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-03-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, Aqueous

Aliquot #: 23-0722-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-03-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 #: 23-0722-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	686		mg/L	10.0	07/28/2023	AB23-0728-09

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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-15010**	Collect Date:	07/26/2023
Lab Sample ID:	23-0722-03	Collect Time:	09:23 AM
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0722-03-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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15028**
Lab Sample ID: 23-0722-04
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 07:43 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-04-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	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, Aqueous

Aliquot #: 23-0722-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1150000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	141000		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0722-04-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1260		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15028**
Lab Sample ID: 23-0722-04
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 07:43 AM

Alkalinity by SM 2320B

Aliquot #: 23-0722-04-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

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **DUP-JCW-BAP**
Lab Sample ID: 23-0722-05
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-05-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, Aqueous

Aliquot #: 23-0722-05-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-05-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 #: 23-0722-05-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

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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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0722-05-C04-A01 **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

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Analytical Report

Report Date: 08/12/23

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

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-06-C01-A01 **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, Aqueous

Aliquot #: 23-0722-06-C01-A02 **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, Cl, F, SO4, Aqueous

Aliquot #: 23-0722-06-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 #: 23-0722-06-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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **JCW-MW-15009 MSD**
Lab Sample ID: 23-0722-07
Matrix: Groundwater

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 08:35 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-07-C01-A01 **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		%	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, Aqueous

Aliquot #: 23-0722-07-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, Aqueous

Aliquot #: 23-0722-07-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 #: 23-0722-07-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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **EB-JCW-BAP**
Lab Sample ID: 23-0722-08
Matrix: Water

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 09:35 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-08-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	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 #: 23-0722-08-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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Bottom Ash Pond**
Field Sample ID: **FB-JCW-BAP**
Lab Sample ID: 23-0722-09
Matrix: Water

Laboratory Project: **23-0722**
Collect Date: 07/26/2023
Collect Time: 09:30 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0722-09-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	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 #: 23-0722-09-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0722

Inspection Date: 7-27-23 **Inspection By:** TwR

Sample Origin/Project Name: Q3-2023 JCW Bottom Ash Pond

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler 1 Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC 1 Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.4-1.8°C Samples Received on Ice: Yes ✓ No ____

M&TE # and Expiration 015402 5-23-24

pH paper
Lot# 205522
Exp: 2-15-25

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	14				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	16				
24 mL vial (glass)					
500 mL (plastic)					
Other 250mL Plas	5				

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q3-2023 JCW Bottom Ash Pond

PROJECT NUMBER: 23-0722

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0722-01	7/26/23	0950	GW	JCW-MW-15007	5	4	1						x	x	x	x	
-02	〃	0935	GW	JCW-MW-15009	5	4	1						x	x	x	x	
-03	〃	0933	GW	JCW-MW-15010	5	4	1						x	x	x	x	
-04	〃	0743	GW	JCW-MW-15028	5	4	1						x	x	x	x	
-05	〃	—	GW	DUP-JCW-BAP	5	4	1						x	x	x	x	
-06	〃	0835	GW	JCW-MW-15009 MS	4	3	1						x	x		x	
-07	〃	0831	GW	JCW-MW-15009 MSD	4	3	1						x	x		x	
-08	〃	0935	W	EB-JCW-BAP	1		1						x				
-09	〃	0930	W	FB-JCW-BAP	1		1						x				

RELINQUISHED BY: [signature] DATE/TIME: 7/27/23 0930 RECEIVED BY: [signature]

RELINQUISHED BY: [signature] DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 1.4 -1.8 °C Cal. Due Date: 5-23-24

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0721-01
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 08:52 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-01-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 Total Metals Exp

Aliquot #: 23-0721-01-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1940000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	2160		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2100		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0721-02
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 01:23 PM

Mercury 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 Appendix III-IV Total Metals Exp

Aliquot #: 23-0721-02-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, Aqueous

Aliquot #: 23-0721-02-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

Aliquot #: 23-0721-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	526		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0721-03
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 09:33 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-03-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 Total Metals Exp

Aliquot #: 23-0721-03-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	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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	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 2540C

Aliquot #: 23-0721-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	660		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0721-04
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 02:05 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-04-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 Total Metals Exp

Aliquot #: 23-0721-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	339000		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

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-04-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

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0721-05
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-05-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 Total Metals Exp

Aliquot #: 23-0721-05-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	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, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	336000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	18800		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	559		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **FB- Background**
Lab Sample ID: 23-0721-06
Matrix: Water

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 09:33 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-06-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 Total Metals Exp

Aliquot #: 23-0721-06-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	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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0721

Inspection Date: 07.27.23 **Inspection By:** CLE

Sample Origin/Project Name: 03.2023 ICW-DEK Background

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler (1) Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 2.8-3.6°C Samples Received on Ice: Yes X No ____

M&TE # and Expiration 015402 5-23-24

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
500 mL (plastic)	5				
Other					

pH FSP 0-3
13.640.511
124-205522
EXP: 2.15.25

250

PG. 2&2 not needed

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

SAMPLING SITE / CUSTOMER: Q3-2023 JCW-DEK Background Wells

PROJECT NUMBER: 23-0721

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER ____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other ____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER ____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0721-01	7-26-23	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	x	
-04	7-24-23	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			

RELINQUISHED BY: [signature] DATE/TIME: 7/27/23 0800 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 2.8-3.6 °C Cal. Due Date: 5-23-24

First Quarter 2023 Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

Essexville, Michigan

April 2023

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Darby Litz
Project Manager/Hydrogeologist

Kristin Lowery, E.I.T.
Project Engineer

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TABLES

FIGURES

APPENDICES

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-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 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
pH	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™ 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
- pH
- Arsenic
- Lithium
- Selenium
- Iron
- Sulfate
- Chromium
- Molybdenum
- 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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Tables

Table 1
Summary of Groundwater Elevation Data
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			March 6, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring Wells							
MW-15002	587.71	Sand	580.9	to	570.9	6.11	581.60
MW-15008	585.36	Sand with clay	578.7	to	568.7	4.35	581.01
MW-15016	586.49	Sand	581.2	to	578.2	3.14	583.35
MW-15019	586.17	Sand and Sand/Clay	579.5	to	569.5	6.12	580.05
Bottom Ash Pond: Downgradient Monitoring Wells							
JCW-MW-15007	587.40	Sand	582.7	to	579.2	3.18	584.22
JCW-MW-15009	589.64	Sand	581.9	to	576.9	8.73	580.91
JCW-MW-15010	597.76	Sand	579.7	to	578.2	17.68	580.08
JCW-MW-15028	589.64	Sand	567.7	to	564.7	6.22	583.42
Landfill: Downgradient Monitoring Wells (outside slurry wall)							
JCW-MW-18001	596.73	Sand and Sandy Clay	578.3	to	573.3	17.35	579.38
JCW-MW-18004	593.04	Sandy Clay	583.9	to	578.9	12.24	580.80
JCW-MW-18005	590.89	Sand and Sandy Clay	580.0	to	575.0	6.33	584.56
JCW-MW-18006	600.72	Fly Ash and Sandy Clay	582.8	to	577.8	12.96	587.76
MW-50	593.36	Sand	577.8	to	574.8	13.96	579.40
MW-51	594.29	Sand and Clay	577.8	to	574.8	14.72	579.57
MW-52	594.90	Sand	579.3	to	576.3	15.38	579.52
MW-53	593.68	Sand and Clay	579.1	to	576.1	14.02	579.66
MW-53R	594.25	Sand and Clay	580.4	to	575.4	14.86	579.39
MW-54R	593.89	Clay and Sand	581.3	to	576.3	14.00	579.89
MW-55	593.82	Sand	581.5	to	578.5	14.16	579.66
OW-57ROUT	591.00	Sandy Clay	577.0	to	572.0	8.50	582.50
Landfill: Static Water Level Only (inside slurry wall)							
JCW-OW-18001	595.84	Fly Ash and Sand	581.1	to	576.1	6.44	589.40
JCW-OW-18002	593.63	Sand	578.9	to	573.9	8.64	584.99
JCW-OW-18003	593.99	Sand and Clay	580.5	to	575.5	7.60	586.39
JCW-OW-18004	594.19	Sandy Clay	584.6	to	579.6	6.82	587.37
JCW-OW-18006	600.61	Fly Ash and Clay with Sand	582.9	to	577.9	6.58	594.03
MW-20	592.73	NR	~581.1	to	~578.1	5.22	587.51
OW-51	593.62	Clay and Sand	578.9	to	575.9	9.50	584.12
OW-53	593.64	Clay and Sand	579.0	to	576.0	6.64	587.00
OW-54	594.10	Clay and Sand	580.0	to	577.0	6.42	587.68
OW-55	594.67	Clay (or Sand and Clay)	580.9	to	577.9	5.00	589.67
OW-56R	592.01	Ash and Sand	577.5	to	572.5	4.38	587.63
OW-57R IN	590.86	Sandy Clay	575.7	to	570.7	4.56	586.30
OW-61	602.15	Ash and Sand	588.0	to	585.0	8.26	593.89
Landfill: Leachate Headwells							
LH-103R	612.70	Fly Ash	30.2	to	33.2	23.58	589.12
LH-104	596.56	Fly Ash	8.0	to	11.0	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 (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (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.

Table 3
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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	500	500	4,000	< 20	102	261	224
Calcium	mg/L	NC	NC	NC	500[EE]	81.3	96.6	108	143
Chloride	mg/L	**250****	**250[E]**	**250[E]**	**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[E]	250[E]	500[EE]	18.3	18.7	210	91.1
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	**574**	**743**	**673**	**1,200**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	7.3	6.8	7.1	6.7
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	**626**	**18,900**	**421**	**21,700**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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	5,000[E]	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) addtional 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 Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	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
								Downgradient	Downgradient/ GSI	Downgradient	Downgradient	Downgradient/ GSI	Downgradient/ GSI
Appendix III[(1)]													
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	500[EE]	NC	NC	486	221	262	121	152	169
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**1,640**	**533**	**435**	32.5	**341**	**360**
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**3,030**	**1,250**	**1,250**	**715**	**939**	**1,180**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.68	6.76	6.64	6.89	7.27	7.23
Appendix IV[(1)]													
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 115[(2)]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**830**	46	**1,720**	**2,930**	**604**	**514**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10

Notes:

ug/L - micrograms per liter; mg/L - milligrams per liter.
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# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.
[E] - Criterion is the aesthetic drinking water value per footnote {E}.
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(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
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BOLD value indicates an exceedance of one or more of the listed criteria.
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Table 4
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JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^	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
								Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient
Appendix III(1)													
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**	250E	250E	**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****	**250E**	**250E**	**500EE**	NC	NC	**581**	93.6	101	62.0	94.6	79.7
Total Dissolved Solids	mg/L	**500****	**500E**	**500E**	**500**	NC	NC	**1,430**	489	**960**	**770**	**898**	**790**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5E	6.5 - 8.5E	6.5 - 9.0	NC	NC	6.77	7.32	6.71	6.80	6.75	6.91
Appendix IV(1)													
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 115(2)													
Iron	ug/L	**300****	**300E**	**300E**	500,000EE	NC	NC	**2,820**	**403**	**1,580**	262	**24,800**	53
Copper	ug/L	1,000**	1,000E	1,000E	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.
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) addtional 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 5
Summary of Confidence Interval Evaluation: March 2023
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Assessment Monitoring Statistical Evaluation

Constituent	Units	GWPS	MW-50		MW-51		MW-52		MW-53		MW-53R		MW-54R		MW-55		OW-57R OUT		JCW-MW-18001		JCW-MW-18005		JCW-MW-18006	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron[(1)]	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	
			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.

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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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.

Table 6
Synthetic Precipitation Leaching Procedure Results
DE Karn & JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Parameter	Reporting Limit	Units	DE Karn Ash Silo Samples - March 21, 2023			
			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

Table 7
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 (**bold** >201)	4 Qtr. 2022 (**bold** >201)	3 Qtr. 2022 (**bold** >201)	2 Qtr. 2022 (**bold** >201)

No Exceedances at Compliance Locations

Figures

0 1,500 3,000

FEET

1:36,000 1" = 3,000'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

PROJECT:

CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

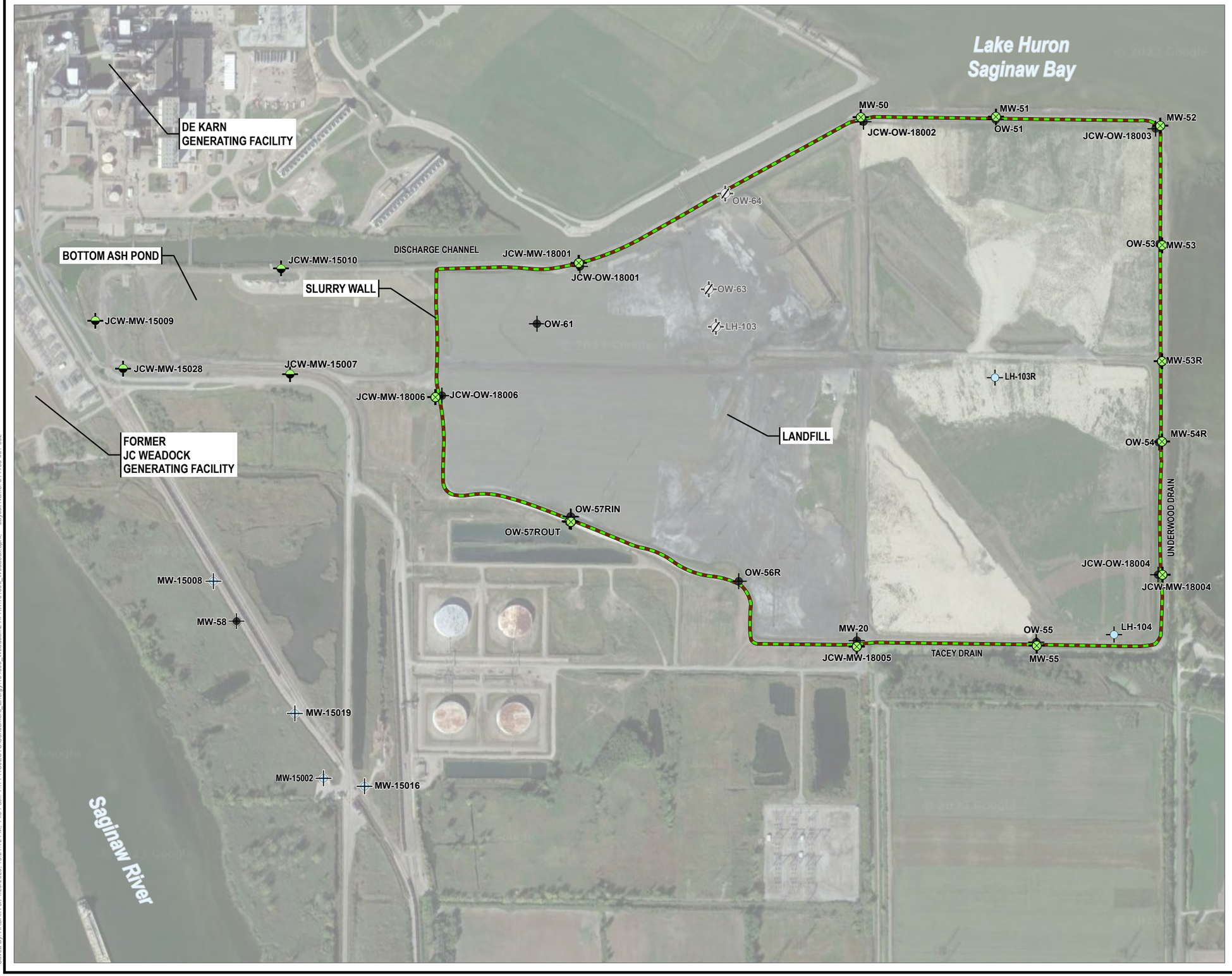
TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	APRIL 2023		

TRC
999 FOURIER DRIVE
SUITE 101
MADISON, WI 53717
PHONE: 608.826.3663

FILE: 464095_DEKARN



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

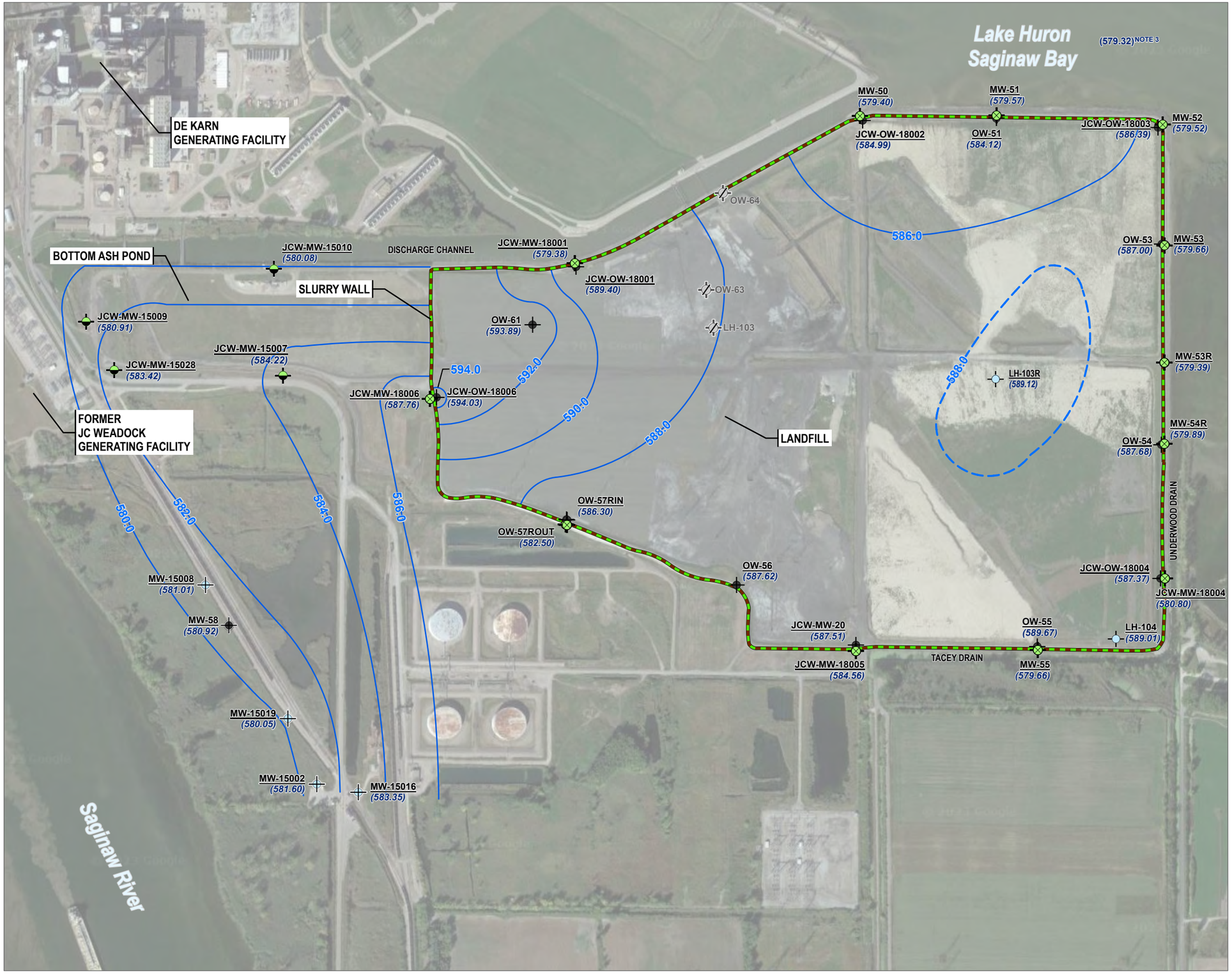
TITLE:
SITE MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		**FIGURE 2**
APPROVED BY:	D. LITZ		
DATE:	APRIL 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By AADAIR on 4/26/2023 - 3:24:12 PM - File Path: T:\PROJECTS\Consumers_Energy\464096_Weadock\2-4 RPYx\464096_Weadock.aprx - Layout Name: 514403-001-002



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (NU) NOT USED TO DEVELOP CONTOURS

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
POTENTIOMETRIC SURFACE MAP
MARCH 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	APRIL 2023		

FIGURE 3

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
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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)[(1)]
MW-50	3/6/2023	579.40	579.32	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		0.34
MW-53R	3/6/2023	579.39		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 Discharge Channel	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
JCW-OW-18001[6]	589.40		22.37	4.48E-01	2.00	2.88	1,010	2.30E-08	0.45	2,904	8.48E-02	0.63	232
JCW-MW-18001		579.38			3.75								
JCW-OW-18002	584.99		28.87	1.94E-01	4.00	4.25	970		0.19	4,123	5.20E-02	0.39	142
MW-50		579.40			4.50								

Monitoring Well Pair Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-51	584.12		14.38	3.16E-01	4.00	4.14	1,850	2.30E-08	0.32	7,650	1.58E-01	1.18	431
MW-51		579.57			4.27								
JCW-OW-18003	586.39		33.85	2.03E-01	3.50	3.62	740		0.20	2,675	3.54E-02	0.26	97
MW-52		579.52			3.73								
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								

Monitoring Well Pair Non-Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-54	587.68		21.23	3.67E-01	2.00	2.25	510	2.30E-08	0.37	1,148	2.75E-02	0.21	75
MW-54R		579.89			2.50								
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								
OW-55	589.67		23.95	4.18E-01	2.00	1.83	1,220		0.42	2,233	6.08E-02	0.46	166
MW-55		579.66			1.66								
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								

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)	**=**	**2.08E-02**

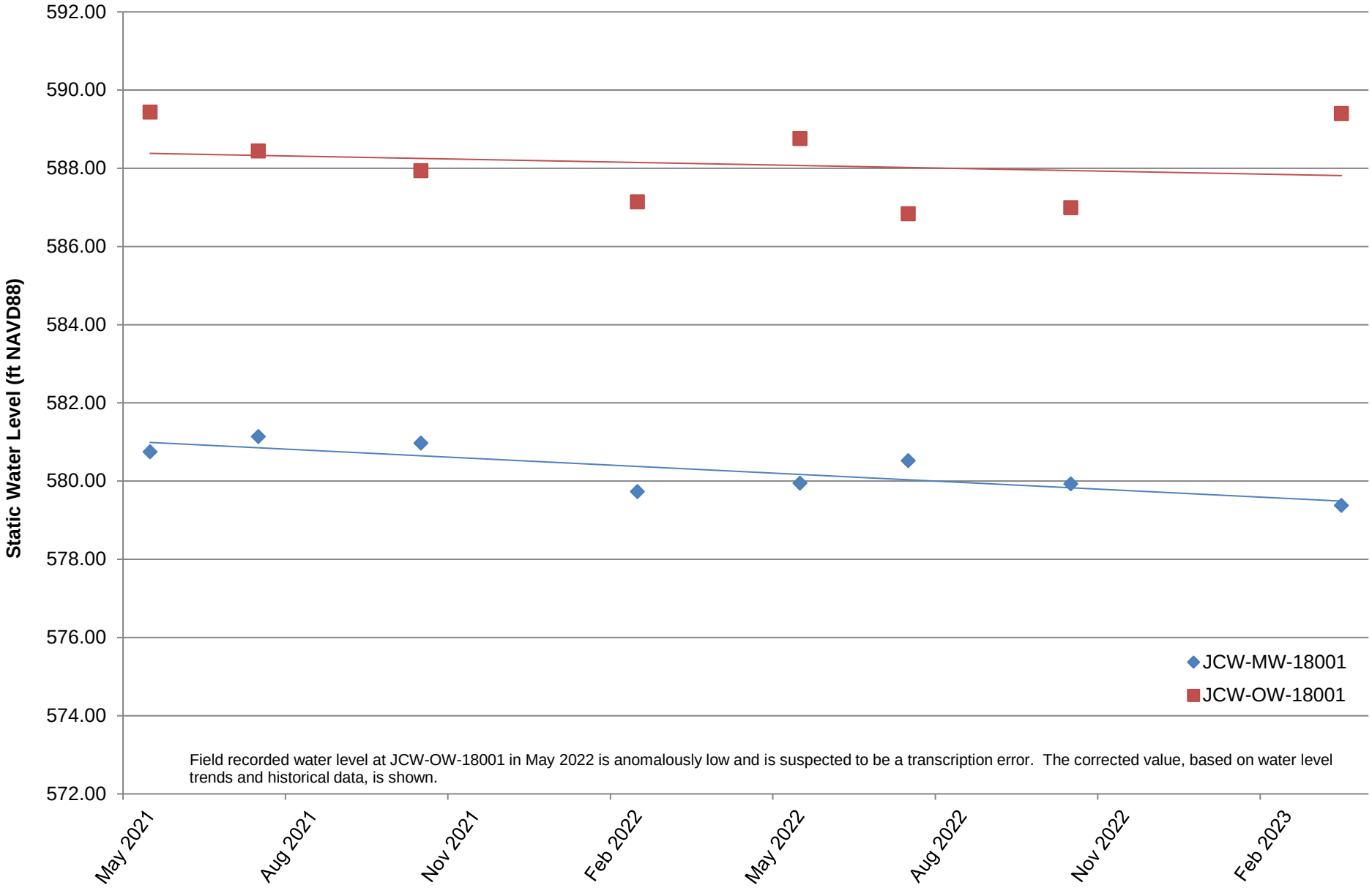
Notes:

Water level data collected on March 6, 2023 are shown by yellow cells:

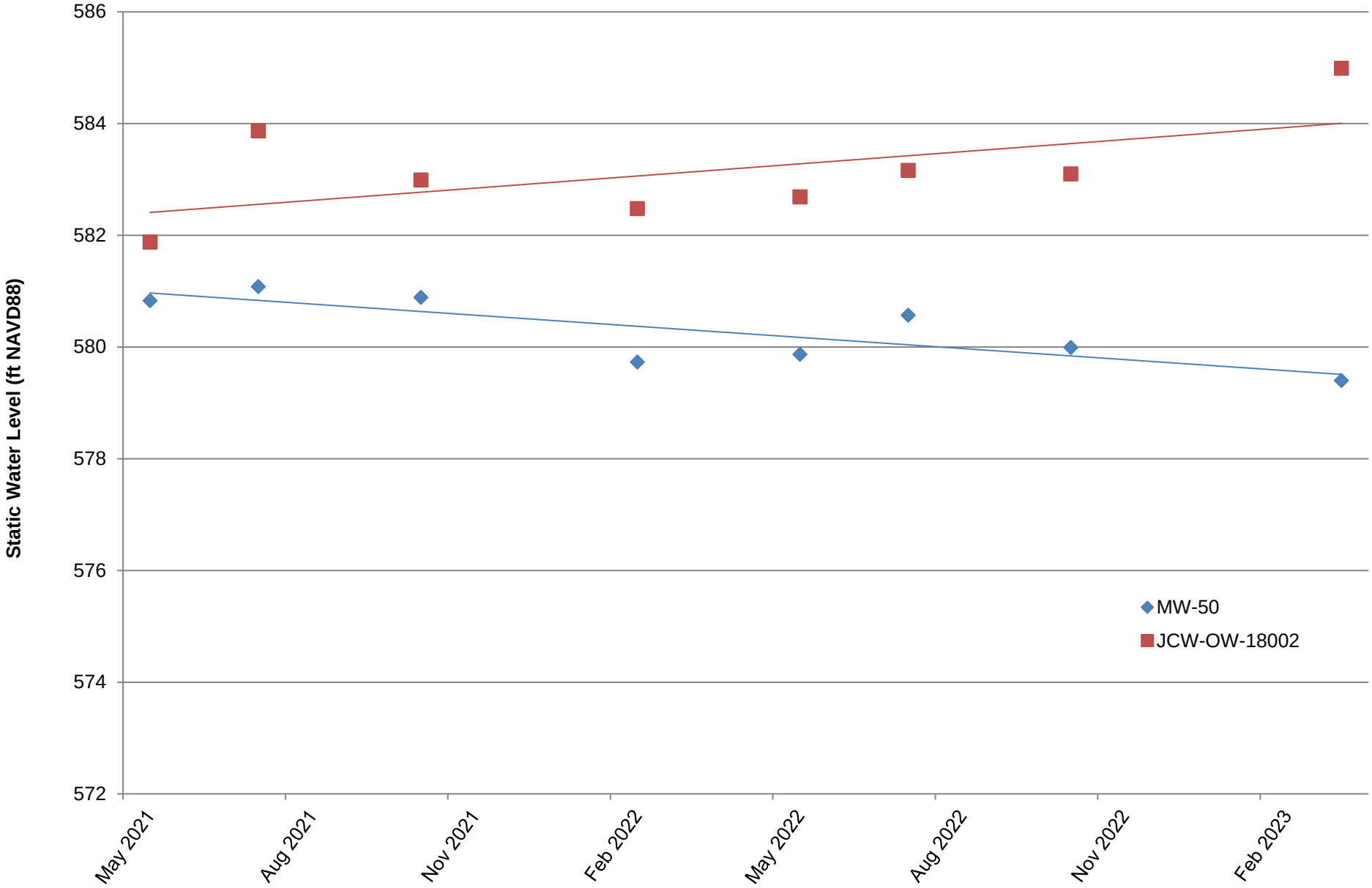
1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above 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^2 = square feet; ft^3/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

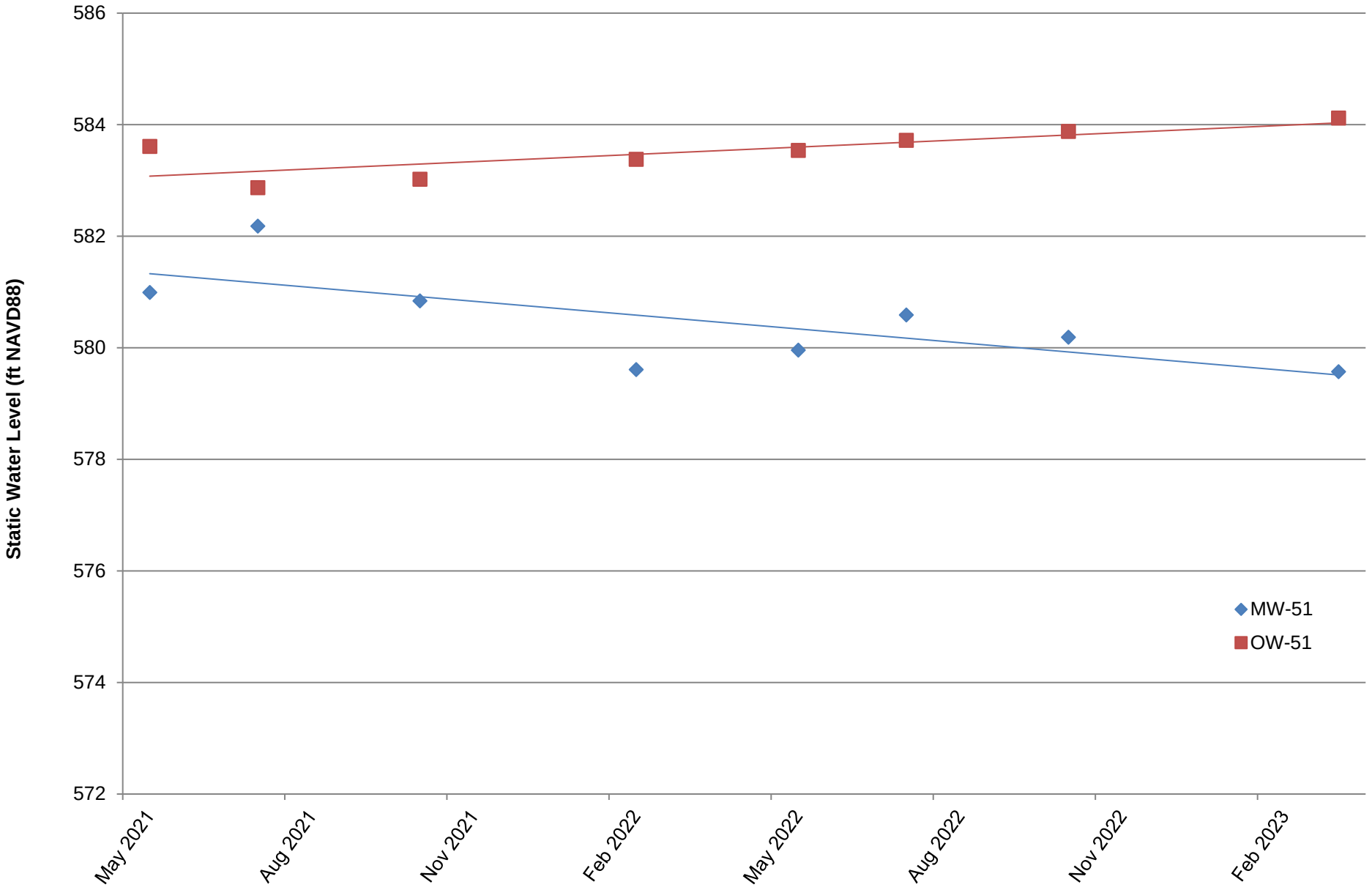
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



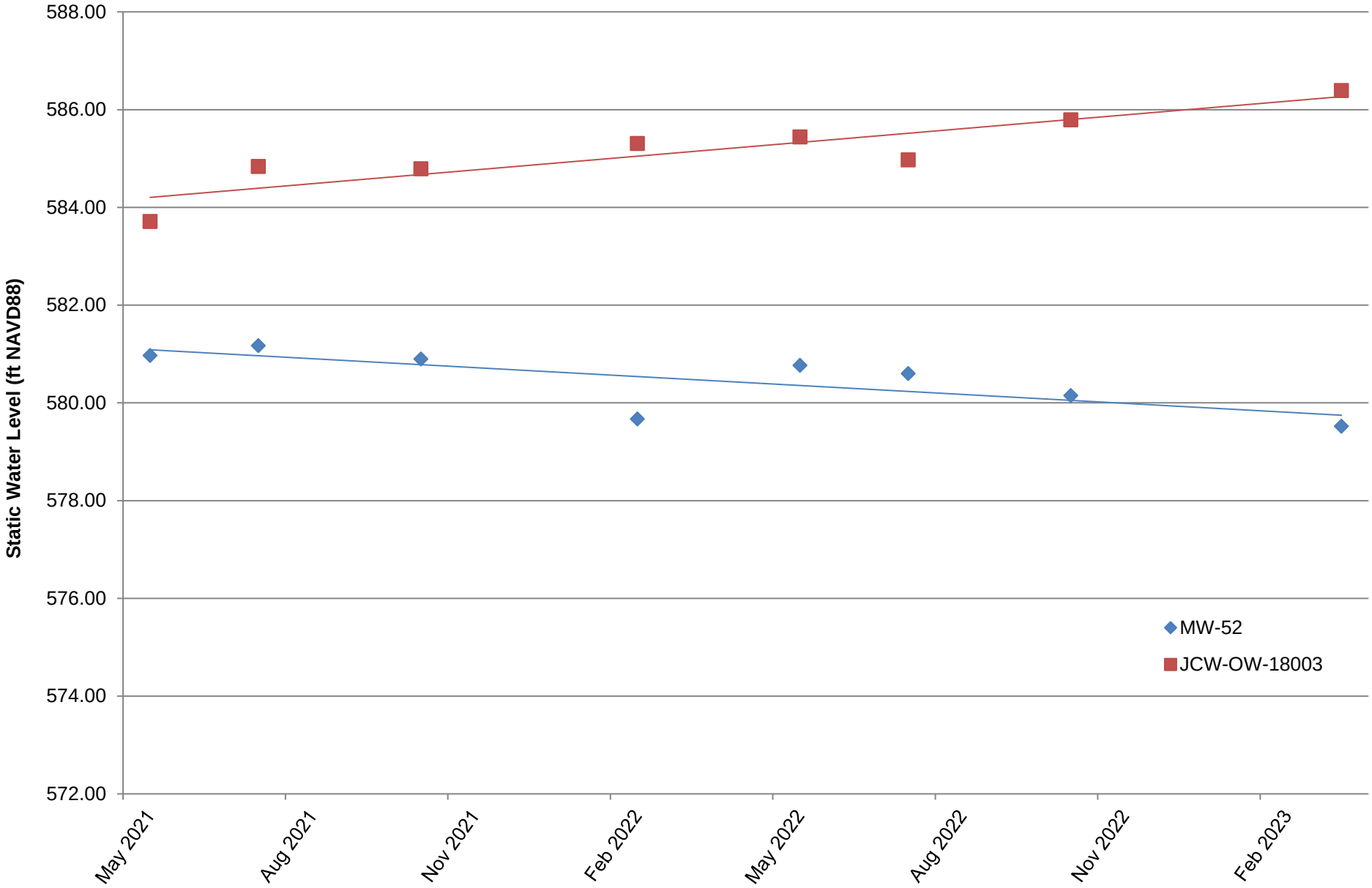
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



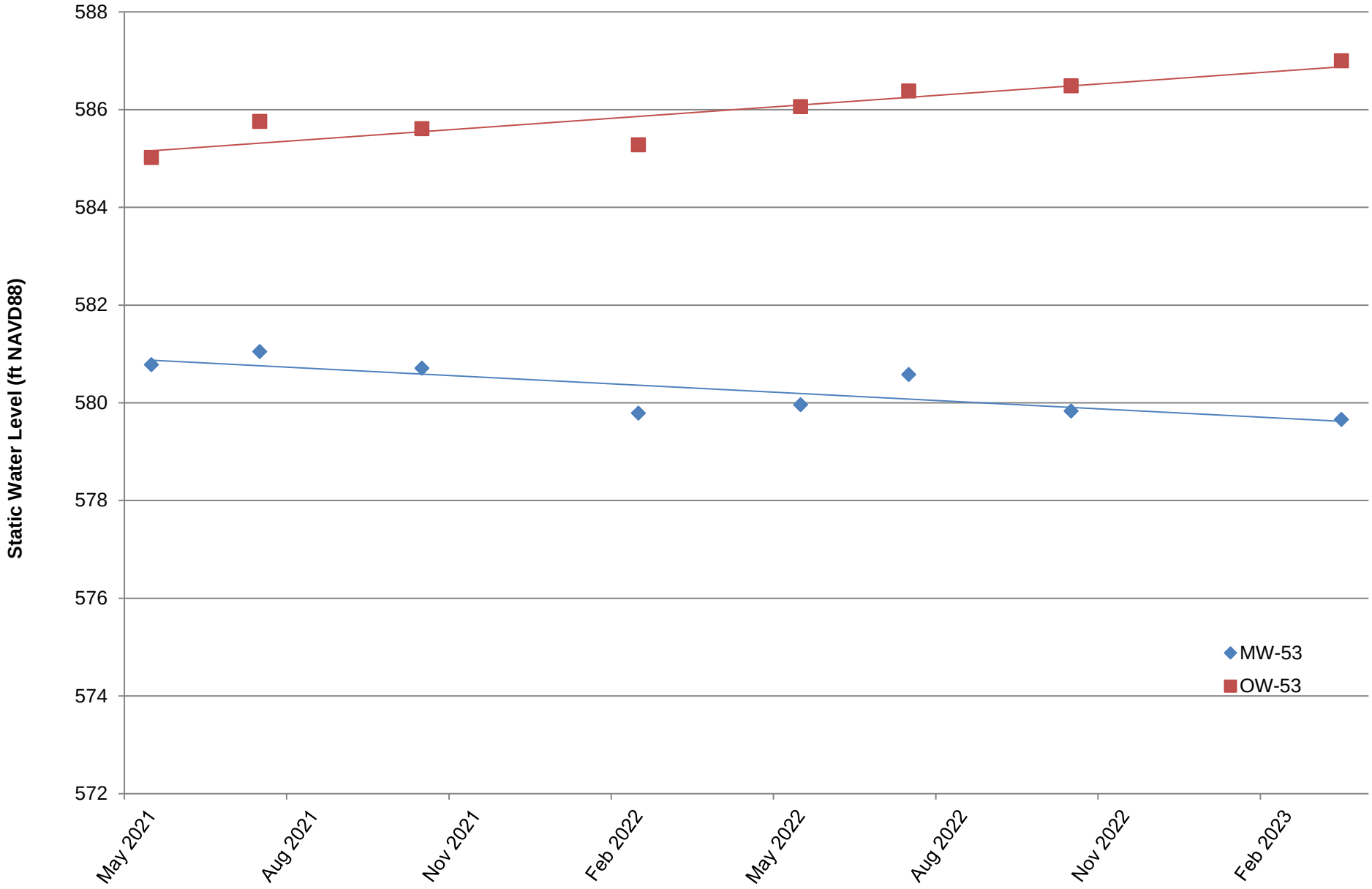
Appendix A
Static Water Level for MW-51 and OW-51



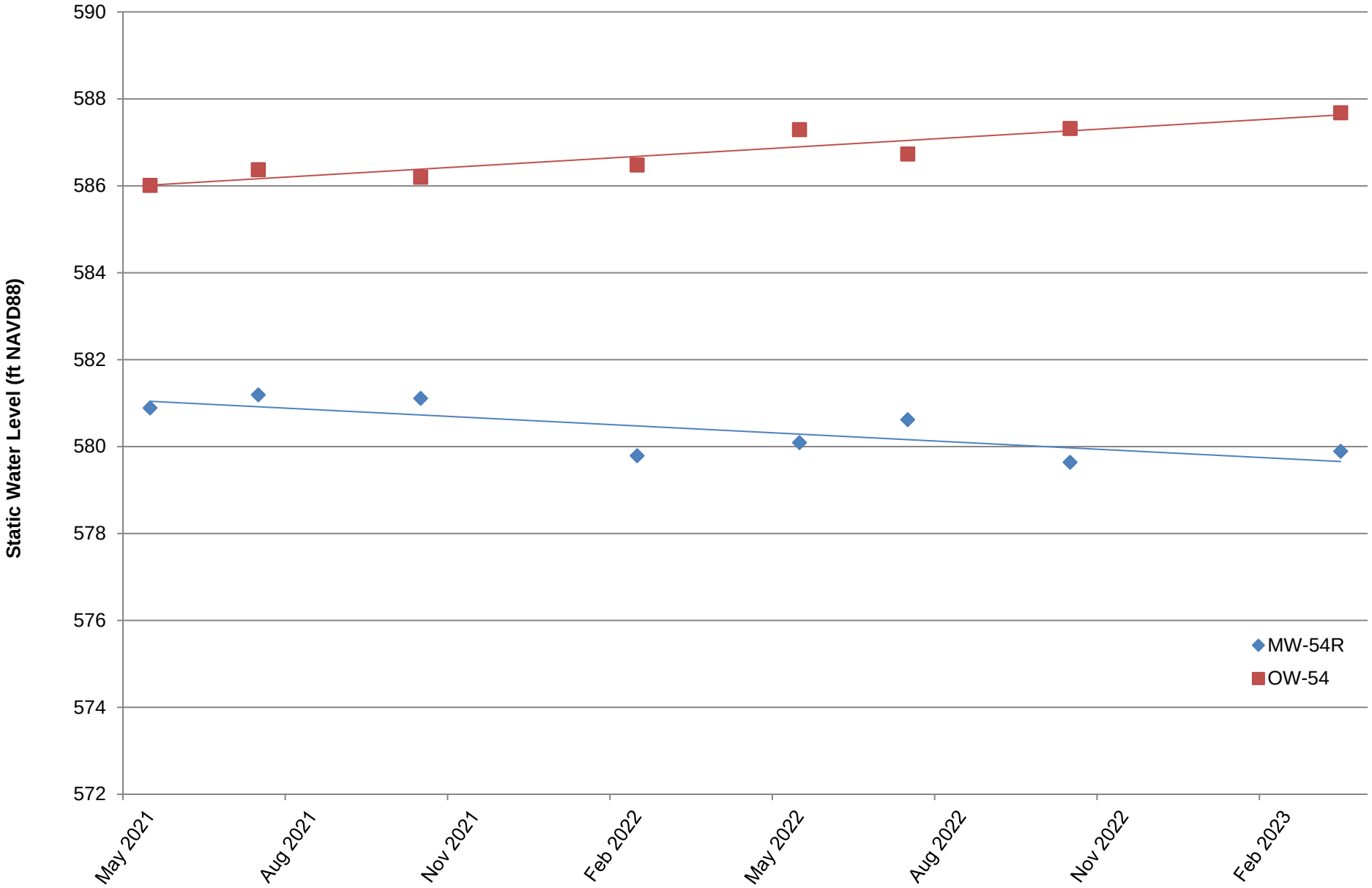
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



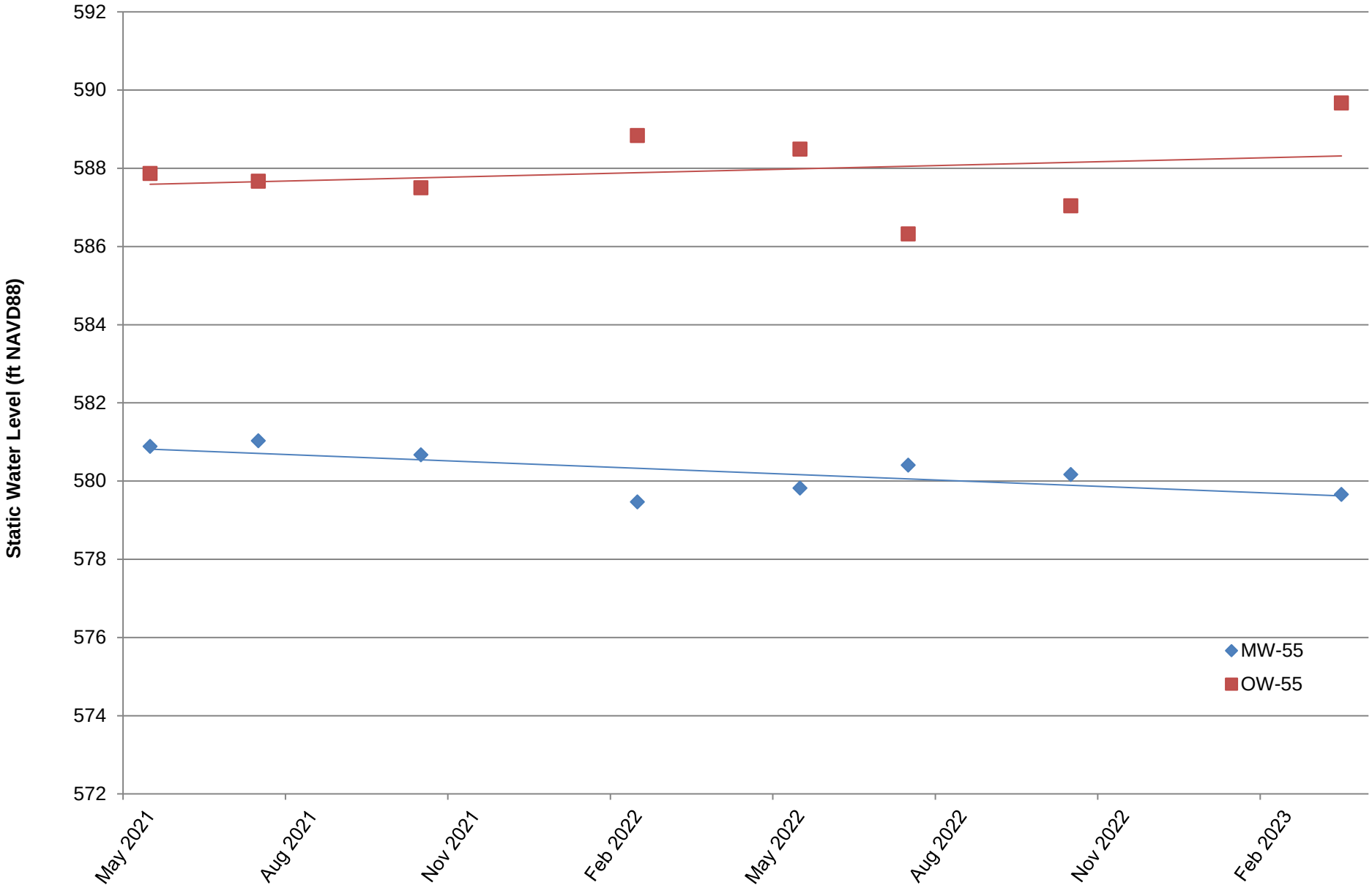
Appendix A
Static Water Level for MW-53 and OW-53



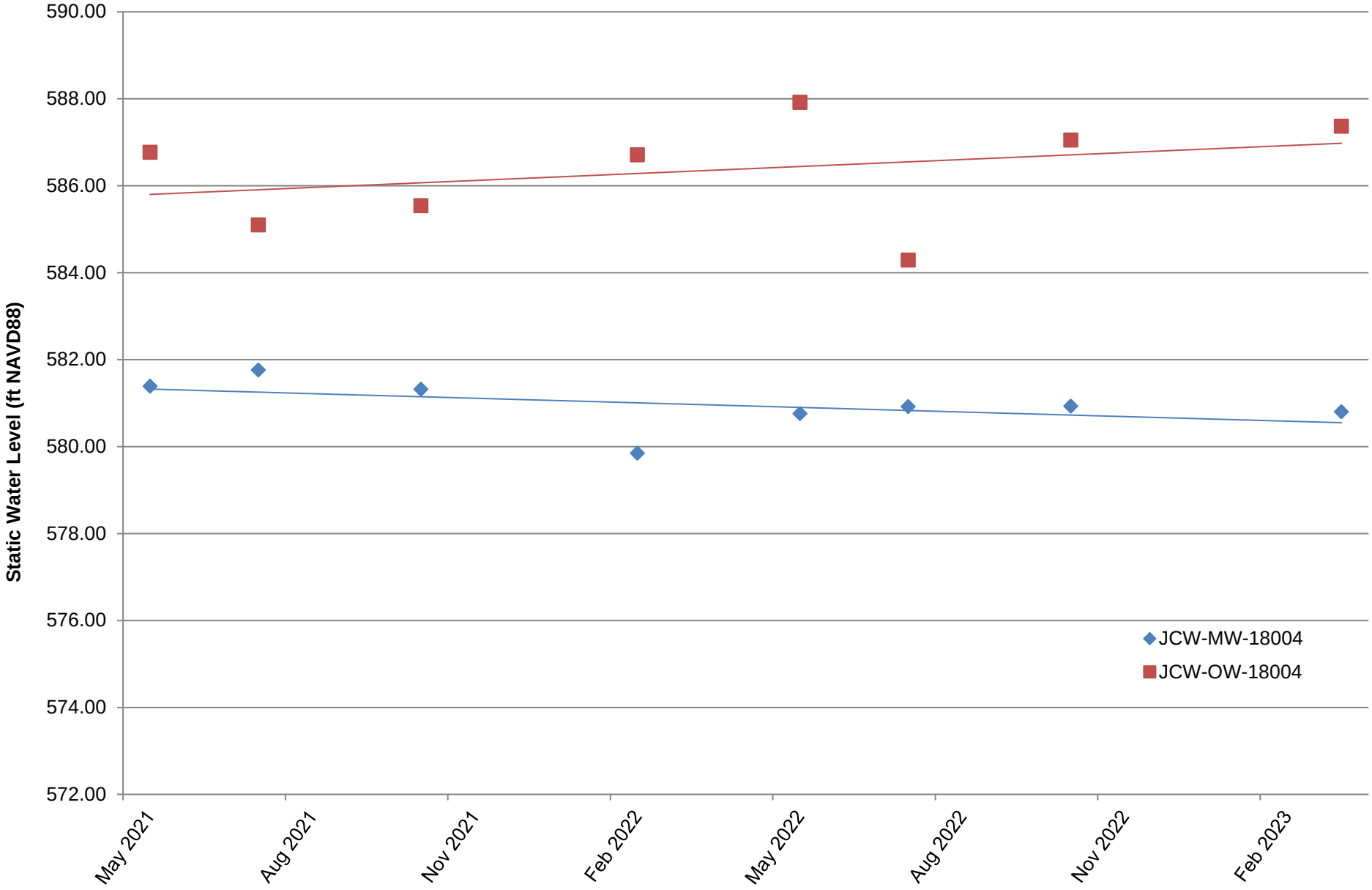
Appendix A
Static Water Level for MW-54R and OW-54



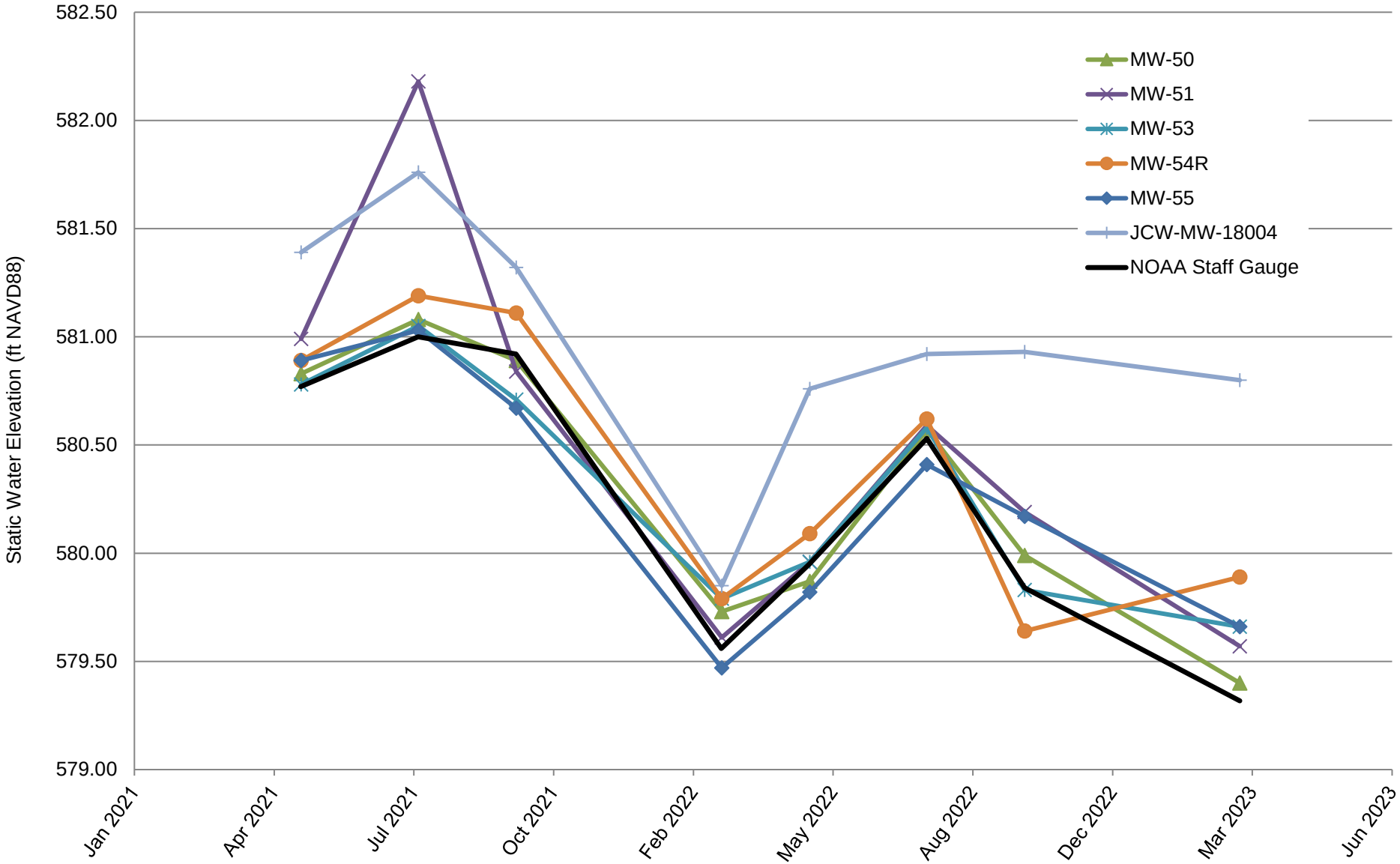
Appendix A
Static Water Level for MW-55 and OW-55



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 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	Chloride	Field duplicate variability (relative percent difference above criteria); potential uncertainty exists.
MW-15008	3/7/2023		
MW-15016	3/7/2023		
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.

- 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[(1)]	O	O	O	O	O	O
Calcium	↑ ASD	O	O	O	↓	↓
Chloride	↓*	O	O	O	↓	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	O	O	O	O	O
pH/Corrosivity[(1)]	O	O	O	O	O	O
Sulfate	↑ ASD	O	O	O	O	↓
Total Dissolved Solids	↑ ASD	O	O	O	O	↓*

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 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(1)	O	O	O	↑	O	O
Calcium	O	↓	O	O	O	O
Chloride	↓*	O	O	↑ ASD	O	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	O	O	O	O	O
pH/Corrosivity(1)	O	O	O	O	O	O
Sulfate	O	O	O	O	O	O
Total Dissolved Solids	O	↓	O	O	O	O

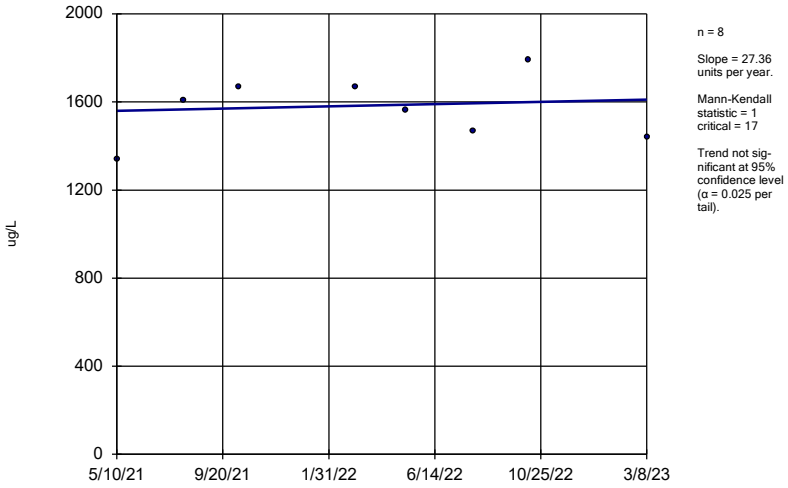
Notes:

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 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).

Boron, Total

JCW-MW-18001



n = 8

Slope = 27.36 units per year.

Mann-Kendall statistic = 1 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

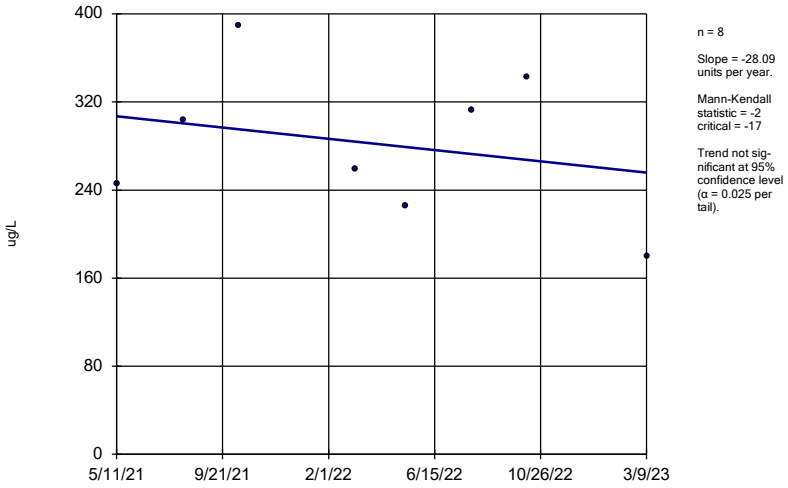
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

JCW-MW-18004



n = 8

Slope = -28.09 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

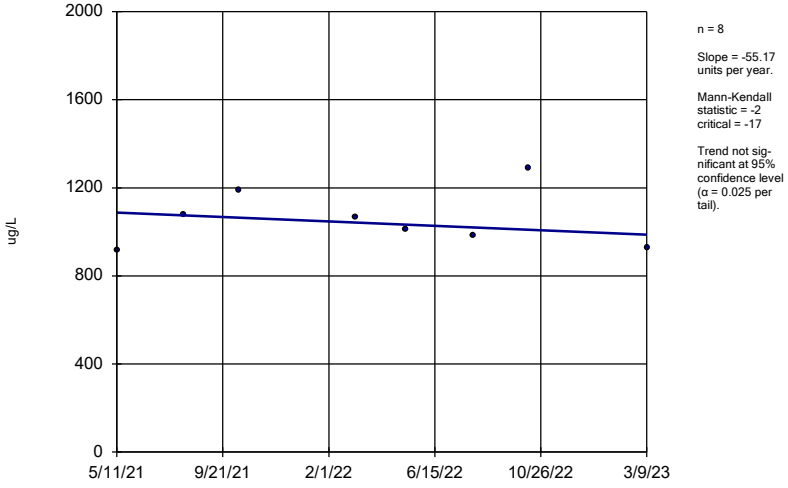
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

JCW-MW-18005



n = 8

Slope = -55.17 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

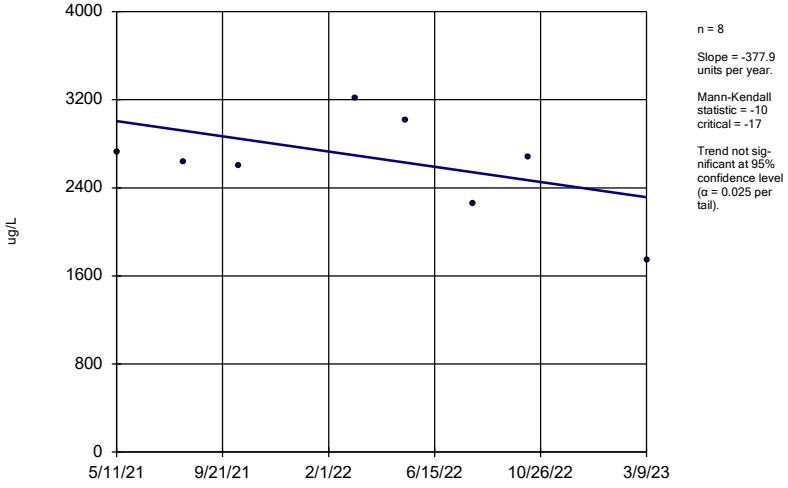
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

JCW-MW-18006



n = 8

Slope = -377.9 units per year.

Mann-Kendall statistic = -10 critical = -17

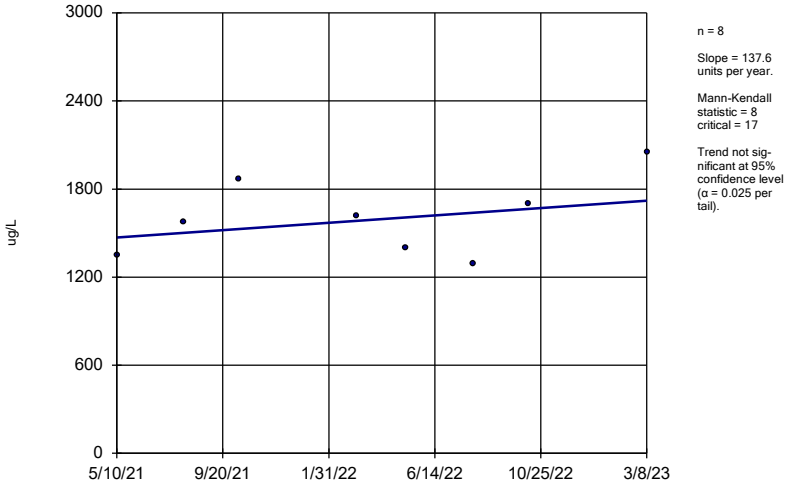
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-50



n = 8

Slope = 137.6 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

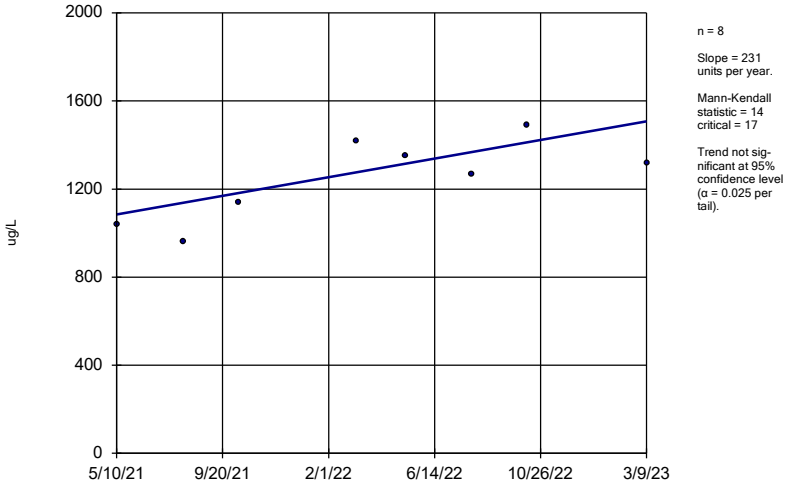
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

MW-51



n = 8

Slope = 231 units per year.

Mann-Kendall statistic = 14 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

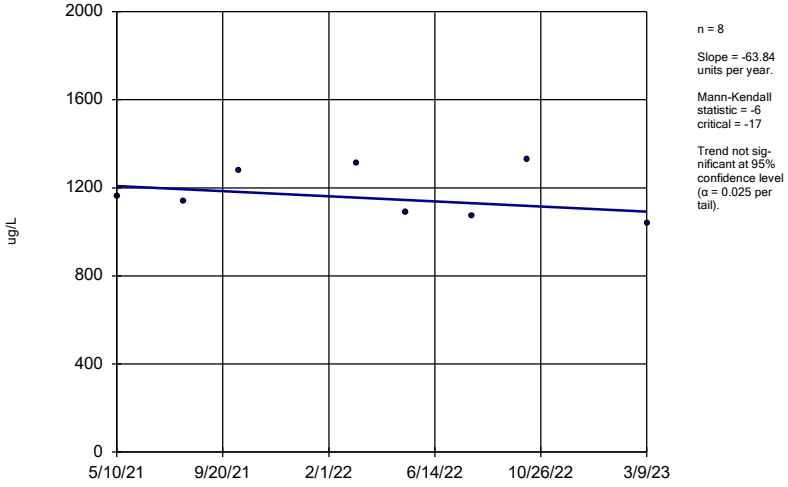
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

MW-52



n = 8

Slope = -63.84 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

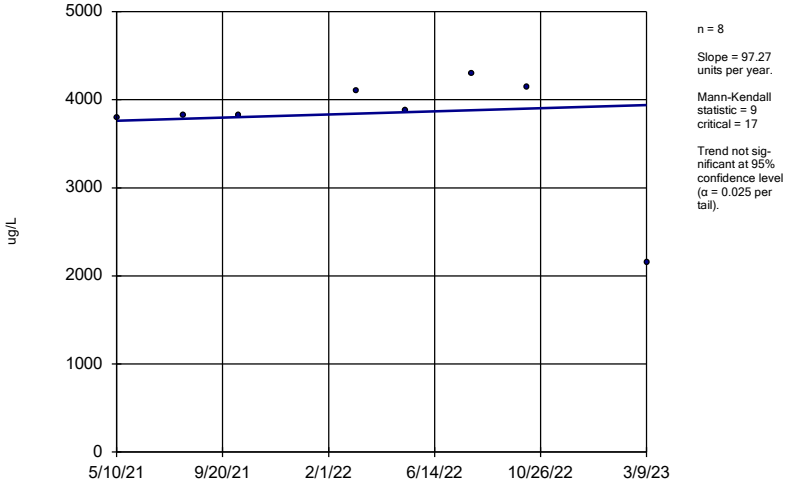
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

MW-53



n = 8

Slope = 97.27 units per year.

Mann-Kendall statistic = 9 critical = 17

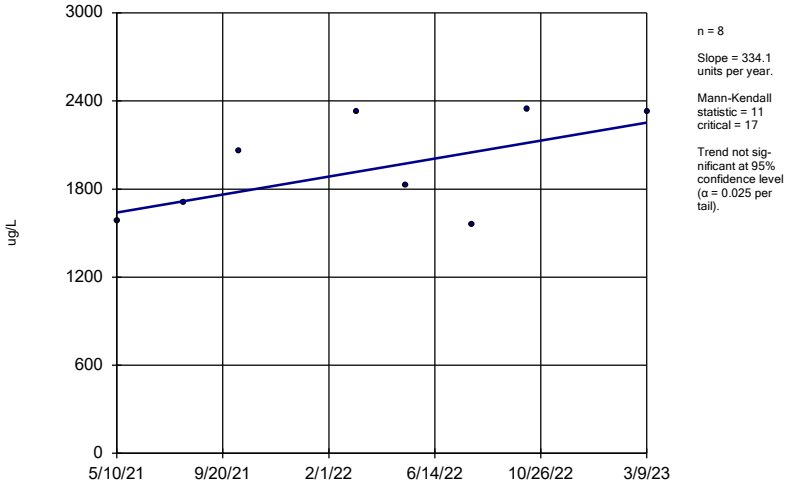
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-53R



n = 8

Slope = 334.1 units per year.

Mann-Kendall statistic = 11 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

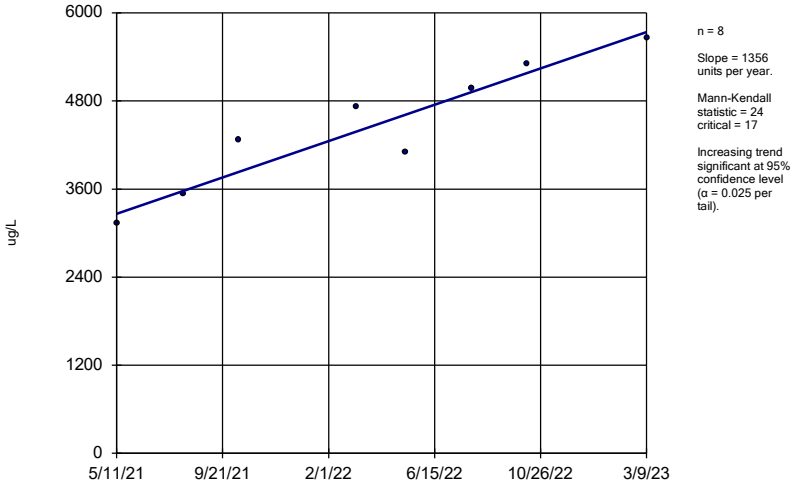
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

MW-54R



n = 8

Slope = 1356 units per year.

Mann-Kendall statistic = 24 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

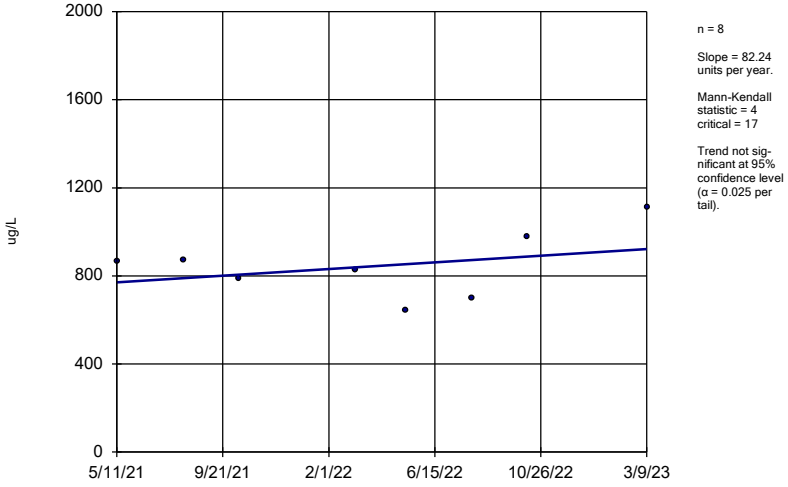
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

MW-55



n = 8

Slope = 82.24 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

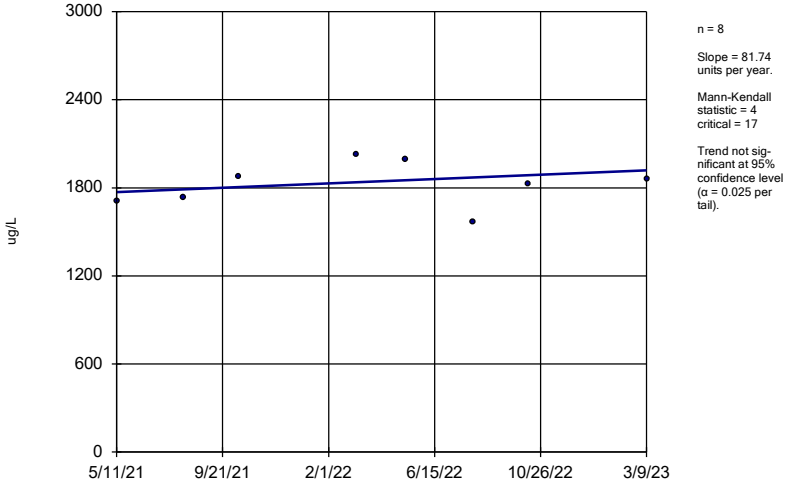
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Boron, Total

OW-57ROUT



n = 8

Slope = 81.74 units per year.

Mann-Kendall statistic = 4 critical = 17

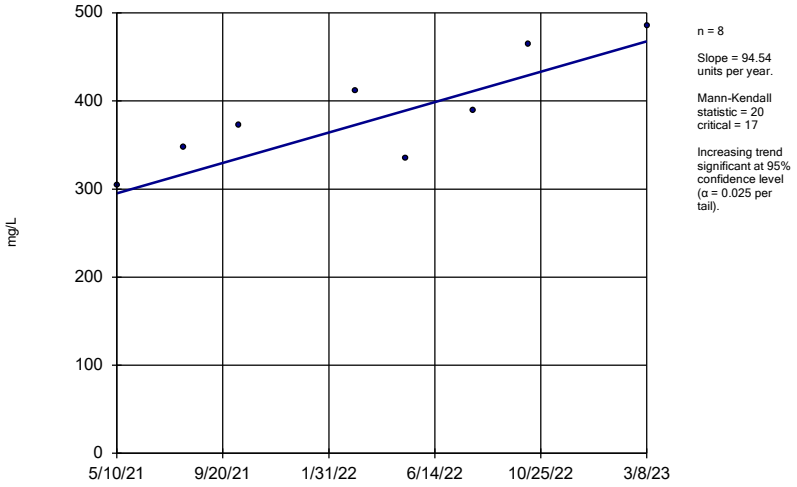
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Calcium, Total

JCW-MW-18001



n = 8

Slope = 94.54 units per year.

Mann-Kendall statistic = 20 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

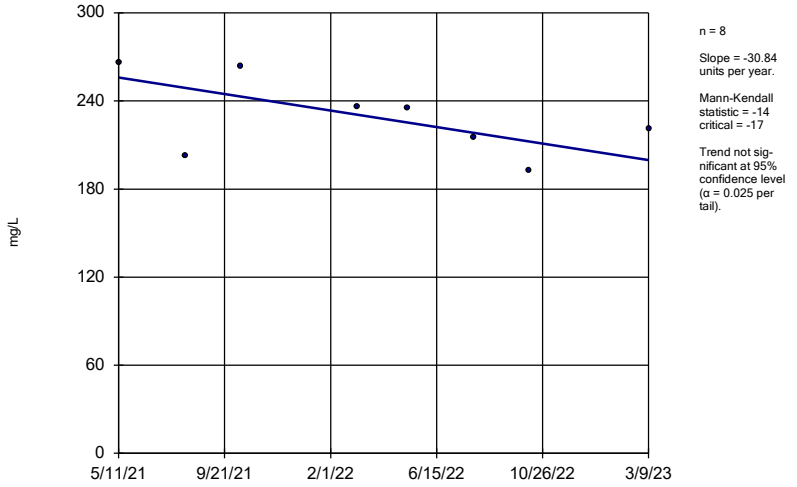
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

JCW-MW-18004



n = 8

Slope = -30.84 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

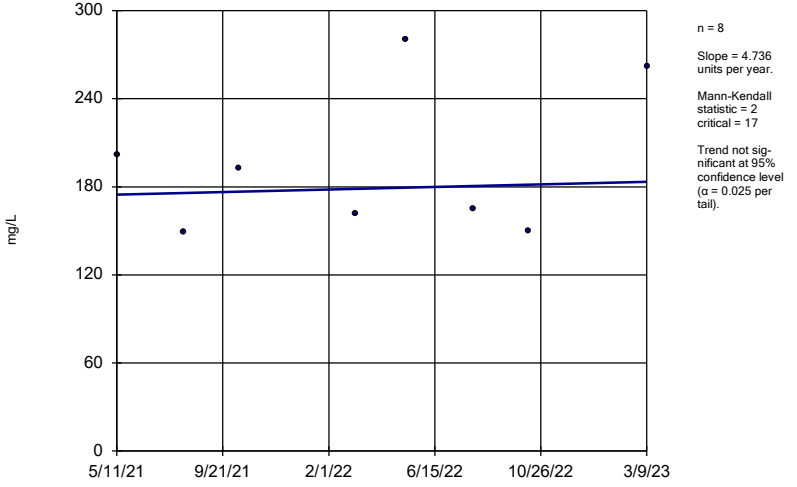
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

JCW-MW-18005



n = 8

Slope = 4.736 units per year.

Mann-Kendall statistic = 2 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

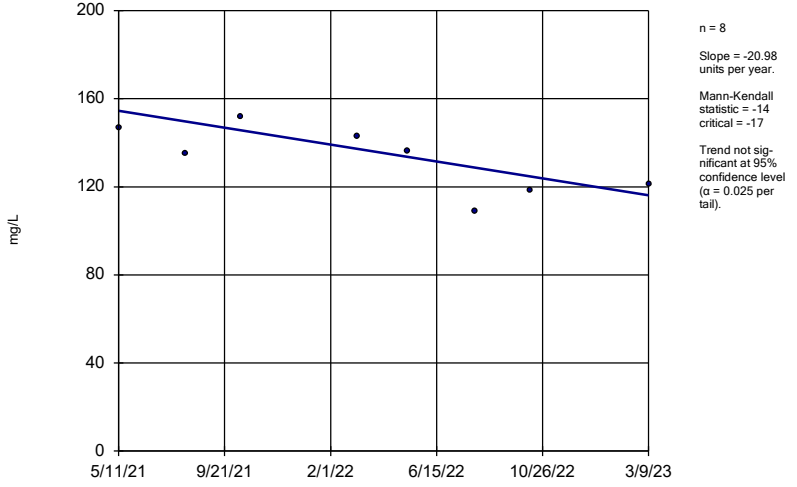
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

JCW-MW-18006



n = 8

Slope = -20.98 units per year.

Mann-Kendall statistic = -14 critical = -17

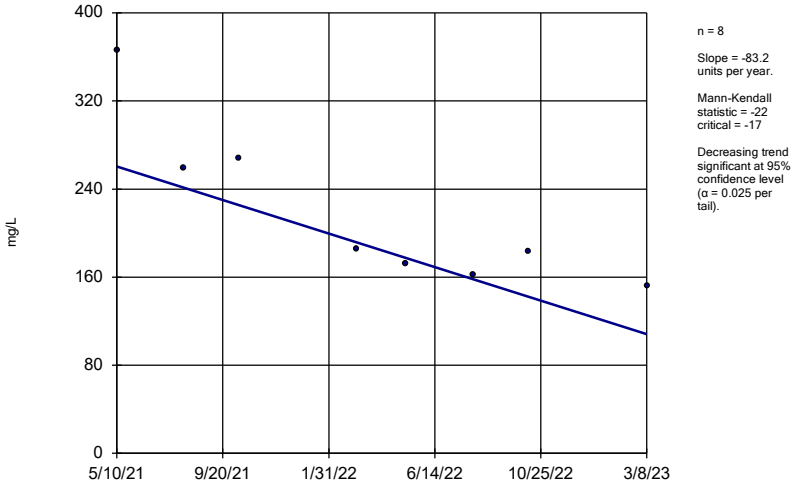
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Calcium, Total

MW-50



n = 8

Slope = -83.2 units per year.

Mann-Kendall statistic = -22 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

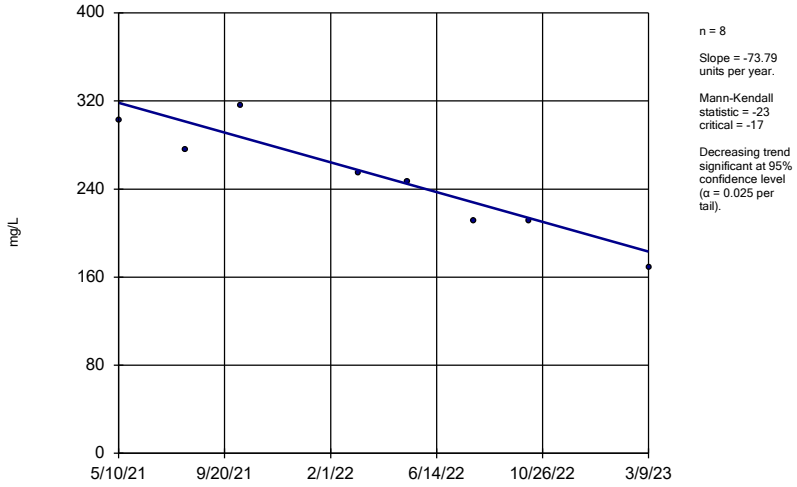
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

MW-51



n = 8

Slope = -73.79 units per year.

Mann-Kendall statistic = -23 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

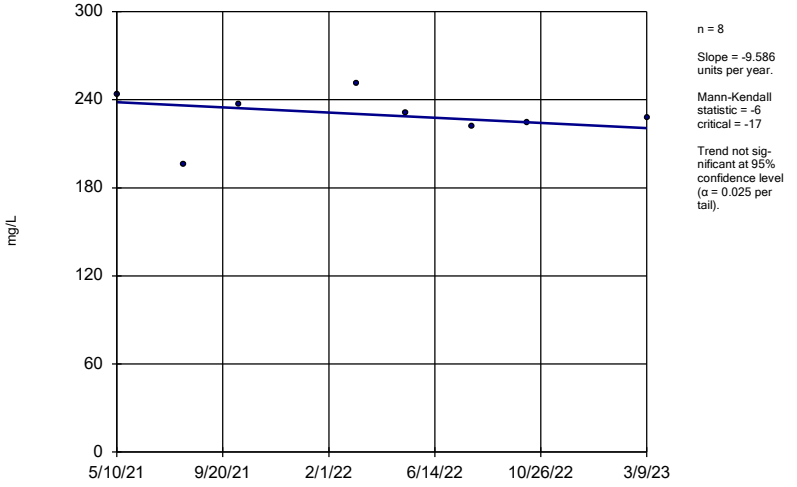
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

MW-52



n = 8

Slope = -9.586 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not sig-nificant at 95% confidence level (α = 0.025 per tail).

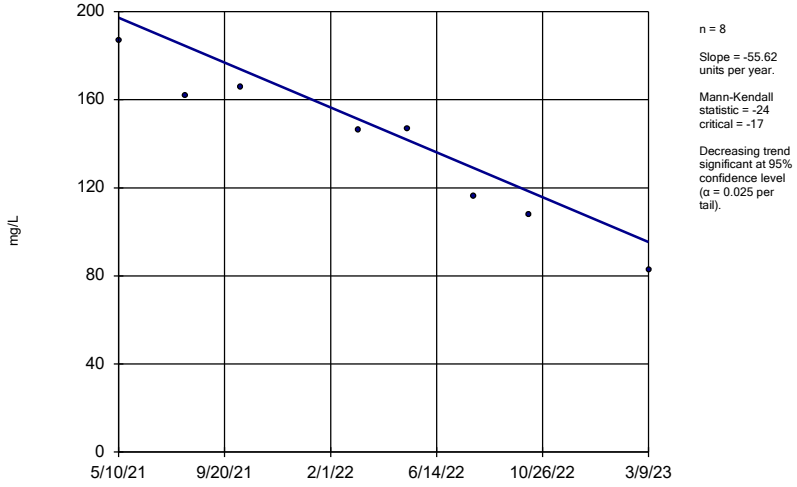
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

MW-53



n = 8

Slope = -55.62 units per year.

Mann-Kendall statistic = -24 critical = -17

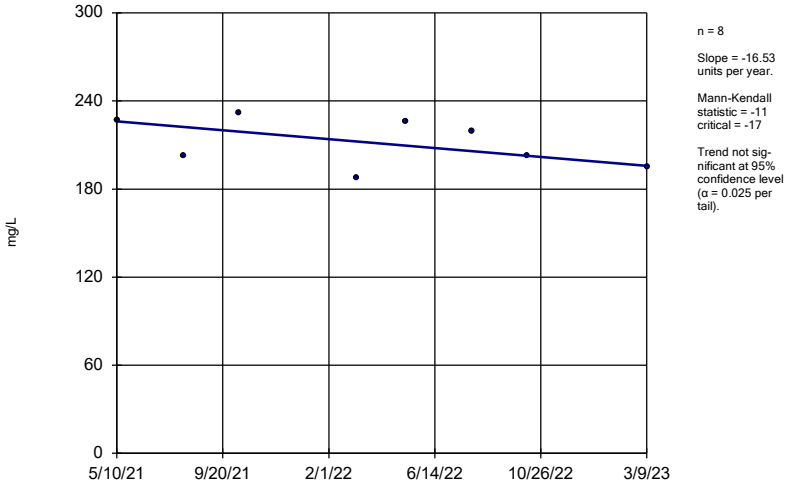
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Calcium, Total

MW-53R



n = 8

Slope = -16.53 units per year.

Mann-Kendall statistic = -11 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

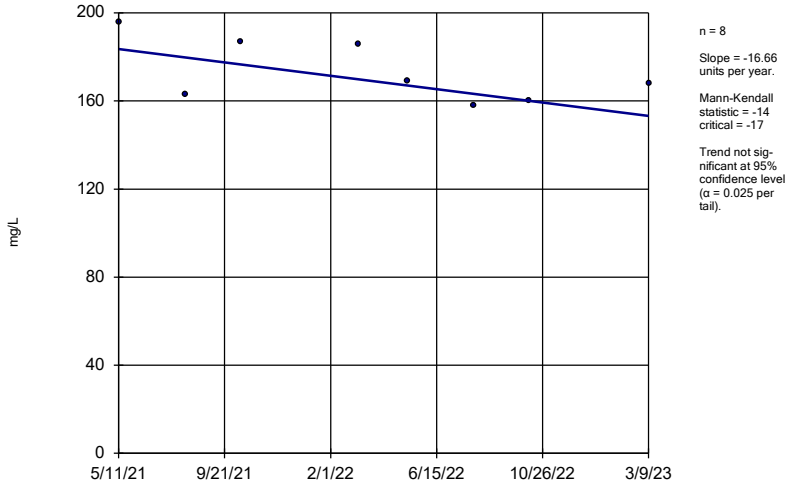
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

MW-54R



n = 8

Slope = -16.66 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

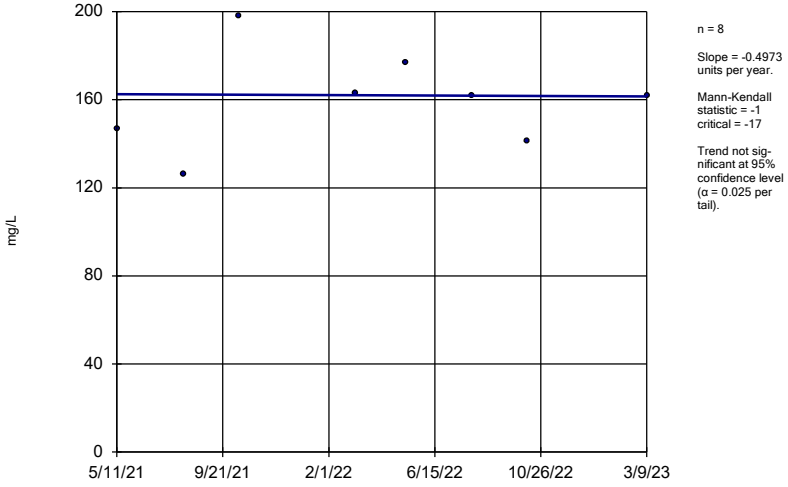
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

MW-55



n = 8

Slope = -0.4973 units per year.

Mann-Kendall statistic = -1 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

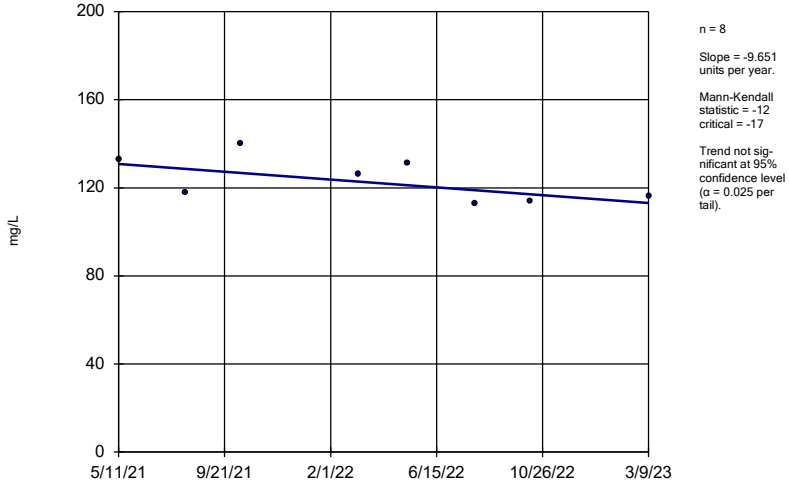
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Calcium, Total

OW-57ROUT



n = 8

Slope = -9.651 units per year.

Mann-Kendall statistic = -12 critical = -17

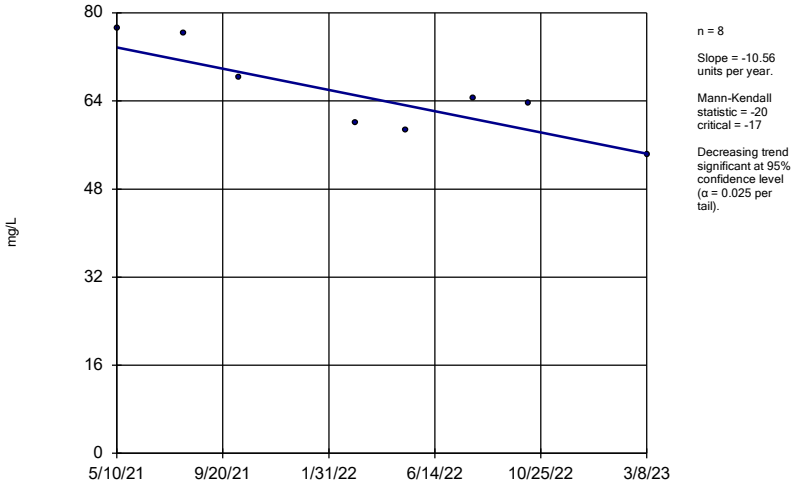
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Chloride

JCW-MW-18001



n = 8

Slope = -10.56 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

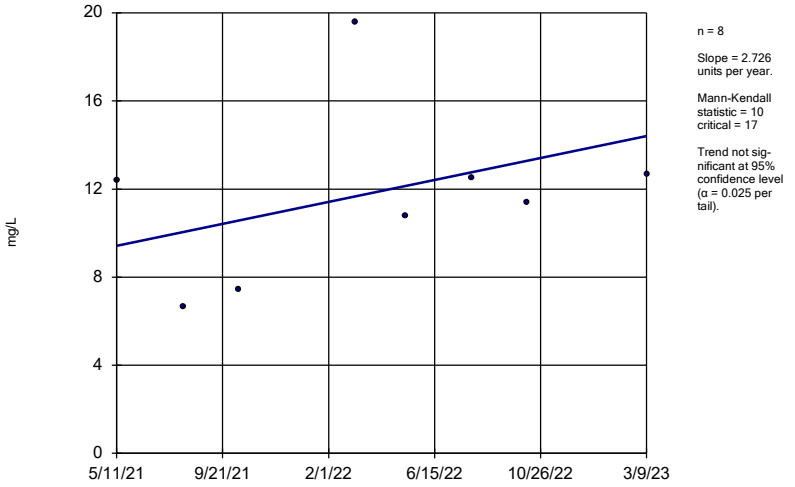
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

JCW-MW-18004



n = 8

Slope = 2.726 units per year.

Mann-Kendall statistic = 10 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

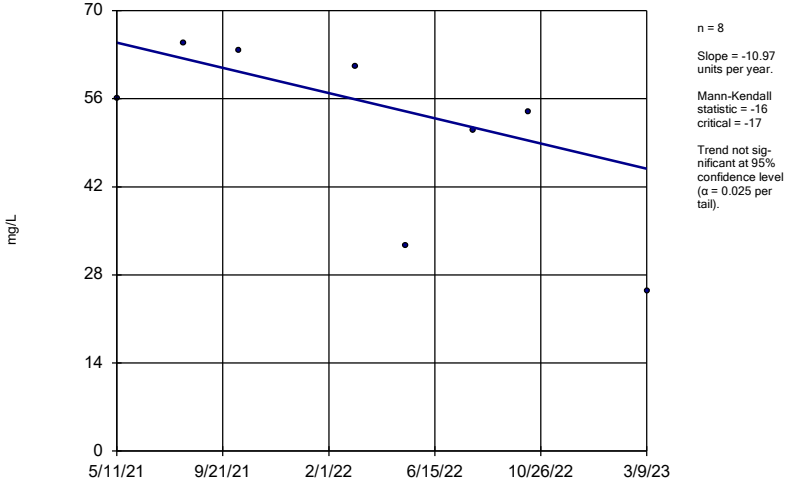
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

JCW-MW-18005



n = 8

Slope = -10.97 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

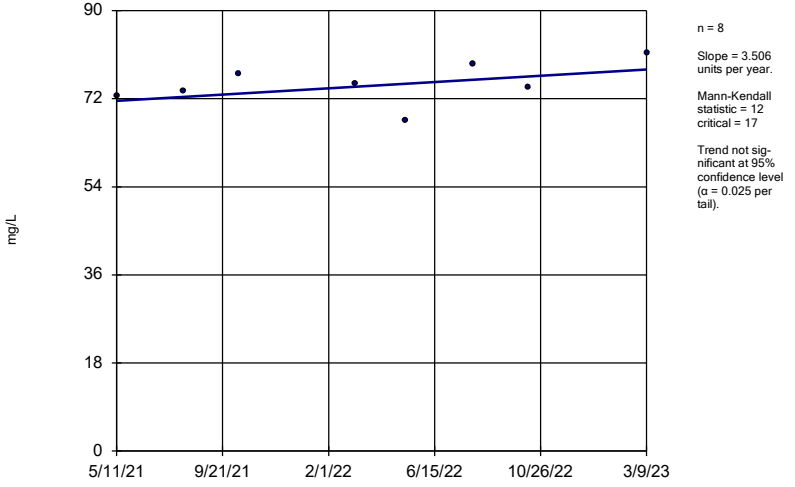
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

JCW-MW-18006



n = 8

Slope = 3.506 units per year.

Mann-Kendall statistic = 12 critical = 17

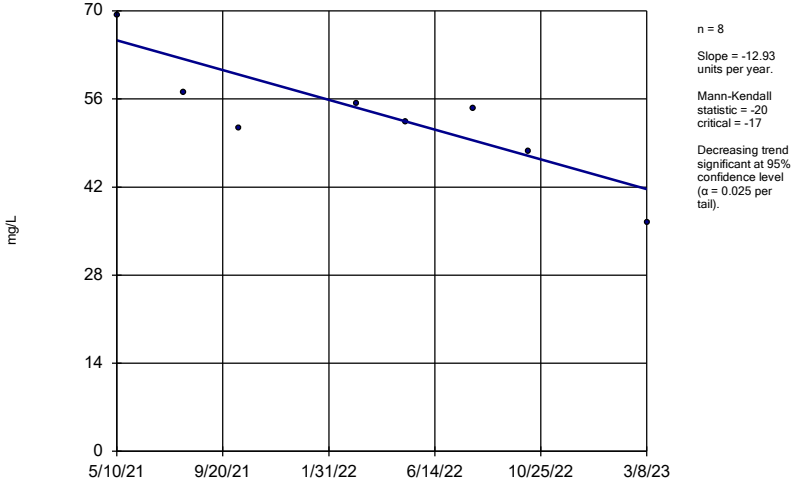
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Chloride

MW-50



n = 8

Slope = -12.93 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

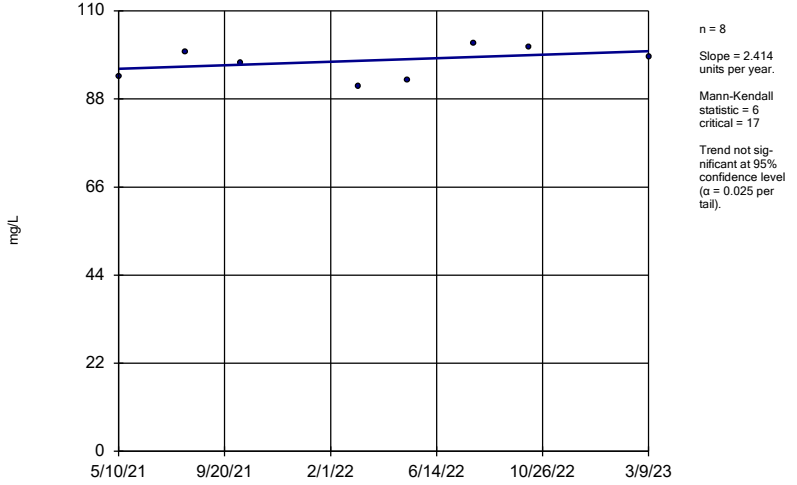
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

MW-51



n = 8

Slope = 2.414 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

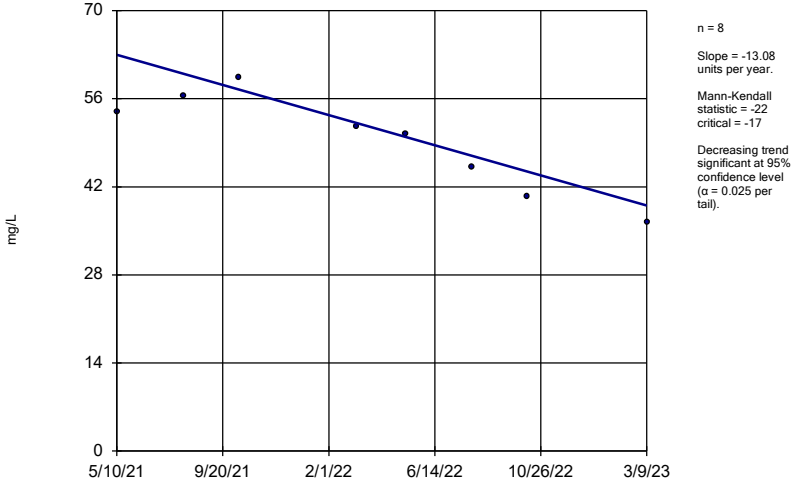
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

MW-52



n = 8

Slope = -13.08 units per year.

Mann-Kendall statistic = -22 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

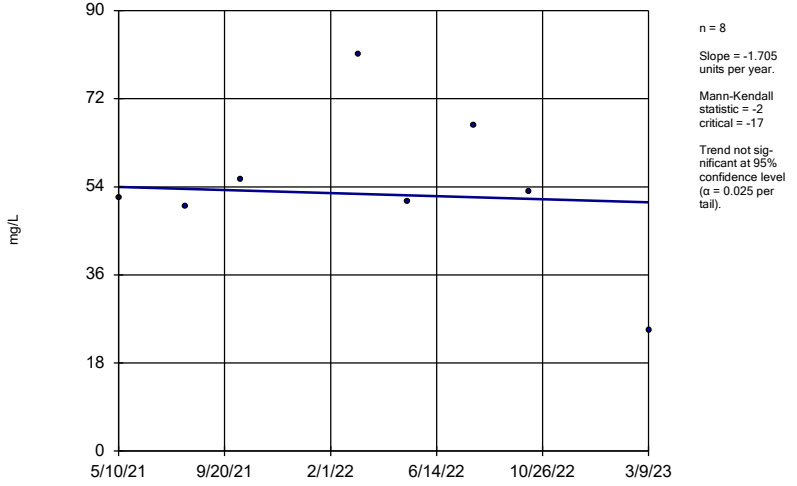
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

MW-53



n = 8

Slope = -1.705 units per year.

Mann-Kendall statistic = -2 critical = -17

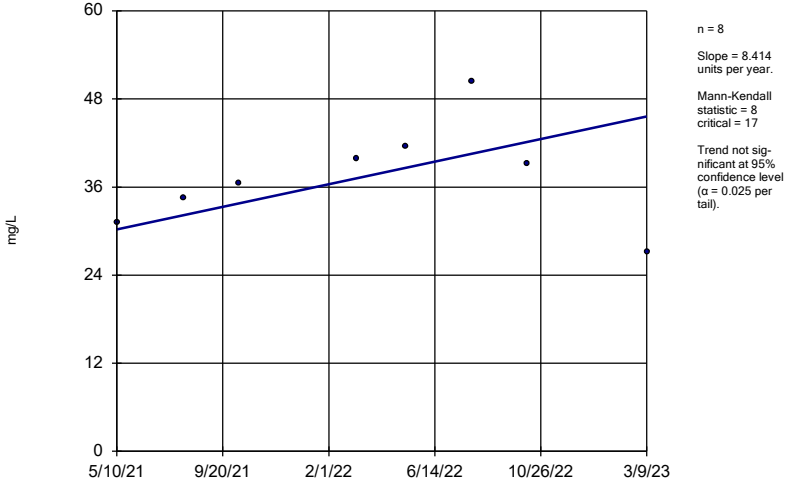
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Chloride

MW-53R



n = 8

Slope = 8.414 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

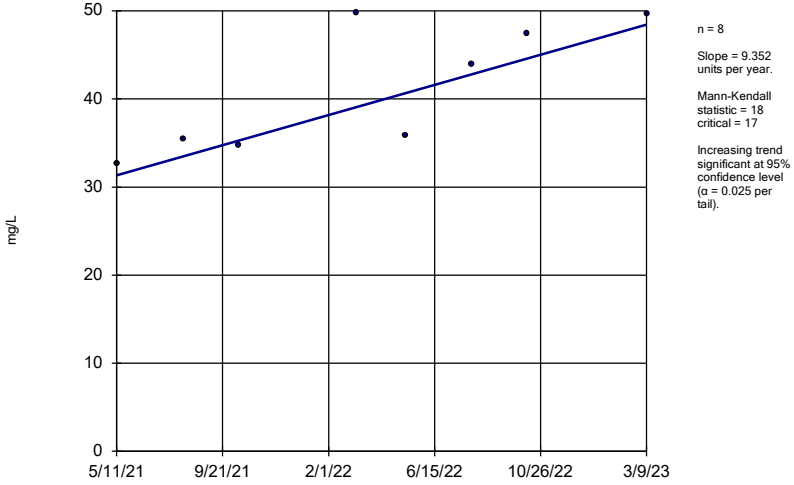
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

MW-54R



n = 8

Slope = 9.352 units per year.

Mann-Kendall statistic = 18 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

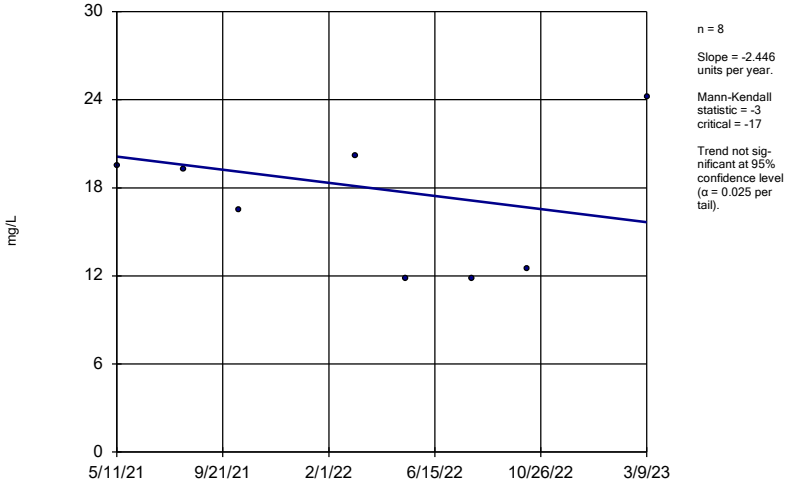
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

MW-55



n = 8

Slope = -2.446 units per year.

Mann-Kendall statistic = -3 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

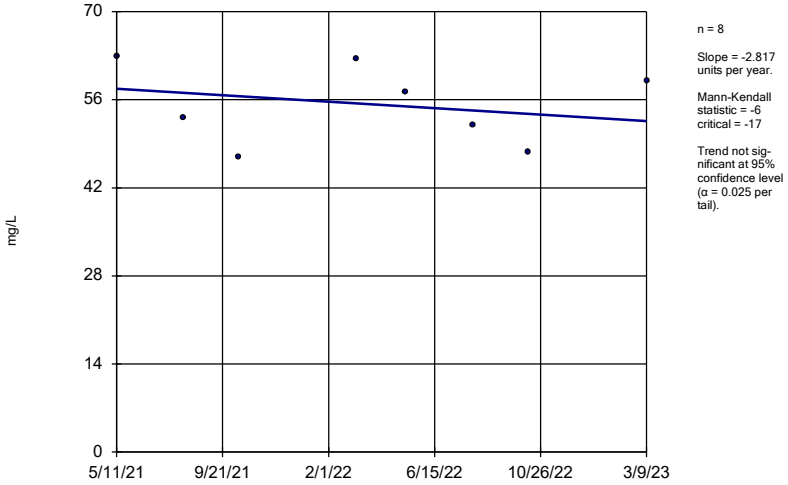
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Chloride

OW-57ROUT



n = 8

Slope = -2.817 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

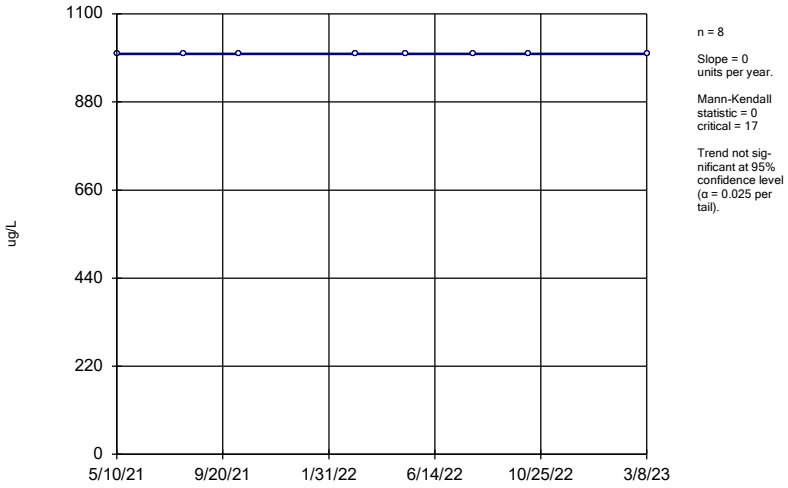
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18001



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

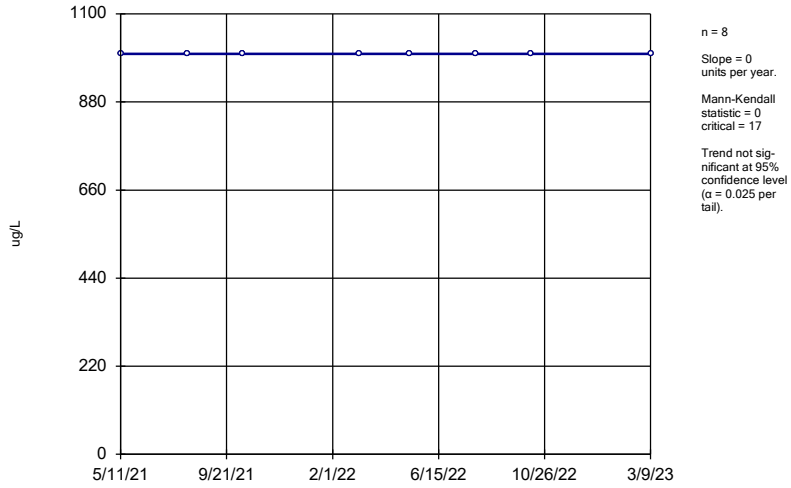
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

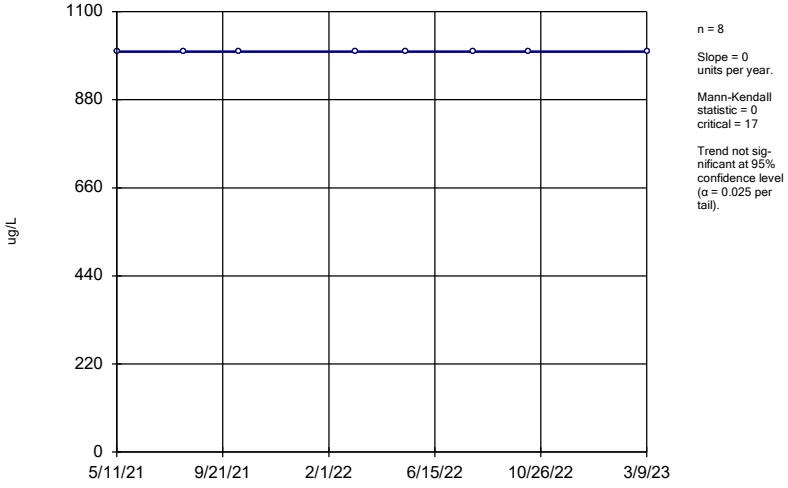
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18005



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

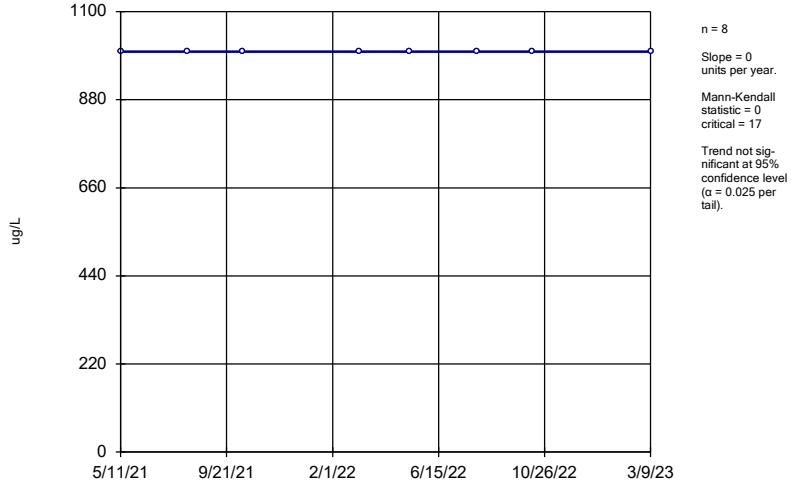
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18006



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

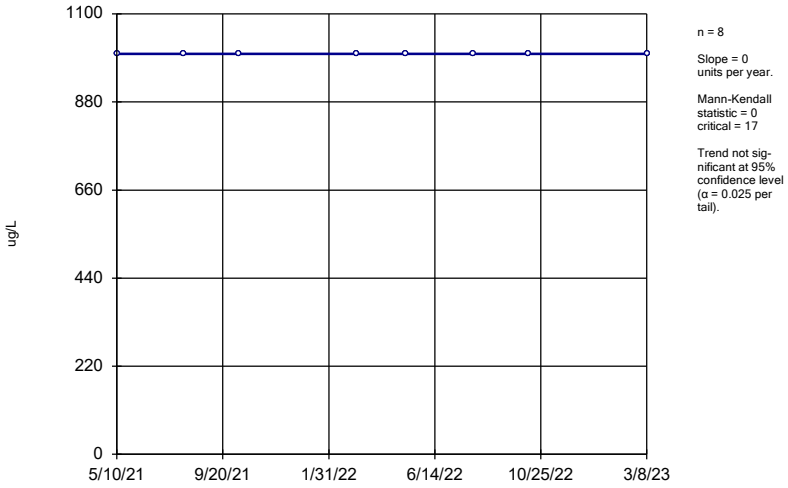
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-50



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

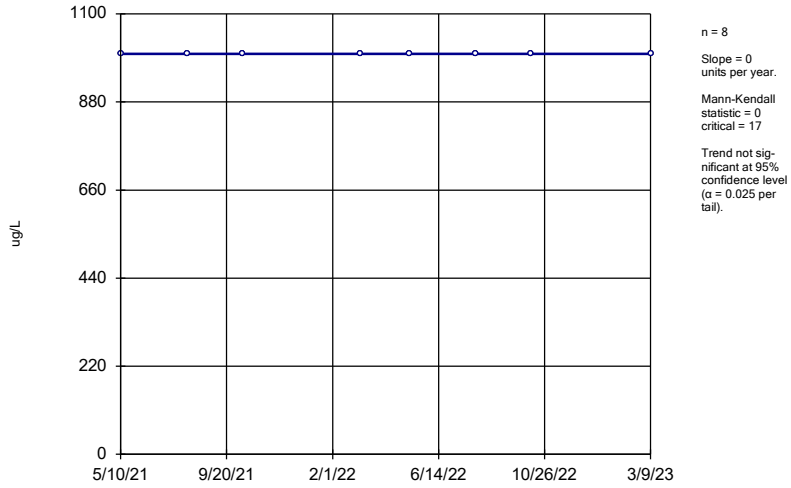
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-51



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

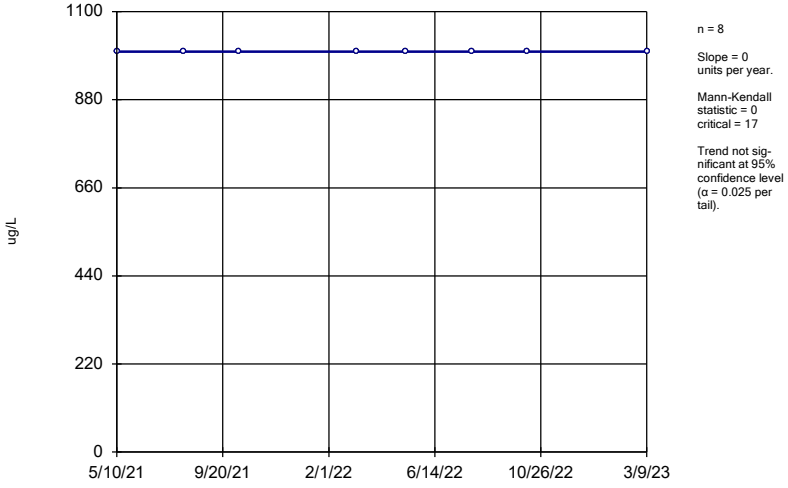
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-52



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

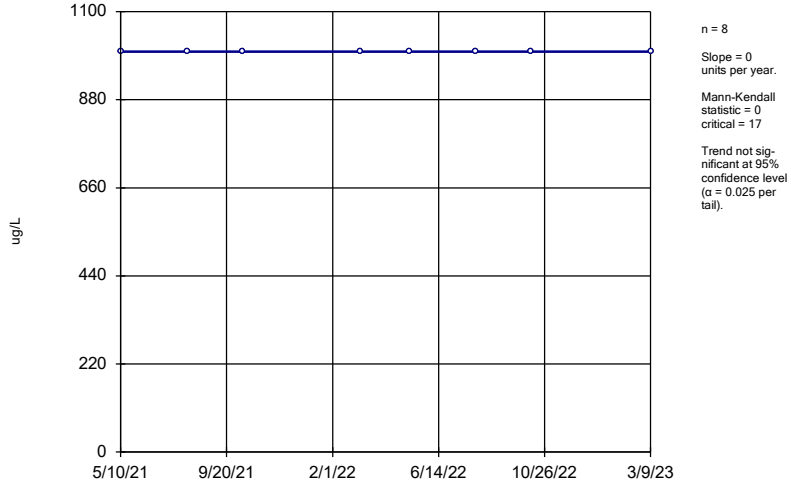
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

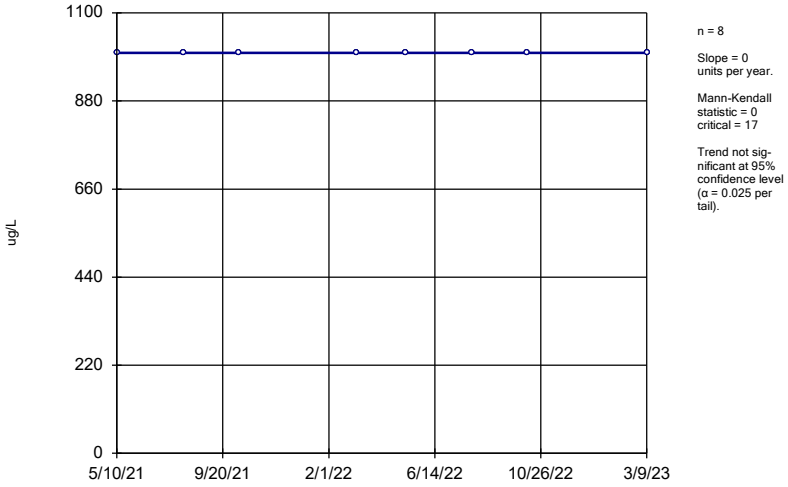
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

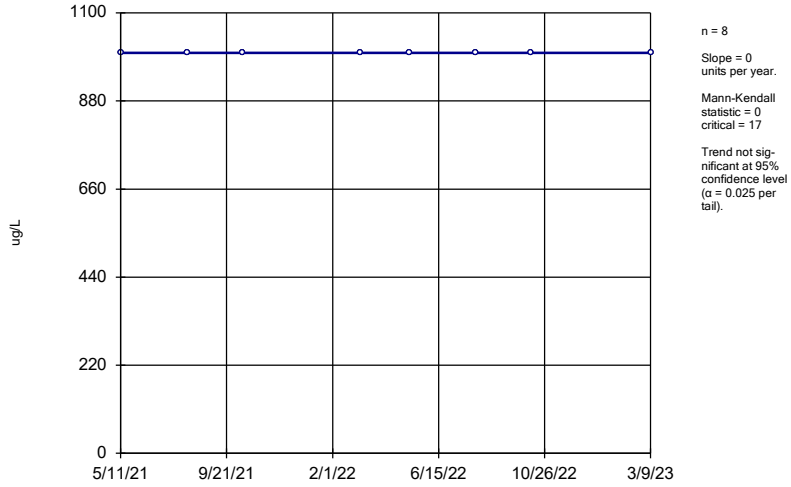
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-54R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

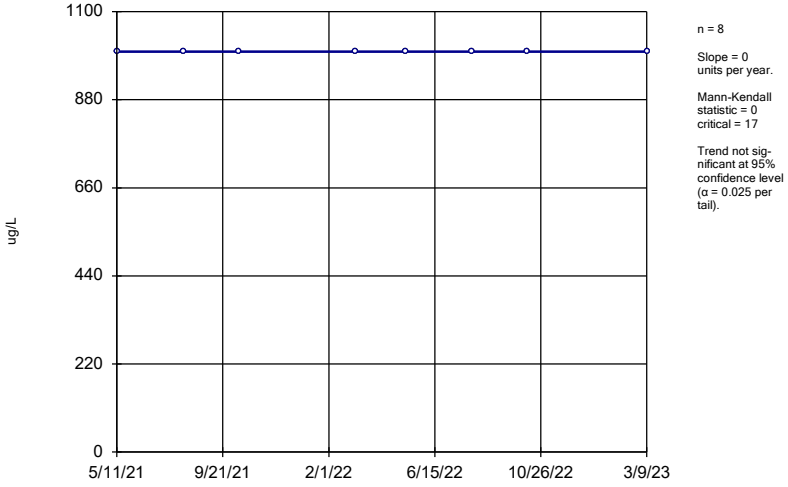
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-55



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

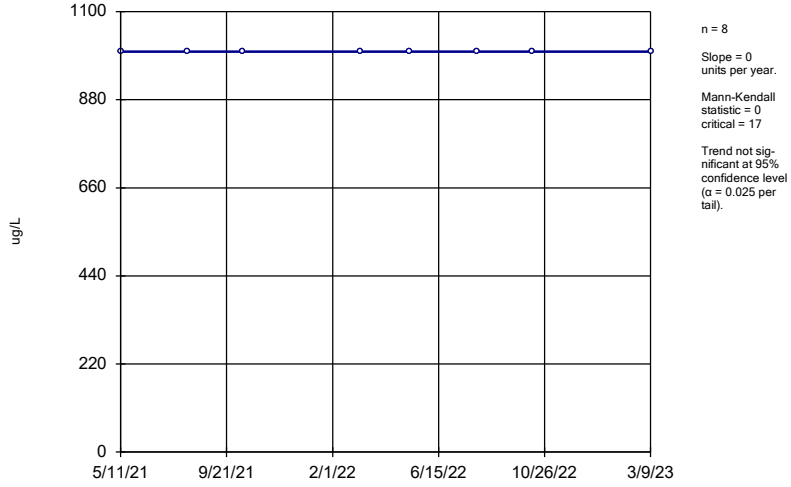
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

OW-57ROUT



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

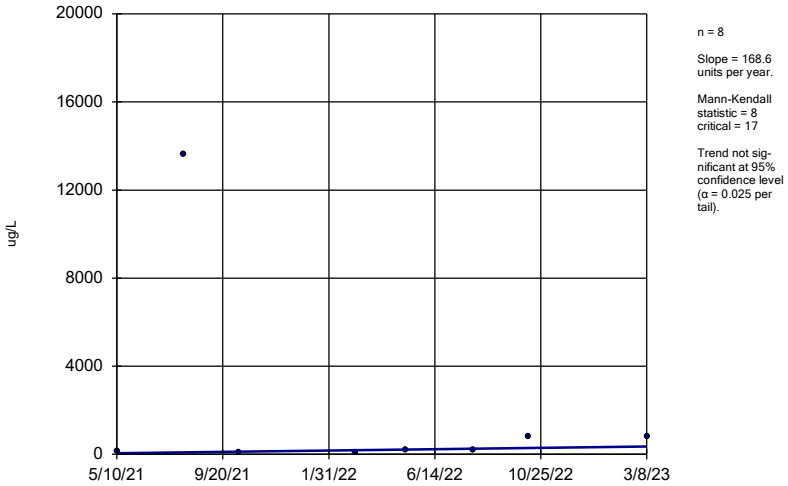
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

JCW-MW-18001



n = 8

Slope = 168.6 units per year.

Mann-Kendall statistic = 8
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

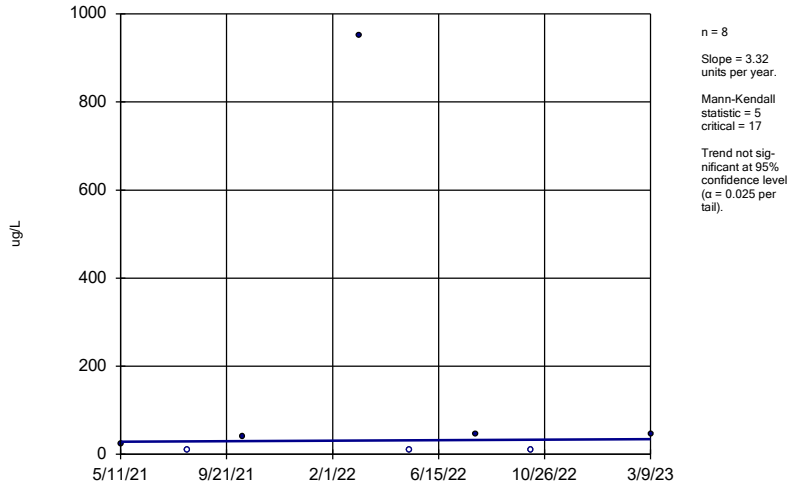
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Hollow symbols indicate censored values.

Iron, Total

JCW-MW-18004



n = 8

Slope = 3.32 units per year.

Mann-Kendall statistic = 5
critical = 17

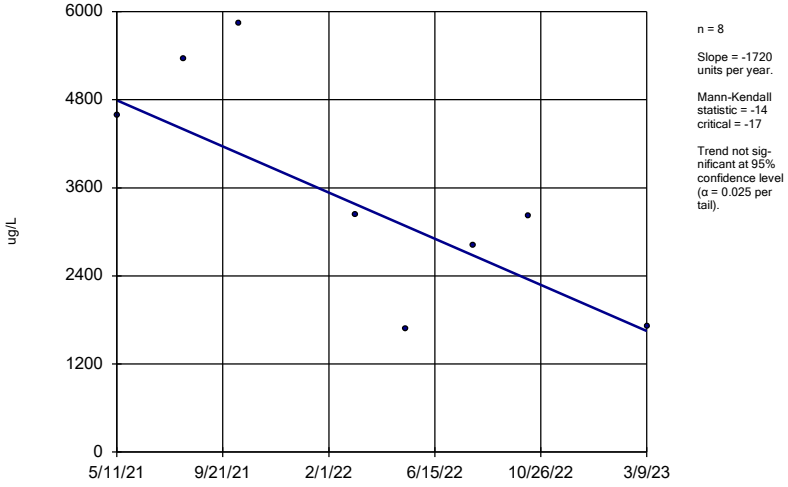
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

JCW-MW-18005



n = 8

Slope = -1720 units per year.

Mann-Kendall statistic = -14
critical = -17

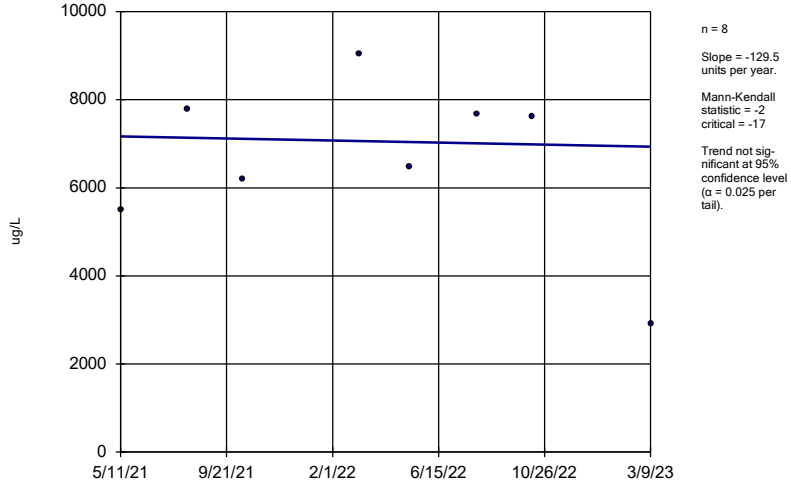
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

JCW-MW-18006



n = 8

Slope = -129.5 units per year.

Mann-Kendall statistic = -2
critical = -17

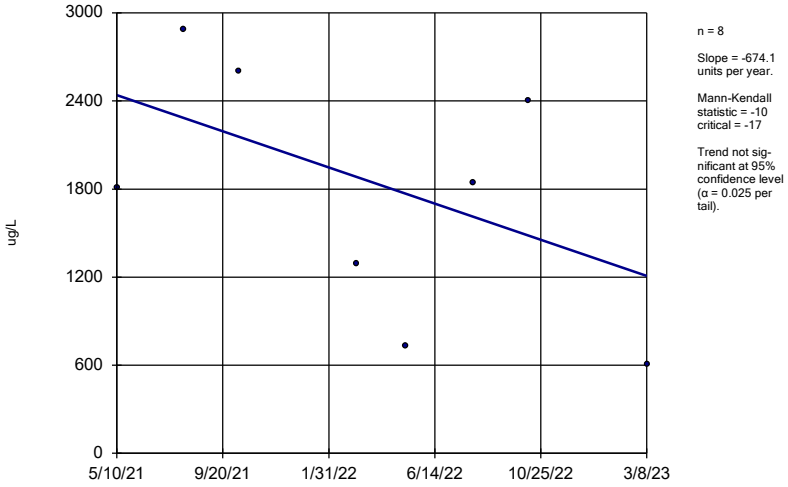
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

MW-50



n = 8

Slope = -674.1 units per year.

Mann-Kendall statistic = -10
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

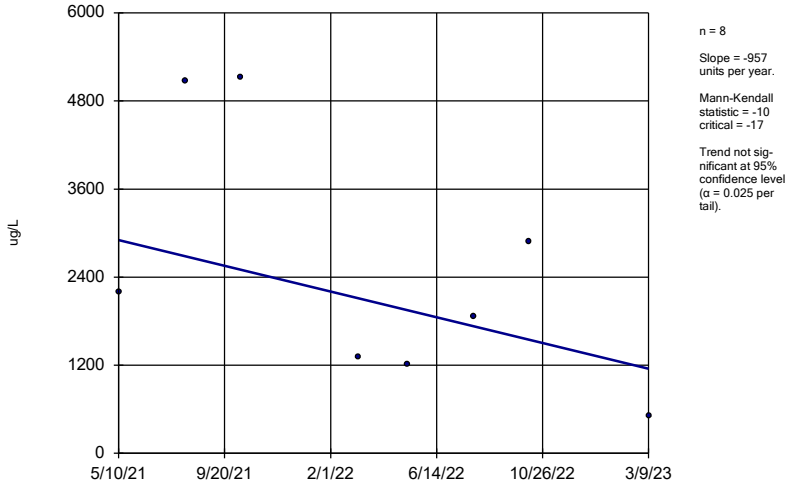
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

MW-51



n = 8

Slope = -957 units per year.

Mann-Kendall statistic = -10
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

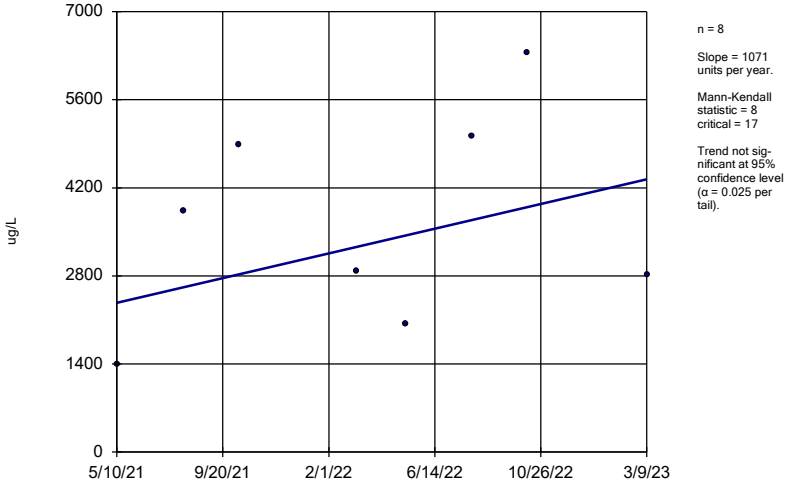
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

MW-52



n = 8

Slope = 1071 units per year.

Mann-Kendall statistic = 8
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

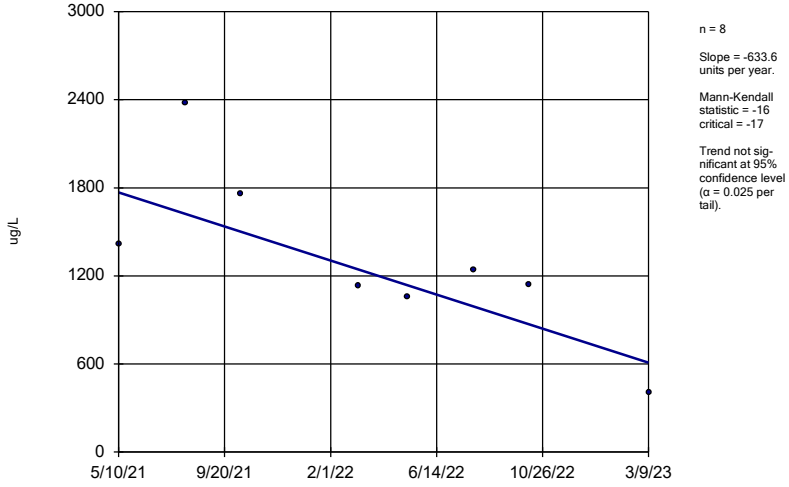
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

MW-53



n = 8

Slope = -633.6 units per year.

Mann-Kendall statistic = -16
critical = -17

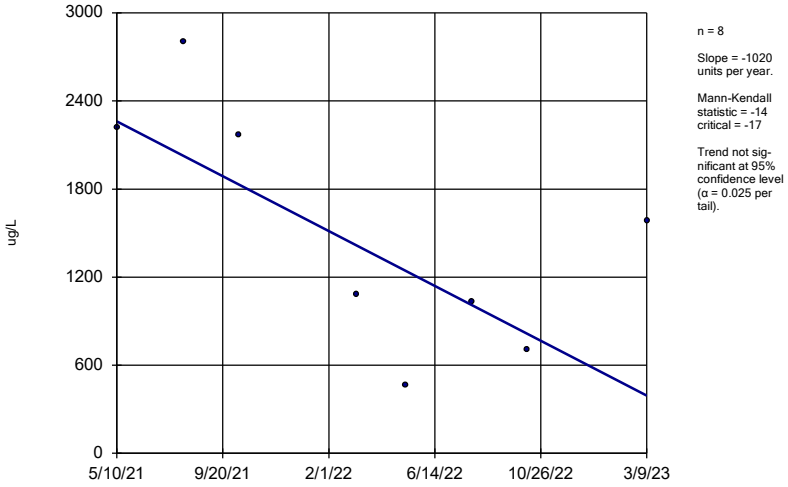
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

MW-53R



n = 8

Slope = -1020 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

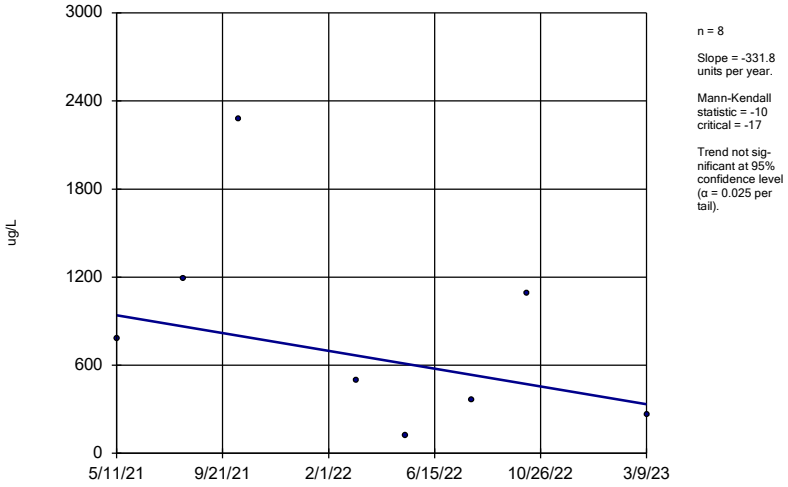
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

MW-54R



n = 8

Slope = -331.8 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

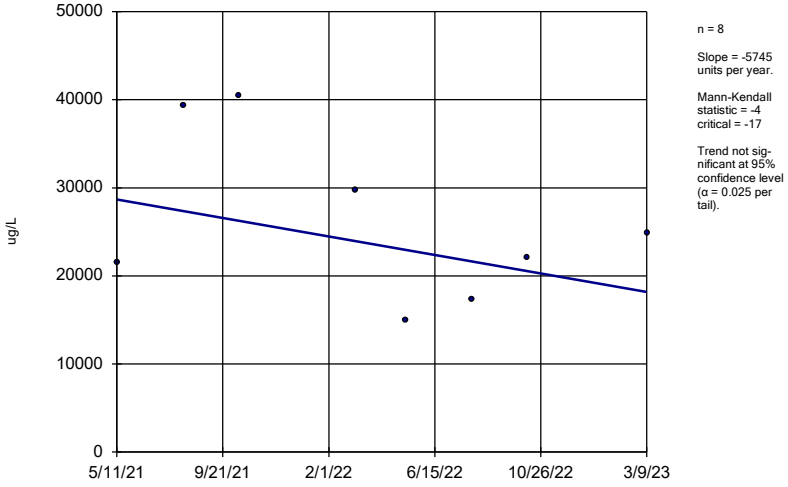
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

MW-55



n = 8

Slope = -5745 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

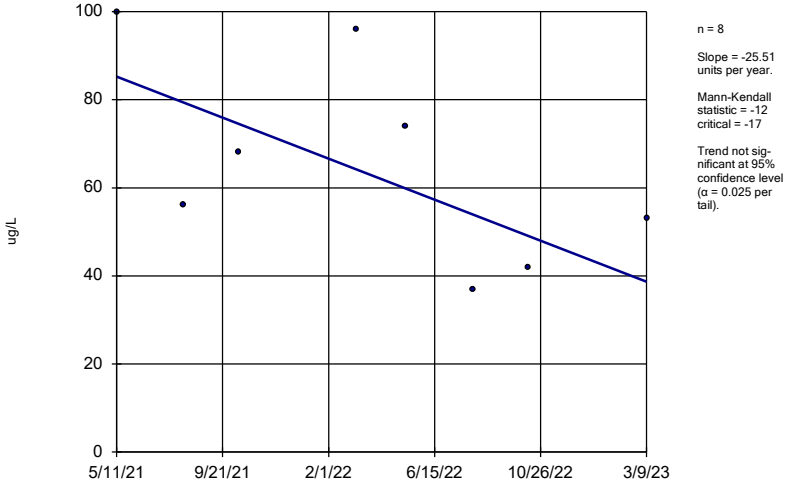
Sen's Slope Estimator Analysis Run 4/3/2023 11:48 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Iron, Total

OW-57ROUT



n = 8

Slope = -25.51 units per year.

Mann-Kendall statistic = -12 critical = -17

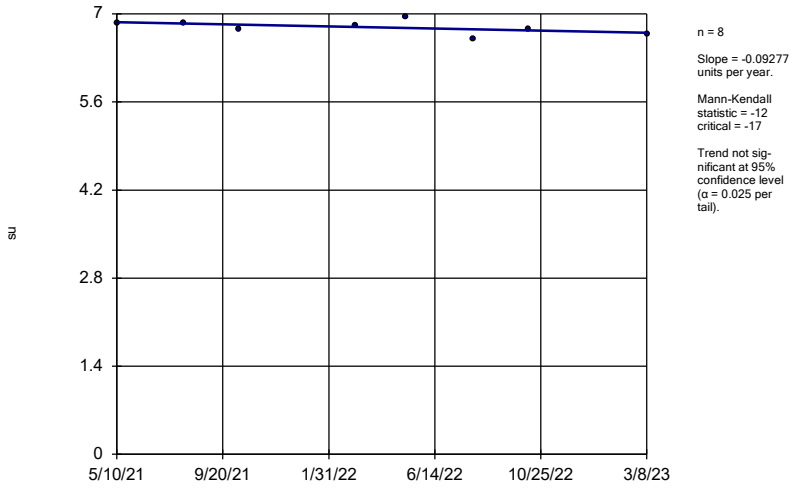
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

JCW-MW-18001



n = 8

Slope = -0.09277 units per year.

Mann-Kendall statistic = -12 critical = -17

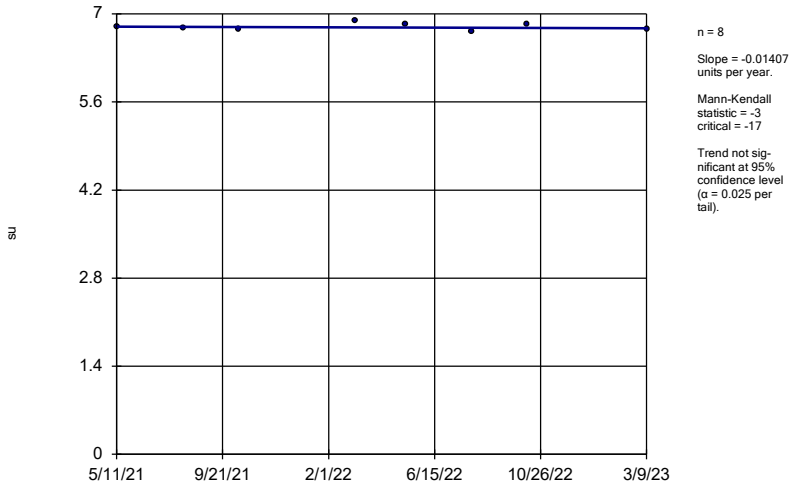
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

JCW-MW-18004



n = 8

Slope = -0.01407 units per year.

Mann-Kendall statistic = -3 critical = -17

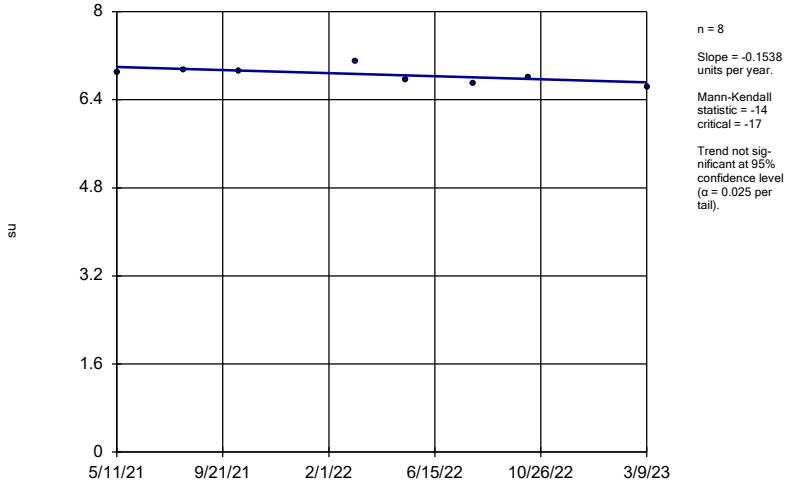
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

JCW-MW-18005



n = 8

Slope = -0.1538 units per year.

Mann-Kendall statistic = -14 critical = -17

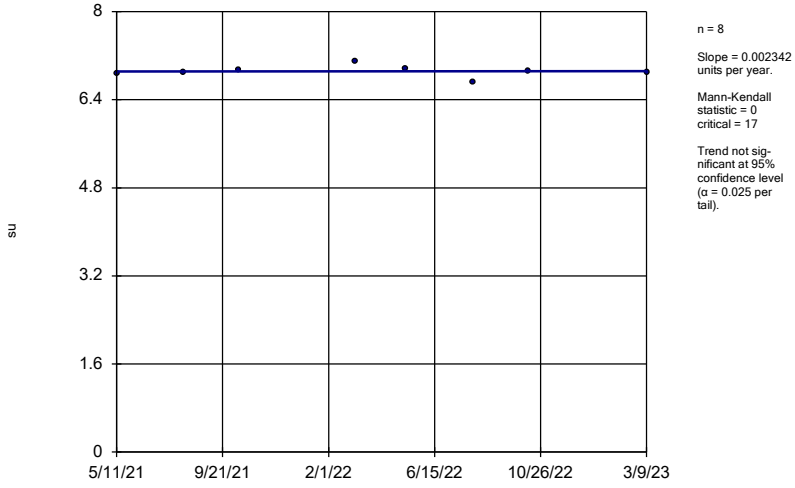
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

JCW-MW-18006



n = 8

Slope = 0.002342 units per year.

Mann-Kendall statistic = 0 critical = 17

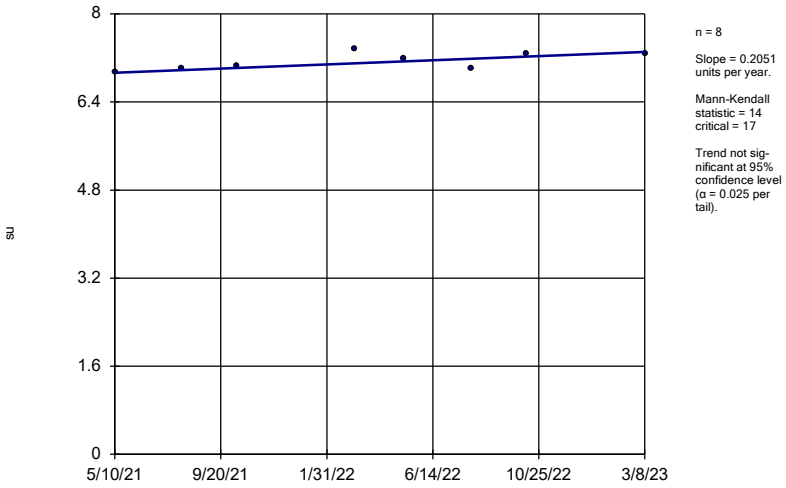
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

MW-50



n = 8

Slope = 0.2051 units per year.

Mann-Kendall statistic = 14 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

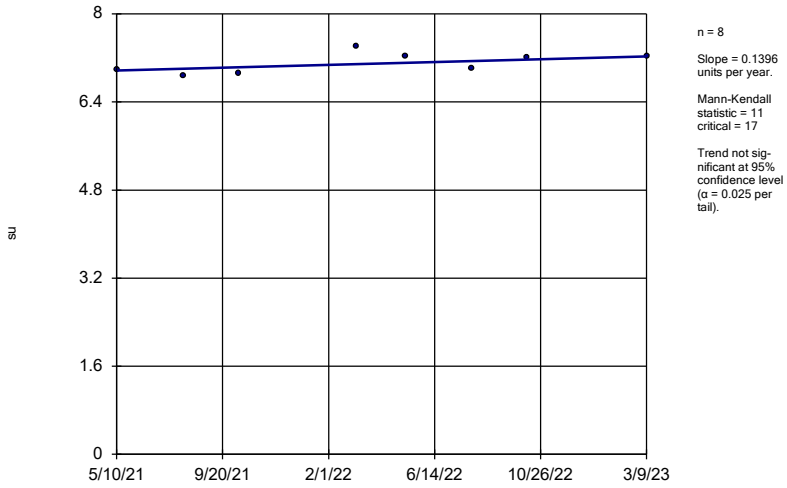
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

MW-51



n = 8

Slope = 0.1396 units per year.

Mann-Kendall statistic = 11 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

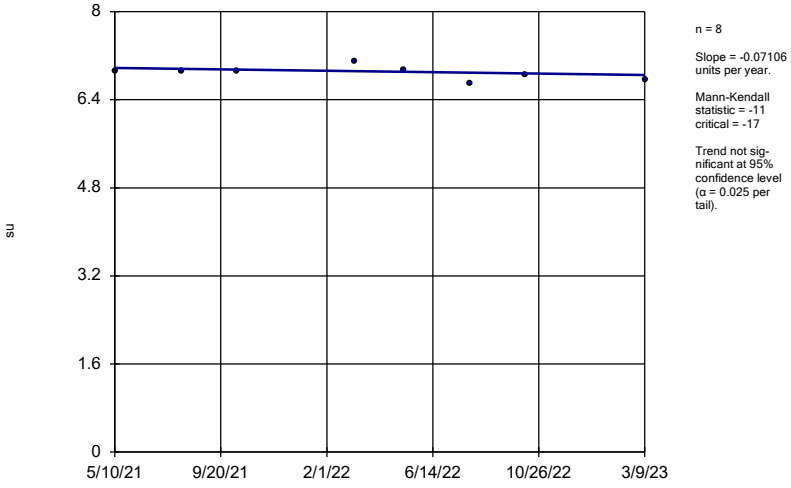
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

MW-52



n = 8

Slope = -0.07106 units per year.

Mann-Kendall statistic = -11 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

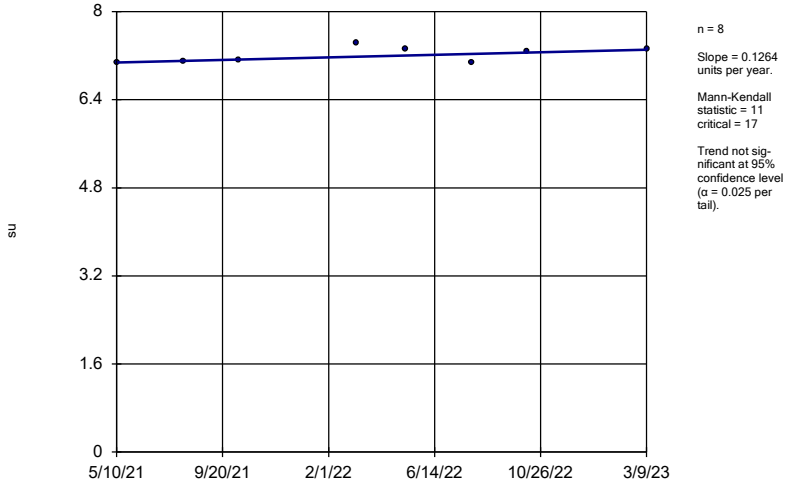
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

MW-53



n = 8

Slope = 0.1264 units per year.

Mann-Kendall statistic = 11 critical = 17

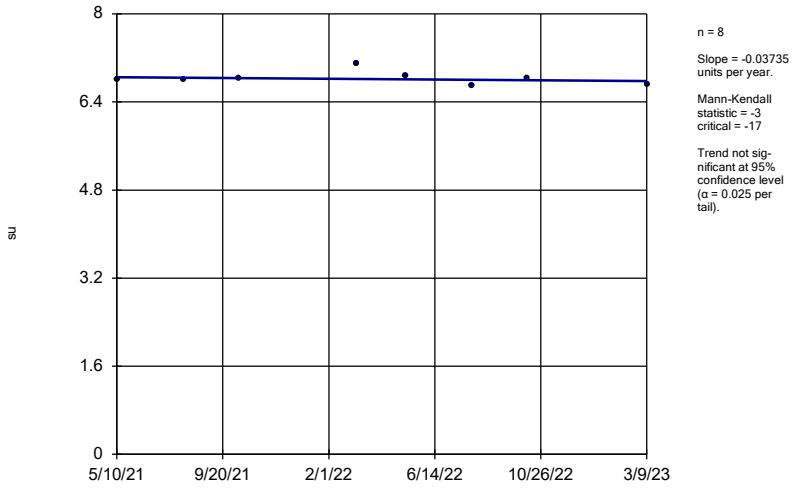
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

pH, Field

MW-53R



n = 8

Slope = -0.03735 units per year.

Mann-Kendall statistic = -3
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

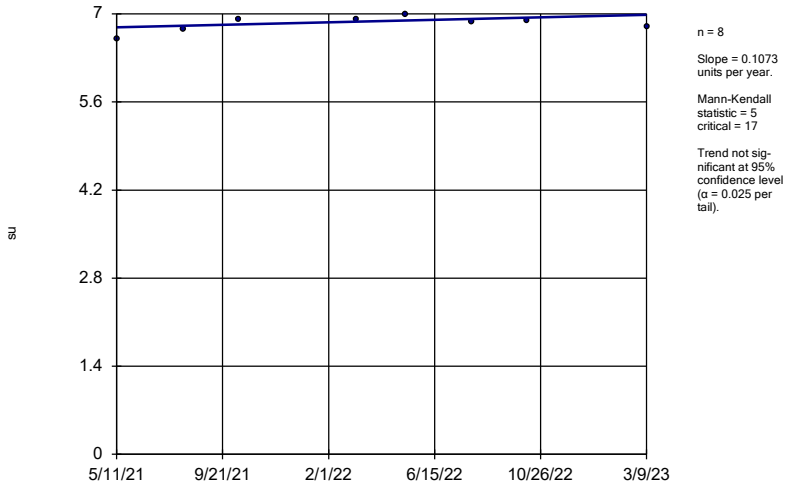
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

MW-54R



n = 8

Slope = 0.1073 units per year.

Mann-Kendall statistic = 5
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

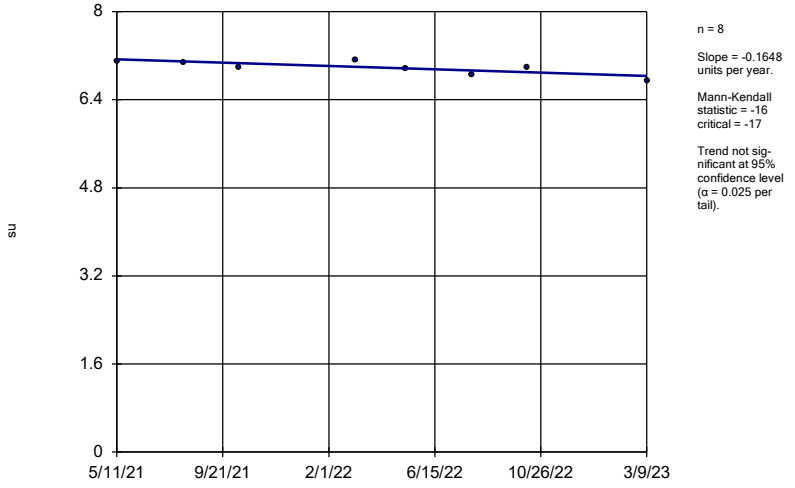
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

MW-55



n = 8

Slope = -0.1648 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

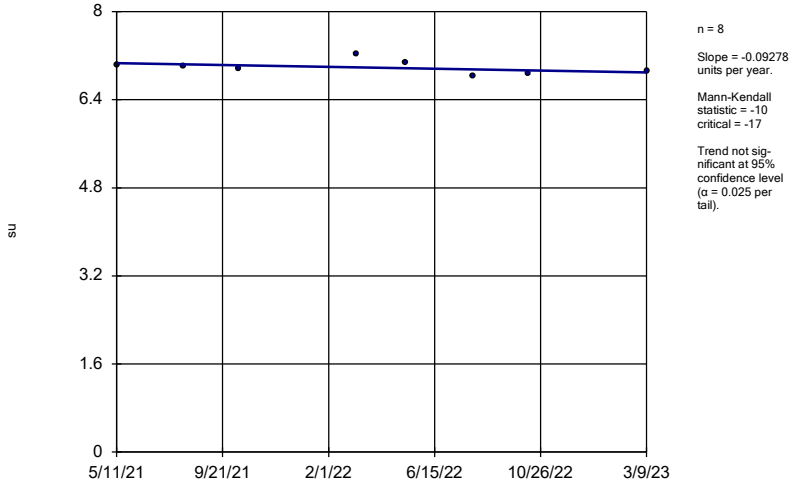
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

pH, Field

OW-57ROUT



n = 8

Slope = -0.09278 units per year.

Mann-Kendall statistic = -10
critical = -17

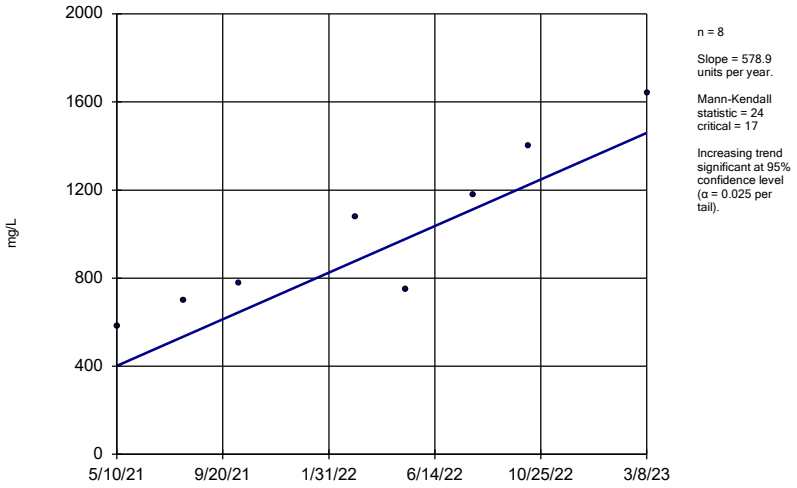
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sulfate

JCW-MW-18001



n = 8

Slope = 578.9 units per year.

Mann-Kendall statistic = 24 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

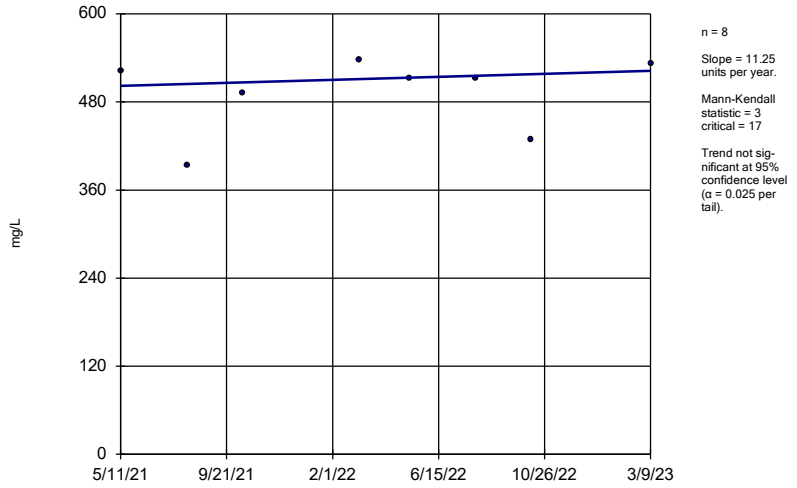
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

JCW-MW-18004



n = 8

Slope = 11.25 units per year.

Mann-Kendall statistic = 3 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

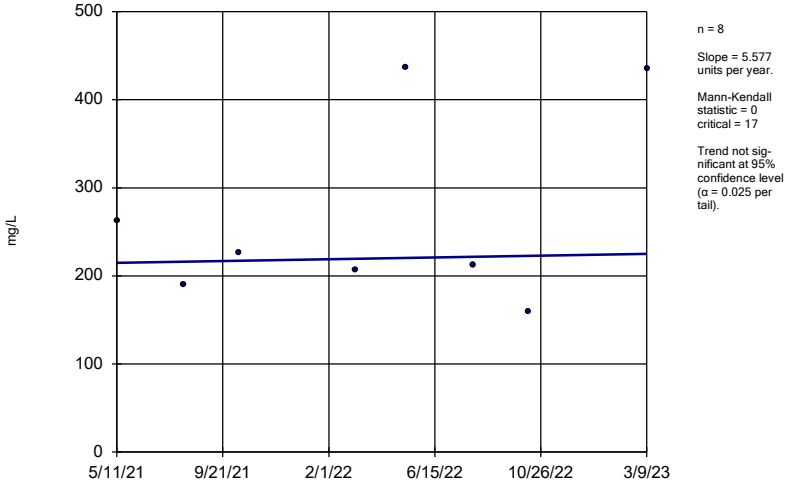
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

JCW-MW-18005



n = 8

Slope = 5.577 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

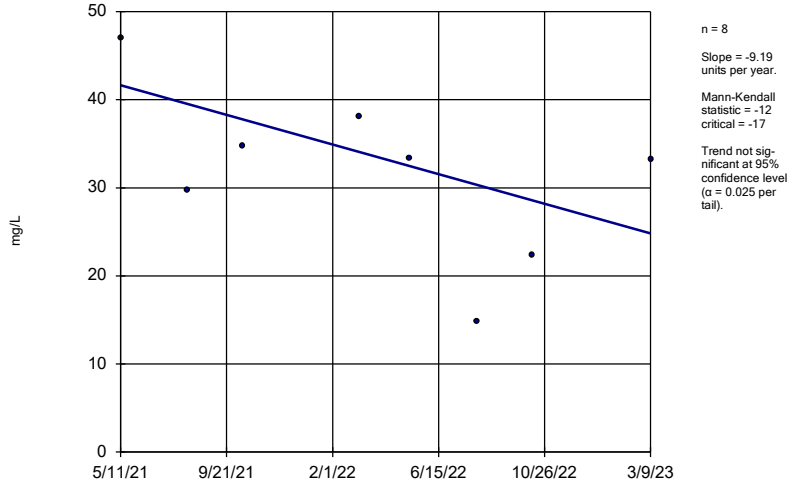
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

JCW-MW-18006



n = 8

Slope = -9.19 units per year.

Mann-Kendall statistic = -12 critical = -17

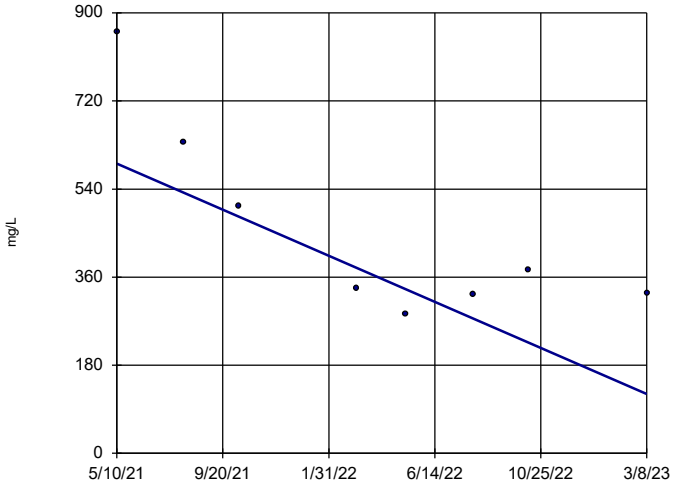
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sulfate

MW-50



n = 8

Slope = -257.4 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

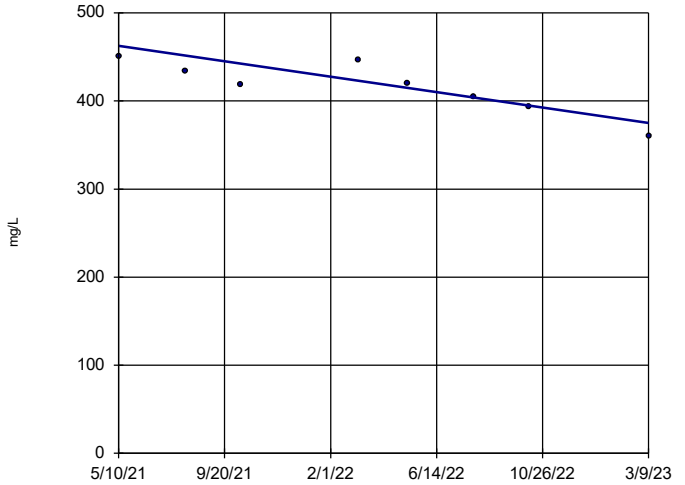
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

MW-51



n = 8

Slope = -47.71 units per year.

Mann-Kendall statistic = -22
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

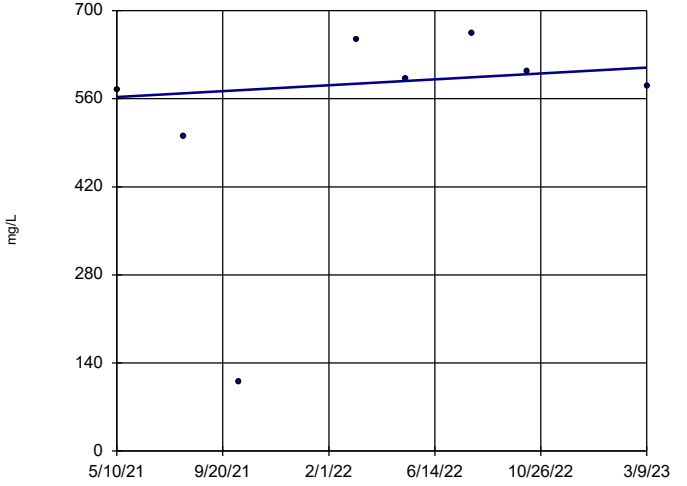
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

MW-52



n = 8

Slope = 25.47 units per year.

Mann-Kendall statistic = 8
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

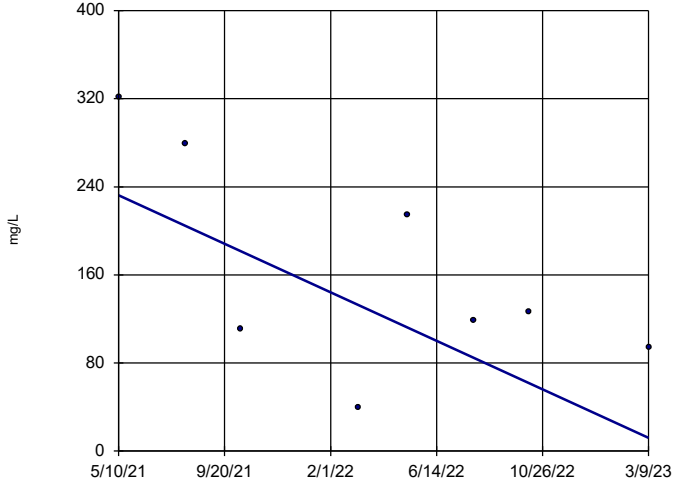
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

MW-53



n = 8

Slope = -120.3 units per year.

Mann-Kendall statistic = -12
critical = -17

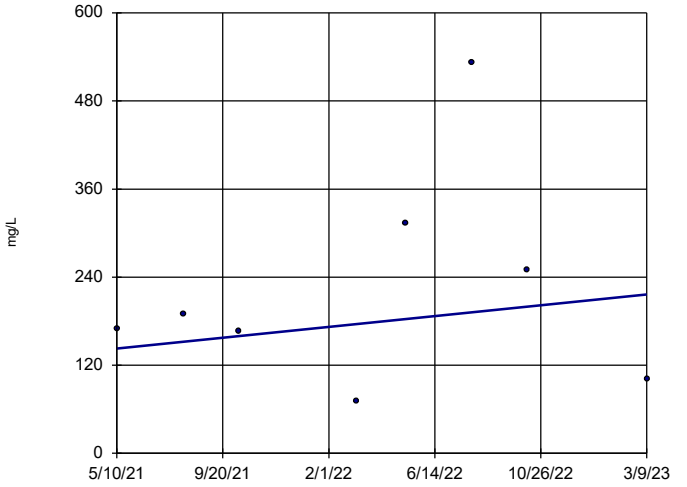
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sulfate

MW-53R



n = 8

Slope = 40.26 units per year.

Mann-Kendall statistic = 2 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

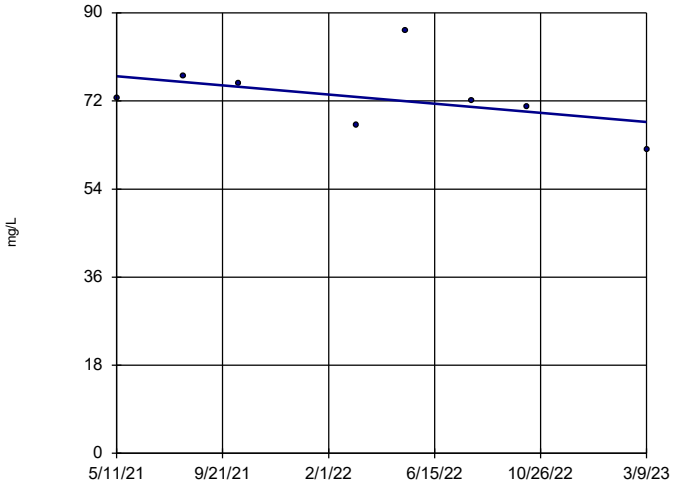
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

MW-54R



n = 8

Slope = -5.121 units per year.

Mann-Kendall statistic = -12 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

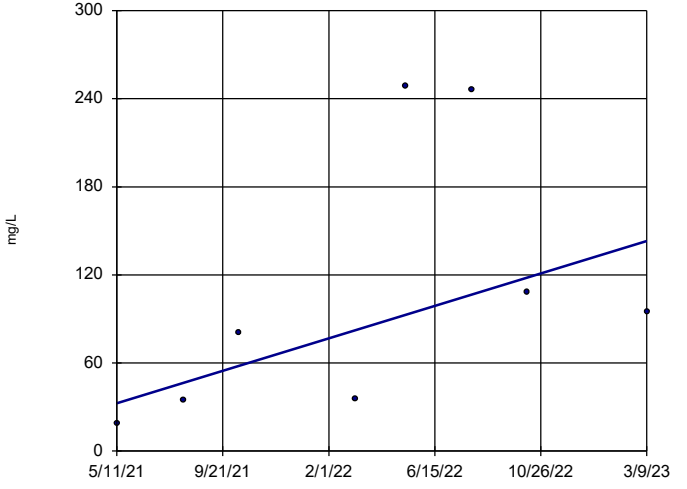
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

MW-55



n = 8

Slope = 60.5 units per year.

Mann-Kendall statistic = 14 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

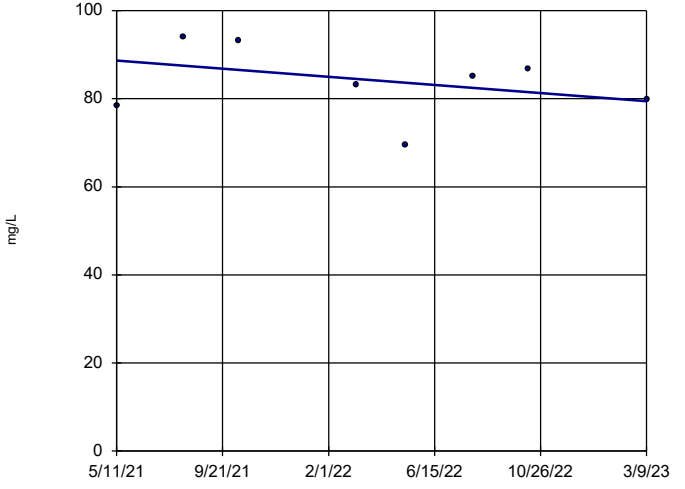
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Sulfate

OW-57ROUT



n = 8

Slope = -5.071 units per year.

Mann-Kendall statistic = -4 critical = -17

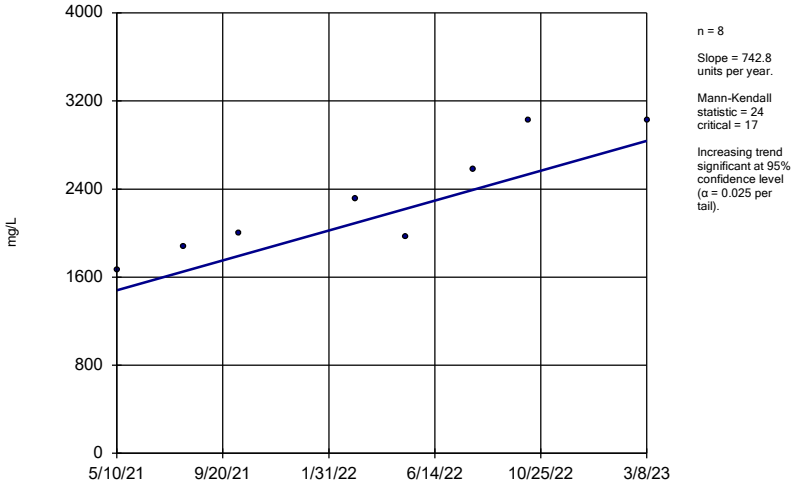
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Total Dissolved Solids

JCW-MW-18001



n = 8

Slope = 742.8 units per year.

Mann-Kendall statistic = 24
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

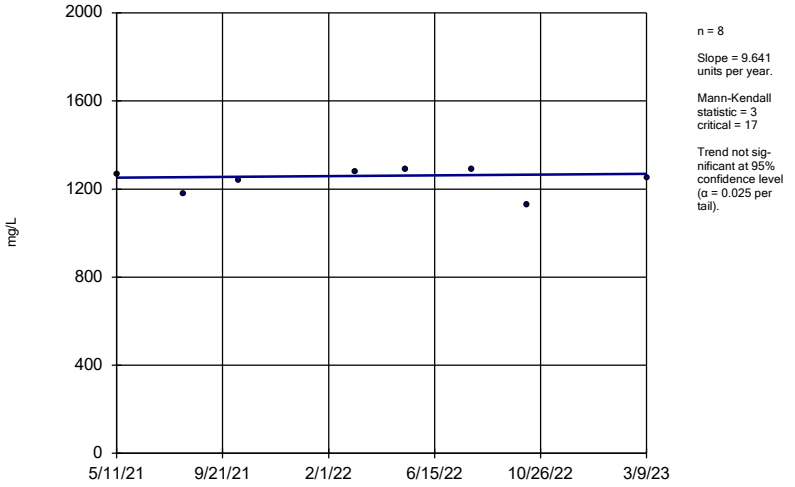
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

JCW-MW-18004



n = 8

Slope = 9.641 units per year.

Mann-Kendall statistic = 3
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

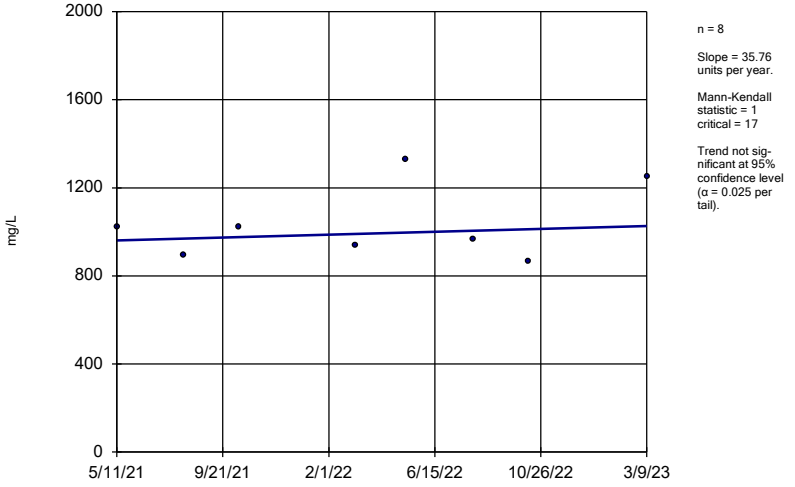
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

JCW-MW-18005



n = 8

Slope = 35.76 units per year.

Mann-Kendall statistic = 1
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

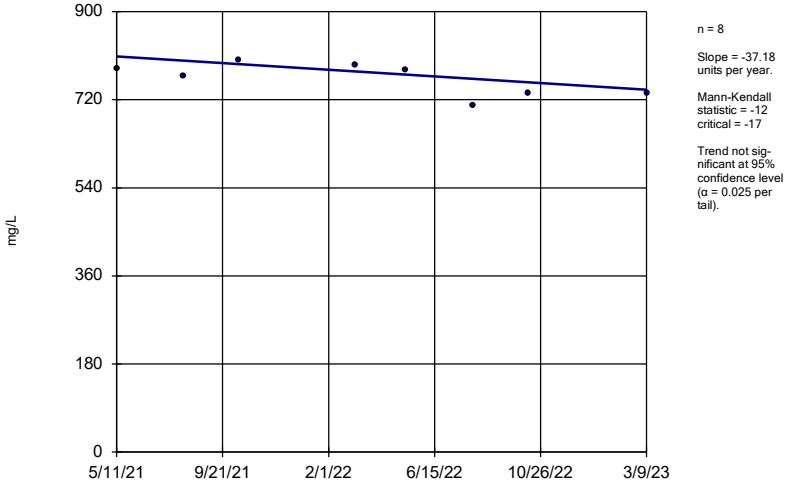
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

JCW-MW-18006



n = 8

Slope = -37.18 units per year.

Mann-Kendall statistic = -12
critical = -17

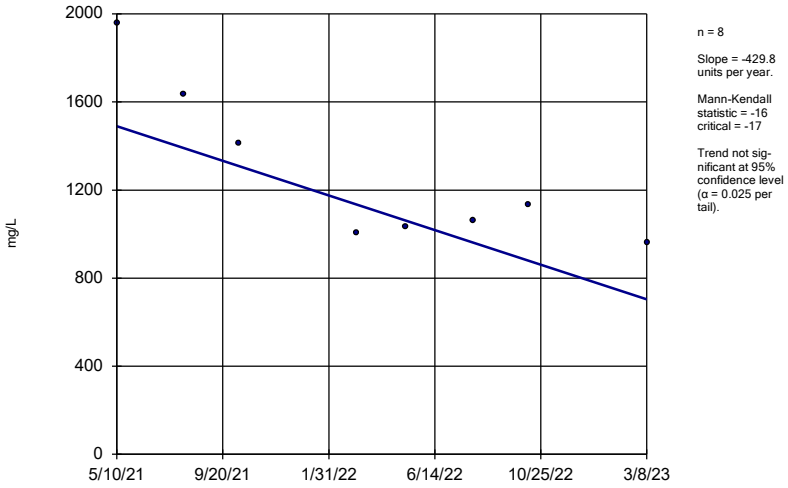
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Total Dissolved Solids

MW-50



n = 8

Slope = -429.8 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

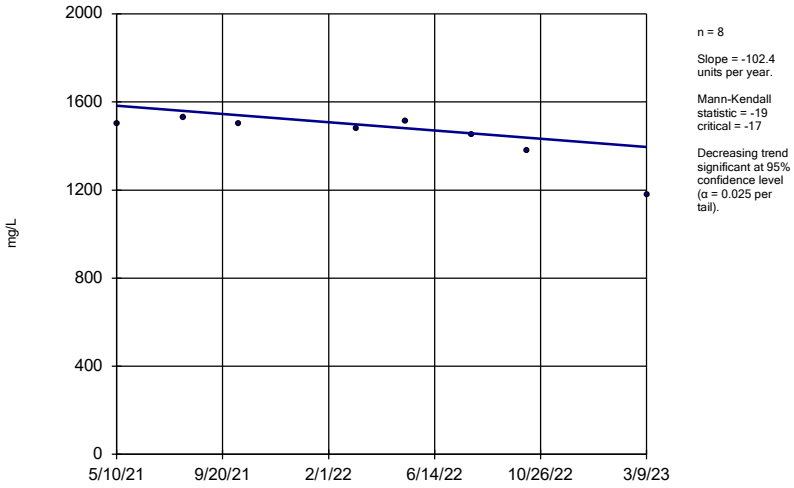
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

MW-51



n = 8

Slope = -102.4 units per year.

Mann-Kendall statistic = -19
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

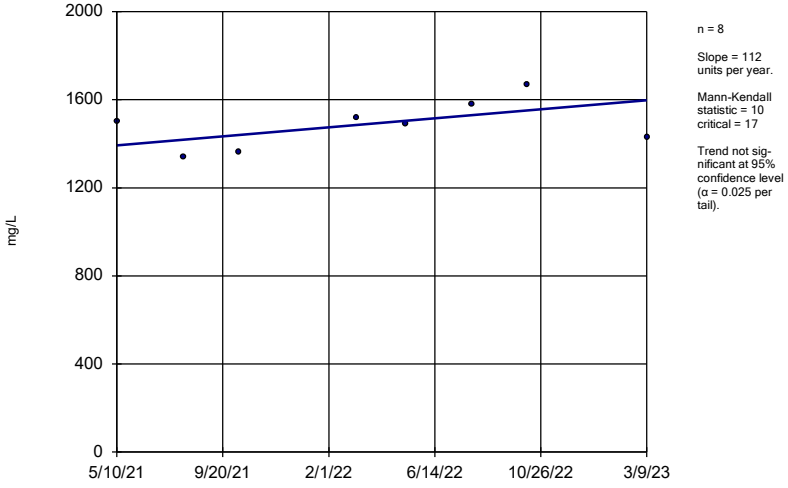
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

MW-52



n = 8

Slope = 112 units per year.

Mann-Kendall statistic = 10
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

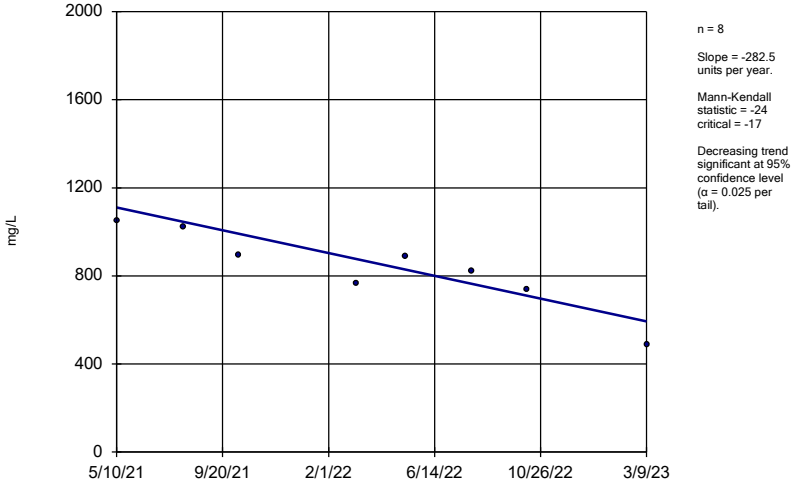
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

MW-53



n = 8

Slope = -282.5 units per year.

Mann-Kendall statistic = -24
critical = -17

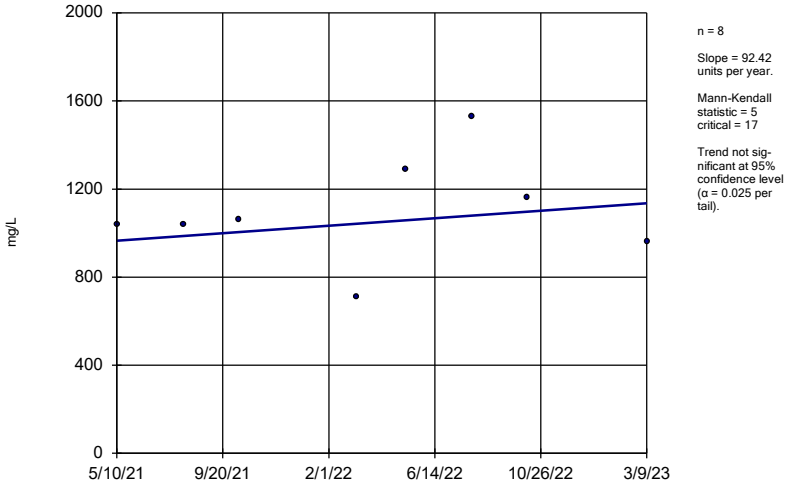
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Total Dissolved Solids

MW-53R



n = 8

Slope = 92.42 units per year.

Mann-Kendall statistic = 5
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

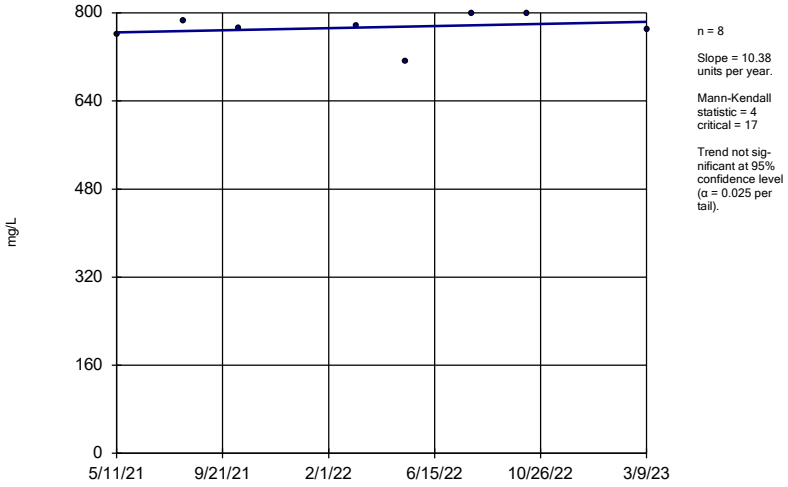
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

MW-54R



n = 8

Slope = 10.38 units per year.

Mann-Kendall statistic = 4
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

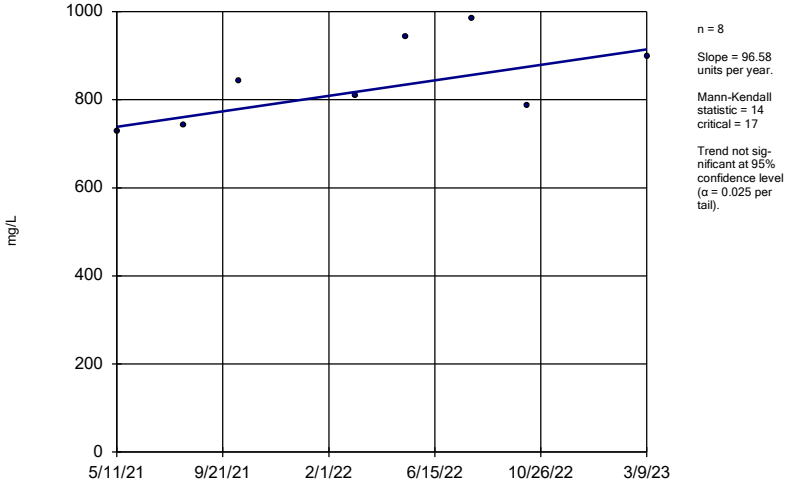
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

MW-55



n = 8

Slope = 96.58 units per year.

Mann-Kendall statistic = 14
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

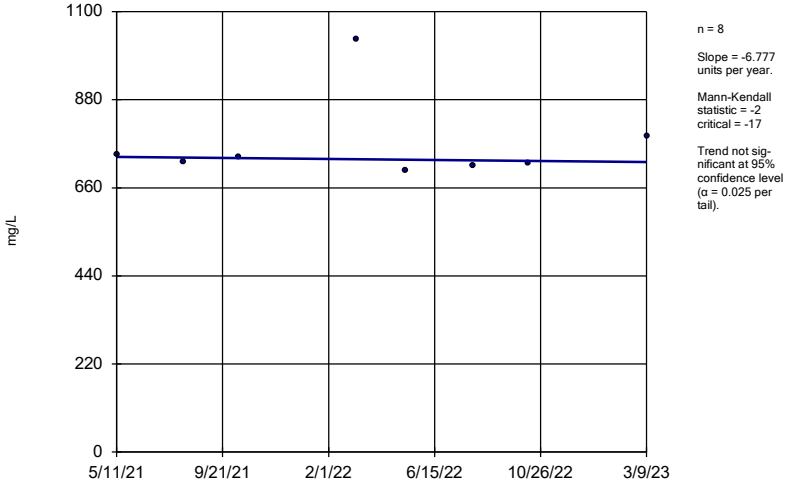
Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Total Dissolved Solids

OW-57ROUT



n = 8

Slope = -6.777 units per year.

Mann-Kendall statistic = -2
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 11:49 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Appendix D
Assessment Monitoring and GSI Statistical Evaluation

Technical Memorandum

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 Rule[1] 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 Report[2]. 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.

[1] 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).

[2] 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

[3] 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™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each parameter with a direct exceedance using a per test[4] 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™ 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™ 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 α = 0.01. Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

[4] Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

The Sanitas™ 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™ 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™ 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

		Sample Location:	MW-50															
		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[1]				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[1]																		
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 Parameters[2]																		
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.

(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:	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[1]											
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[1]											
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.
(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:	MW-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[1]											
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[1]											
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.
(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:	MW-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[1]										
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[1]										
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[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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

			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[1]											
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[1]											
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.
(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:	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[1]										
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[1]										
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.
(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:	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								Field Dup		
Appendix III[1]												
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[1]												
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

			Sample Location:	OW-57R 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[1]											
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[1]											
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.
(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-MW-18001						
			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[1]											
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[1]											
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.
(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-MW-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[1]										
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[1]										
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	--	< 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.
(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-MW-18005								
		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[1]							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[1]											
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

		Sample Location:	JCW-MW-18006										
		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[1]								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[1]													
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.

(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:	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	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**			Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Appendix III[(1)]																					
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[F]	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[(1)]																					
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[H]	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 Parameters[(2)]																					
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	11	14	20	12	10	15	18	10
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	2	2	1	< 1	1	2	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	18	23	25	10	8	17	20	17
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-54R							
					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**								
Appendix III[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	1	2	4	1	< 1	2	2	1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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**							Field Dup		
Appendix III(1)														
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[F]	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(1)														
Arsenic	ug/L	10	100	680	**100**	**169**	**204**	**198**	88	48	80	78	**126**	68
Chromium	ug/L	11[H]	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 Parameters(2)														
Iron	ug/L	500,000[EE]	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.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

					Sample Location:	JCW-MW-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[(1)]													
Boron	ug/L	4,000	44,000	69,000	44,000	246	304	389	259	226	313	343	180
Sulfate	mg/L	1,200[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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.

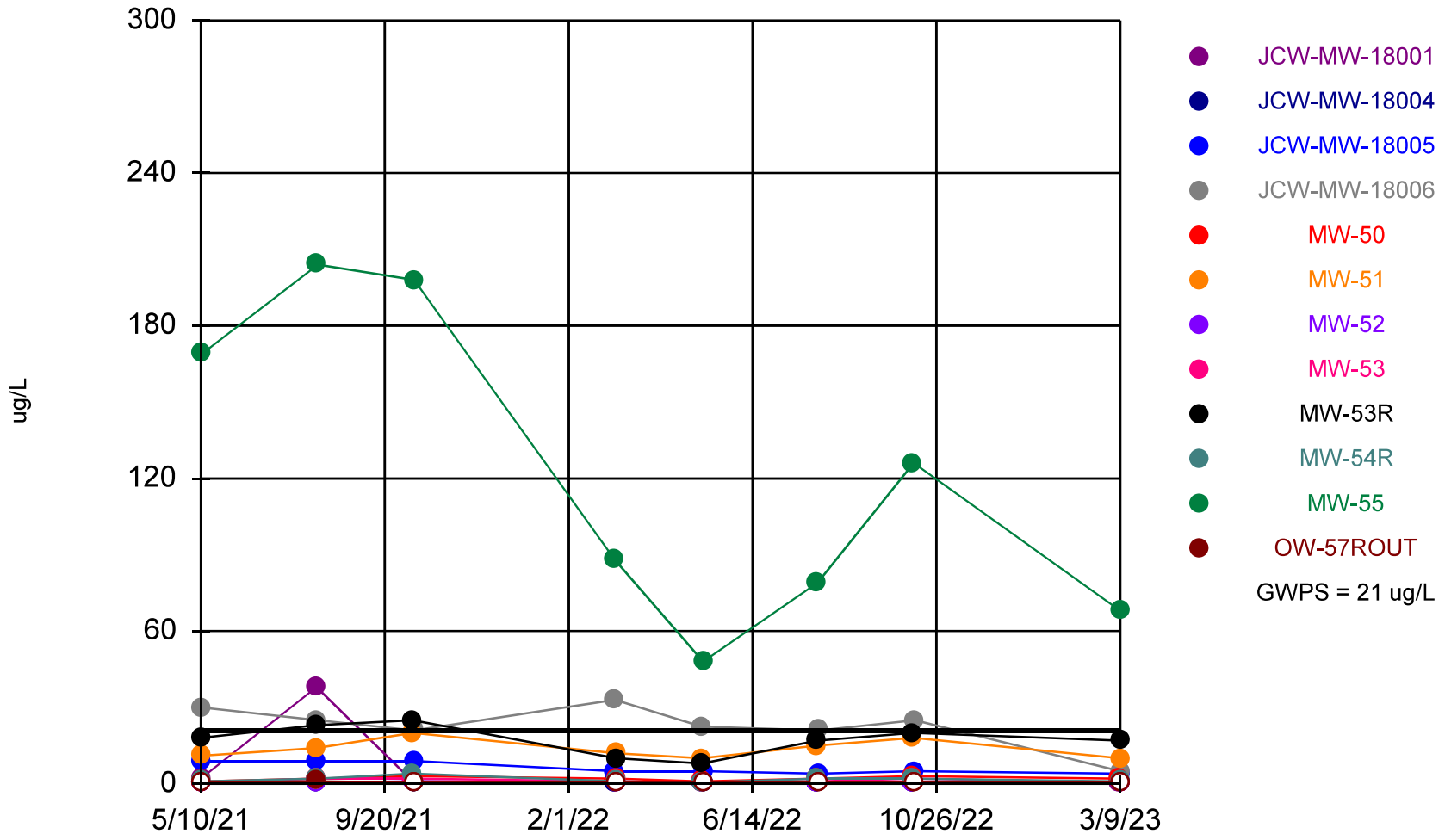
(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Attachment 1
Assessment Monitoring Sanitas™ Output Files

Hollow symbols indicate censored values.

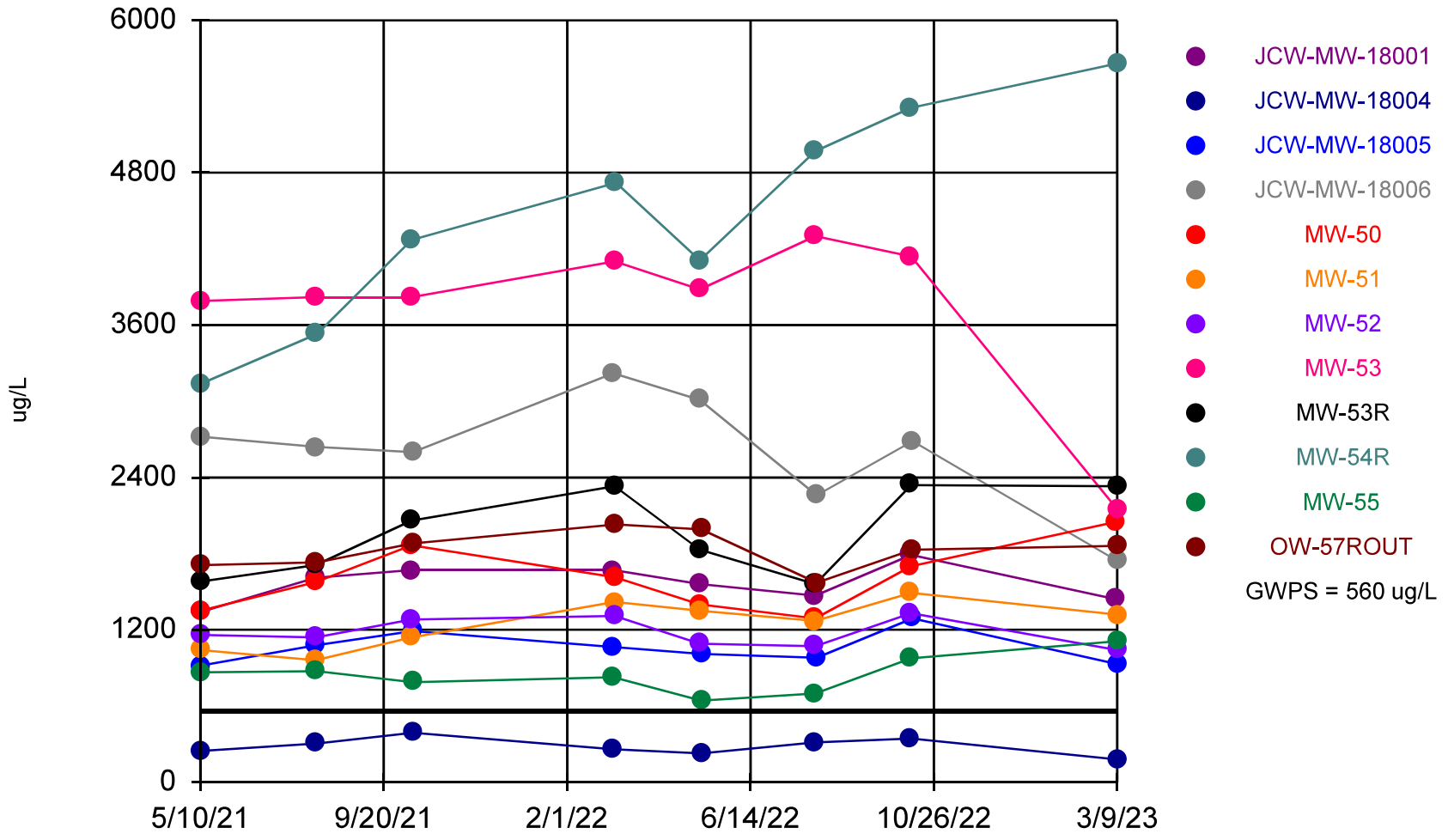
Arsenic Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:20 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

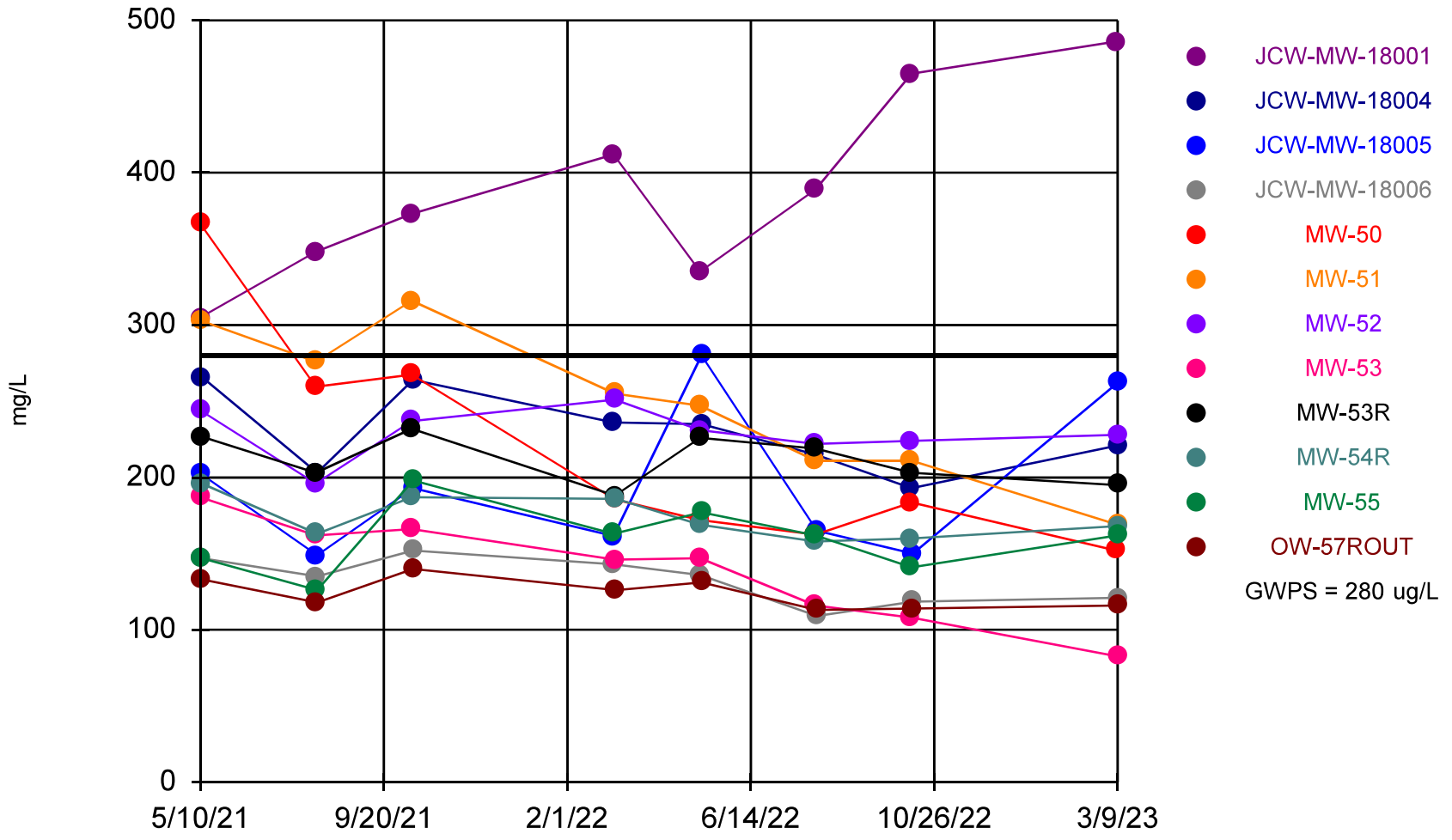
Boron Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:21 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Calcium Comparison to GWPS

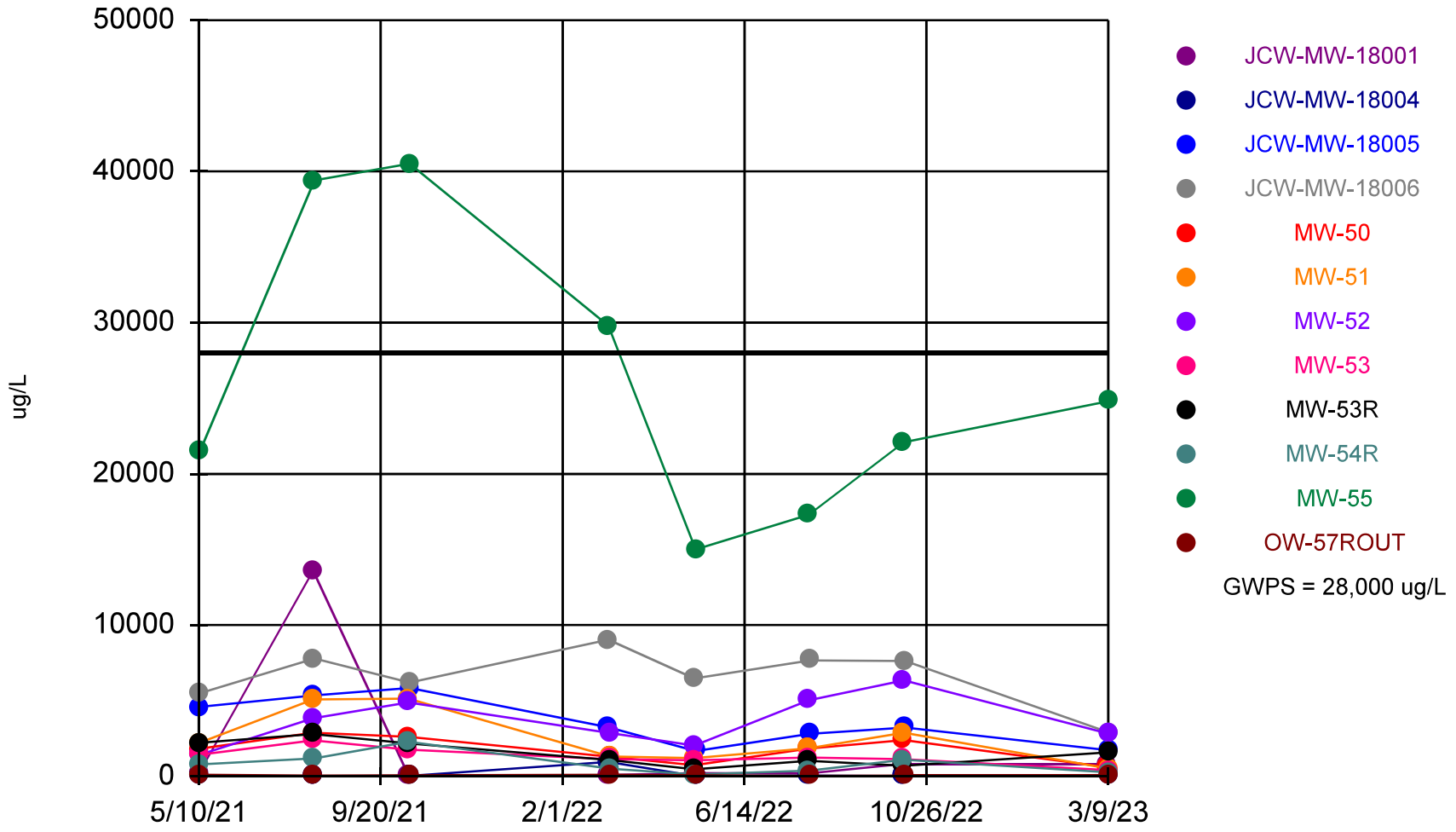


Time Series Analysis Run 4/3/2023 1:22 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Hollow symbols indicate censored values.

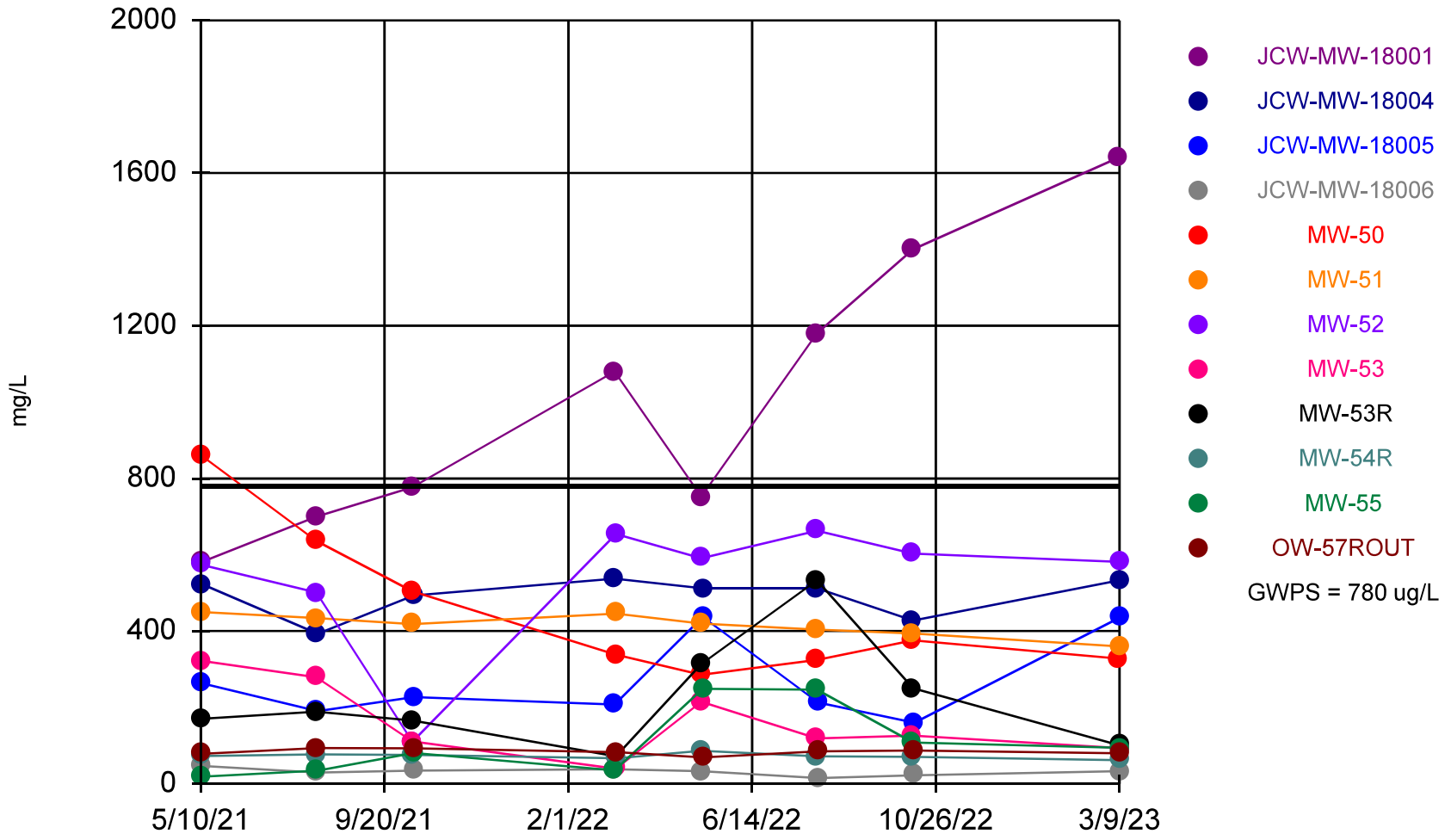
Iron Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:23 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sulfate Comparison to GWPS

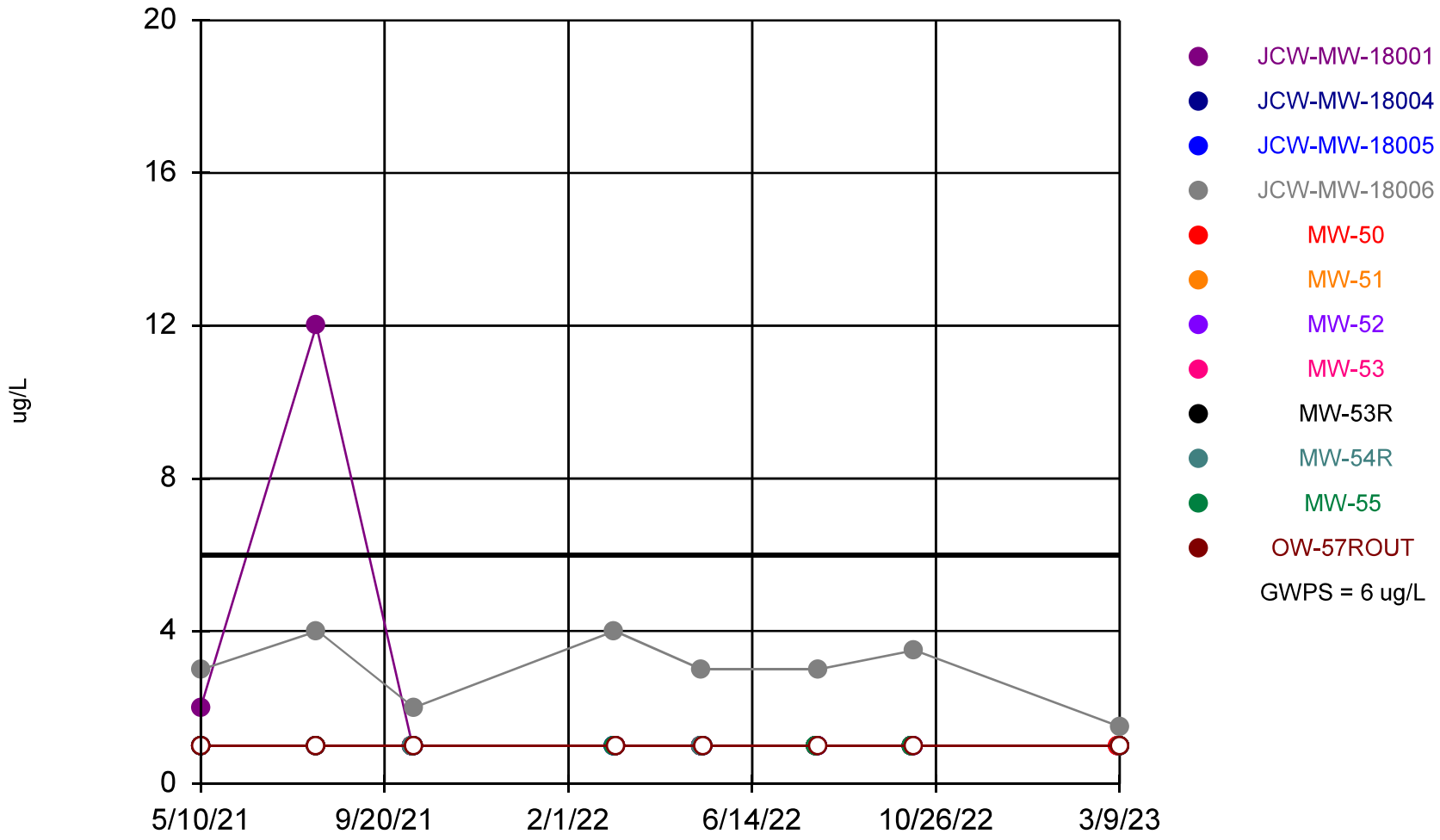


Time Series Analysis Run 4/3/2023 1:23 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Hollow symbols indicate censored values.

Vanadium Comparison to GWPS



Time Series Analysis Run 4/3/2023 1:24 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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:

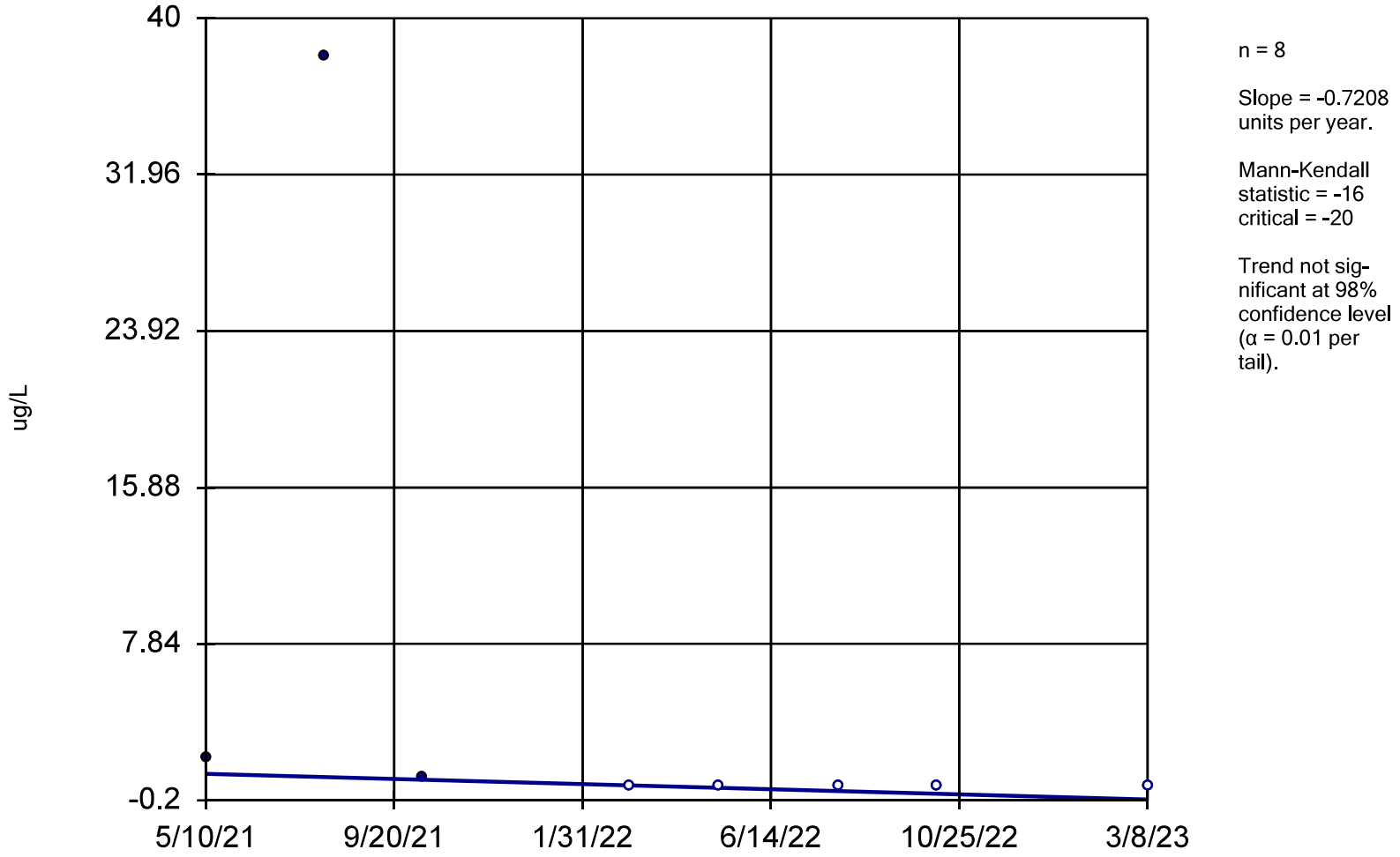
Observations = 96
ND/Trace = 86
Wells = 12
Minimum Value = 1
Maximum Value = 12
Mean Value = 1.292
Median Value = 1
Standard Deviation = 1.262
Coefficient of Variation = 0.9771
Skewness = 6.8

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Hollow symbols indicate censored values.

Arsenic, Total

JCW-MW-18001



n = 8

Slope = -0.7208 units per year.

Mann-Kendall statistic = -16
critical = -20

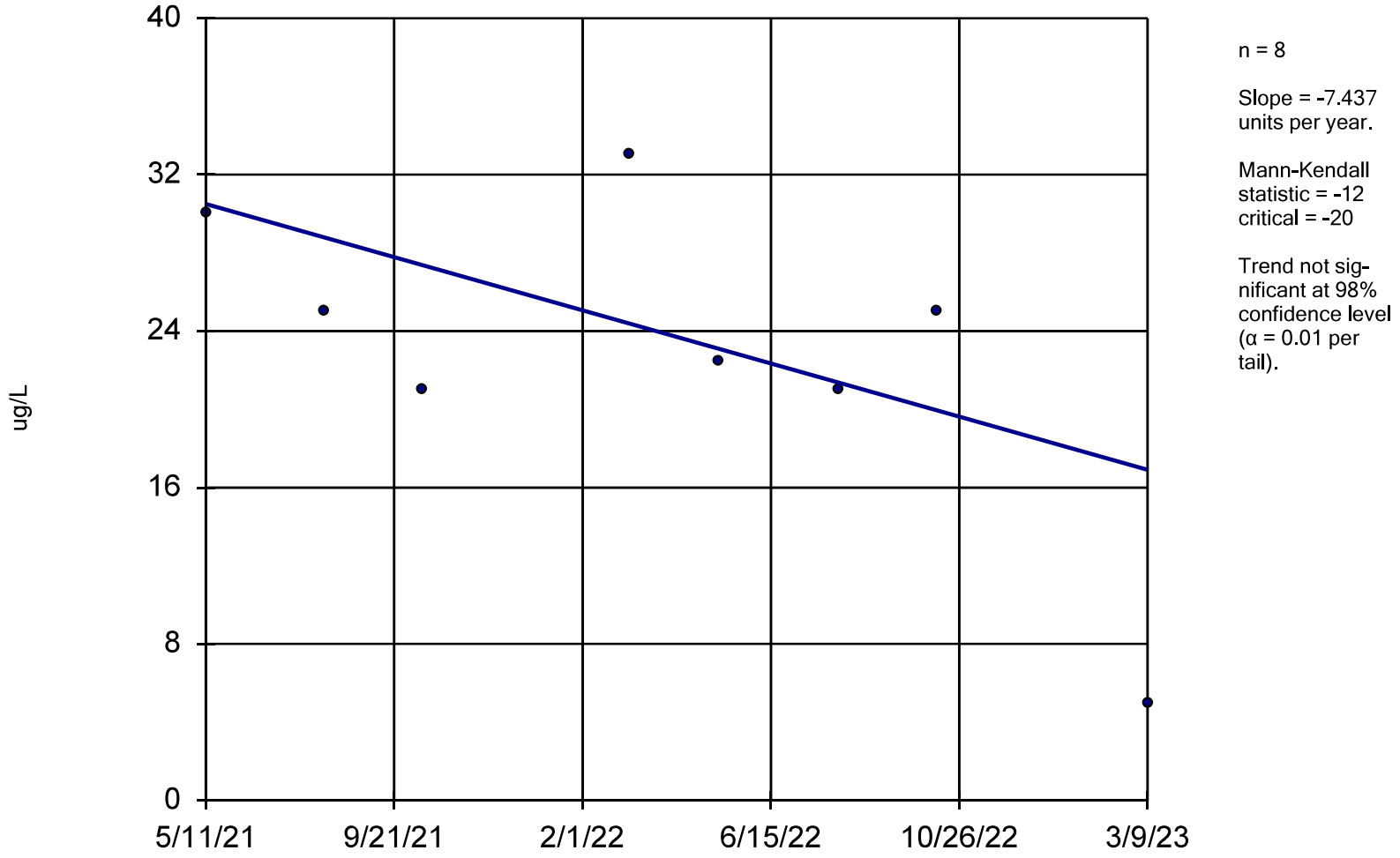
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Arsenic, Total

JCW-MW-18006



n = 8

Slope = -7.437 units per year.

Mann-Kendall statistic = -12
critical = -20

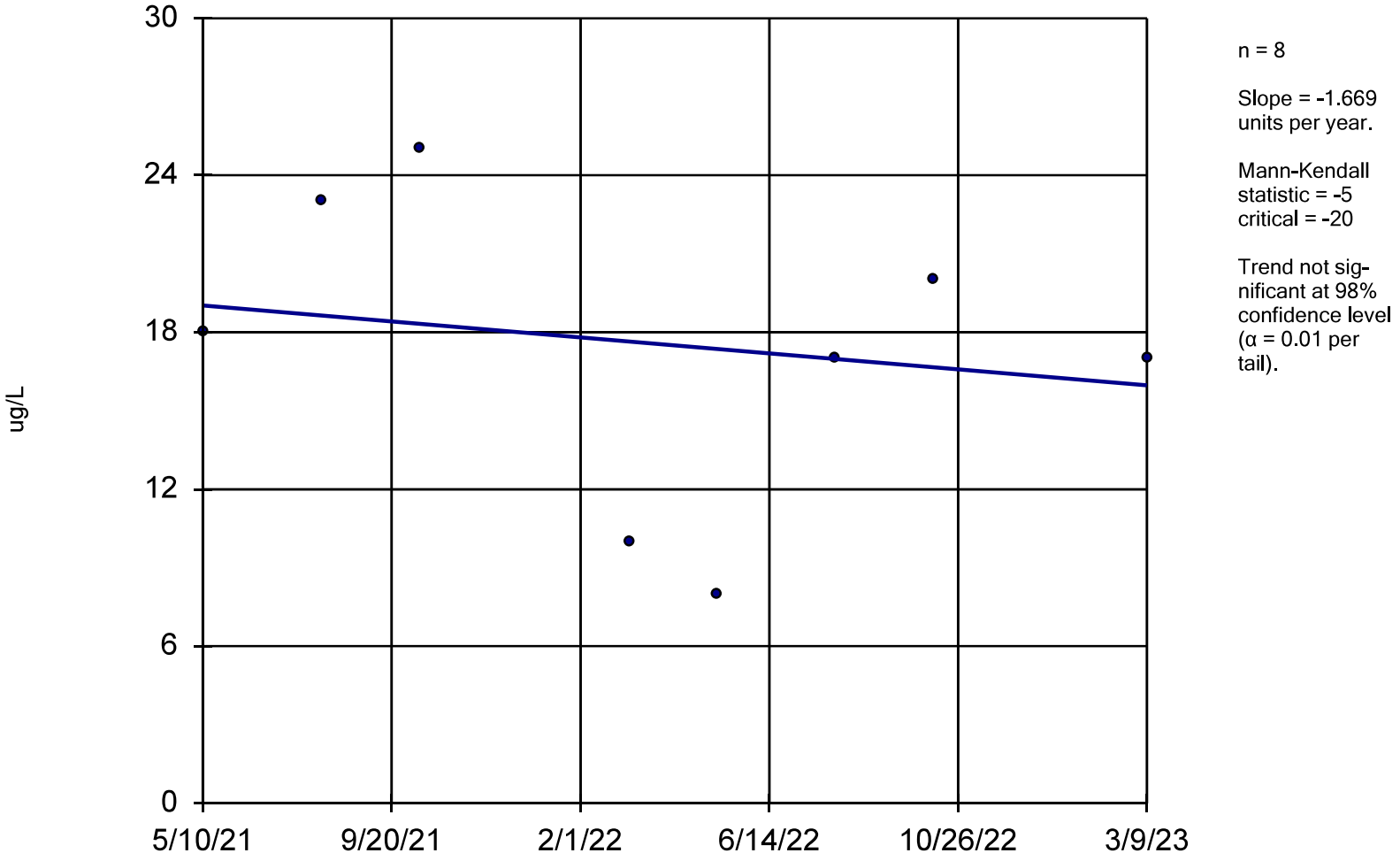
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Arsenic, Total

MW-53R



n = 8

Slope = -1.669 units per year.

Mann-Kendall statistic = -5 critical = -20

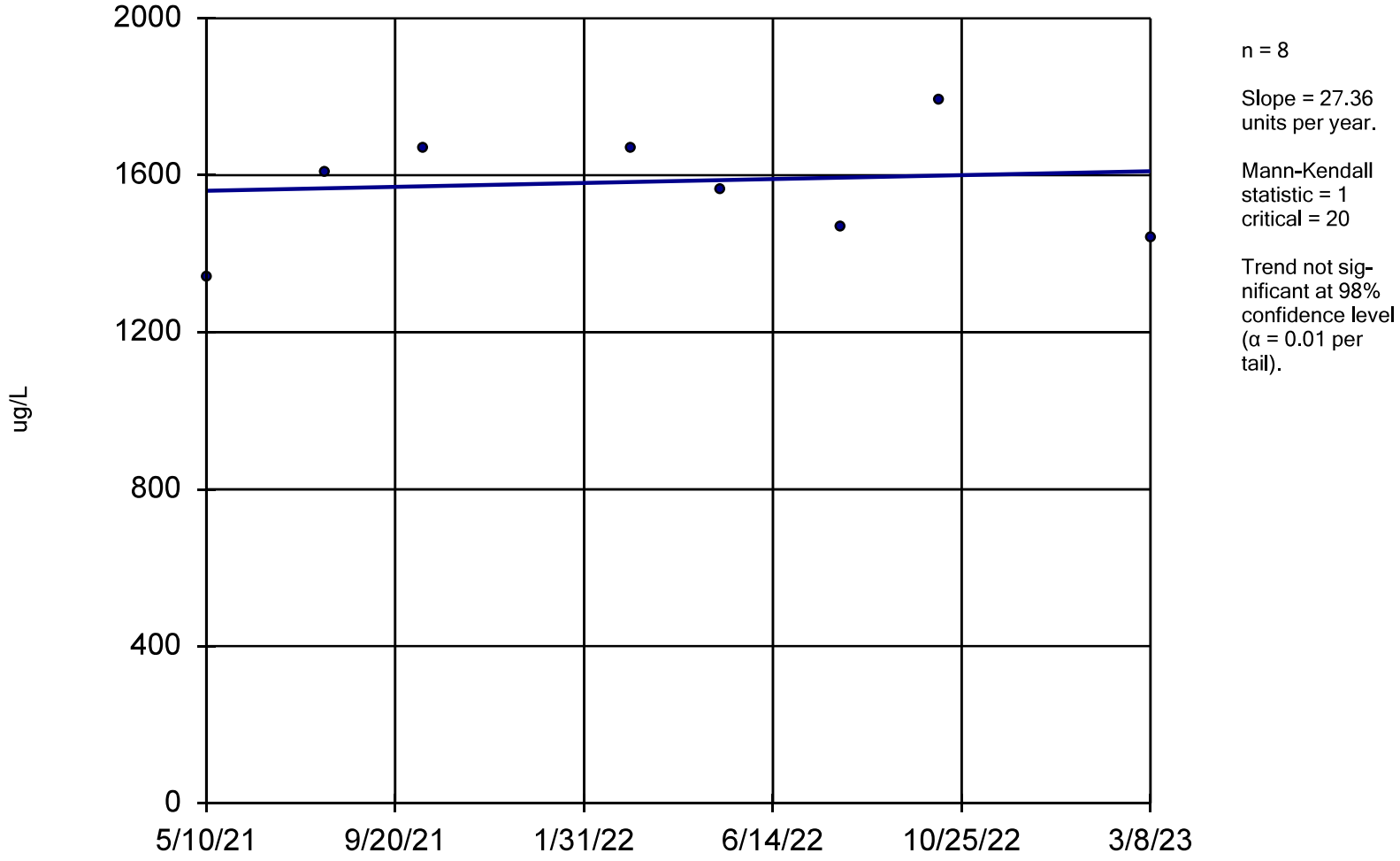
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

JCW-MW-18001



n = 8

Slope = 27.36 units per year.

Mann-Kendall statistic = 1
critical = 20

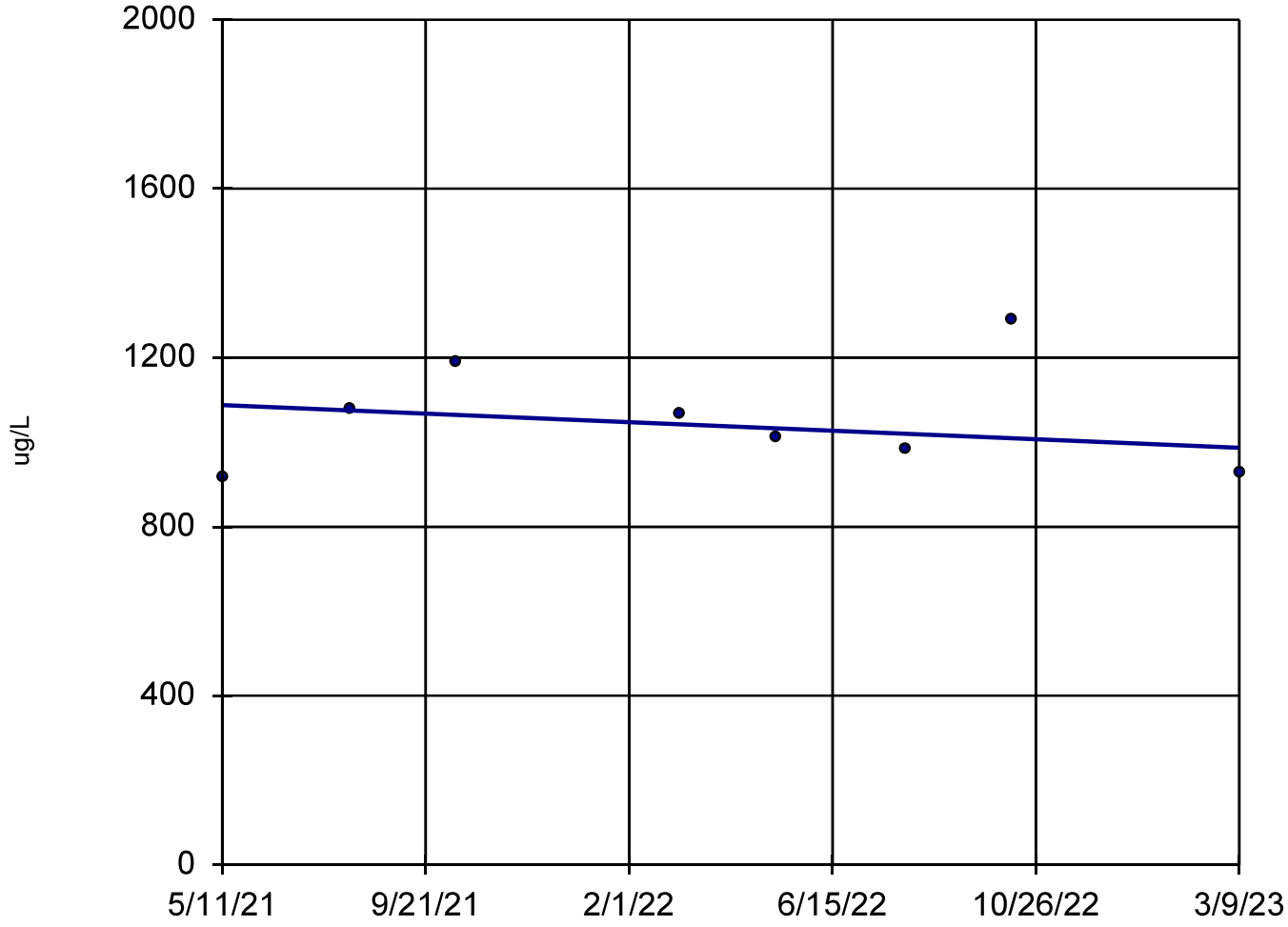
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

JCW-MW-18005



n = 8

Slope = -55.17 units per year.

Mann-Kendall statistic = -2
critical = -20

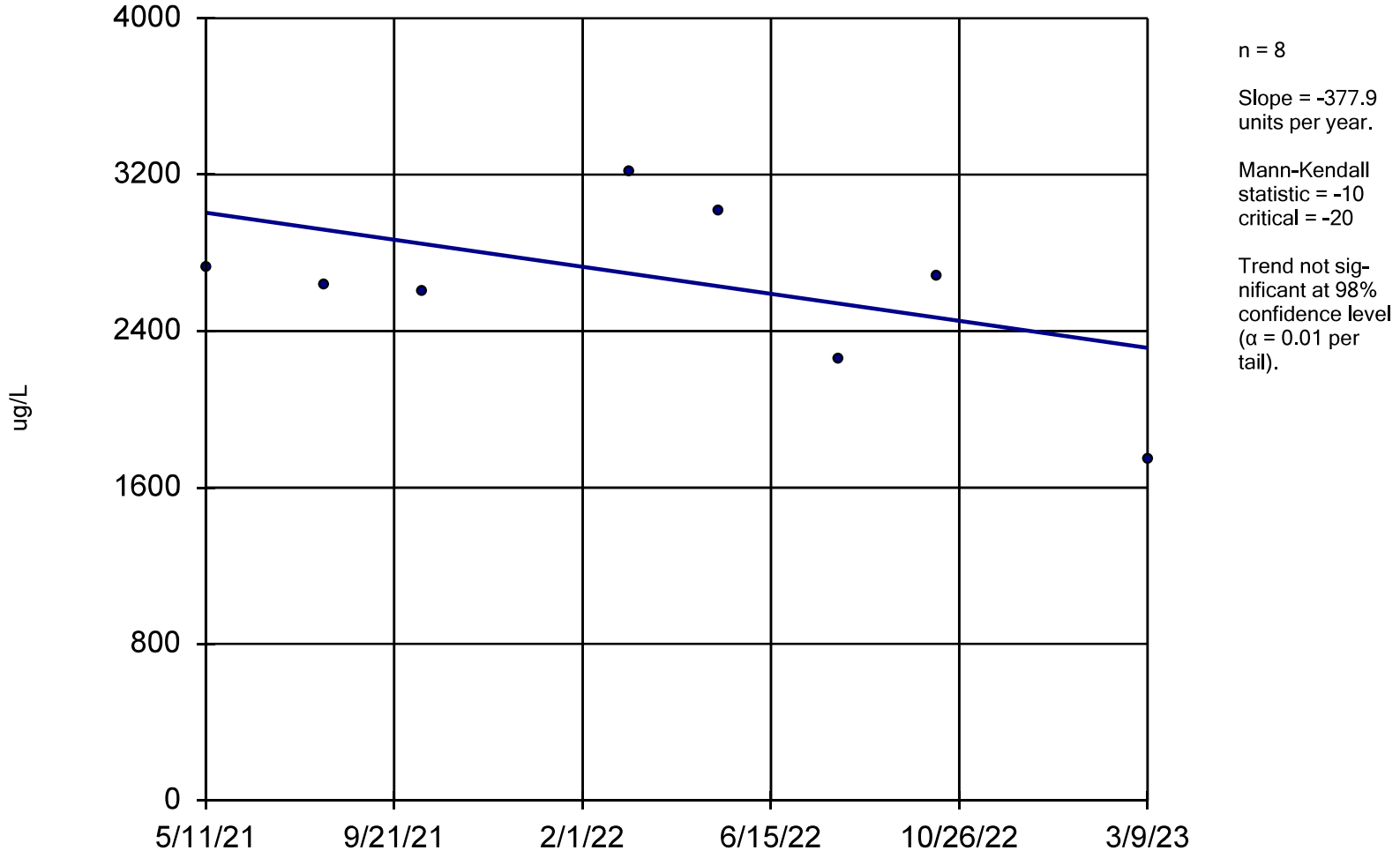
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

JCW-MW-18006



n = 8

Slope = -377.9 units per year.

Mann-Kendall statistic = -10
critical = -20

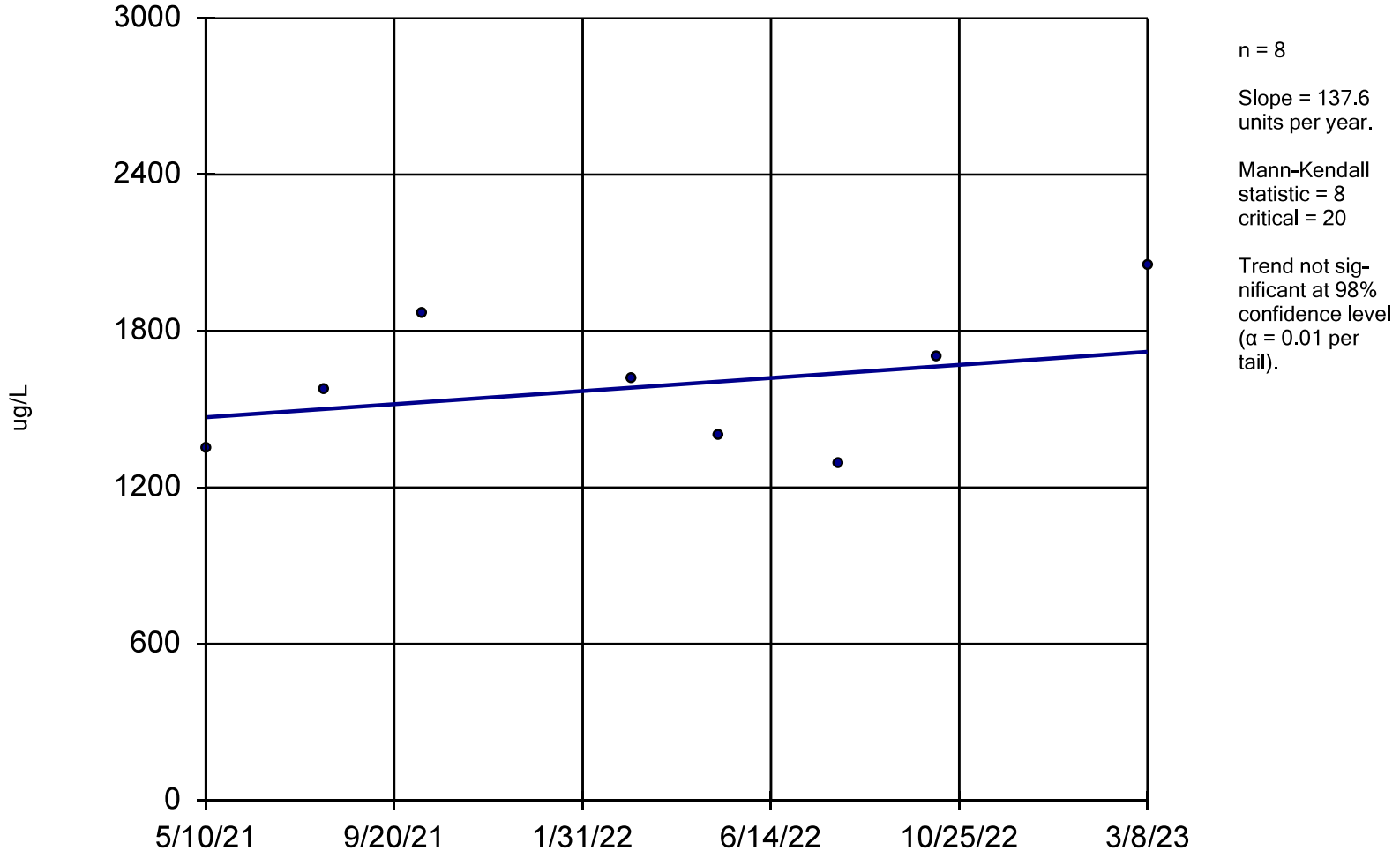
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-50



n = 8

Slope = 137.6 units per year.

Mann-Kendall statistic = 8
critical = 20

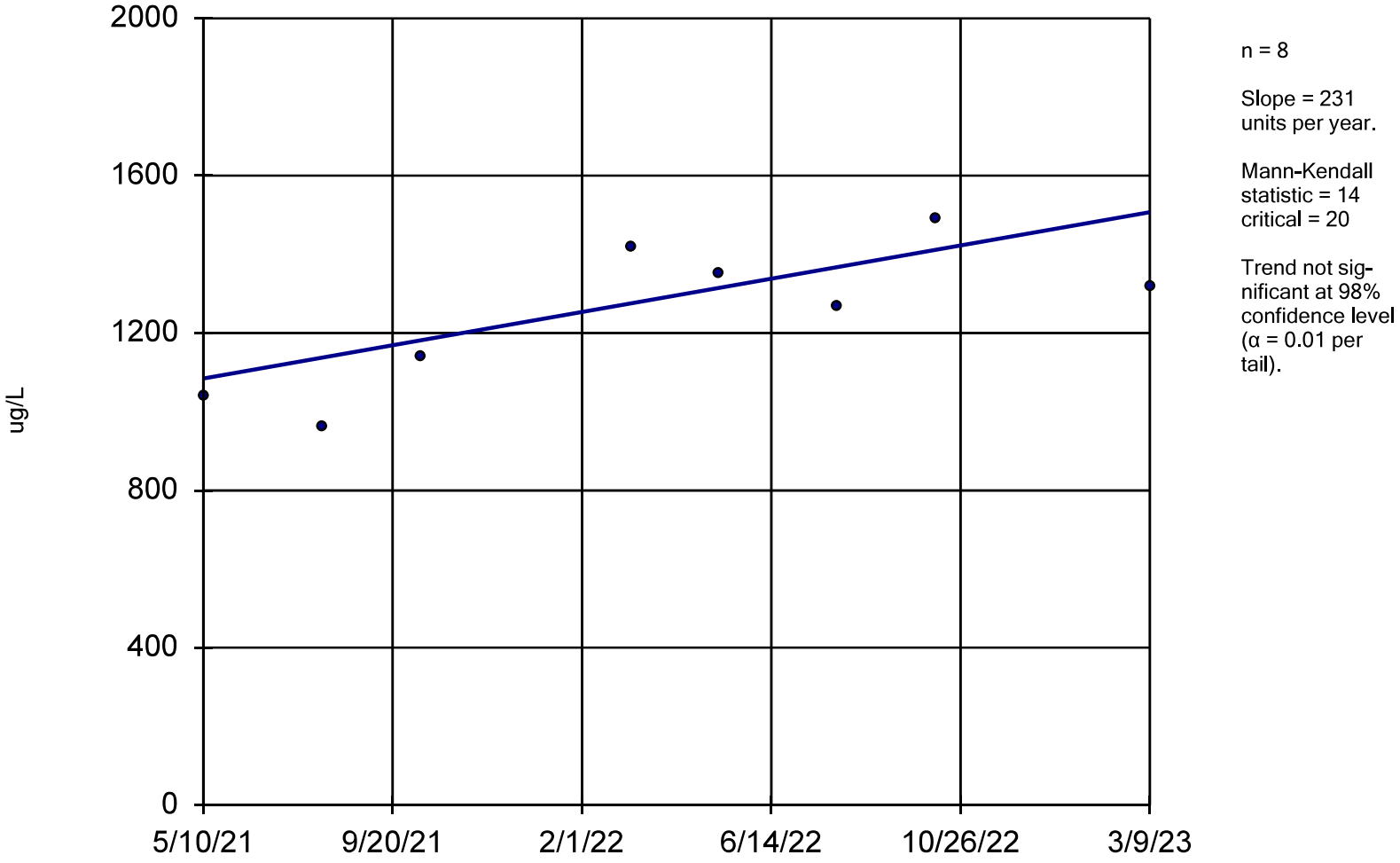
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-51



n = 8

Slope = 231 units per year.

Mann-Kendall statistic = 14
critical = 20

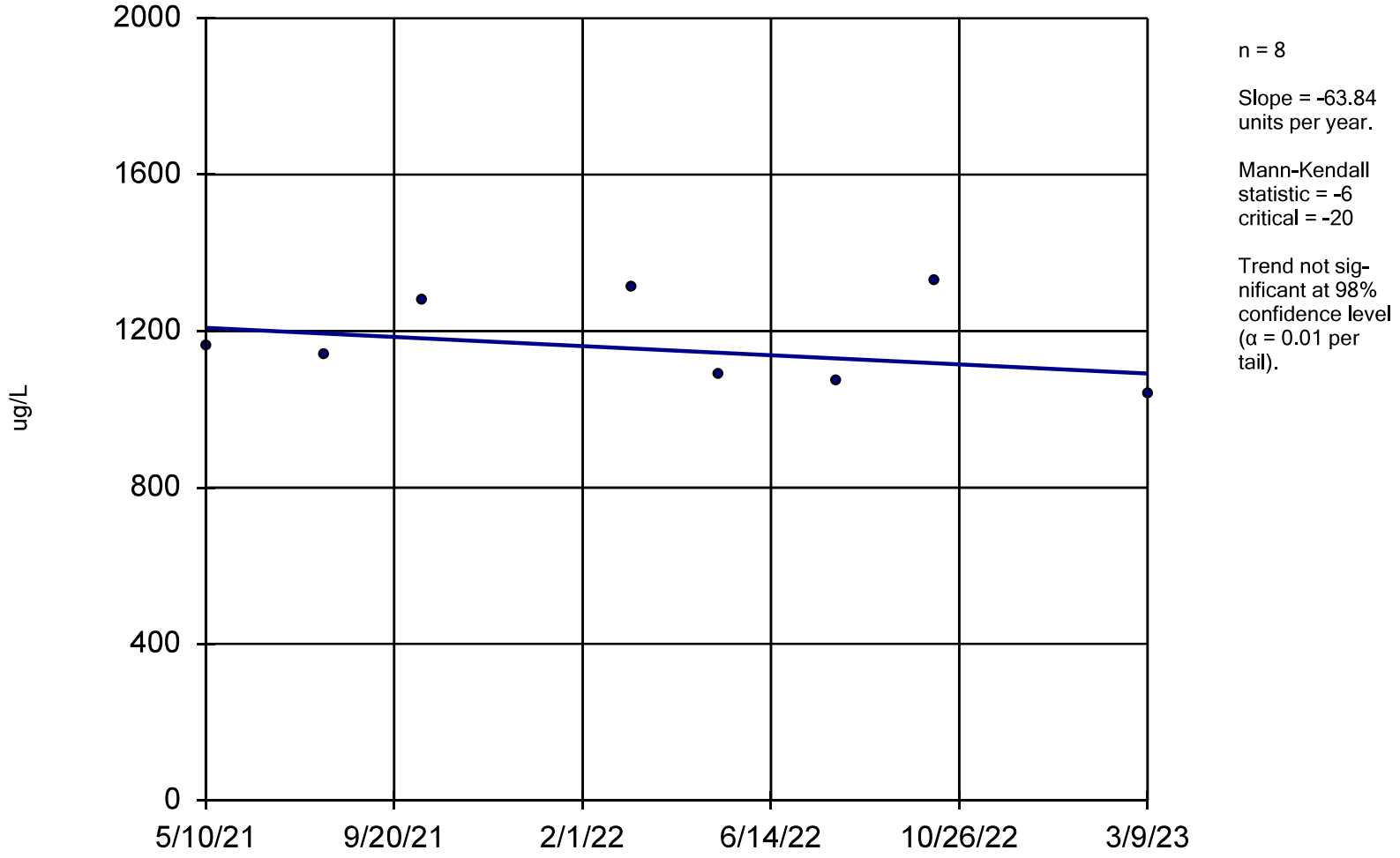
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-52



n = 8

Slope = -63.84 units per year.

Mann-Kendall statistic = -6
critical = -20

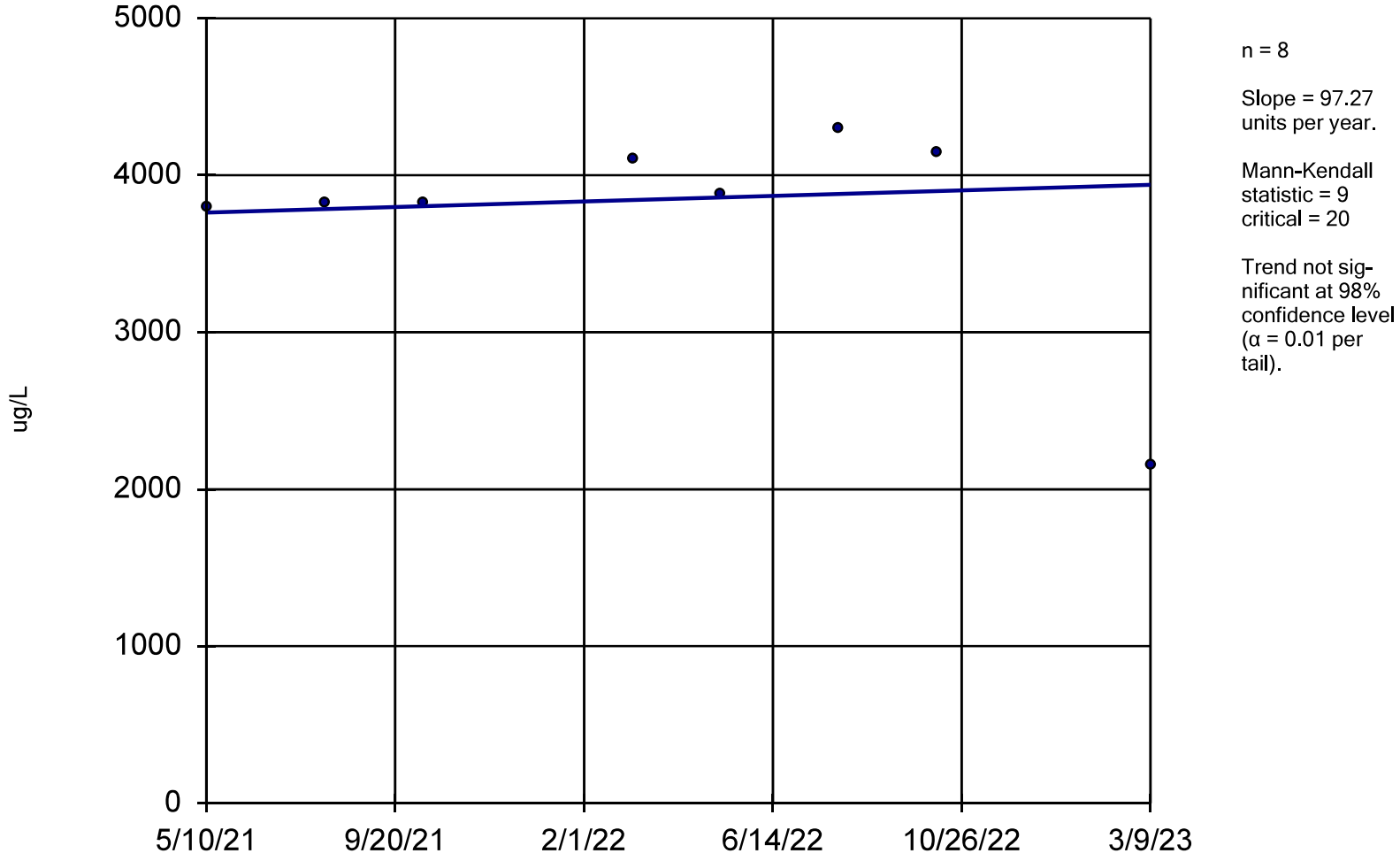
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-53



n = 8

Slope = 97.27 units per year.

Mann-Kendall statistic = 9
critical = 20

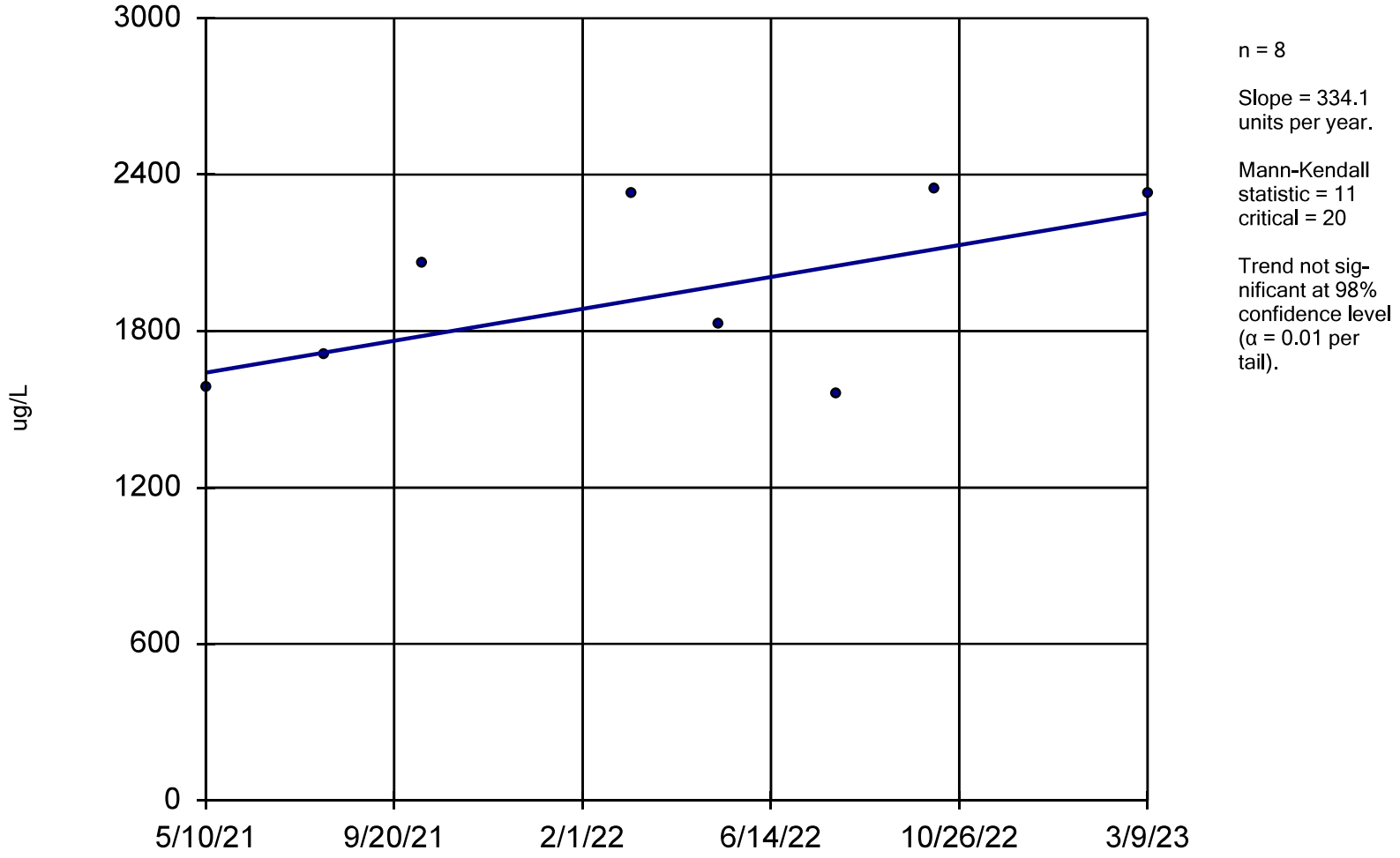
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-53R



n = 8

Slope = 334.1 units per year.

Mann-Kendall statistic = 11
critical = 20

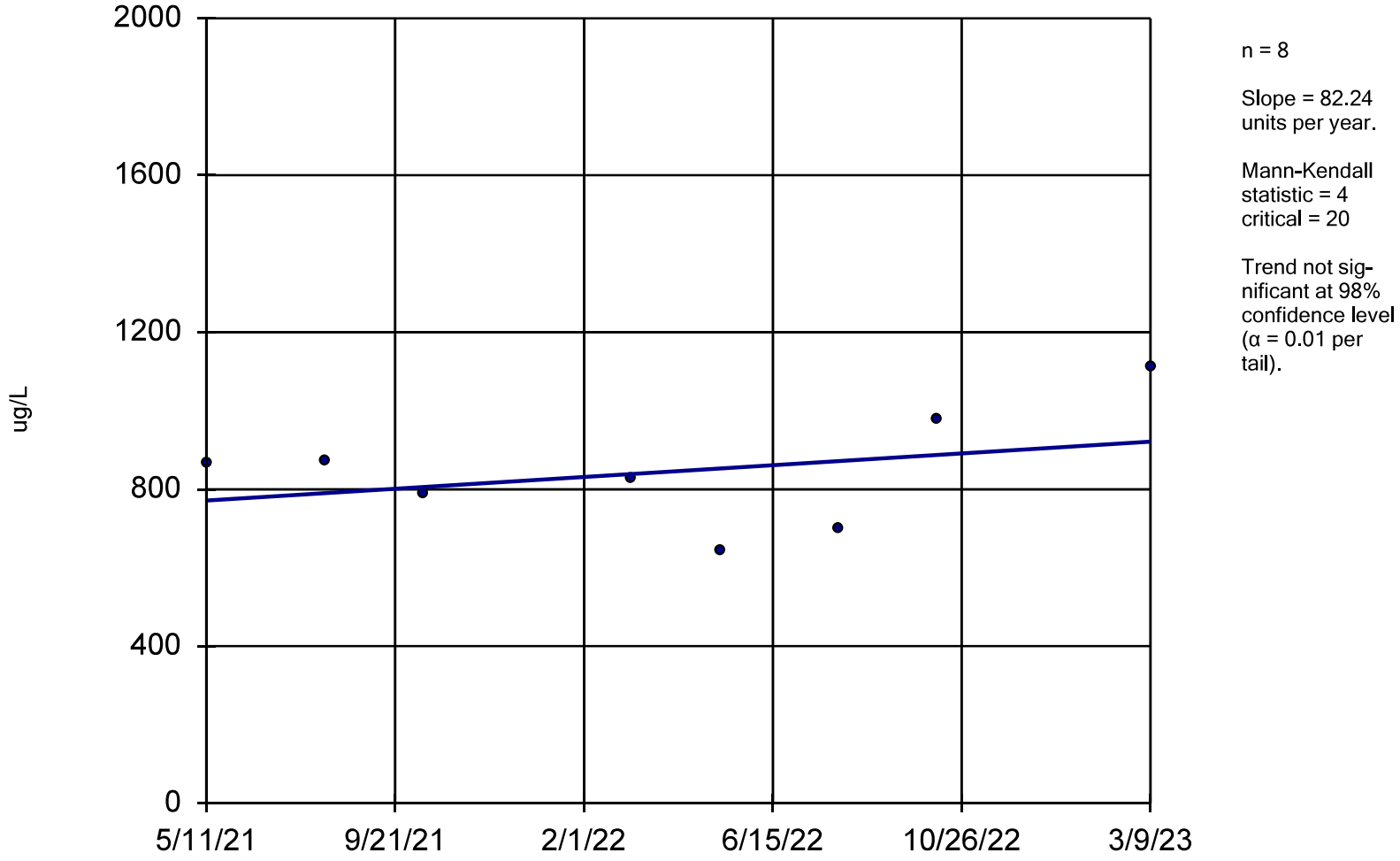
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

MW-55



n = 8

Slope = 82.24 units per year.

Mann-Kendall statistic = 4
critical = 20

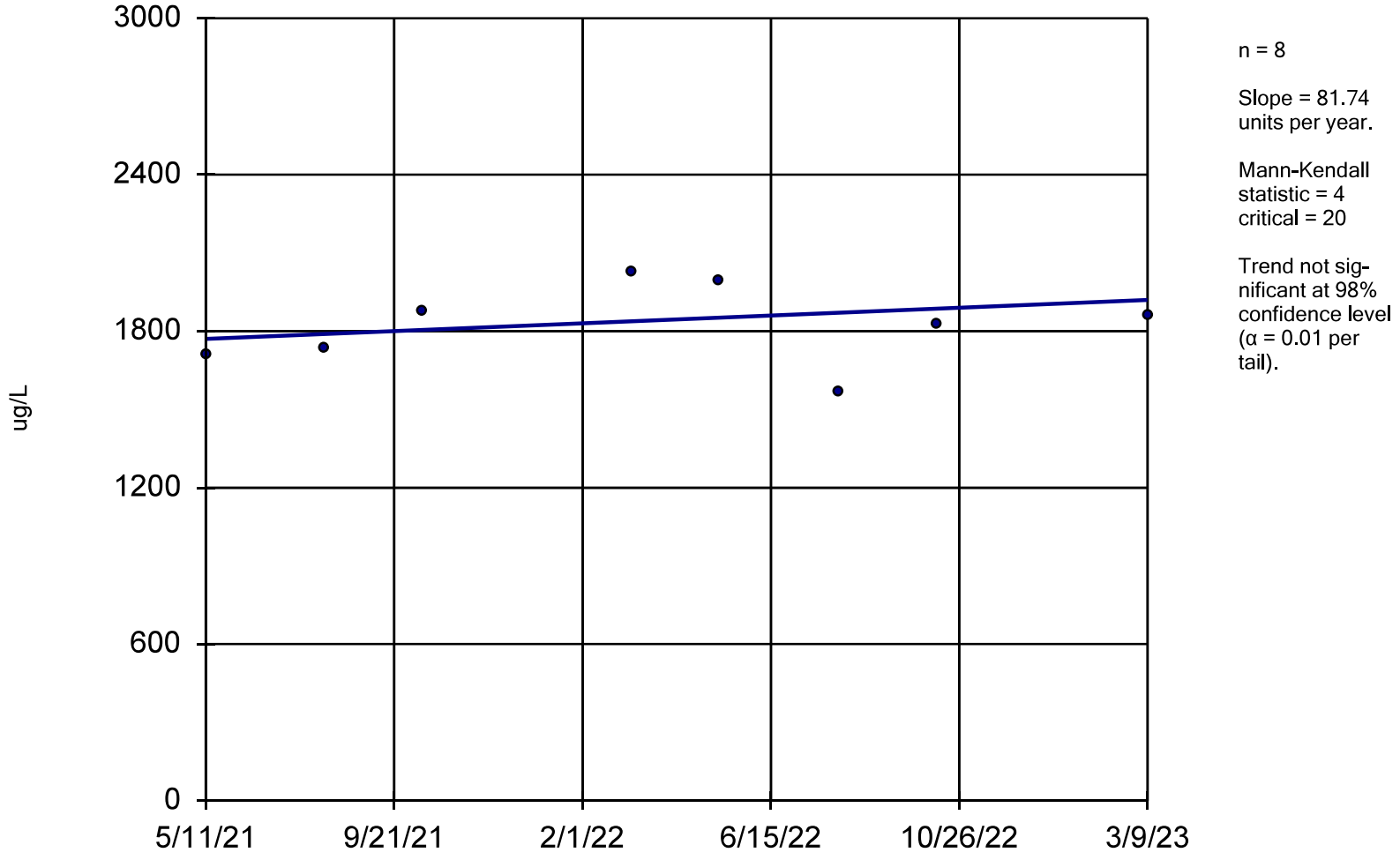
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Boron, Total

OW-57ROUT



n = 8

Slope = 81.74 units per year.

Mann-Kendall statistic = 4
critical = 20

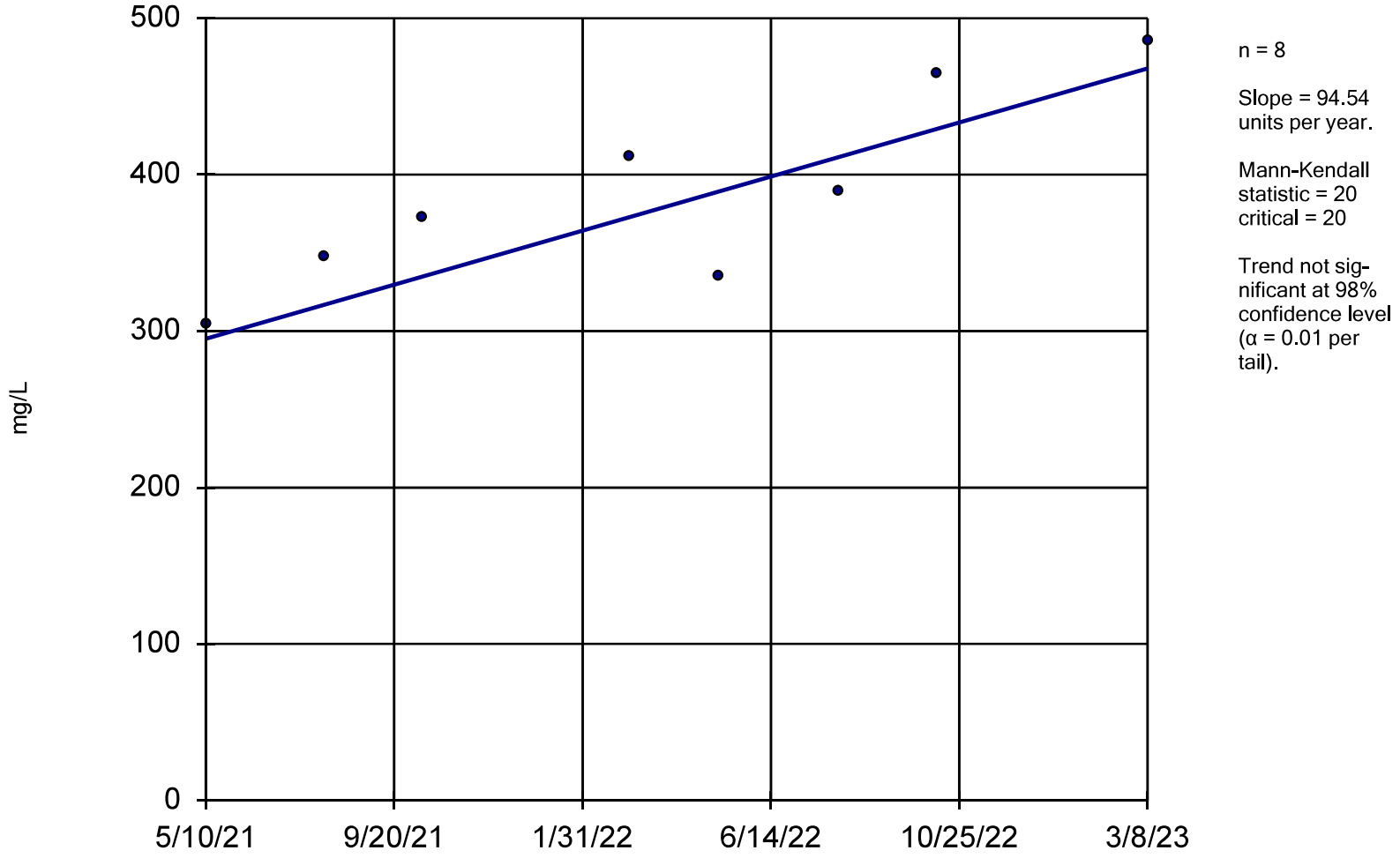
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Calcium, Total

JCW-MW-18001



n = 8

Slope = 94.54 units per year.

Mann-Kendall statistic = 20
critical = 20

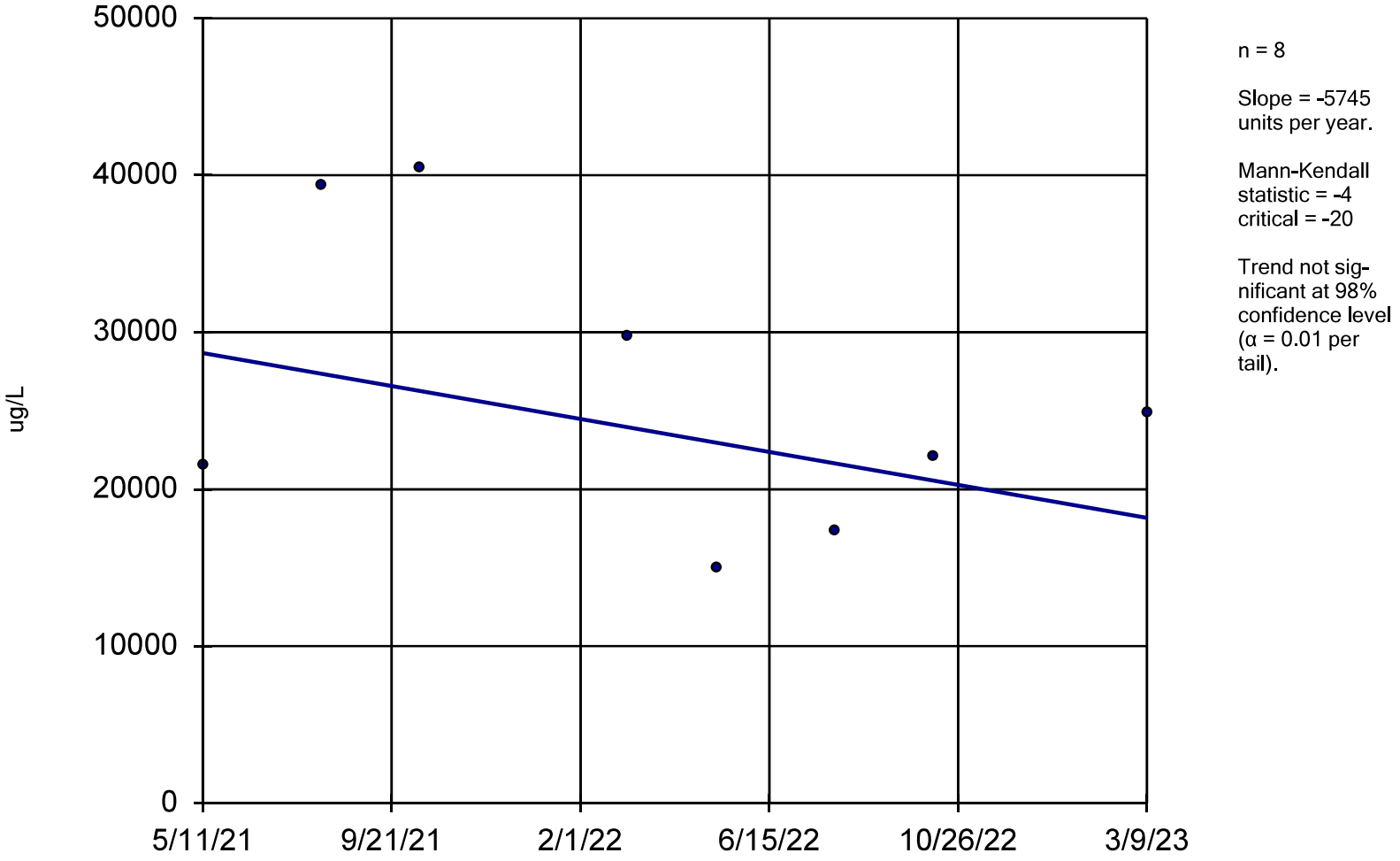
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Iron, Total

MW-55



n = 8

Slope = -5745 units per year.

Mann-Kendall statistic = -4 critical = -20

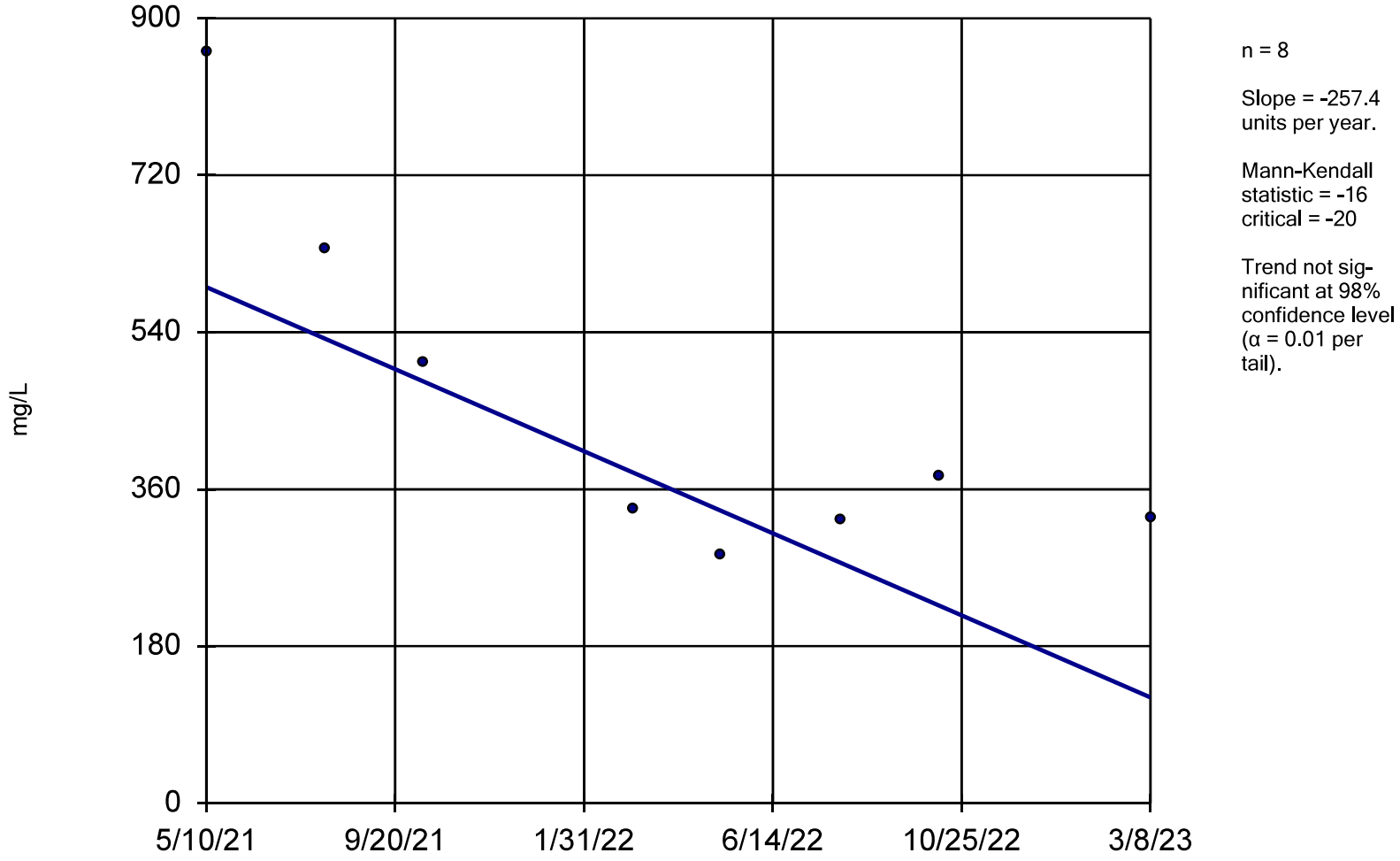
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Sulfate

MW-50



n = 8

Slope = -257.4 units per year.

Mann-Kendall statistic = -16
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

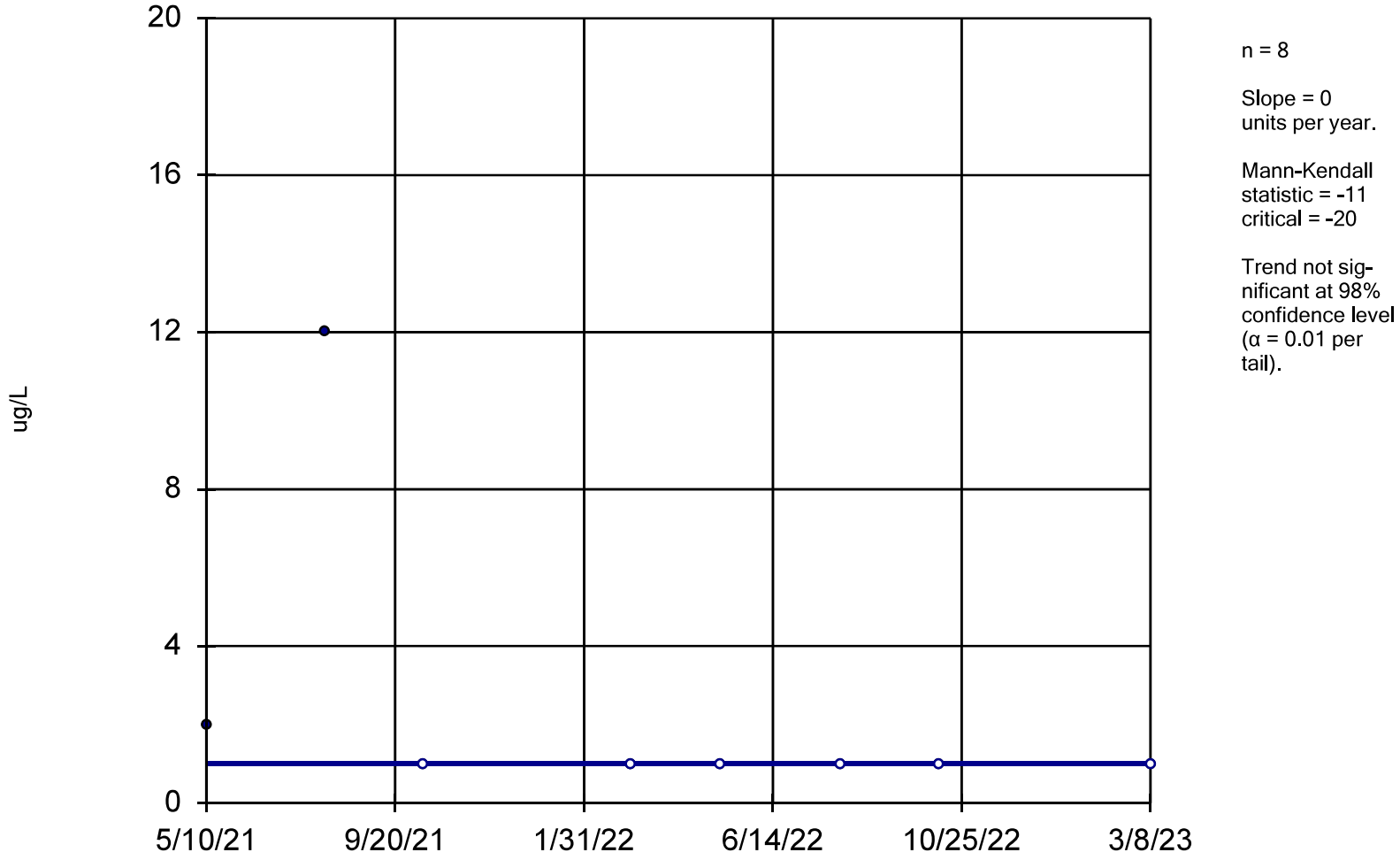
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Hollow symbols indicate censored values.

Vanadium, Total

JCW-MW-18001



n = 8

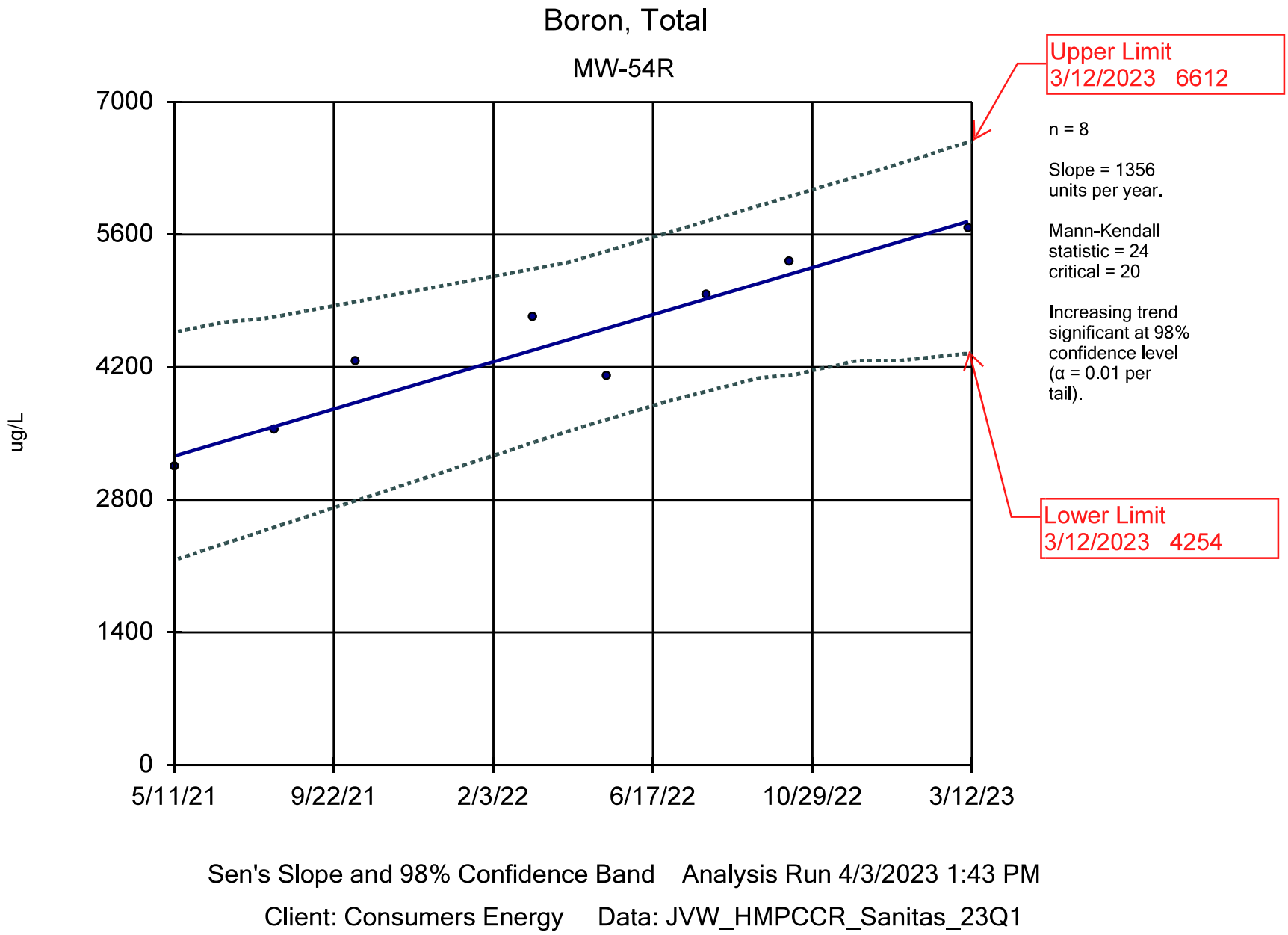
Slope = 0
units per year.

Mann-Kendall
statistic = -11
critical = -20

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

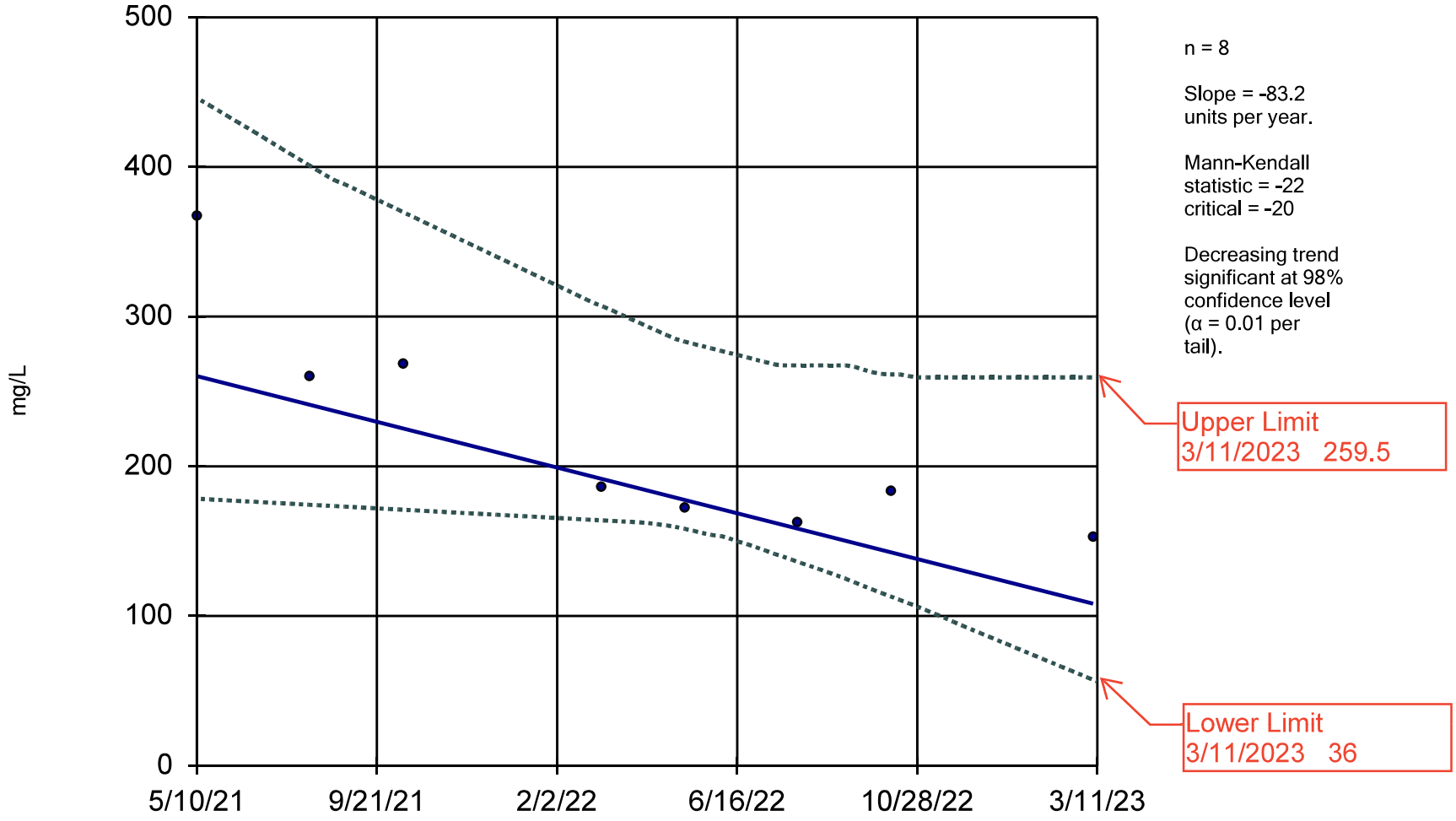
Sen's Slope Estimator Analysis Run 4/3/2023 1:41 PM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1



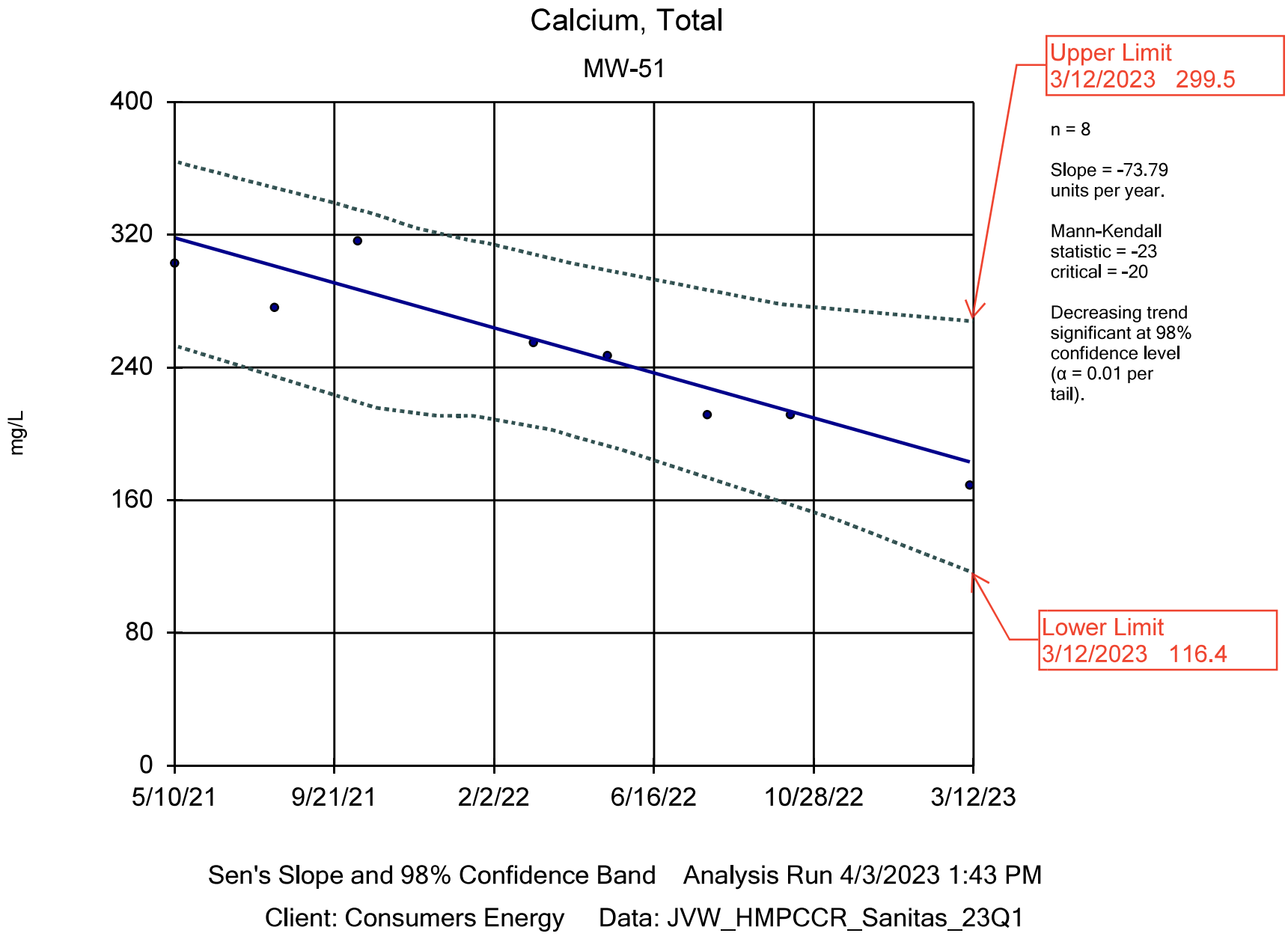
Calcium, Total

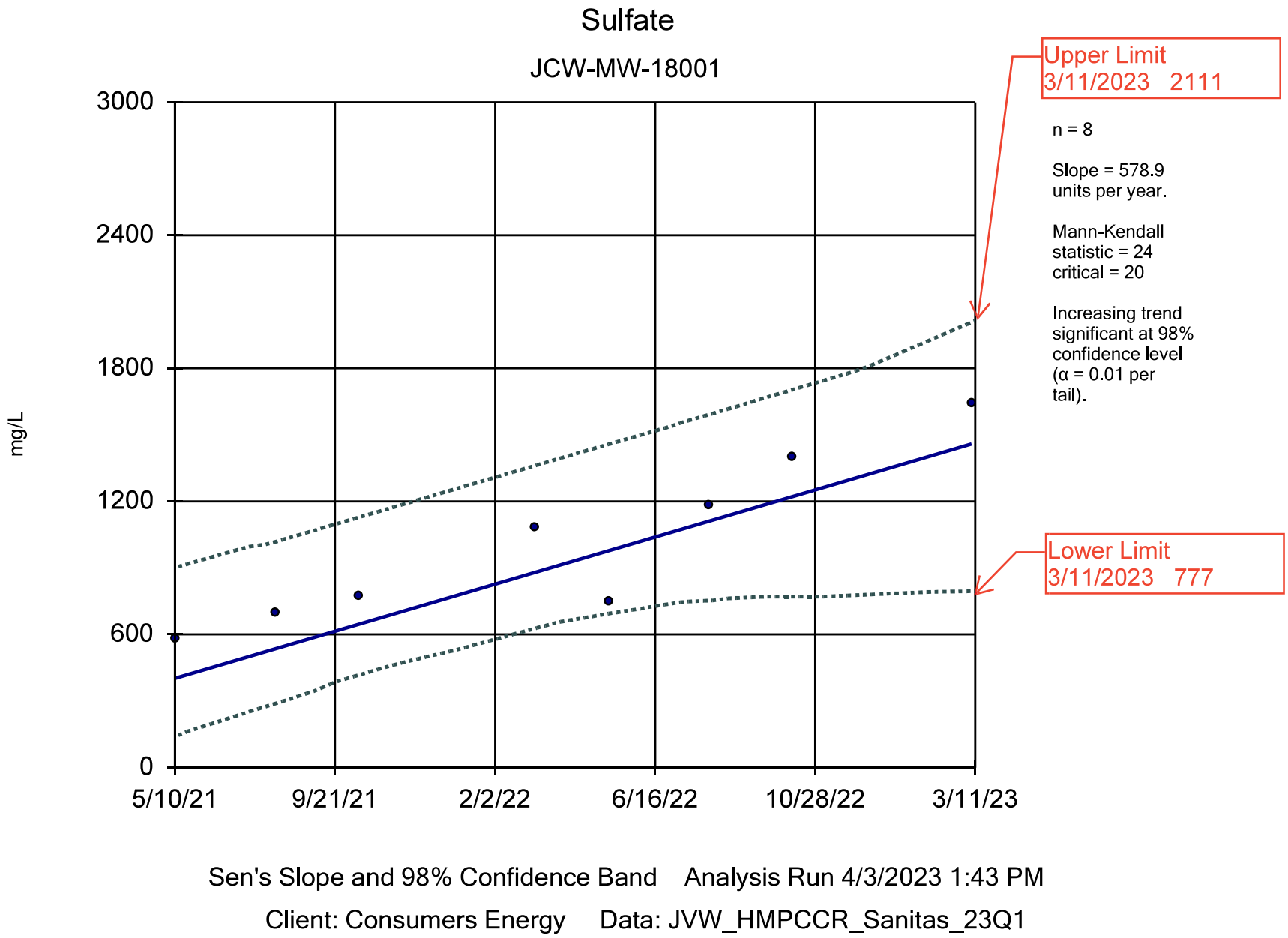
MW-50



Sen's Slope and 98% Confidence Band Analysis Run 4/3/2023 1:43 PM

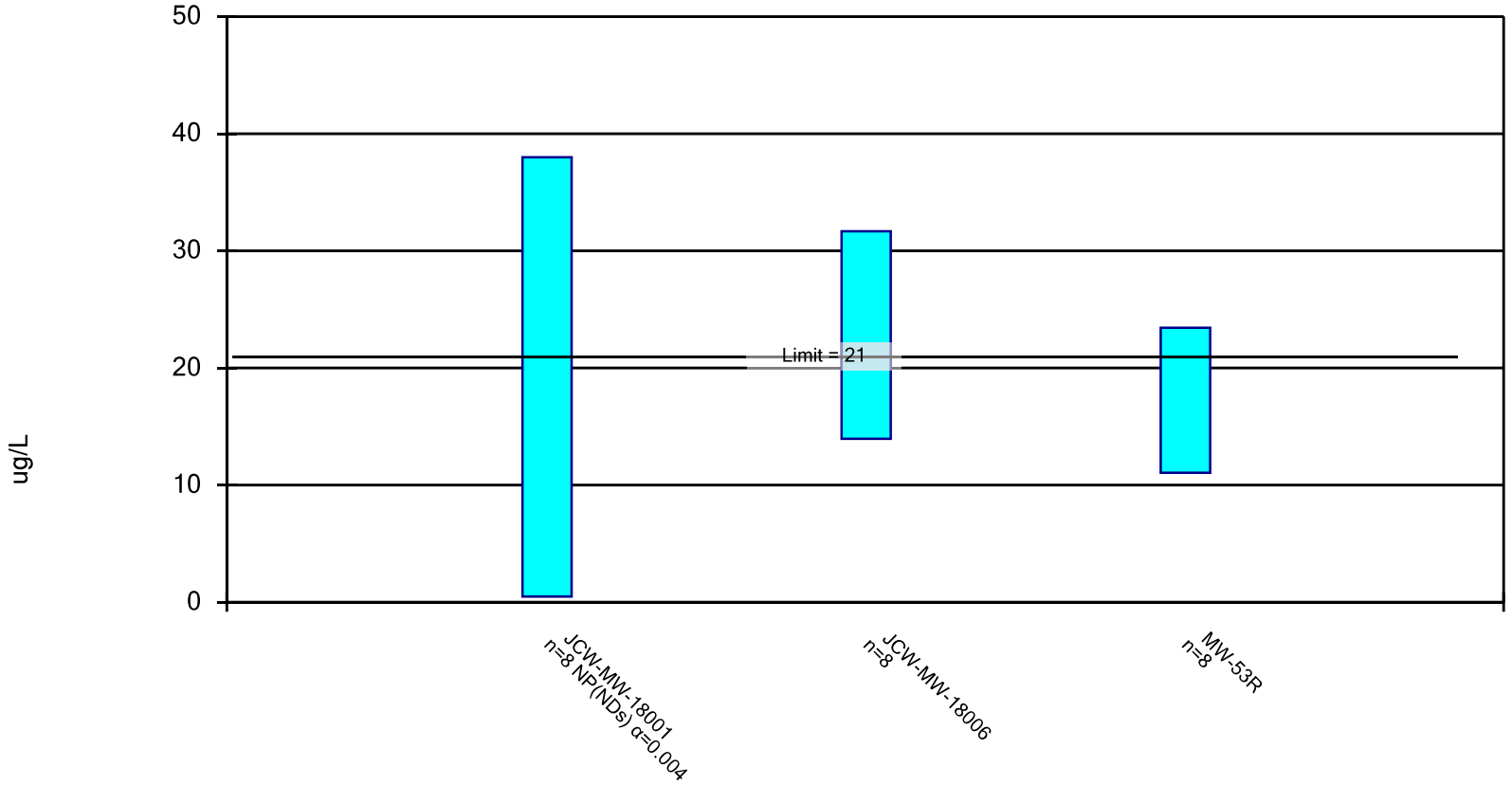
Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1


Calcium, Total
MW-51
Upper Limit
3/12/2023 299.5
n = 8
Slope = -73.79
units per year.
Mann-Kendall
statistic = -23
critical = -20
Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).
Lower Limit
3/12/2023 116.4
mg/L
400
320
240
160
80
0
5/10/21
9/21/21
2/2/22
6/16/22
10/28/22
3/12/23
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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

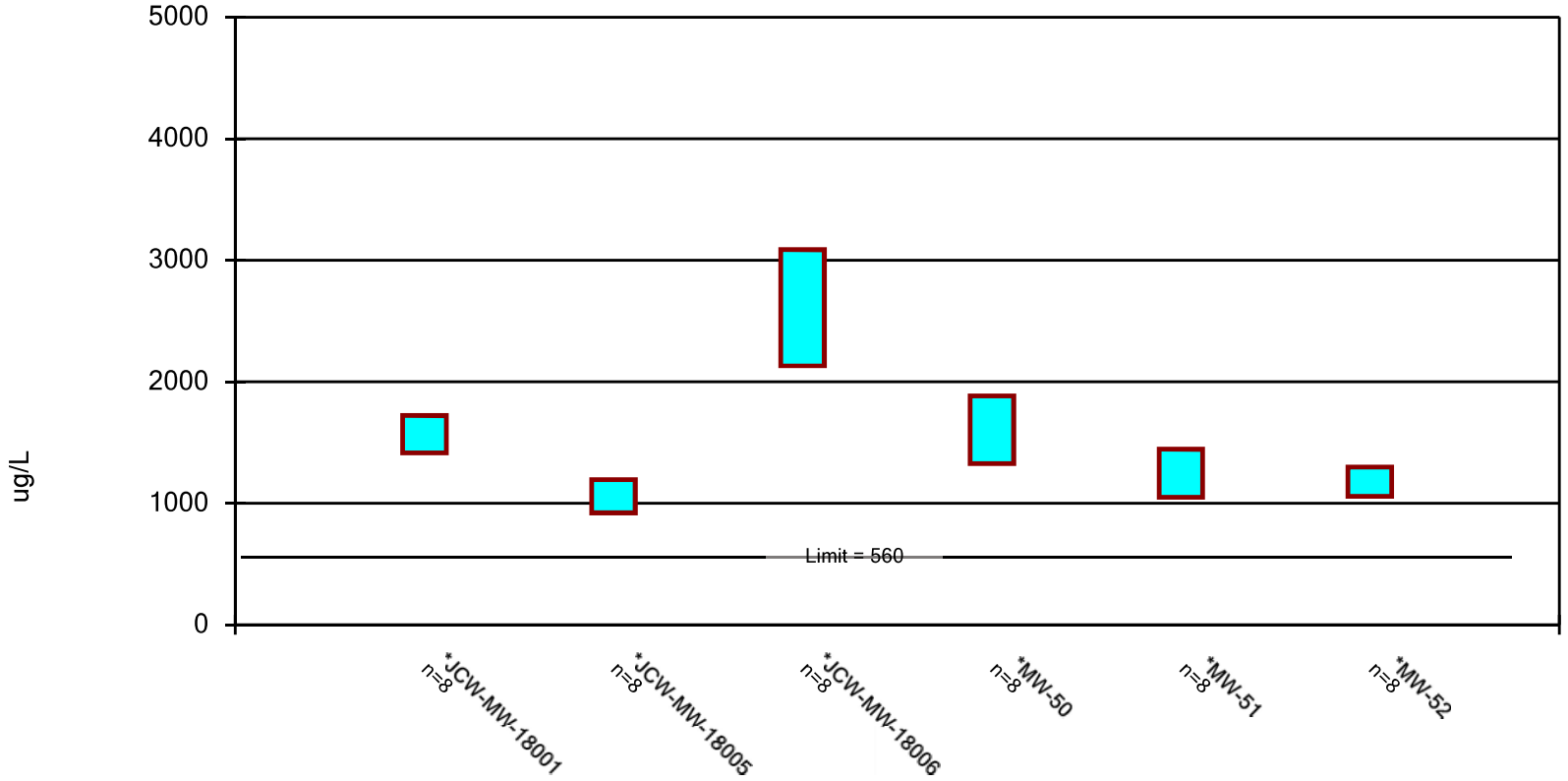
Constituent: Arsenic, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

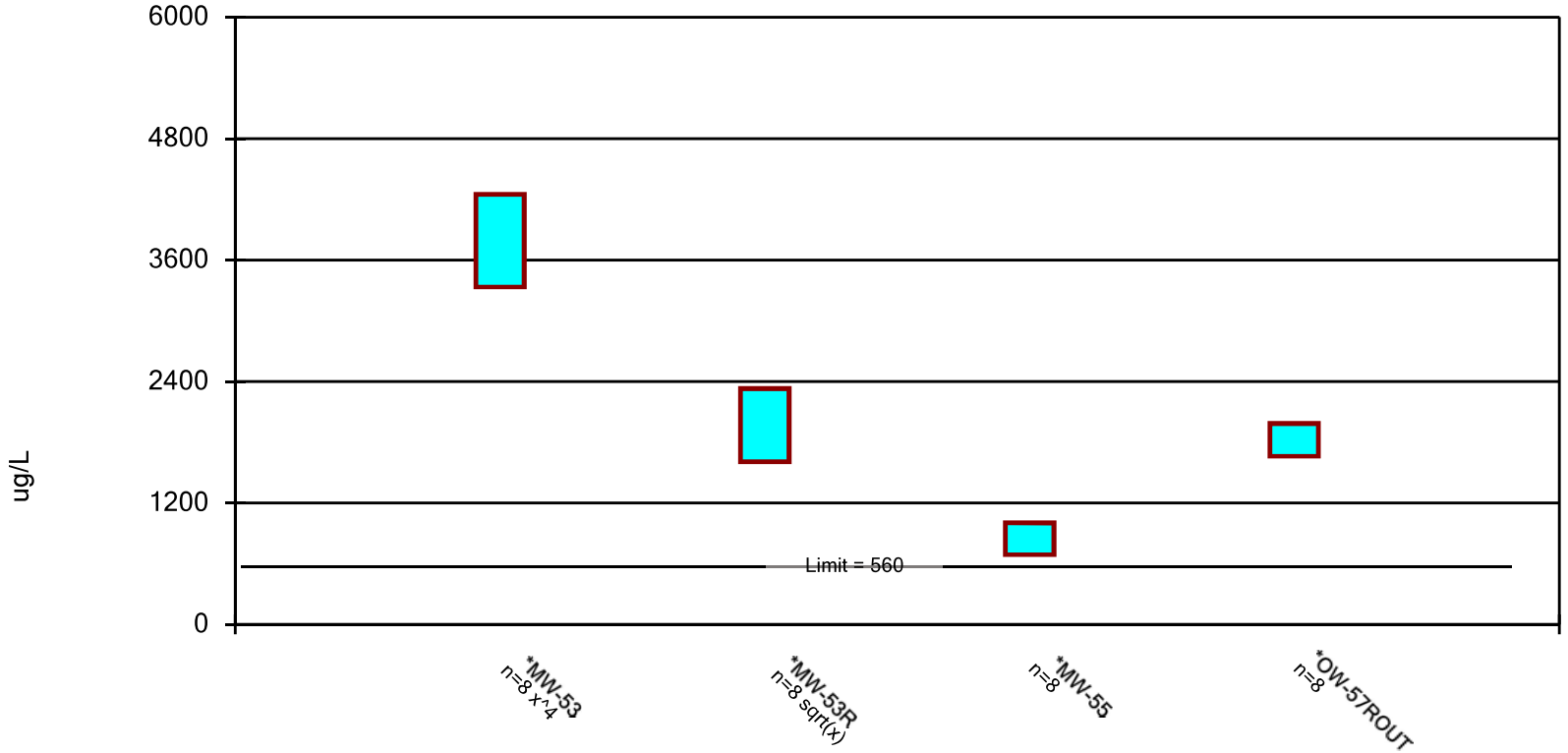
Constituent: Boron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

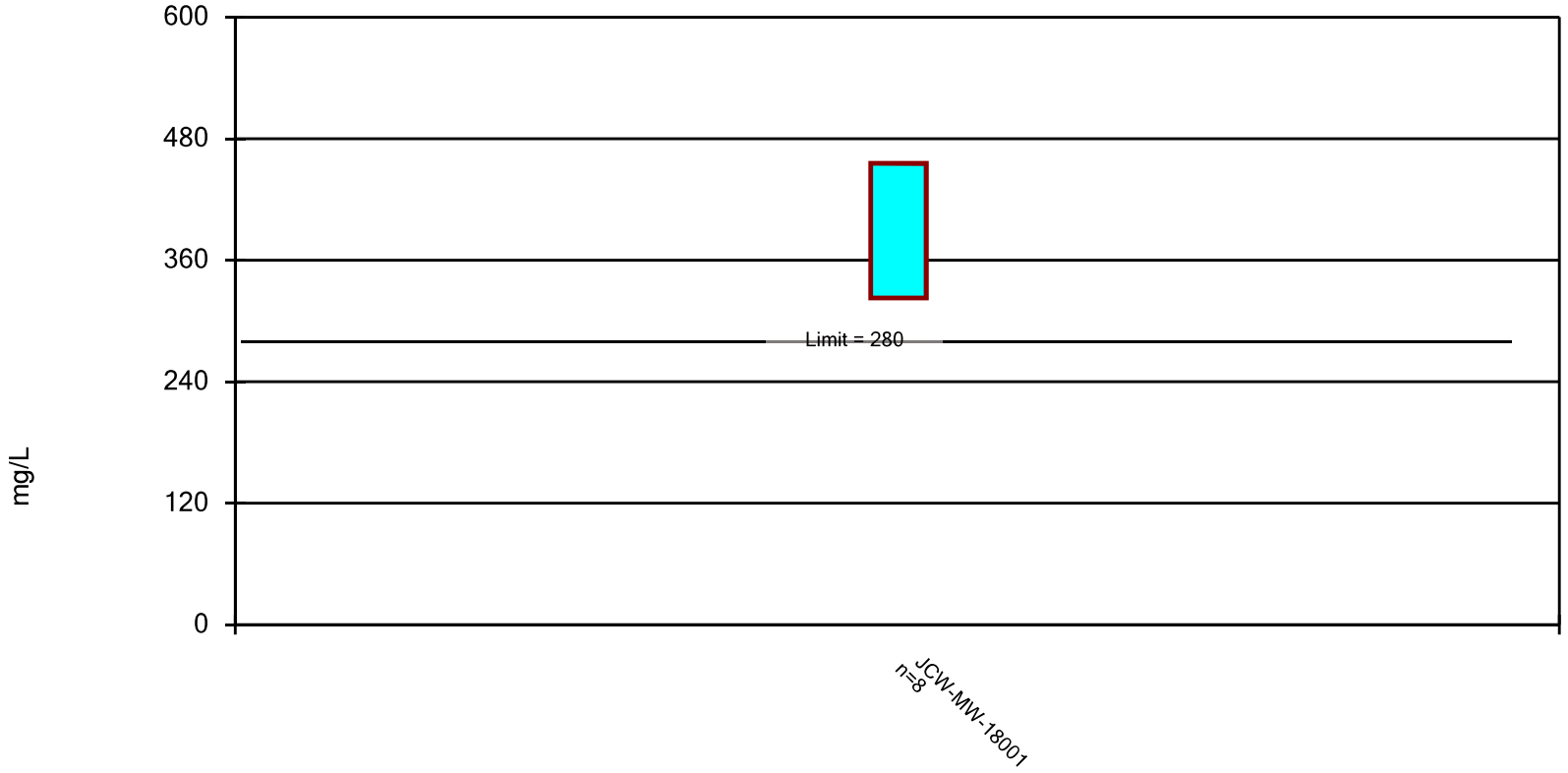
Constituent: Boron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

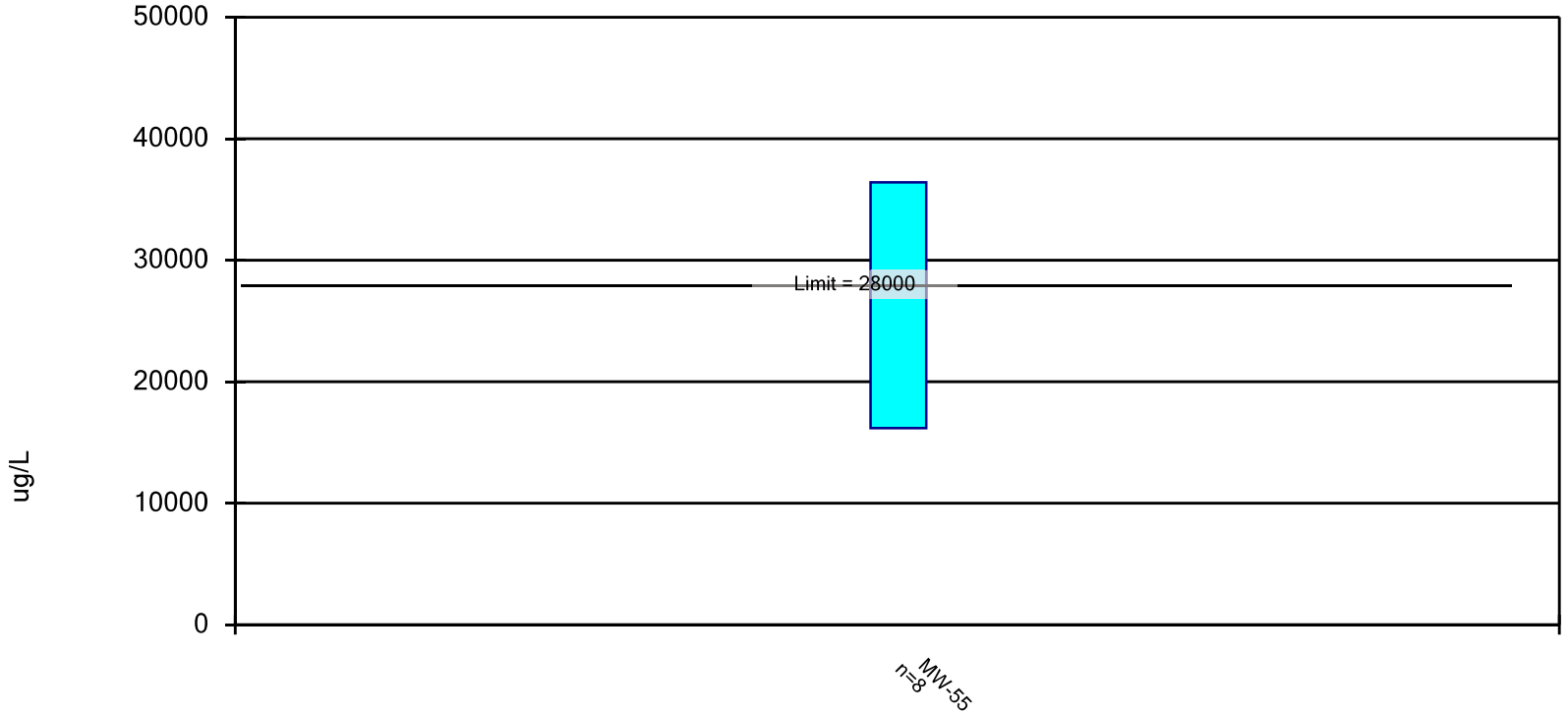
Constituent: Calcium, Total (mg/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

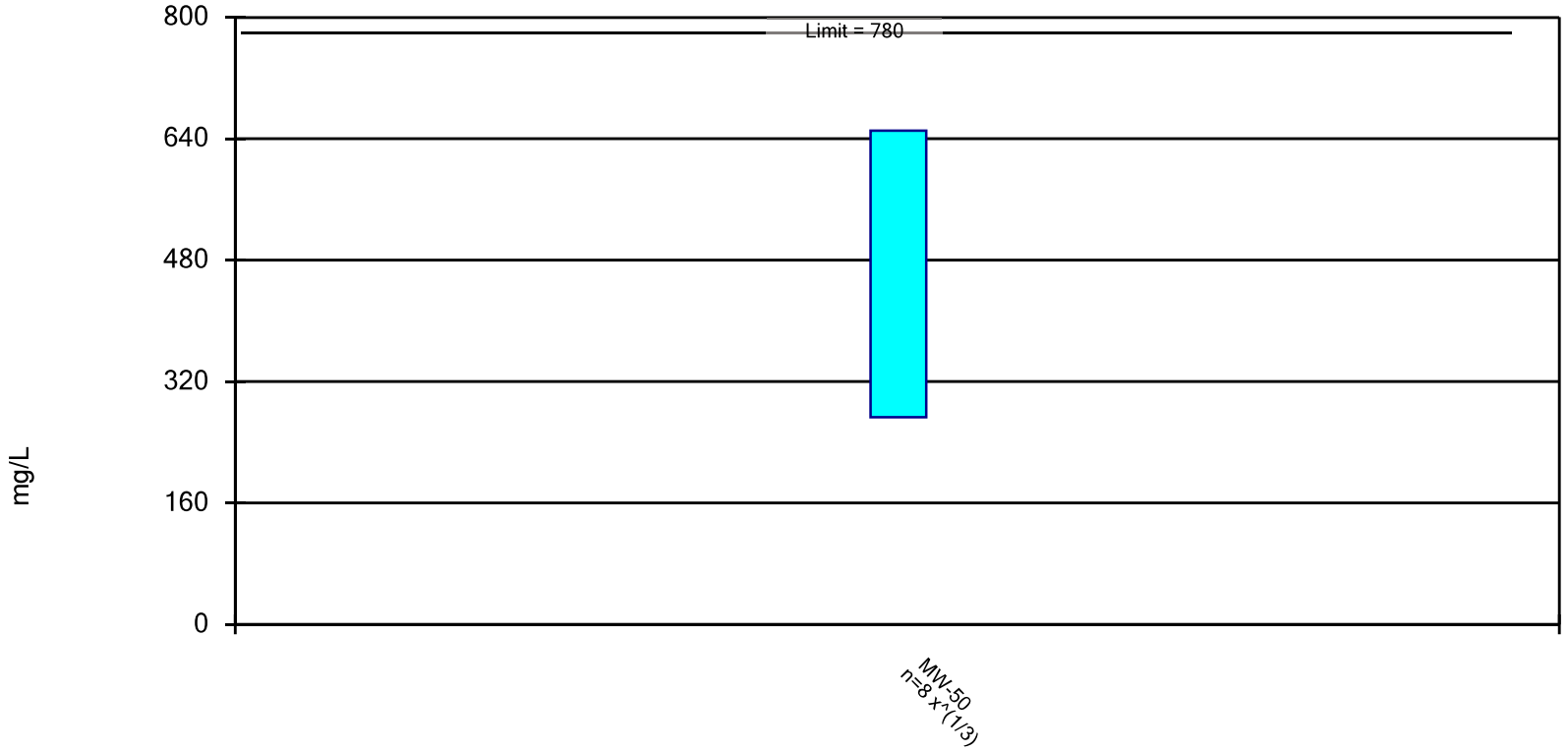
Constituent: Iron, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

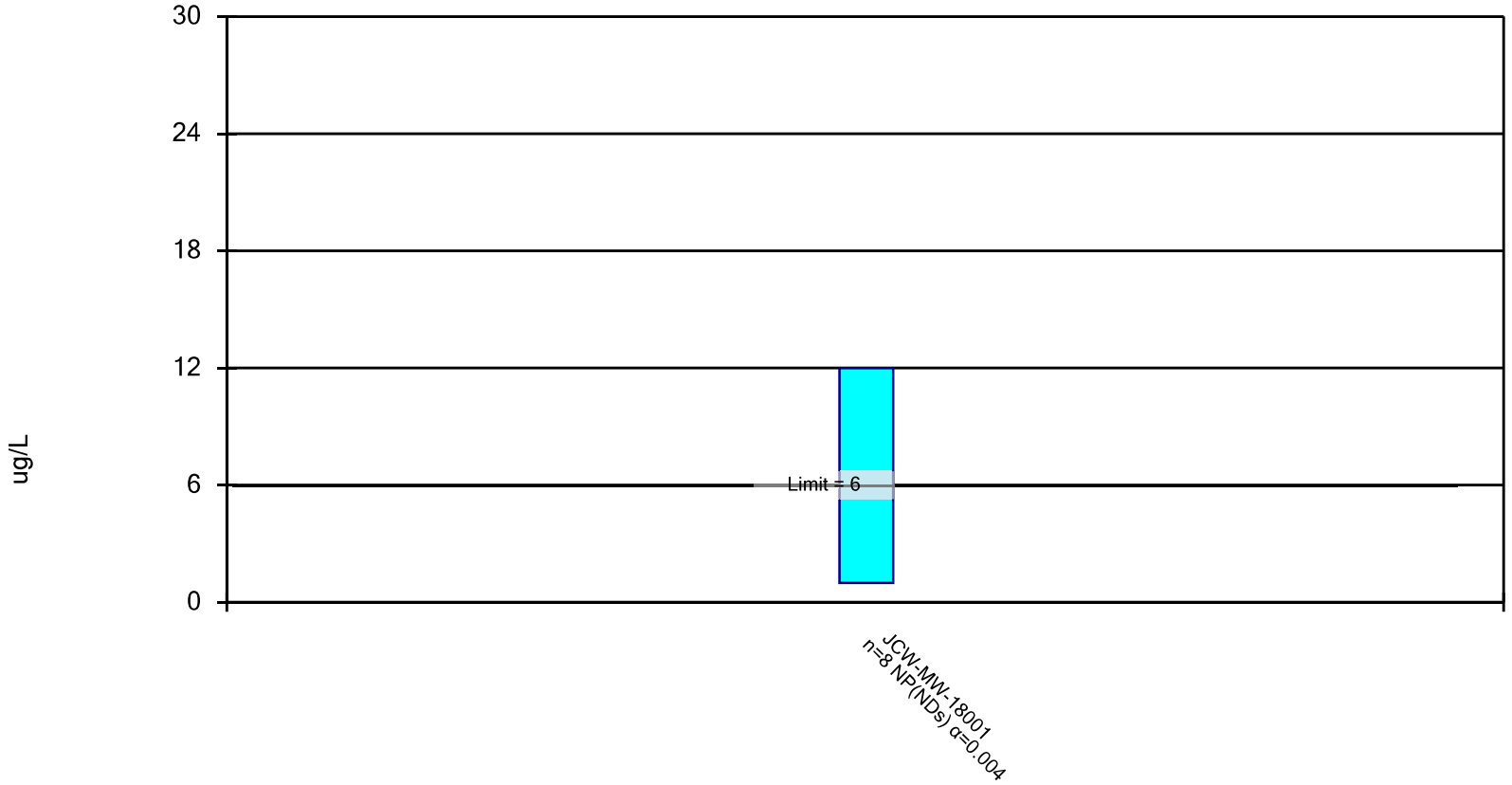
Constituent: Sulfate (mg/L) Analysis Run 4/3/2023 1:55 PM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

Constituent: Vanadium, Total (ug/L) Analysis Run 4/3/2023 1:55 PM

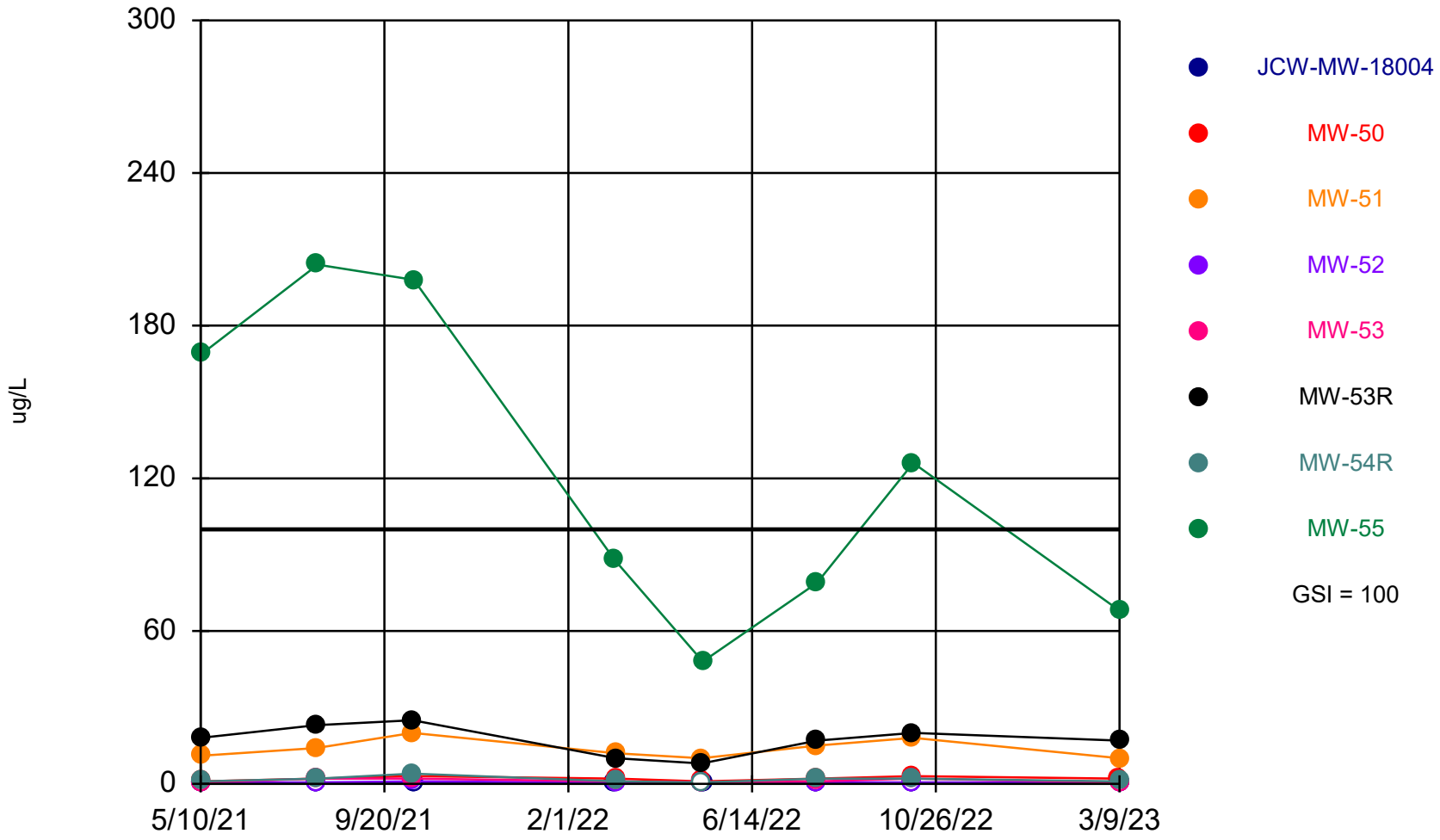
Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

	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

Hollow symbols indicate censored values.

Arsenic Comparison to GSI

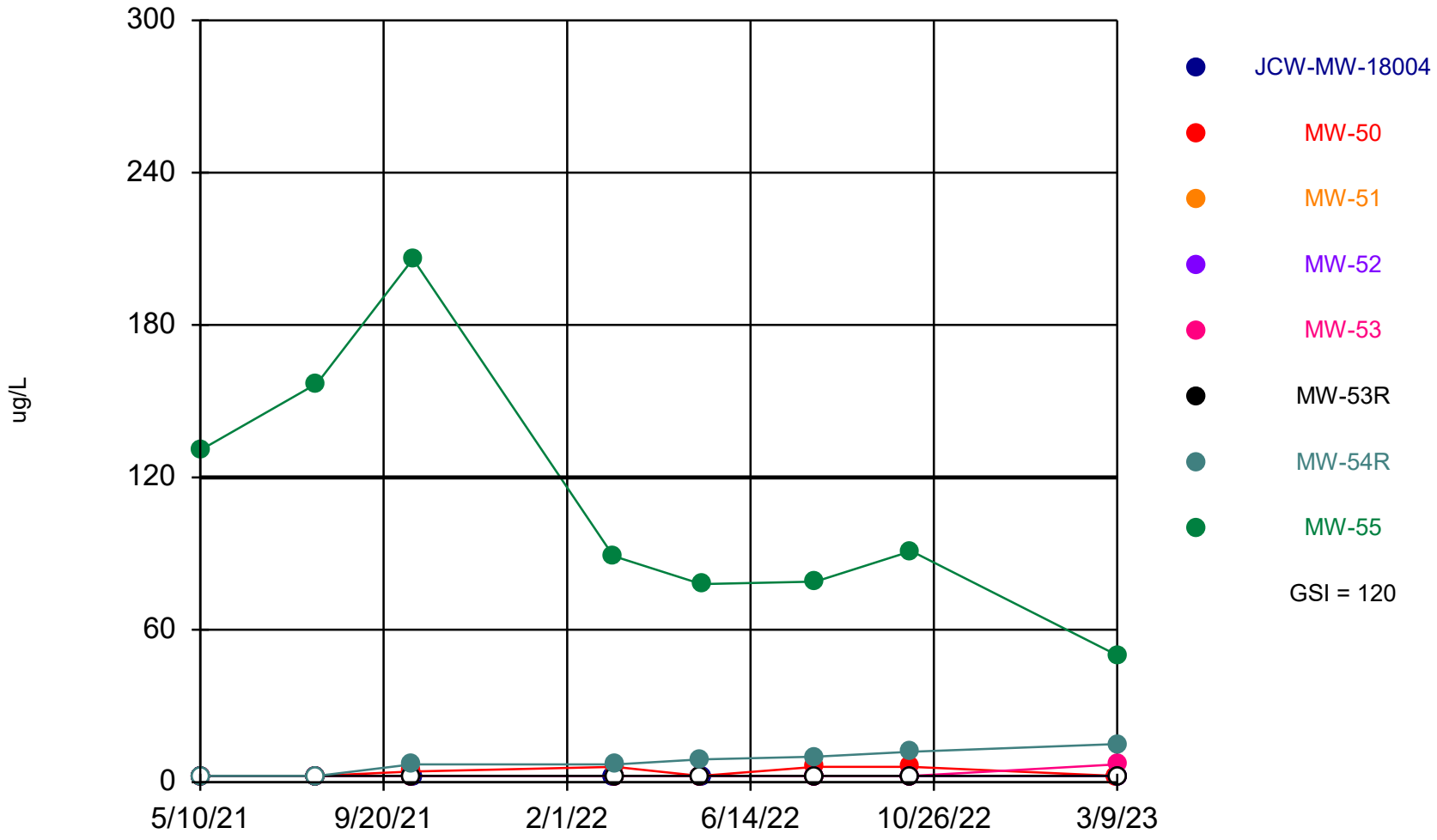


Time Series Analysis Run 4/5/2023 10:06 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Hollow symbols indicate censored values.

Molybdenum Comparison to GSI



Time Series Analysis Run 4/5/2023 10:07 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

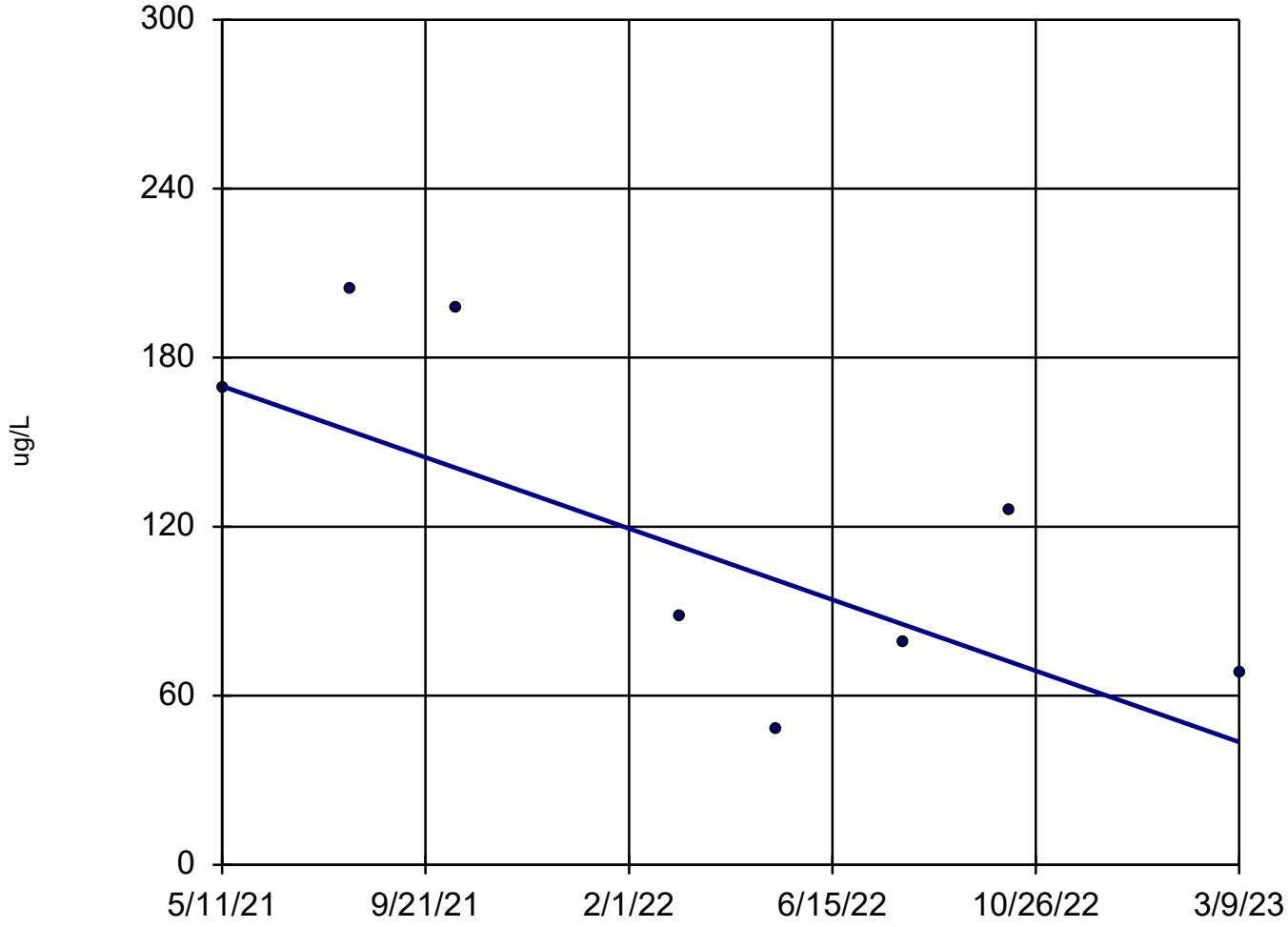
For observations made between 5/10/2021 and 3/9/2023, a summary of the selected data set:

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Arsenic, Total

MW-55



n = 8

Slope = -69.07 units per year.

Mann-Kendall statistic = -14
critical = -20

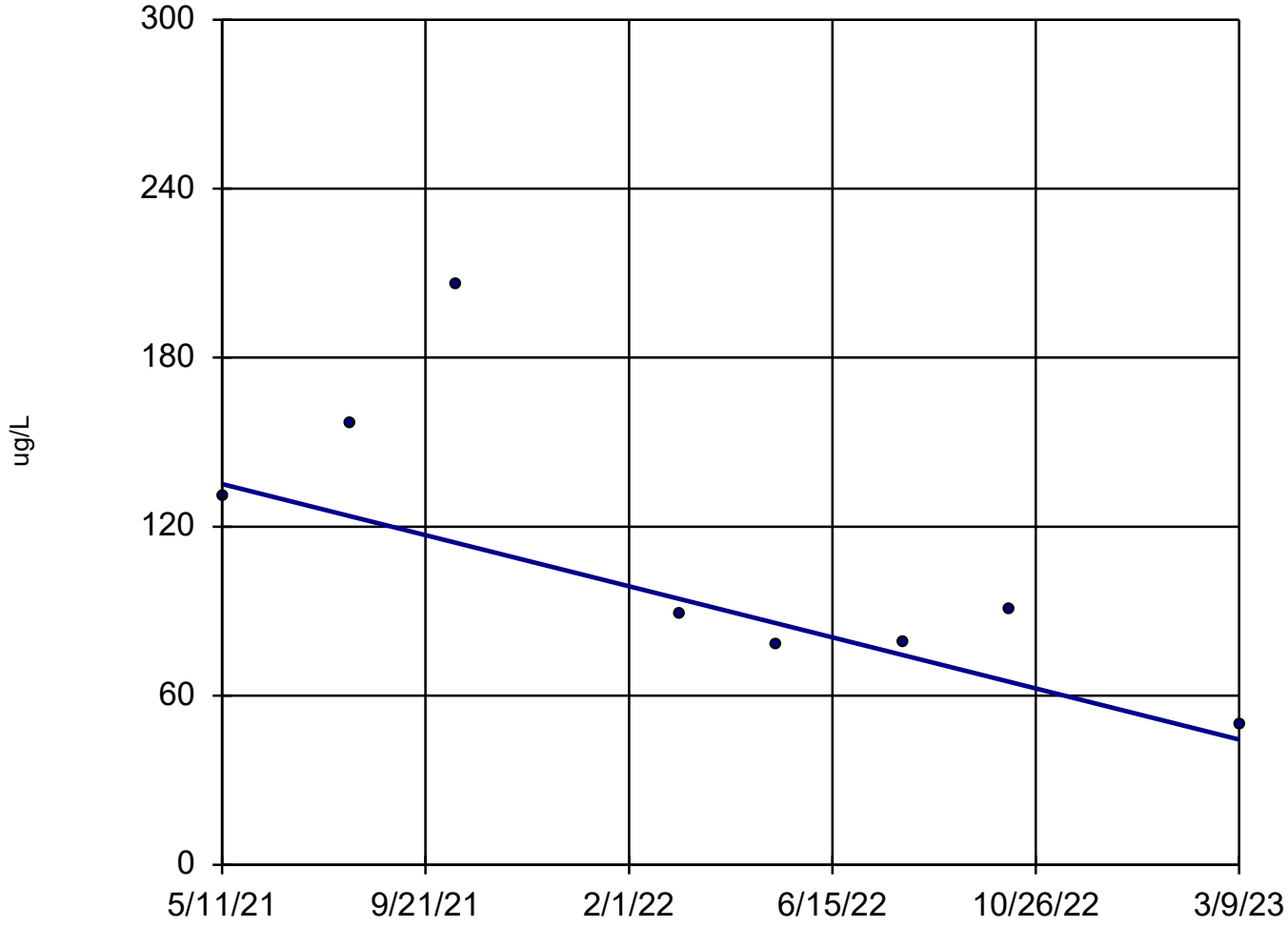
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 4/5/2023 10:09 AM

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Molybdenum, Total

MW-55



n = 8

Slope = -49.61 units per year.

Mann-Kendall statistic = -14
critical = -20

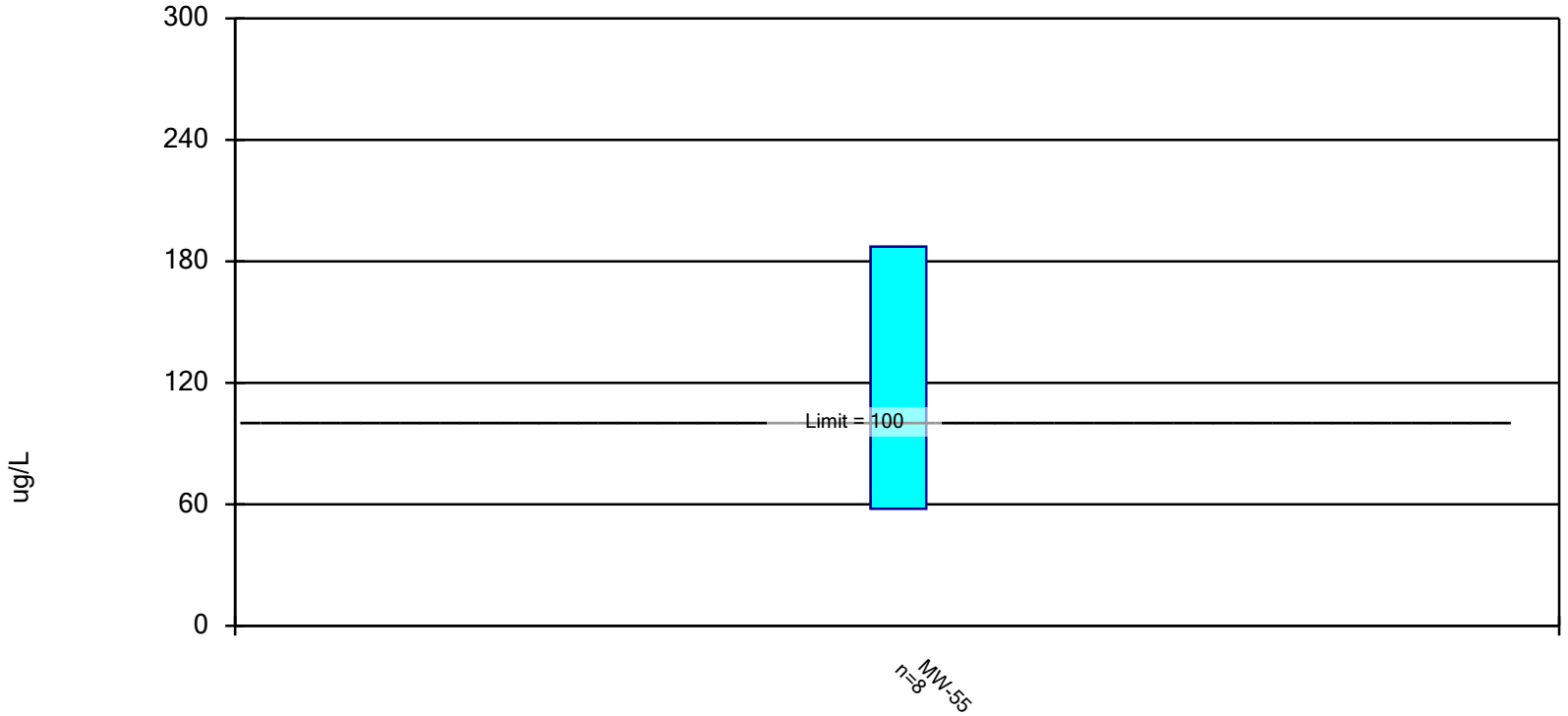
Trend not significant at 98% confidence level (α = 0.01 per tail).

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

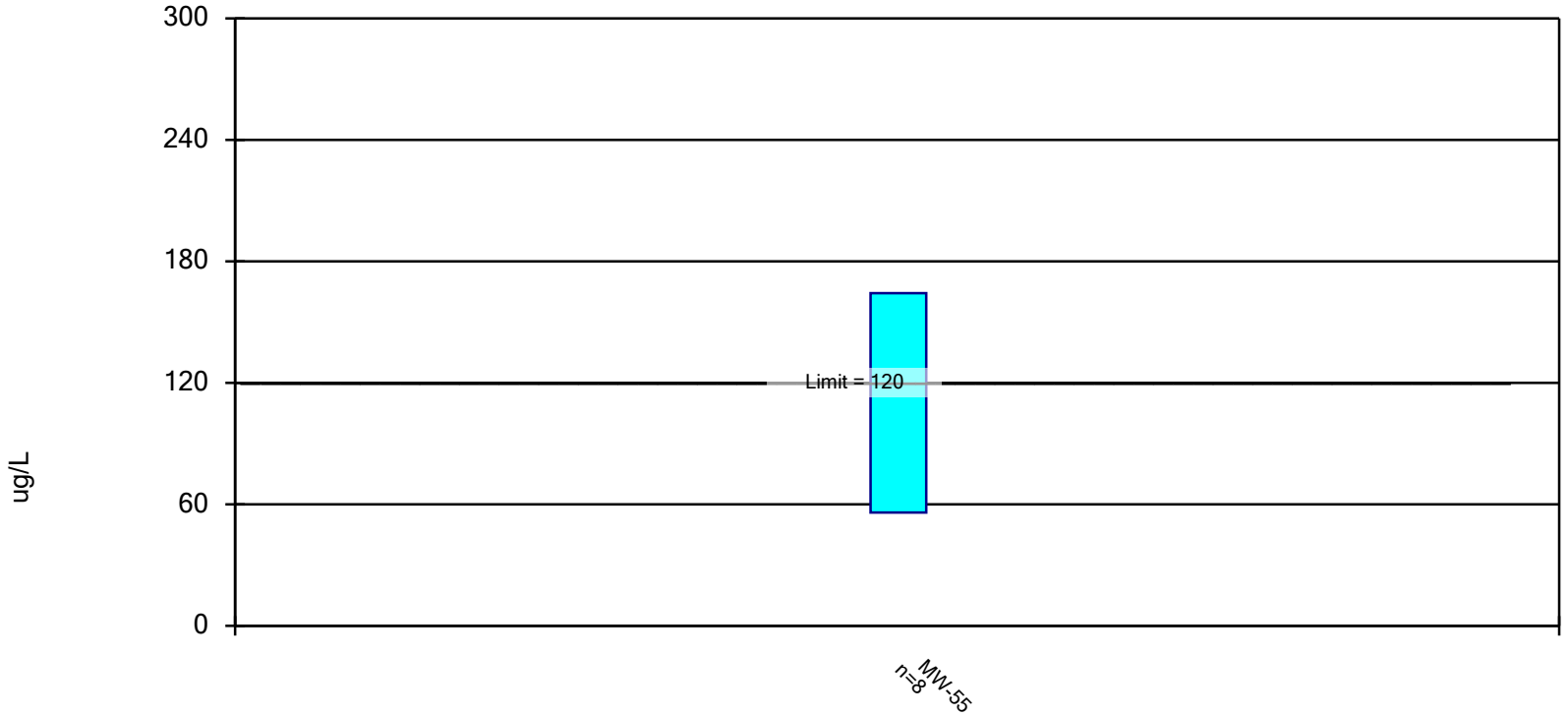
Constituent: Arsenic, Total (ug/L) Analysis Run 4/5/2023 10:10 AM

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

Client: Consumers Energy Data: JVW_HMPCCR_Sanitas_23Q1

Confidence Interval

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

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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: March 24, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q1

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 1st 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 03/24/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0166-01
Matrix: Groundwater

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 11:53 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-01-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 Total Metals Exp

Aliquot #: 23-0166-01-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, SO4, Aqueous

Aliquot #: 23-0166-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	2500000		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 2540C

Aliquot #: 23-0166-01-C03-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	574		mg/L	10.0	03/10/2023	AB23-0310-05

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Analytical Report

Report Date: 03/24/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0166-02
Matrix: Groundwater

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 02:15 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-02-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 Total Metals Exp

Aliquot #: 23-0166-02-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	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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0166-02-C02-A01 **Analyst: KDR**

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

Aliquot #: 23-0166-02-C03-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	743		mg/L	10.0	03/10/2023	AB23-0310-05

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Analytical Report

Report Date: 03/24/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0166-03
Matrix: Groundwater

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 12:35 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-03-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 Total Metals Exp

Aliquot #: 23-0166-03-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	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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0166-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	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 2540C

Aliquot #: 23-0166-03-C03-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	673		mg/L	10.0	03/10/2023	AB23-0310-05

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0166-04
Matrix: Groundwater

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 01:20 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-04-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 Appendix III-IV Total Metals Exp

Aliquot #: 23-0166-04-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	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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0166-04-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
Sulfate	91100		ug/L	1000.0	03/10/2023	AB23-0310-15

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0166-04-C03-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1200		mg/L	10.0	03/10/2023	AB23-0310-05

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0166-05
Matrix: Groundwater

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-05-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 Total Metals Exp

Aliquot #: 23-0166-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0166-05-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 2540C

Aliquot #: 23-0166-05-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

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Analytical Report

Report Date: 03/24/23

Sample Site: **DEK JCW Background**
Field Sample ID: **FB- Background**
Lab Sample ID: 23-0166-06
Matrix: Water

Laboratory Project: **23-0166**
Collect Date: 03/07/2023
Collect Time: 02:20 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0166-06-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 Total Metals Exp

Aliquot #: 23-0166-06-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-1066

Inspection Date: 3-9-23 **Inspection By:** TMR

Sample Origin/Project Name: Q1-2023 JCW-DEK Background Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony ____ FedEx X UPS ____ USPS ____ Airborne ____

Other/Hand Carry (whom) ____

Tracking Number: 3954 9797 0183 Shipping Form Attached: Yes ____ No ____

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

Cooler 1 Cardboard Box ____ Custom Case ____ Envelope/Mailer ____

Loose/Unpackaged Containers ____ Other ____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented ____ Leaking ____

Other ____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened ____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request ____ Air Data Sheet ____ Other ____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.3°C Samples Received on Ice: Yes X No ____

M&TE # and Expiration LS027723/5-25-23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
500 mL (plastic)					
Other 250 mL Plastic	5				

pH Paper
Lot # 230320
Exp: 10-30-23

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q1-2023 JCW-DEK Background Wells

PROJECT NUMBER: **23-0166**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0166-01	3/7/23	1153	GW	MW-15002	3	2	1						x	x	x	
-02	3/7/23	1415	GW	MW-15008	3	2	1						x	x	x	
-03	3/7/23	1337	GW	MW-15016	3	2	1						x	x	x	
-04	3/7/23	1330	GW	MW-15019	3	2	1						x	x	x	
-05	3/7/23	—	GW	DUP-Background	3	2	1						x	x	x	
-06	3/7/23	1420	W	FB- Background	1								x			

RELINQUISHED BY: [signature] DATE/TIME: 3/8/23 1230 RECEIVED BY: Fed Ex

RELINQUISHED BY: Fed Ex DATE/TIME: 03.09.23 12:05 PM RECEIVED BY: [signature]

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS 027723

Temperature: 1.3 °C Cal. Due Date: 05-25-23

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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: March 24, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q1

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 1st 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: Karn/Weadock Complex
Work Order ID: Q1-2023 Weadock Porewater Wells
Date Received: 3/10/2023
Chemistry Project: 23-0172

Sample #	Field Sample ID	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 03/24/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001**
Lab Sample ID: 23-0172-01
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/08/2023
Collect Time: 01:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-01-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	ND		ug/L	1.0	03/20/2023	AB23-0320-03
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	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	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	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

Aliquot #: 23-0172-01-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 Analyte List, Cl, 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	03/15/2023	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	3030		mg/L	10.0	03/10/2023	AB23-0310-06

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Analytical Report

Report Date: 03/24/23

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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0172-01-C04-A01 **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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18004**
Lab Sample ID: 23-0172-02
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 10:22 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-02-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	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	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	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	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
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
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 #: 23-0172-02-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
Total Dissolved Solids	1250		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18005**
Lab Sample ID: 23-0172-03
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 12:10 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-03-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	4		ug/L	1.0	03/20/2023	AB23-0320-03
Barium	115		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	930		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		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

Aliquot #: 23-0172-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-03-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 #: 23-0172-03-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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18006**
Lab Sample ID: 23-0172-04
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 01:07 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-04-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, Aqueous

Aliquot #: 23-0172-04-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 #: 23-0172-04-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 #: 23-0172-04-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	715		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-50**
Lab Sample ID: 23-0172-05
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/08/2023
Collect Time: 02:50 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-05-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	89		ug/L	5.0	03/20/2023	AB23-0320-03
Beryllium	ND		ug/L	1.0	03/20/2023	AB23-0320-03
Boron	2020		ug/L	20.0	03/20/2023	AB23-0320-03
Cadmium	ND		ug/L	0.2	03/20/2023	AB23-0320-03
Calcium	152000		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	604		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
Magnesium	51500		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	6700		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	60100		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 #: 23-0172-05-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 #: 23-0172-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	35900		ug/L	1000.0	03/15/2023	AB23-0315-03
Fluoride	ND		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	341000		ug/L	1000.0	03/15/2023	AB23-0315-03

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0172-05-C03-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	939		mg/L	10.0	03/10/2023	AB23-0310-06

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-51**
Lab Sample ID: 23-0172-06
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 06:34 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-06-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	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, Aqueous

Aliquot #: 23-0172-06-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 #: 23-0172-06-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	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 2540C

Aliquot #: 23-0172-06-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1180		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-52**
Lab Sample ID: 23-0172-07
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 07:23 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-07-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, Aqueous

Aliquot #: 23-0172-07-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-07-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 #: 23-0172-07-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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53**
Lab Sample ID: 23-0172-08
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 08:06 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-08-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	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	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
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	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

Aliquot #: 23-0172-08-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 #: 23-0172-08-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	03/15/2023	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	Tracking
Total Dissolved Solids	489		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53R**
Lab Sample ID: 23-0172-09
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 08:53 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-09-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	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, Aqueous

Aliquot #: 23-0172-09-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 #: 23-0172-09-C02-A01 **Analyst: KDR**

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 #: 23-0172-09-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	960		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-54R**
Lab Sample ID: 23-0172-10
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 09:40 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-10-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	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, Aqueous

Aliquot #: 23-0172-10-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 #: 23-0172-10-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	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 2540C

Aliquot #: 23-0172-10-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	770		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-55**
Lab Sample ID: 23-0172-11
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 11:17 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-11-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, Aqueous

Aliquot #: 23-0172-11-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 #: 23-0172-11-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 #: 23-0172-11-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	898		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **OW-57ROUT**
Lab Sample ID: 23-0172-12
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 12:38 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-12-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	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	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	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	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**

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	790		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-58**
Lab Sample ID: 23-0172-13
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 01:45 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-13-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

Aliquot #: 23-0172-13-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, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-13-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 #: 23-0172-13-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	850		mg/L	10.0	03/13/2023	AB23-0313-03

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Analytical Report

Report Date: 03/24/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-01**
Lab Sample ID: 23-0172-14
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/08/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-14-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 #: 23-0172-14-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 #: 23-0172-14-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 #: 23-0172-14-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	984		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-02**
Lab Sample ID: 23-0172-15
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-15-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, Aqueous

Aliquot #: 23-0172-15-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 #: 23-0172-15-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 Dissolved Solids by SM 2540C

Aliquot #: 23-0172-15-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	753		mg/L	10.0	03/13/2023	AB23-0313-03

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001 MS**
Lab Sample ID: 23-0172-16
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/08/2023
Collect Time: 01:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-16-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, Aqueous

Aliquot #: 23-0172-16-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-16-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

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Analytical Report

Report Date: 03/24/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001 MSD**
Lab Sample ID: 23-0172-17
Matrix: Groundwater

Laboratory Project: **23-0172**
Collect Date: 03/08/2023
Collect Time: 01:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-17-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, Aqueous

Aliquot #: 23-0172-17-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-17-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

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Analytical Report

Report Date: 03/24/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **FB-01**
Lab Sample ID: 23-0172-18
Matrix: Water

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 01:53 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-18-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	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 #: 23-0172-18-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 Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0172-18-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
Sulfate	ND		ug/L	1000.0	03/15/2023	AB23-0315-03

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Analytical Report

Report Date: 03/24/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **EB-01**
Lab Sample ID: 23-0172-19
Matrix: Water

Laboratory Project: **23-0172**
Collect Date: 03/09/2023
Collect Time: 01:58 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0172-19-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	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 #: 23-0172-19-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 #: 23-0172-19-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		ug/L	1000.0	03/15/2023	AB23-0315-03
Sulfate	ND		ug/L	1000.0	03/15/2023	AB23-0315-03

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0172

Inspection Date: 03.10.23 **Inspection By:** UE

Sample Origin/Project Name: Wladock Porewater

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/~~Hand Carry~~ (whom) TRC

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

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

Cooler (1) Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.1 - 2.3°C Samples Received on Ice: Yes X No ____

M&TE # and Expiration LS027723
5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or ~~60mL~~)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	38				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	15				
Other					

PG. 2 of 2 not needed

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SAMPLING SITE / CUSTOMER: Q1-2023 Weadock Porewater Wells	PROJECT NUMBER: 23-0172	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)
SAMPLING TEAM:	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER	REQUESTER: Harold Register	QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER
SEND REPORT TO: Caleb Batts	email:	phone:	
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other; SL = Sludge; A = Air; WP = Wipe; WT = General Waste		

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity					REMARKS
23-0172-01	3/8/23	1340	GW	JCW-MW-18001	5	4	1						x	x	x	x					
-02	3/9/23	1033	GW	JCW-MW-18004	5	4	1						x	x	x						
-03	3/9/23	1210	GW	JCW-MW-18005	5	4	1						x	x	x						
-04	3/9/23	1307	GW	JCW-MW-18006	5	4	1						x	x	x						
-05	3/8/23	1452	GW	MW-50	5	4	1						x	x	x						
-06	3/9/23	0634	GW	MW-51	5	4	1						x	x	x						
-07	3/9/23	0733	GW	MW-52	5	4	1						x	x	x						
-08	3/9/23	0804	GW	MW-53	5	4	1						x	x	x						
-09	3/9/23	0853	GW	MW-53R	5	4	1						x	x	x						
-10	3/9/23	0940	GW	MW-54R	5	4	1						x	x	x						
-11	3/9/23	1117	GW	MW-55	5	4	1						x	x	x						
-12	3/9/23	1236	GW	OW-57ROUT	5	4	1						x	x	x						

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	COMMENTS:
	3/10/23 0825	3.10.23 0845 Caseyarnett	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	Received on Ice? ☒ Yes ☐ No M&TE #: LS027723
			Temperature: 1.1-2.3 °C Cal. Due Date: 5.25.23

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

SAMPLING SITE / CUSTOMER: Q1-2023 Weadock Porewater Wells

PROJECT NUMBER: **23-0172**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0172-13	3/9/23	1345	GW	MW-58	5	4	1						x	x	x		
-14	3/8/23	—	GW	DUP-JCW-LF-01	5	4	1						x	x	x		
-15	3/9/23	—	GW	DUP-JCW-LF-02	5	4	1						x	x	x		
-16	3/8/23	1340	GW	JCW-MW-18001 MS	4	3	1						x	x			
-17	3/8/23	1340	GW	JCW-MW-18001 MSD	4	3	1						x	x			
-18	3/9/23	1353	W	FB-01	2	1	1						x	x			
-19	3/9/23	1358	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: [signature] DATE/TIME: 3/10/23 0827

RECEIVED BY: [signature] 3.10.23 0845

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LS027723

Temperature: 1.1-2.3 °C Cal. Due Date: 05.25.23

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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: March 24, 2023

Subject: HMP GROUNDWATER MONITORING – JCWEADOCK ASD – 2023 Q1

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: 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

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Analytical Report

Report Date: 03/24/23

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0173-01
Matrix: Groundwater

Laboratory Project: **23-0173**
Collect Date: 03/08/2023
Collect Time: 02:17 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0173-01-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, Aqueous

Aliquot #: 23-0173-01-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0173-01-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 #: 23-0173-01-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

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Analytical Report

Report Date: 03/24/23

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0173-01
Matrix: Groundwater

Laboratory Project: **23-0173**
Collect Date: 03/08/2023
Collect Time: 02:17 PM

Alkalinity by SM 2320B

Aliquot #: 23-0173-01-C04-A01 **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

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Analytical Report

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: 23-0173

Inspection Date: 03.10.23 **Inspection By:** CLE

Sample Origin/Project Name: Wendlock ASP

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler (1) Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.1-2.3°C Samples Received on Ice: Yes ✓ No _____

M&TE # and Expiration LS027723 5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	2				
24 mL vial (glass)					
250/500 mL (plastic)	1				
Other					

PG. 2 of 2 not needed

CHAIN OF CUSTODY

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Page _____ of _____

SAMPLING SITE / CUSTOMER: Q1-2023 Weadock ASD

PROJECT NUMBER: **23-0173**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER ______

SEND REPORT TO: Caleb Batts

email:

phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other ______; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER ______

LAB SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOCATION	TOTAL #	None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity						REMARKS
23-0173-01	3/8/23	1415	GW	JCW-OW-18001	5	4	1						x	x	x	x						

RELINQUISHED BY: [signature] DATE/TIME: 3/10/23 0830 RECEIVED BY: Casual Salwer 3.10.23 0845

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LS027723

Temperature: 1.1-2.3 °C Cal. Due 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:	3/8/23 3/9/23 ~~2/27/2023~~ TO ~~3/8/2023~~
PURPOSE OF FIELDWORK:	First Quarter HMP Sampling Event
WORK PERFORMED BY:	Javier Jasso

3/13/23
SIGNED DATE

3-13-23
CHECKED BY DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 3/8/23	TIME ARRIVED: 1300
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1515

WEATHER		
TEMPERATURE: 30 °F	WIND: 20 MPH	VISIBILITY: Clear

WORK / SAMPLING PERFORMED

Water Sample = JCW-MW 18001 MS+MSD, JCW-DW #8001
MW-50 Dup #01

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Caleb Batts	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

3/13/23
SIGNED DATE

3-13-23
CHECKED BY DATE

REVISED 04/2019

TRC

GENERAL NOTES

PROJECT NAME: CEC Weadock LF: 2023 GW Com	DATE: 3/9/23	TIME ARRIVED: 0550
PROJECT NUMBER: 514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1410

WEATHER		
TEMPERATURE: 30 °F	WIND: 15 to 20 MPH	VISIBILITY: Clear

WORK / SAMPLING PERFORMED

Wells SAMPLED = MW-51, 52, 53, 53R, 54R, JCW MW 18004 MW-55, JCW MW 18005, 57 Rout, JCW MW 18006, DUP #2 58, EB, FB

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Caleb Batts	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

SIGNED 3/13/23 DATE

CHECKED BY 3-13-23 DATE

TRC

EQUIPMENT SUMMARY

PROJECT NAME:	CEC Weadock LF: 2023 GW Co	SAMPLER NAME:	Javier Jasso
PROJECT NO.:	514403.0000.0000		

WATER LEVEL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PURGING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

SAMPLING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTERATION DEVICE	FILTER TYPE AND SIZE
DEDICATED POLY TUBING	☑ LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

☑ GROUND ☐ DRUM ☐ POTW ☐ POLYTANK ☐ OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
3/13/23	3-13-23
SIGNED DATE	CHECKED BY DATE

REVISED 04/2019

TRC

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: 3/7/23

PH CALIBRATION CHECK

pH 7 (LOT #): 261834 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 261306 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	CAL. RANGE	TIME
700 / 700	400 / 400	☑ WITHIN RANGE	0510
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 261617 (EXP. DATE): 9/23 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1309 / 1309	20.0	☑ WITHIN RANGE	0510
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 19K 100016 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
220 / 220	21.0	☑ WITHIN RANGE	0510
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL. READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
8.51 / 8.51	22.	☑ WITHIN RANGE	0510
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A2172 (EXP. DATE): 6/24 POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 / 0	/	☑ WITHIN RANGE	0510
100 / 100	/	☑ WITHIN RANGE	0510
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

NOTES

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):	☑ STANDARD SOLUTION (S) LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ _____	

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED _____ 3/17/23 DATE

CHECKED BY _____ 3-17-23 DATE

TRC

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: 3/9/23

PH CALIBRATION CHECK

pH 7 (LOT #): 261834 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 261306 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	CAL. RANGE	TIME
7.00 / 7.00	4.00 / 4.00	☑ WITHIN RANGE	0800
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 261017 (EXP. DATE): 9/23 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1309 / 1309	21.	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 1411000116 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
220 / 220	21.0	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL. READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
8.05 / 8.05	25.0	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A2173 (EXP. DATE): 6/24 POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 / 0	/	☑ WITHIN RANGE	0800
100 / 100	/	☑ WITHIN RANGE	0800
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION
(LOT #):
(EXP. DATE):

☑ STANDARD SOLUTION (S)
LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK

CALIBRATED PARAMETERS		CALIBRATION RANGES (1)	
☐	pH	pH:	+/- 0.2 S.U.
☐	COND	COND:	+/- 1% OF CAL. STANDARD
☐	ORP	ORP:	+/- 25 mV
☐	D.O.	D.O.:	VARIES
☐	TURB	TURB:	+/- 5% OF CAL. STANDARD
☐	_____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER	
☐	_____		

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED 3/13/23 DATE

CHECKED BY 3-13-23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 3/6/23
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
JCW-MW-18001	0630	TOC	17.35	23.75	NA	NM
JCW-MW-18004	0721	TOC	12.24	14.97	NA	NM
JCW-MW-18005	0739	TOC	6.33	16.28	NA	NM
JCW-MW-18006	0756	TOC	12.96	23.63	NA	NM
JCW-OW-18001	0631	TOC	6.44	20.35	NA	NM
JCW-OW-18002	0644	TOC	8.64	19.41	NA	NM
JCW-OW-18003	0651	TOC	7.60	Dry	NA	NM
JCW-OW-18004	0738	TOC	6.88	14.87	NA	NM
JCW-OW-18006	0757	TOC	6.58	23.45	NA	NM
LH-103R	0710	TOC	23.58	33.46	NA	NM
LH-104	0729	TOC	7.51	14.00	NA	NM
~~JCW-MW-20~~ JCW-MW-20	0740	TOC	5.27	20.00	NA	NM
MW-50	0651	TOC	13.96	19.40	NA	NM
MW-51	0645	TOC	14.77	20.00	NA	NM
MW-52	0650	TOC	15.38	19.74	NA	NM
MW-53	0654	TOC	14.02	18.16	NA	NM
MW-53R	0703	TOC	14.80	18.80	NA	NM
MW-54R	0715	TOC	14.00	17.27	NA	NM
MW-55	0733	TOC	14.16	14.36	NA	NM
MW-58	0640	TOC	534	18.15	NA	NM
OW-51	0646	TOC	9.50	17.78	NA	NM
OW-53	0700	TOC	6.64	18.00	NA	NM
OW-54	0716	TOC	6.47	16.46	NA	NM
OW-55	0734	TOC	5.00	18.47	NA	NM
OW-56	0747	TOC	4.40	19.27	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

3/13/23
SIGNED DATE

3-13-23
CHECKED DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 3/6/23
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	20.37	NA	NM
OW-57 IN	0751	TOC	4.61	19.60	NA	NM
OW-57R IN	0753	TOC	4.56	20.14	NA	NM
OW-57 OUT	0746	TOC	9.16	19.48	NA	NM
OW-57R OUT	0749	TOC	8.50	20.20	NA	NM
JCW-MW-15007	0610	TOC	3.18	8.87	NA	NM
JCW-MW-15009	~~0654~~	TOC	~~8.93~~	13.66	NA	NM
JCW-MW-15010	0603	TOC	17.64	19.57	NA	NM
JCW-MW-15028	0613	TOC	6.20	25.16	NA	NM
MW-15002	0839	TOC	6.11	16.88	NA	NM
MW-15008	0823	TOC	4.35	17.48	NA	NM
MW-15016	0843	TOC	3.14	8.10	NA	NM
MW-15019	0833	TOC	6.13	16.87	NA	NM
JCW-15022	0615		15.40	100 plus		
JCW MW-15026	0704		14.94	100 plus		
MW-16R	0717		14.35	19.87		
JCW-MW-15021	0724		15.49	100 plus		
OW-61	0803		8.26	37.07		
MW-19	0817		8.67	20.83		
MW15030	0815		5.02	100 plus		
MW 16R	0830		4.74	32.76		
MW-15024	0831		9.74	17.17		
MW 15018	0836		5.16	9.94		
JCW MW-15001	0841		9.25	100 plus		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

3/13/23
SIGNED DATE

3-13-23
CHECKED DATE

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/7/23	BY: JK	DATE: 3-17-23

SAMPLE ID: XW-MW-18001 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1305	DATE: 3/8/23	SAMPLE	TIME: 1340	DATE: 3/8/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.68 SU	CONDUCTIVITY: 3343	umhos/cm
			ORP: -55.5 mV	DO: 0.39	mg/L
DEPTH TO WATER: 17.35 T/ PVC			TURBIDITY: 4.1 NTU		
DEPTH TO BOTTOM: 23.71 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 11.0 °C	OTHER:	
VOLUME REMOVED: 76 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: NON	
COLOR: Cloudy ODOR: NON			FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☒ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1305	200	7.17	1878	117.0	8.7	350	9.9	170.5	INITIAL
1310		6.77	3400	10.1	1.0	60	10.6	1718	1
1315		6.70	3300	-21.0	0.89	40	10.8	1716	2
1320		6.67	3265	-40	0.58	14.8	11.0	1716	3
1325		6.67	3315	-50	0.48	10	10.9	1716	4
1330		6.67	3339	-55.0	0.43	5.0	11.0	1716	5
1335		6.67	3347	-55.3	0.41	4.5	11.0	1715	6
1340		6.68	3343	-55.5	0.39	4.1	11.0	1715	7

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
2	125	glass	D	☐ Y ☒ N					☐ Y ☐ N
1	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
3	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
3	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	FedEx Drop Off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: XW-OW-18001 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1352	DATE: 3/8/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 6.44 T/ PVC

DEPTH TO BOTTOM: 20.05 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 5 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1417	DATE: 3/8/23

PH: 6.64 SU CONDUCTIVITY: 6714 umhos/cm

ORP: -51.3 mV DO: 0.40 mg/L

TURBIDITY: 0.5 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.3 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1352	200	7.21	16800	12.1	9.3	30	9.0	6.50	INITIAL
1357		6.67	1701	-37.0	1.0	11.0	8.8	6.60	1
1402		6.65	16996	-50.0	0.67	8.9	9.0	6.60	2
1407		6.64	1693	-50.8	0.51	9.0	9.2	6.60	3
1412		6.64	1686	-51.0	0.44	8.5	9.3	6.60	4
1417		6.64	1674	-51.3	0.40	8.5	9.3	6.60	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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
2	125	glass	A	☐ Y ☒ N					☐ Y ☐ N
1	250	P	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P	A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW 50 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1430	DATE: 3/8/23	SAMPLE	TIME: 1450	DATE: 3/8/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.27 SU	CONDUCTIVITY: 1338	umhos/cm
			ORP: -36.0 mV	DO: 0.95	mg/L
DEPTH TO WATER:	13.96 T/ PVC		TURBIDITY: 9.1	NTU	
DEPTH TO BOTTOM:	19.46 T/ PVC		☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 9.8 °C	OTHER:	
VOLUME REMOVED:	4 ☒ LITERS ☐ GALLONS		COLOR: Clear	ODOR: none	
COLOR:	Clear ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☒ DUP- 01		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1430	200	7.57	1396	-26.5	8.5	2420	8.7	1375	INITIAL
1435		7.29	1338	-32.1	1.5	9.6	9.0	1380	1
1440		7.27	1342	-35.8	1.0	9.2	9.1	1380	2
1445		7.27	1340	-35.8	0.99	9.2	9.2	1380	3
1450		7.27	1338	-36.0	0.95	9.1	9.2	1380	4
~~1455~~								~~1380~~	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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
2	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW 51 — WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0604	DATE: 3/9/23	SAMPLE	TIME: 0634	DATE: 3/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.23 SU	CONDUCTIVITY: 1700 umhos/cm	
			ORP: 145 mV	DO: 0.70 mg/L	
DEPTH TO WATER: 14.78 T/ PVC			TURBIDITY: 4.9 NTU		
DEPTH TO BOTTOM: 20.00 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.8 °C	OTHER:	
VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Cloudy	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0604	200	7.44	744	211	8.3	54	8.8	14.76	INITIAL
0609		7.29	1676	214.7	2.6	32	6.4	14.75	1
0614		7.24	1686	215	1.3	6.8	6.7	14.75	2
0619		7.23	1701	200	1.0	5.7	6.7	14.75	3
0624		7.23	1698	150	0.88	4.9	6.8	14.75	4
0629		7.23	1703	148	0.77	5.0	6.8	14.75	5
0634		7.23	1700	145	0.70	4.9	6.8	14.75	6

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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	DUP	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off	DATE SHIPPED: 3-10-23	AIRBILL NUMBER:
COC NUMBER:	SIGNATURE:	DATE SIGNED: 3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW-52 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0648	DATE: 3/9/23	SAMPLE	TIME: 0723	DATE: 3/9/23
PURGE METHOD: ☑ PUMP ☐ PERISTALTIC PUMP ☐ BAILER			PH: ~~6.73~~ 6.78 SU	CONDUCTIVITY: 1767 umhos/cm	
			ORP: 39 mV	DO: 0.50 mg/L	
DEPTH TO WATER: 15.36 T/ PVC			TURBIDITY: 7.0 NTU		
DEPTH TO BOTTOM: 19.79 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.4 °C	OTHER:	
VOLUME REMOVED: 7 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: NOR	
COLOR: Clear	ODOR: NOR		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0648	200	7.68	1040	100	9.0	60	4.3	1537	INITIAL
0653		6.97	1734	121	1.7	23	5.9	1545	1
0658		6.80	1754	100	1.0	16	6.4	1545	2
0703		6.80	1756	90	0.80	11	6.4	1545	3
0708		6.79	1759	78	0.69	9.5	6.3	1545	4
0713		6.78	1762	48	0.59	6.7	6.3	1545	5
0718		6.77	1766	40	0.53	6.4	6.4	1541	6
0723		6.78	1767	39	0.50	7.0	6.4	1541	7

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	21	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off	DATE SHIPPED: 3-10-23	AIRBILL NUMBER:
COC NUMBER:	SIGNATURE:	DATE SIGNED: 3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW 53 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0736	DATE: 3/9/23	SAMPLE	TIME: 0806	DATE: 3/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.32 SU	CONDUCTIVITY: 746 umhos/cm	
			ORP: -25.6 mV	DO: 0.58 mg/L	
DEPTH TO WATER: 14.03 T/ PVC			TURBIDITY: 3.9 NTU		
DEPTH TO BOTTOM: 18.18 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.4 °C	OTHER:	
VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS			COLOR: CLEAR	ODOR: NOR	
COLOR: CLEAR ODOR: NOR			FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0736	200	7.63	400	54.5	10	21	5.1	1403	INITIAL
0741		7.44	791	45.3	2.5	10.5	6.6	1410	1
0746		7.36	761	39.3	1.6	5.2	6.3	1410	2
0751		7.33	752	20.0	1.0	4.0	6.4	1410	3
0756		7.32	749	-21.0	0.75	4.0	6.3	1411	4
0801		7.32	747	-25.3	0.64	3.9	6.4	1410	5
0806		7.32	746	-25.6	0.58	3.9	6.4	1410	6

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/9/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW ~~53R~~ 53R | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0827	DATE: 3/9/23	SAMPLE	TIME: 0853	DATE: 3/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.71 SU	CONDUCTIVITY: 1433 umhos/cm	
			ORP: 30 mV	DO: 0.48 mg/L	
DEPTH TO WATER: 14.86 T/ PVC			TURBIDITY: 9.5 NTU		
DEPTH TO BOTTOM: 19.80 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.4 °C	OTHER:	
VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: No ne	
COLOR: Brownish	ODOR: none		FILTRATE (0.45 um) ☐ YES ☐ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0803	200	7.06	1393	67.5	9.0	150	4.5	1465	INITIAL
0808		6.77	1419	71.1	1.6	590	5.6	1471	1
0833		6.74	1435	64.8	0.97	130	6.2	1471	2
0838		6.73	1433	56.0	0.75	14	6.3	1470	3
0843		6.71	1433	30	0.61	10	6.4	1470	4
0848		6.71	1434	30	0.55	9.5	6.4	1471	5
0853		6.71	1433	30	0.48	9.5	6.4	1471	6
~~0858~~								~~1472~~	~~7~~

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	2L	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	1L	PL	A	☐ Y ☐ N					☐ Y ☐ N
1	1L	PL	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab ~~drop~~ drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW 54R	WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER			
WELL MATERIAL:	☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL	☐ OTHER		
SAMPLE TYPE:	☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE	☐ OTHER		

PURGING	TIME: 0910	DATE: 3/9/23	SAMPLE	TIME: 0940	DATE: 3/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.80 SU	CONDUCTIVITY: 1193	umhos/cm
			ORP: ~~1337~~ 1225 mV	DO: 2.9	mg/L
DEPTH TO WATER:	14.00 T/ PVC		TURBIDITY: 6.8 NTU		
DEPTH TO BOTTOM:	17.33 T/ PVC		☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 5.2 °C	OTHER:	
VOLUME REMOVED:	6 ☑ LITERS ☐ GALLONS		COLOR: Clear	ODOR: none	
COLOR:	Brown ODOR: none		FILTRATE (0.45 um) ☐ YES	☒ NO	
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE	☑ VERY		QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0910	200	7.13	1203	85.5	10	400	4.7	14.00	INITIAL
0915		6.89	1190	99.5	6.0	100	4.8	14.15	1
0920		6.85	1193	109.0	6.0	18	5.0	14.15	2
0925		6.80	1193	120.5	4.5	8	5.1	14.15	3
0930		6.80	1193	122.5	3.0	6.8	5.1	14.15	4
0935		6.80	1193	122.6	3.0	6.5	5.2	14.20	5
0940		6.80	1192	122.5	2.9	6.8	5.2	14.20	6

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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: SK	DATE: 3-13-23

SAMPLE ID: JCW MW-18004 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0957	DATE: 3/9/23	SAMPLE	TIME: 1007	DATE: 3/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.76 SU	CONDUCTIVITY: 1494 umhos/cm	
			ORP: 200.9 mV	DO: 9.4 mg/L	
DEPTH TO WATER: 12.24 T/ PVC			TURBIDITY: 4.5 NTU		
DEPTH TO BOTTOM: 14.97 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 11.5 °C	OTHER:	
VOLUME REMOVED: 2.5 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear	ODOR: NOR		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0957	100	7.05	1527	164.6	11.0	10.1	3.8	12.97	INITIAL
1002		6.87	1495	174.5	9.5	5.7	4.3	13.50	.5
1007		6.78	1485	188.0	9.4	5.0	4.3	13.65	1
1012		6.76	1492	200.5	9.4	4.5	4.5	13.85	1.5
1017		6.76	1494	200.5	9.4	4.5	4.5	13.90	2
1022		6.76	1494	200.9	9.4	4.5	4.5	13.75	2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW 55 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1037	DATE: 3/9/23	SAMPLE	TIME: 1117	DATE: 3/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.75 SU	CONDUCTIVITY: 1405 umhos/cm	
			ORP: -71.0 mV	DO: 0.42 mg/L	
DEPTH TO WATER: 14.16 T/ PVC			TURBIDITY: 9.7 NTU		
DEPTH TO BOTTOM: 16.36 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.8 °C	OTHER:	
VOLUME REMOVED: 9 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: orange	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1037	200	7.05	646	21.3	9.0	470	6.1	14.2	INITIAL
1042		6.79	1391	63.5	1.2	23.5	6.4	14.35	1
1047		6.76	1411	-35.0	0.75	7.5	6.5	14.35	2
1052		6.75	1416	-50.0	0.60	4.5	6.5	14.35	3
1057		6.75	1412	-60.5	0.55	2.0	6.5	14.35	4
1102		6.75	1409	-70.5	0.48	1.0	6.5	14.25	5
1107		6.74	1407	-71.0	0.44	1.0	6.8	14.25	6
1112		6.75	1405	-71.5	0.43	9.9	6.8	14.35	7
1117		6.75	1405	-71.0	0.42	9.7	6.6	14.15	8

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	250	21	A	☐ Y ☒ N					☐ Y ☐ N
1	125	21	B	☐ Y ☒ N					☐ Y ☐ N
1	125	121	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-17-23

SAMPLE ID: MW-9001 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1130	DATE: 3/9/23	SAMPLE	TIME: 1210	DATE: 3/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: Calibrated SU	CONDUCTIVITY: 1487	umhos/cm
			ORP: 19.9 mV	DO: 6.10	mg/L
DEPTH TO WATER: 6.37	T/ PVC		TURBIDITY: 10	NTU	
DEPTH TO BOTTOM: 16.38	T/ PVC		☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA	☐ LITERS ☐ GALLONS		TEMPERATURE: 6.0 °C	OTHER:	
VOLUME REMOVED: 4	☑ LITERS ☐ GALLONS		COLOR: Clear	ODOR: none	
COLOR: Brown	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1130	140	6.97	1527	-32.6	10	320	6.8	6.15	INITIAL
1135		6.64	1547	-15.5	1.2	222	6.7	7.35	.5
1140		6.60	1545	-7.2	0.88	33.5	6.4	7.55	1
1145		6.63	1516	-2.4	0.67	100	6.3	7.70	1.5
1150		6.63	1486	3.5	0.50	40	6.1	7.80	2
1155		6.64	1477	9.5	1.10	20	5.9	7.85	2.5
1200		6.64	1483	20.0	1.13	10	6.0	7.90	3
1205		6.64	1487	20.0	1.10	10	6.0	7.90	3.5
1210		6.64	1487	19.9	1.10	10	6.0	7.90	4

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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	1 L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	7-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: OW-57 Rout | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1223	DATE: 3/9/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 9.50 T/ PVC

DEPTH TO BOTTOM: 20.20 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 1.5 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: NOR

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1238	DATE: 3/9/23

PH: 6.91 SU | CONDUCTIVITY: 1195 umhos/cm

ORP: 124.8 mV | DO: 4.0 mg/L

TURBIDITY: 4.5 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 6.9 °C | OTHER:

COLOR: clear | ODOR: NOR

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1223	100	7.14	513	124.1	10.8	14	6.9	9.58	INITIAL
1228		6.91	1192	125.0	4.0	4.9	6.4	10.11	.5
1233		6.91	1193	124.9	4.0	4.7	6.9	10.90	1
1238		6.91	1195	124.8	4.0	4.5	6.9	11.95	1.5
									~~2~~
									~~2.5~~

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	AG	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off	DATE SHIPPED: 3-10-23	AIRBILL NUMBER: —
COC NUMBER: —	SIGNATURE:	DATE SIGNED: 3/13/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/10/23	BY: JK	DATE: 3-13-23

SAMPLE ID: YW-MW-1800 G | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1252	DATE: 3/9/23	SAMPLE	TIME: 1312	DATE: 3/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.84 SU	CONDUCTIVITY: 1236 umhos/cm	
			ORP: -24.3 mV	DO: 0.91 mg/L	
DEPTH TO WATER: 12.96 T/ PVC			TURBIDITY: 43 NTU		
DEPTH TO BOTTOM: 23.67 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 8.1 °C	OTHER:	
VOLUME REMOVED: 3 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: NON	
COLOR: clear	ODOR: NON		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD	☒ DUP: MW-2	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1251	200	7.38	1230	164.7	10.6	33	6.4	12.96	INITIAL
1257		6.90	1226	-25.5	0.99	45	8.1	12.96	1
1302		6.90	1226	-26.6	0.95	45	8.2	12.96	2
1307		6.89	1228	-24.3	0.95	43	8.1	12.96	3
~~1312~~								~~12.96~~	~~4~~
									~~5~~
									~~6~~

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
2	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	A	☐ Y ☒ N					☐ Y ☐ N
3	1L	A	A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW-58 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1330	DATE: 3/9/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 5.34 T/ PVC

DEPTH TO BOTTOM: 18.75 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 5 ☒ LITERS ☐ GALLONS

COLOR: cloudy ODOR: non

TURBIDITY ☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1345	DATE: 3/9/23

PH: 6.97 SU CONDUCTIVITY: 1475 umhos/cm

ORP: -76.0 mV DO: 0.50 mg/L

TURBIDITY: ~~6.9~~ 7.0 (SK) NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 6.9 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1330	200	7.34	1766	68.7	10.0	60	7.7	5.38	INITIAL
1335		6.94	1860	-13.0	1.2	370	7.4	5.40	1
1340		6.97	1497	-75.0	0.58	416	6.8	540	2
1335		6.97	1483	-75.8	0.56	7.0	6.8	540	3
1340		6.97	1478	-75.8	0.55	7.0	6.8	540	4
1345		6.97	1475	-76.0	0.50	7.0	6.9	540	5
									6

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-17-23

SAMPLE ID: FB-01 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: T/ PVC

DEPTH TO BOTTOM: T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: ☐ LITERS ☐ GALLONS

COLOR: ODOR:

TURBIDITY: ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1353	DATE: 3/9/23

PH: NR SU CONDUCTIVITY: NR umhos/cm

ORP: NR mV DO: NR mg/L

TURBIDITY: NR NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NR °C OTHER:

COLOR: Clear ODOR: None

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	125	AG	A	☐ Y ☑ N					☐ Y ☐ N
1	125	AG	H	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	3/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: EB #1 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: T/ PVC

DEPTH TO BOTTOM: T/ PVC

WELL VOLUME: NA ☑ LITERS ☐ GALLONS

VOLUME REMOVED: ☐ LITERS ☐ GALLONS

COLOR: ODOR:

TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1358	DATE: 3/9/23

PH: NA SU | CONDUCTIVITY: NA umhos/cm

ORP: NA mV | DO: NA mg/L

TURBIDITY: NP NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NA °C | OTHER:

COLOR: CLR | ODOR: NOR

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	250	P	A	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	3-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock BAP: 2023 GW	PREPARED			CHECKED		
PROJECT NUMBER:	514403.0001.0000	BY:	JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23	

SAMPLE ID: MW-1 S002 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1110	DATE: 3/6/23	SAMPLE	TIME: 1153	DATE: 3/6/23
PURGE METHOD: ☐ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.33 SU	CONDUCTIVITY: 1036 umhos/cm	
			ORP: 69.5 mV	DO: 3.8 mg/L	
DEPTH TO WATER: 6.11 T/ PVC			TURBIDITY: 6.0 NTU		
DEPTH TO BOTTOM: 16.89 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 6.1 °C	OTHER:	
VOLUME REMOVED: 7 ☐ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear ODOR: none			FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☑ DUP- #01		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1118	240	7.63	1015	104.0	11.0	12.0	6.4	6.38	INITIAL
1123		7.43	1059	100.0	5.0	12.0	6.1	6.76	1
1128		7.36	1061	90.0	4.2	8.8	6.1	6.80	2
1133		7.30	1056	80.0	4.0	8.8	6.0	6.82	3
1138		7.30	1050	70.0	3.8	9.0	6.1	6.82	4
1143		7.33	1043	70.0	3.8	6.0	6.1	6.80	5
1148		7.32	1036	69.5	3.8	6.0	6.1	6.82	6
1153		7.33	1036	69.5	3.8	6.0	6.1	6.80	7

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
2	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
2	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
2	125	PL	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Fedex	DATE SHIPPED:	3-8-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock BAP: 2023 GW	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0001.0000	BY: JJ	DATE: 3/17/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW-1501b | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1200	DATE: 3/16/23	SAMPLE	TIME: 1235	DATE: 3/16/23

PURGE METHOD: ☒ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 3.14 T/ PVC

DEPTH TO BOTTOM: 6.16 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 3.5 ☒ LITERS ☐ GALLONS

COLOR: Cloudy ODOR: NOR

TURBIDITY ☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

PH: 7.10 SU | CONDUCTIVITY: 970 umhos/cm

ORP: 59.0 mV | DO: 0.52 mg/L

TURBIDITY: 6.6 NTU

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 3.7 °C | OTHER:

COLOR: Clear | ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1200	100	7.62	813	136.1	10.0	26.0	4.3	3.18	INITIAL
1205		7.32	811	123.0	2.95	20.0	3.8	3.40	.1
1210		7.17	862	106.0	0.92	18.3	3.7	3.43	1
1215		7.10	913	81.9	0.64	9.5	3.7	3.45	1.1
1220		7.10	937	60.0	0.59	7.1	3.7	3.45	2
1225		7.10	957	59.8	0.53	6.6	3.7	3.45	2.1
1230		7.10	967	59.0	0.53	6.6	3.7	3.47	3
1235		7.10	970	59.0	0.52	6.0	3.7	3.41	3.1
					~~0.52~~				

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	250	P1	A	☐Y ☒N					☐Y ☐N
1	125	P1	A	☐Y ☒N					☐Y ☐N
1	125	P1	B	☐Y ☒N					☐Y ☐N
				☐Y ☐N					☐Y ☐N
				☐Y ☐N					☐Y ☐N

SHIPPING METHOD:	Fedex	DATE SHIPPED:	3-8-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/16/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock BAP: 2023 GW	PREPARED			CHECKED		
PROJECT NUMBER:	514403.0001.0000	BY:	JJ	DATE: 3/9/23	BY: JK	DATE: 3-13-23	

SAMPLE ID: MW-~~150~~15019 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1250	DATE: 3/7/23	SAMPLE	TIME: 1330	DATE: 3/7/23

PURGE METHOD: ☑ ~~PUMP~~ PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 6.11 T/ PVC

DEPTH TO BOTTOM: 16.67 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS

COLOR: Brownish ODOR: none

TURBIDITY ☐ NONE ☐ SLIGHT ☑ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.70 SU CONDUCTIVITY: 2064 umhos/cm

ORP: -89.0 mV DO: 0.30 mg/L

TURBIDITY: 4.9 NTU

☑ ~~NONE~~ ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 6.6 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☑ ~~NO~~

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1250	200	7.07	1586	151.9	9.9	53.0	6.1	5.16	INITIAL
1255		6.69	2054	-52.0	1.0	7.6	6.7	5.57	1
1300		6.69	2073	-80.0	0.40	5.0	6.6	5.57	2
1305		6.70	2070	-88.5	0.40	5.0	6.7	5.57	3
1310		6.70	2066	-88.8	0.30	5.0	6.6	5.57	4
1315		6.70	2064	-88.5	0.30	4.9	6.4	5.57	5
1320		6.70	2064	-89.0	0.30	4.9	6.6	5.57	6

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	250	P1	A	☐ Y ☑ ~~N~~					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ ~~N~~					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ ~~N~~					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Fedex	DATE SHIPPED:	3-8-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	3/13/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock BAP: 2023 GW	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0001.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: MW-1S008 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1330	DATE: 3/7/23	SAMPLE	TIME: 1415	DATE: 3/7/23
PURGE METHOD:	☒ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.71 SU	CONDUCTIVITY: 1320 umhos/cm	
			ORP: -98.5 mV	DO: 0.19 mg/L	
DEPTH TO WATER: 4.37 T/ PVC			TURBIDITY: 6.0 NTU		
DEPTH TO BOTTOM: 17.46 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 7.1 °C	OTHER:	
VOLUME REMOVED: 9 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: Brownish	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1330	200	7.24	870	-94.5 T	4.5	115	6.9	4.39	INITIAL
1335		7.23	814	-113.5	079	223	6.7	4.40	1
1340		7.06	985	-115.0	038	200	6.9	4.40	2
1345		6.90	1146	-108.0	029	32.7	7.0	4.40	3
1350		6.80	1216	-104.0	024	14.0	7.0	4.40	4
1355		6.80	1245	-100.0	023	10	7.0	4.40	5
1400		6.80	1289	-101.5	020	26.5	7.1	4.40	6
1405		6.74	1318	-98.5	020	10.0	7.1	4.40	7
1410		6.79	1318	-98.0	019	10.0	7.1	4.40	8
1415		6.79	1320	-98.5	0.19	10.0	7.1	4.40	9

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	FedEx	DATE SHIPPED:	3-8-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	7/13/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock BAP: 2023 GW	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0001.0000	BY: JJ	DATE: 3/13/23	BY: JK	DATE: 3-13-23

SAMPLE ID: FB # Background | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☐ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: ____ T/ PVC

DEPTH TO BOTTOM: ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: ____ ☐ LITERS ☐ GALLONS

COLOR: ____ ODOR: ____

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME:	DATE: 3/7/23

PH: NM SU | CONDUCTIVITY: NM umhos/cm

ORP: NM mV | DO: NM mg/L

TURBIDITY: NM NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NM °C | OTHER: ____

COLOR: CLR | ODOR: NOR

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: ____ | FILTRATE ODOR: ____

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	FedEx	DATE SHIPPED:	3-8-23	AIRBILL NUMBER:	____
COC NUMBER:	____	SIGNATURE:		DATE SIGNED:	3/13/23

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q1-2023 JCW-DEK Background Wells

PROJECT NUMBER: 23-0166

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0166-01	3/7/23	1153	GW	MW-15002	3	2	1						x	x	x	
-02	3/7/23	1415	GW	MW-15008	3	2	1						x	x	x	
-03	3/7/23	1337	GW	MW-15016	3	2	1						x	x	x	
-04	3/7/23	1330	GW	MW-15019	3	2	1						x	x	x	
-05	3/7/23	—	GW	DUP-Background	3	2	1						x	x	x	
-06	3/7/23	1420	W	FB- Background	1								x			

RELINQUISHED BY: DATE/TIME: 3/8/23 1230 RECEIVED BY: Fed Ex

RELINQUISHED BY: Fed Ex DATE/TIME: 03.09.23 12:05 PM RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS 027723

Temperature: 1.3 °C Cal. Due Date: 05-25-23

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Page 1 of 2

SAMPLING SITE / CUSTOMER: Q1-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0172

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	ANALYSIS REQUESTED: Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0172-01	3/8/23	1340	GW	JCW-MW-18001	5	4	1						x	x	x	x	
-02	3/9/23	1033	GW	JCW-MW-18004	5	4	1						x	x	x		
-03	3/9/23	1210	GW	JCW-MW-18005	5	4	1						x	x	x		
-04	3/9/23	1307	GW	JCW-MW-18006	5	4	1						x	x	x		
-05	3/8/23	1454	GW	MW-50	5	4	1						x	x	x		
-06	3/9/23	0634	GW	MW-51	5	4	1						x	x	x		
-07	3/9/23	0733	GW	MW-52	5	4	1						x	x	x		
-08	3/9/23	0804	GW	MW-53	5	4	1						x	x	x		
-09	3/9/23	0853	GW	MW-53R	5	4	1						x	x	x		
-10	3/9/23	0940	GW	MW-54R	5	4	1						x	x	x		
-11	3/9/23	1117	GW	MW-55	5	4	1						x	x	x		
-12	3/9/23	1236	GW	OW-57ROUT	5	4	1						x	x	x		

RELINQUISHED BY: _____ DATE/TIME: 3/10/23 0825 RECEIVED BY: Caseyarnett 3.10.23 0845

RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LS027723

Temperature: 1.1-2.3 °C Cal. Due Date: 5.25.23

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Page 2 of 2

SAMPLING SITE / CUSTOMER: Q1-2023 Weadock Porewater Wells

PROJECT NUMBER: **23-0172**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0172-13	3/9/23	1345	GW	MW-58	5	4	1						x	x	x		
-14	3/8/23	—	GW	DUP-JCW-LF-01	5	4	1						x	x	x		
-15	3/9/23	—	GW	DUP-JCW-LF-02	5	4	1						x	x	x		
-16	3/8/23	1340	GW	JCW-MW-18001 MS	4	3	1						x	x			
-17	3/8/23	1340	GW	JCW-MW-18001 MSD	4	3	1						x	x			
-18	3/9/23	1353	W	FB-01	2	1	1						x	x			
-19	3/9/23	1358	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: [signature] DATE/TIME: 3/10/23 0827

RECEIVED BY: Caleb Batts 3.10.23 0845

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LS027723

Temperature: 1.1-2.3 °C Cal. Due Date: 05.25.23

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Page _____ of _____

SAMPLING SITE / CUSTOMER: Q1-2023 Weadock ASD

PROJECT NUMBER: **23-0173**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED:

☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES:
GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT:

☐ NPDES
☒ TNI
☐ ISO 17025
☐ 10 CFR 50 APP. B
☐ INTERNAL INFO
☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity					REMARKS
23-0173-01	3/8/23	1417	GW	JCW-OW-18001	5	4	1						x	x	x	x					

RELINQUISHED BY: 3/10/23 1234 DATE/TIME: RECEIVED BY: 3.10.23 0845

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

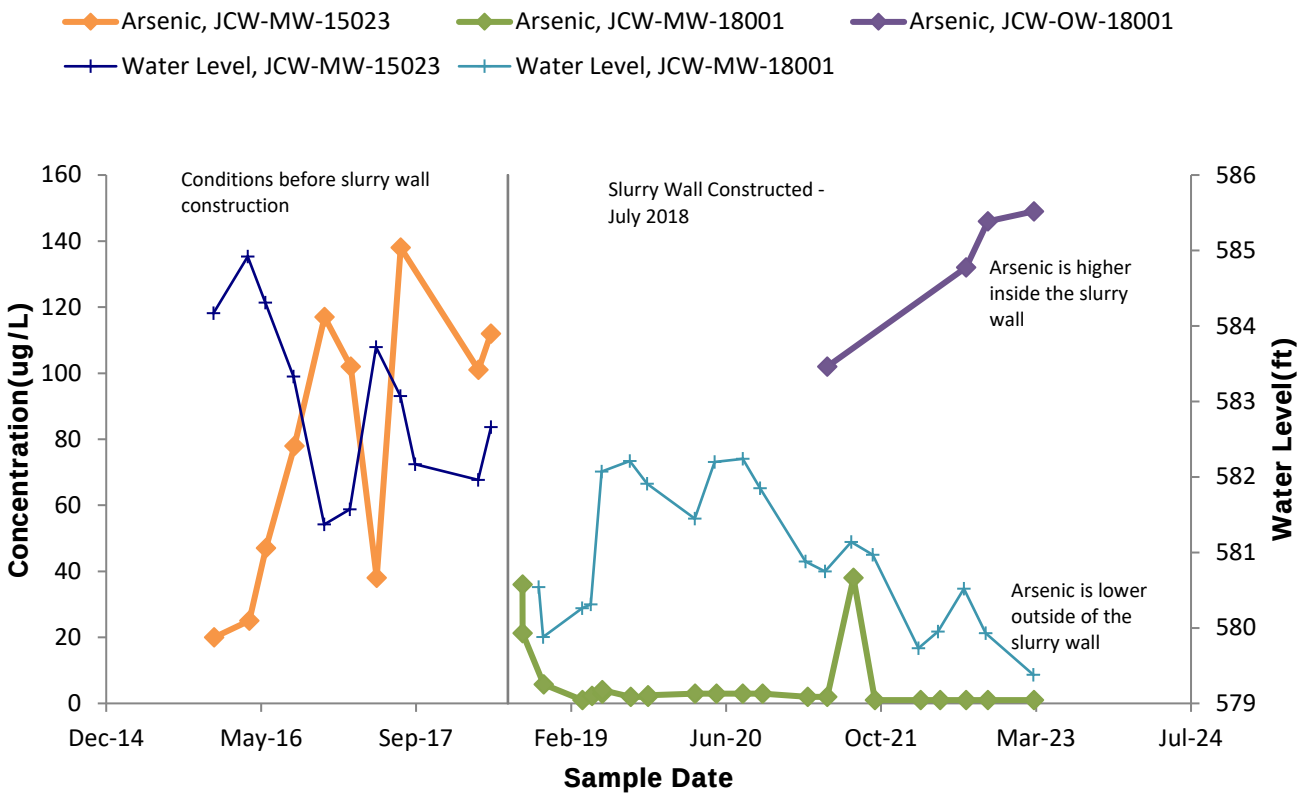
COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LS027723

Temperature: 1.1-2.3 °C Cal. Due Date: 5.25.23

Appendix G
Alternate Source Demonstration Supporting Information

Figure G1: Time Series Plots for JCW-MW-18001 ASD



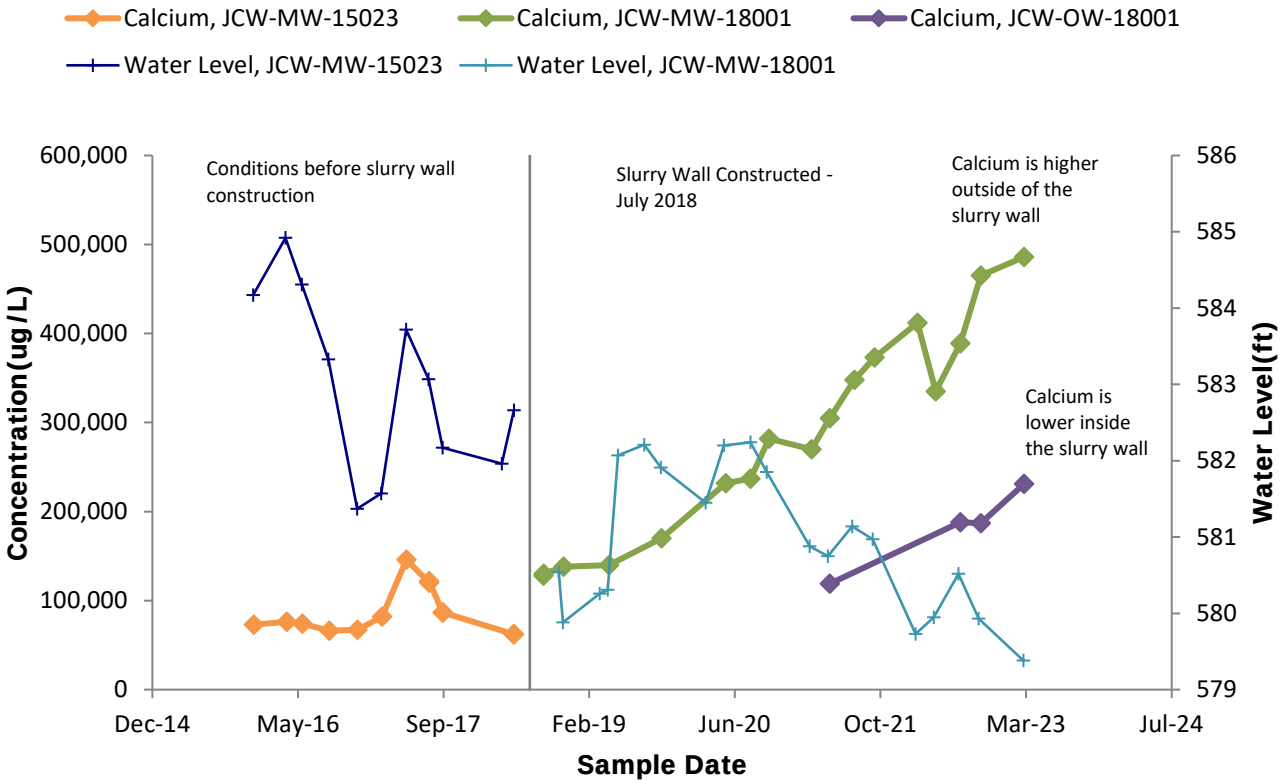
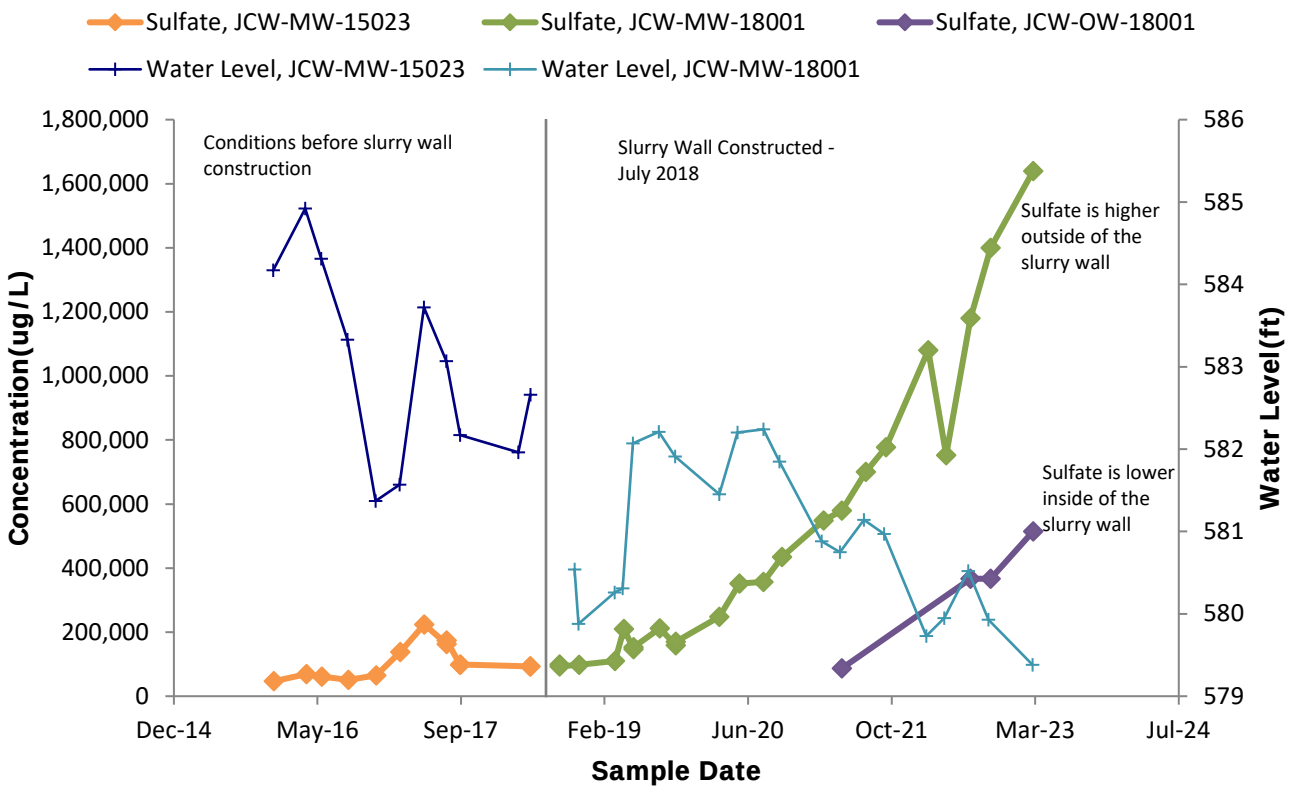


Figure G1: Time Series Plots for JCW-MW-18001 ASD



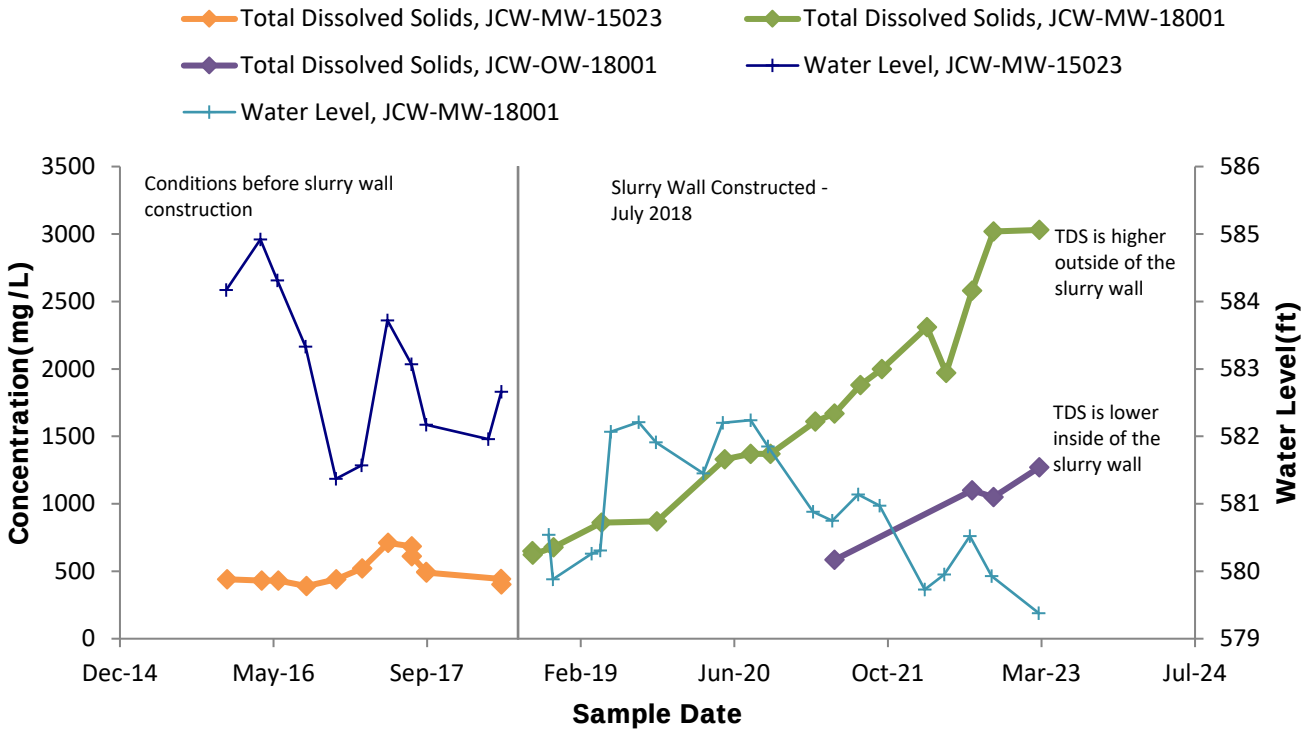
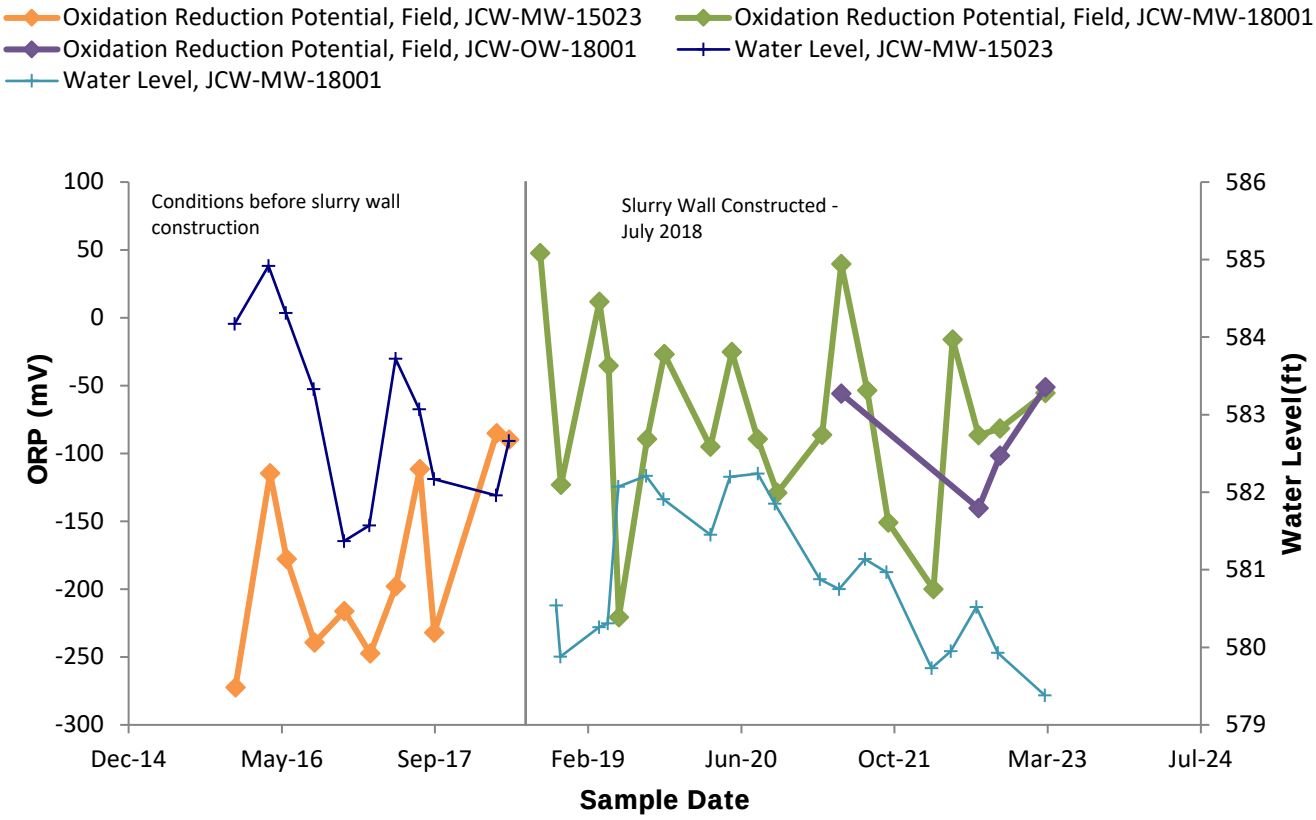


Figure G1: Time Series Plots for JCW-MW-18001 ASD



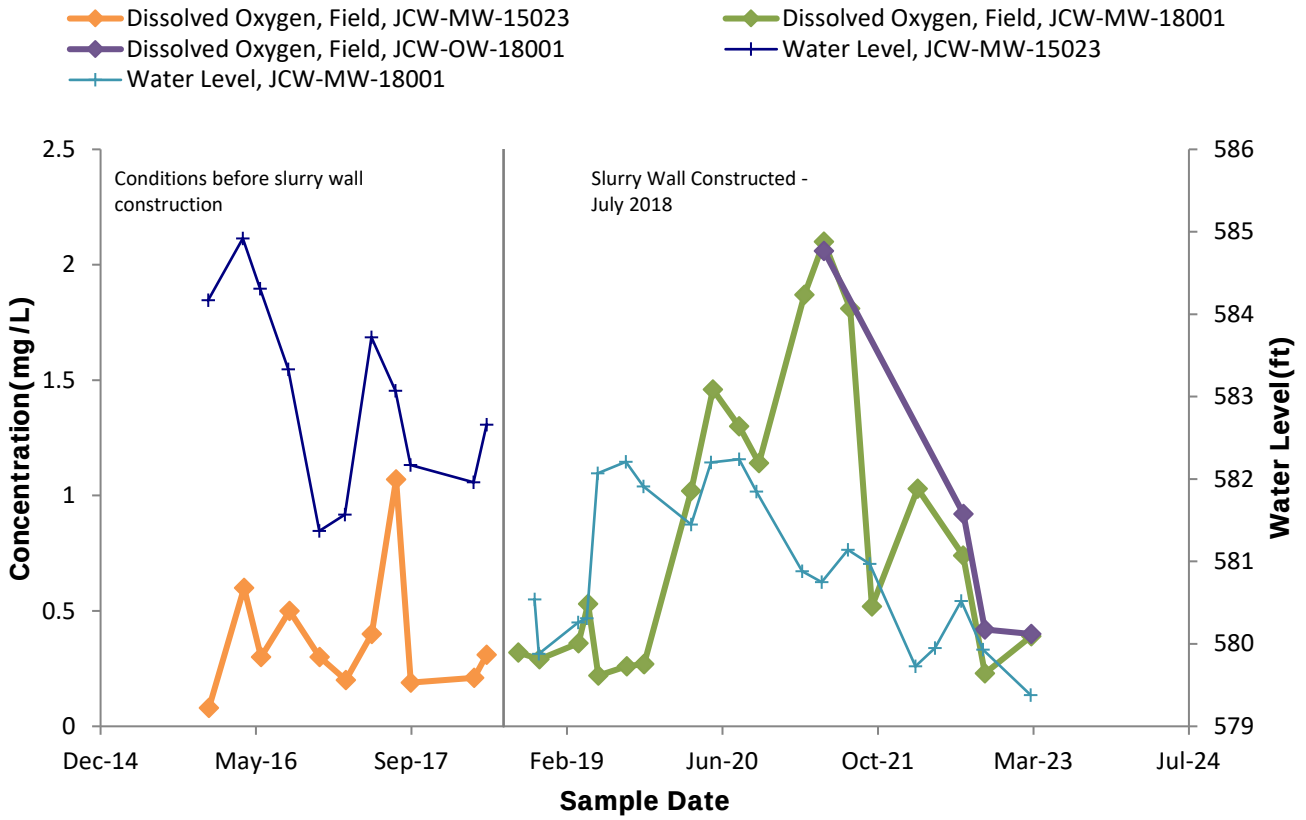
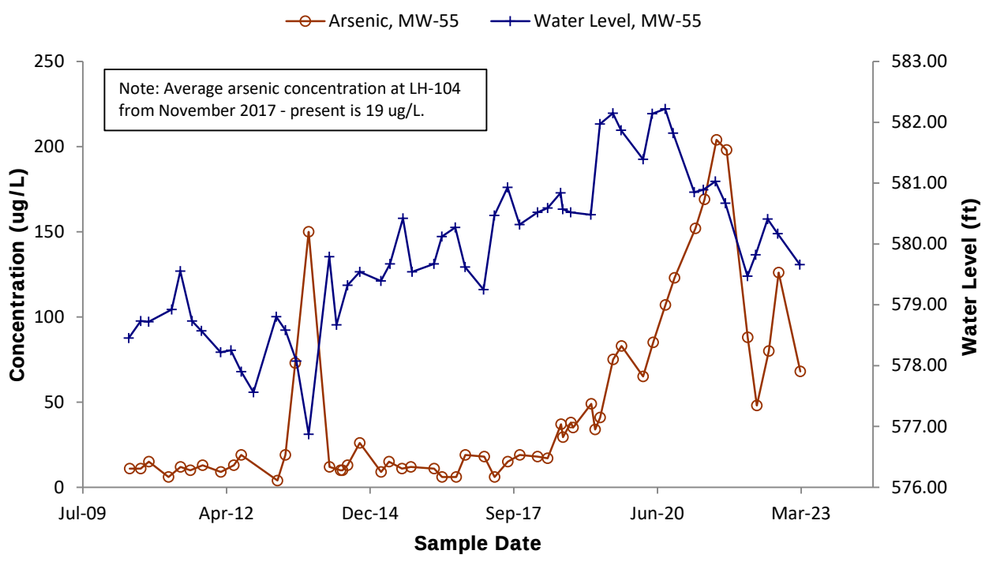
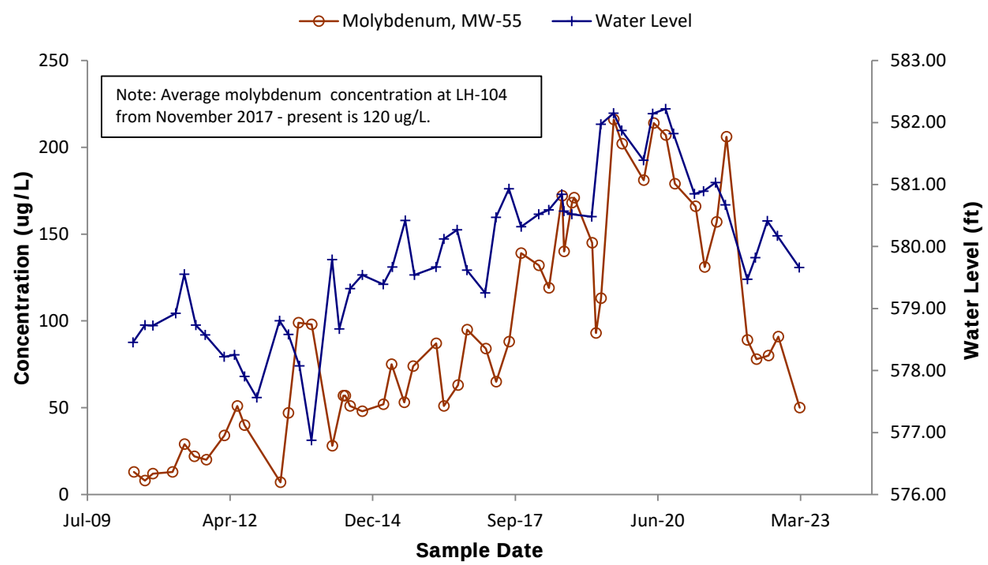
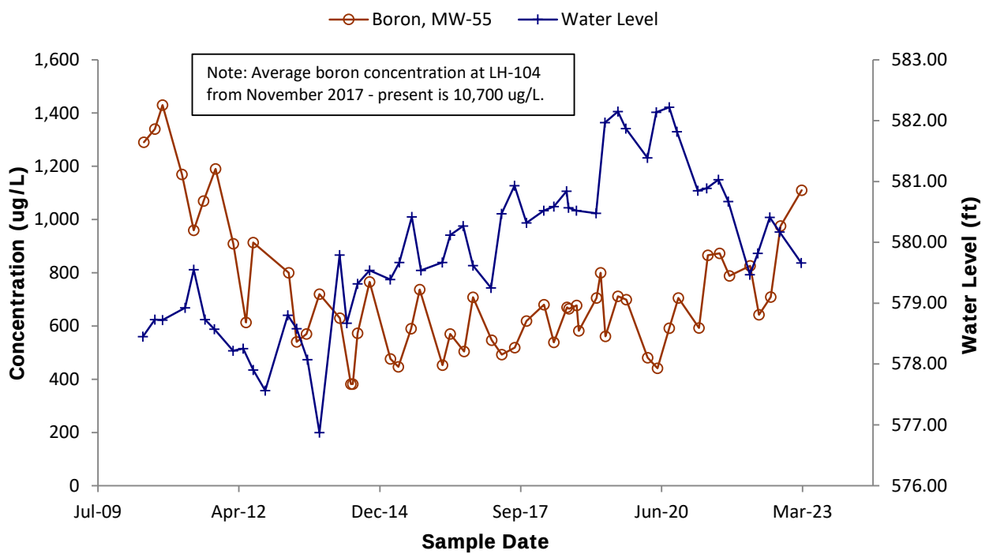
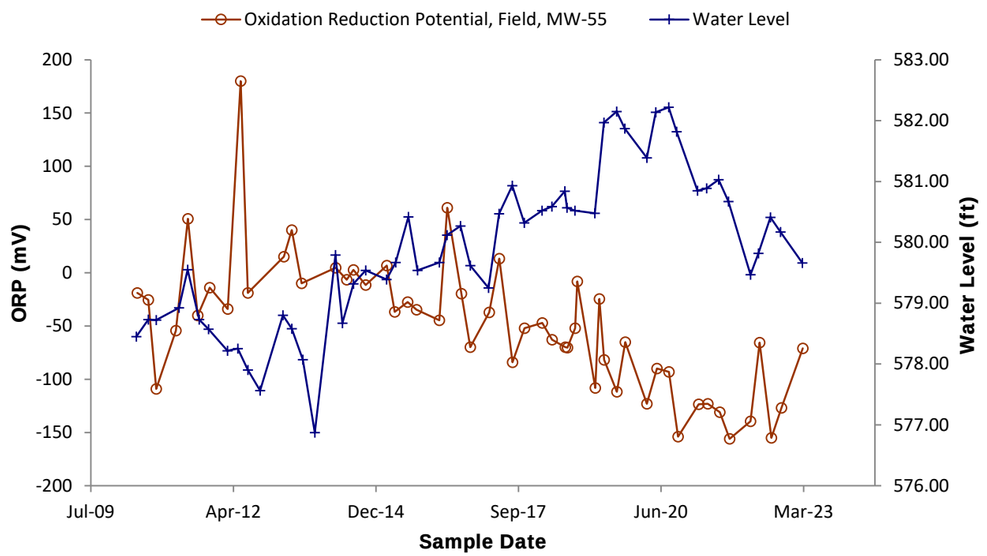


Figure G2: Time Series Plots for MW-55 ASD

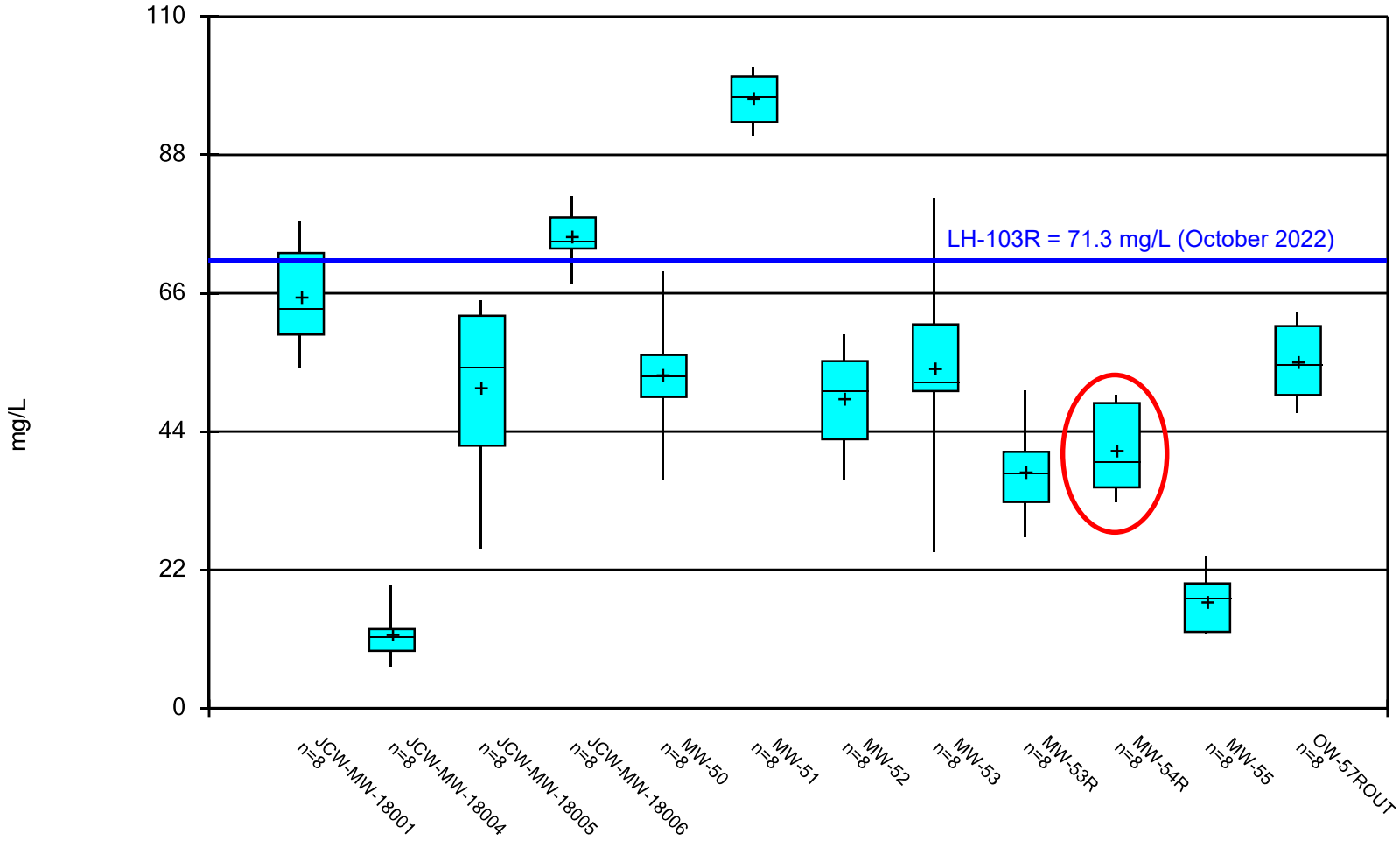








Chloride



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

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Darby Litz
Project Manager/Hydrogeologist

Kristin Lowery, P.E.
Project Engineer

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

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) – Assessment Monitoring Constituents	
Boron	Antimony	Lithium
Calcium	Arsenic	Mercury
Chloride	Barium	Molybdenum
Fluoride	Beryllium	Nickel
Iron	Cadmium	Selenium
pH	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™ 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™ 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 on-site. 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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Tables

Table 1
Summary of Groundwater Elevation Data
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			May 1, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring 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: Downgradient Monitoring 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: Downgradient Monitoring Wells (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 Headwells							
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 (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	7.20	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.

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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	500	500	4,000	< 20	107	347	211
Calcium	mg/L	NC	NC	NC	500[EE]	48.4	108	175	159
Chloride	mg/L	**250****	**250**[E]	**250**[E]	**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**[E]	**250**[E]	500[EE]	14.9	10.5	**253**	94.2
Total Dissolved Solids	mg/L	**500****	**500**[E]	**500**[E]	**500**	351	**877**	**889**	**1,170**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	7.2	6.6	6.9	6.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300**[E]	**300**[E]	500,000[EE]	**729**	**17,900**	**1,970**	**21,500**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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 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[(1)]													
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	500[EE]	NC	NC	496	265	258	118	142	166
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**1,670**	**722**	**422**	34.2	**314**	**356**
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**1,580**	**1,530**	**1,190**	**734**	**878**	**1,240**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.71	6.84	6.75	6.98	7.36	7.33
Appendix IV[(1)]													
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 115[(2)]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**1,180**	67	**676**	**6,890**	**755**	**450**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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 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:	5/8/2023	5/8/2023	5/8/2023	5/9/2023	5/9/2023	5/9/2023
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[(1)]													
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[EE]	NC	NC	217	104	202	163	165	117
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**581**	50.8	185	67.2	208	80.5
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**1,430**	**613**	**1,060**	**759**	**929**	**743**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.88	7.41	6.84	6.87	6.94	7.05
Appendix IV[(1)]													
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 115[(2)]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**2,720**	**569**	**1,410**	74	**21,600**	78
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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 5
Summary of Confidence Interval Evaluation: May 2023
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Assessment Monitoring Statistical Evaluation

Constituent	Units	GWPS	MW-50		MW-51		MW-52		MW-53		MW-53R		MW-54R		MW-55		OW-57R OUT		JCW-MW-18001		JCW-MW-18005		JCW-MW-18006	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron[(1)]	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-55	
			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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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.

Table 6
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 (**bold** >201)	1 Qtr. 2023 (**bold** >201)	4 Qtr. 2022 (**bold** >201)	3 Qtr. 2022 (**bold** >201)

No Exceedances at Compliance Locations

Figures

0 1,500 3,000

FEET

1:36,000 1" = 3,000'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

PROJECT:

CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

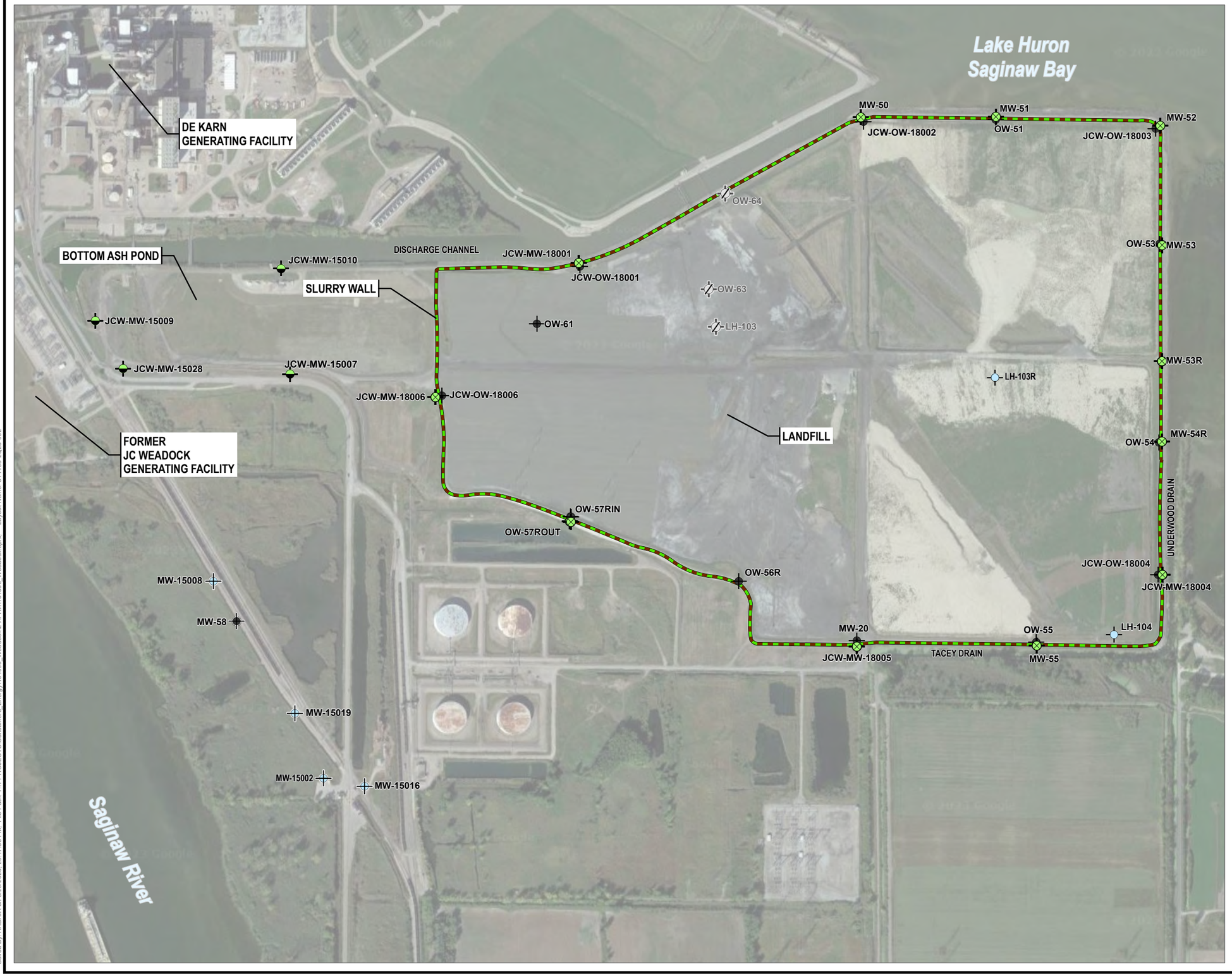
TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0000
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	JULY 2023		

TRC
999 FOURIER DRIVE
SUITE 101
MADISON, WI 53717
PHONE: 608.826.3663

FILE: 464095_DEKARN



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
SITE MAP

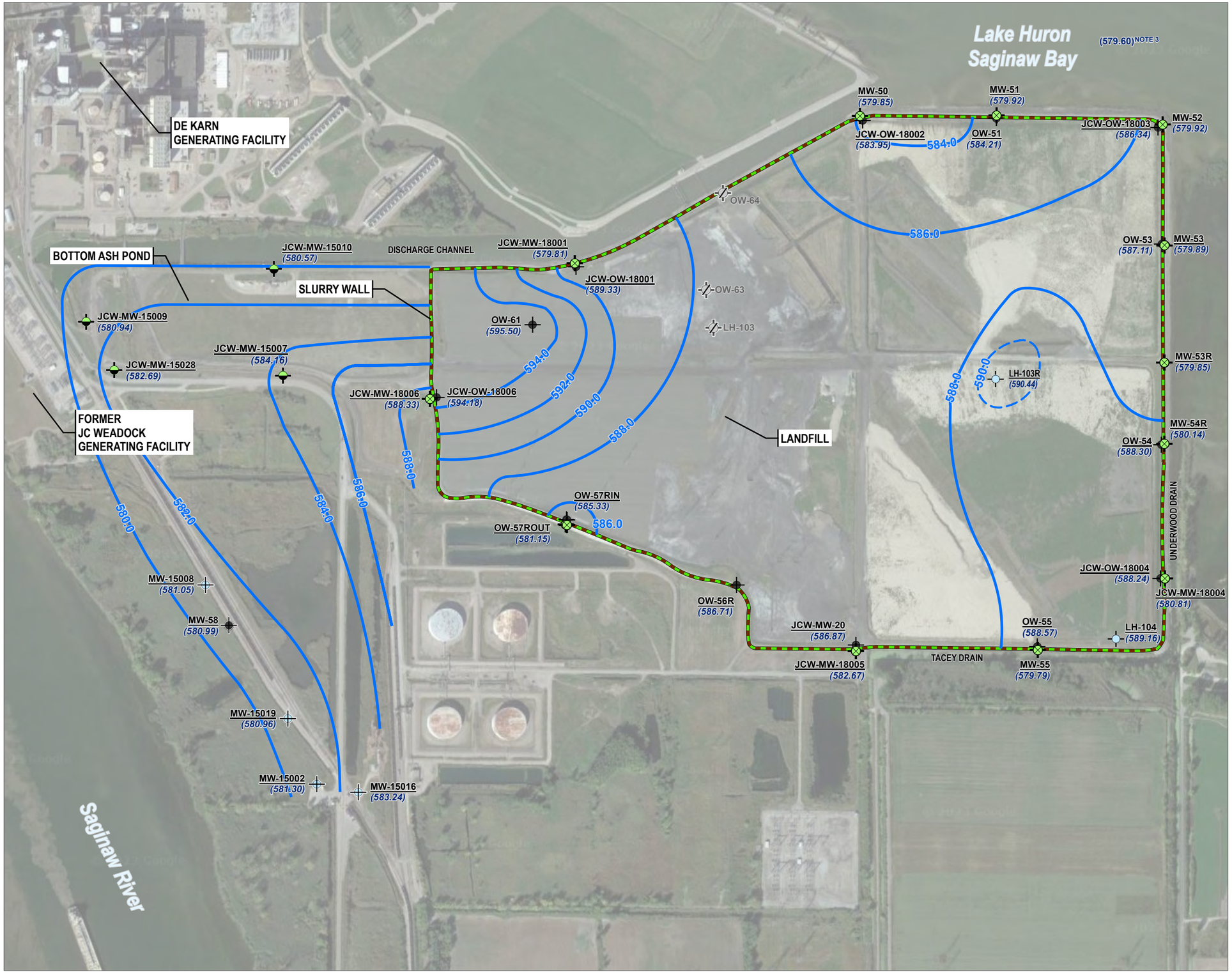
DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	JULY 2023		

FIGURE 2

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 8/25/2023 2:34:35 PM; File Path: T:\PROJECTS\Consumers_Energy\464096_Weadock\2-4\RPX\464096_Weadock.aprx; Layout Name: 514403-2023-002



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (NU) NOT USED TO DEVELOP CONTOURS

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
POTENTIOMETRIC SURFACE MAP
MAY 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	JULY 2023		

FIGURE 3

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
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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)[(1)]
MW-50	5/1/2023	579.85	579.60	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		0.29
MW-53R	5/1/2023	579.85		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:		**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 Discharge Channel	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
JCW-OW-18001[6]	589.33		22.37	4.26E-01	2.00	2.88	1,010	2.30E-08	0.43	2,904	8.06E-02	0.60	220
JCW-MW-18001		579.81			3.75								
JCW-OW-18002	583.95		28.87	1.42E-01	4.00	4.25	970		0.14	4,123	3.82E-02	0.29	104
MW-50		579.85			4.50								

Monitoring Well Pair Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-51	584.21		14.38	2.98E-01	4.00	4.31	1,850	2.30E-08	0.30	7,974	1.55E-01	1.16	423
MW-51		579.92			4.62								
JCW-OW-18003	586.34		33.85	1.90E-01	3.50	3.82	740		0.19	2,823	3.49E-02	0.26	95
MW-52		579.92			4.13								
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								

Monitoring Well Pair Non-Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-54	588.30		21.23	3.84E-01	2.00	2.25	510	2.30E-08	0.38	1,148	2.88E-02	0.22	79
MW-54R		580.14			2.50								
JCW-OW-18004	588.24		26.59	2.79E-01	8.00	4.45	820		0.28	3,653	6.66E-02	0.50	182
JCW-MW-18004		580.81			0.91								
OW-55	588.57		23.95	3.67E-01	2.00	1.89	1,220		0.37	2,312	5.53E-02	0.41	151
MW-55		579.79			1.79								
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								

Calculated Groundwater Discharge from JC Weadock (gal per day)	**=**	**3.72**
(cubic ft per day)	**=**	**0.50**
(cubic ft per min)		**3.5E-04**
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)	**=**	**2.03E-02**

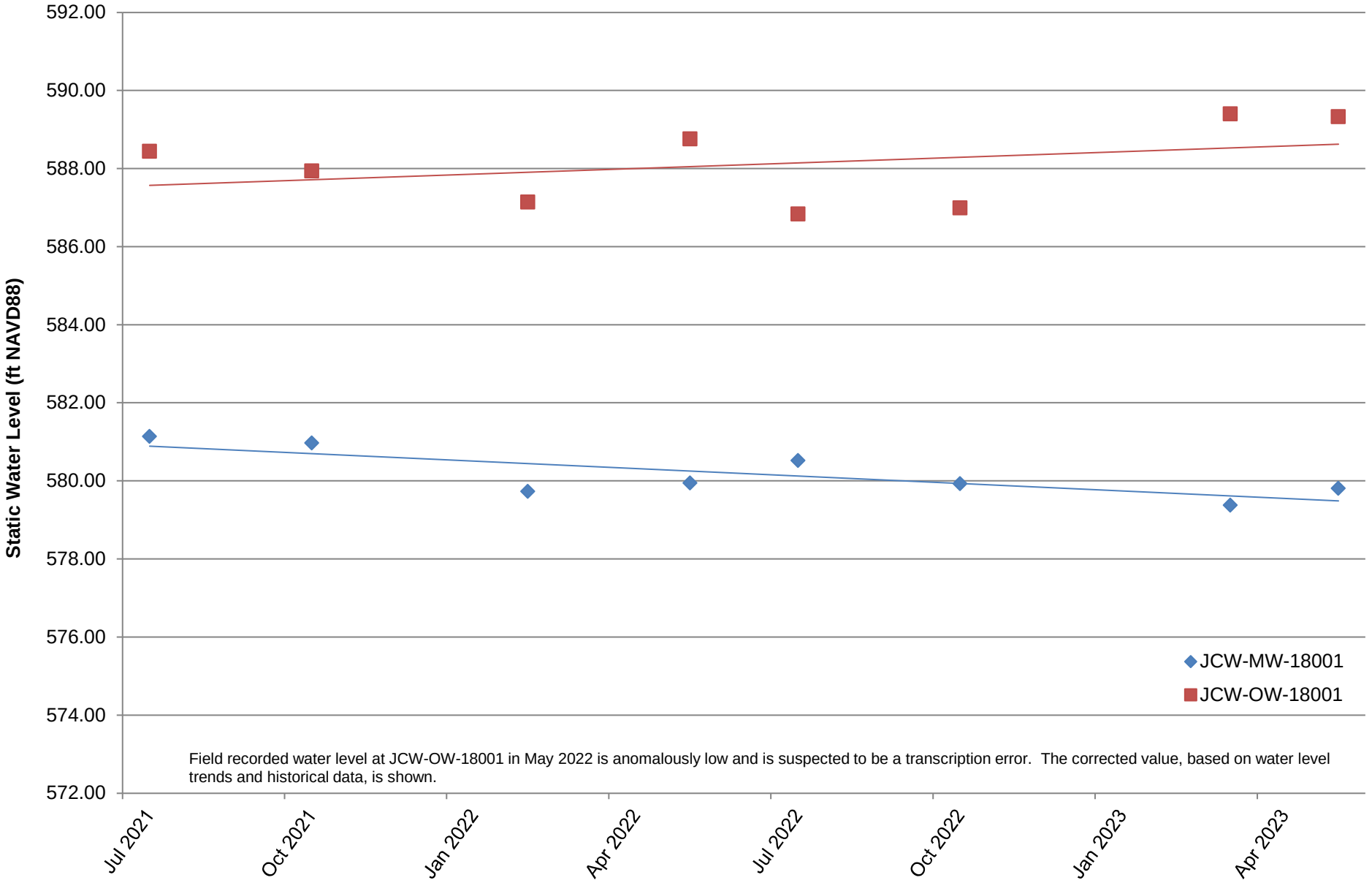
Notes:

Water level data collected on May 1, 2023 are shown by yellow cells:

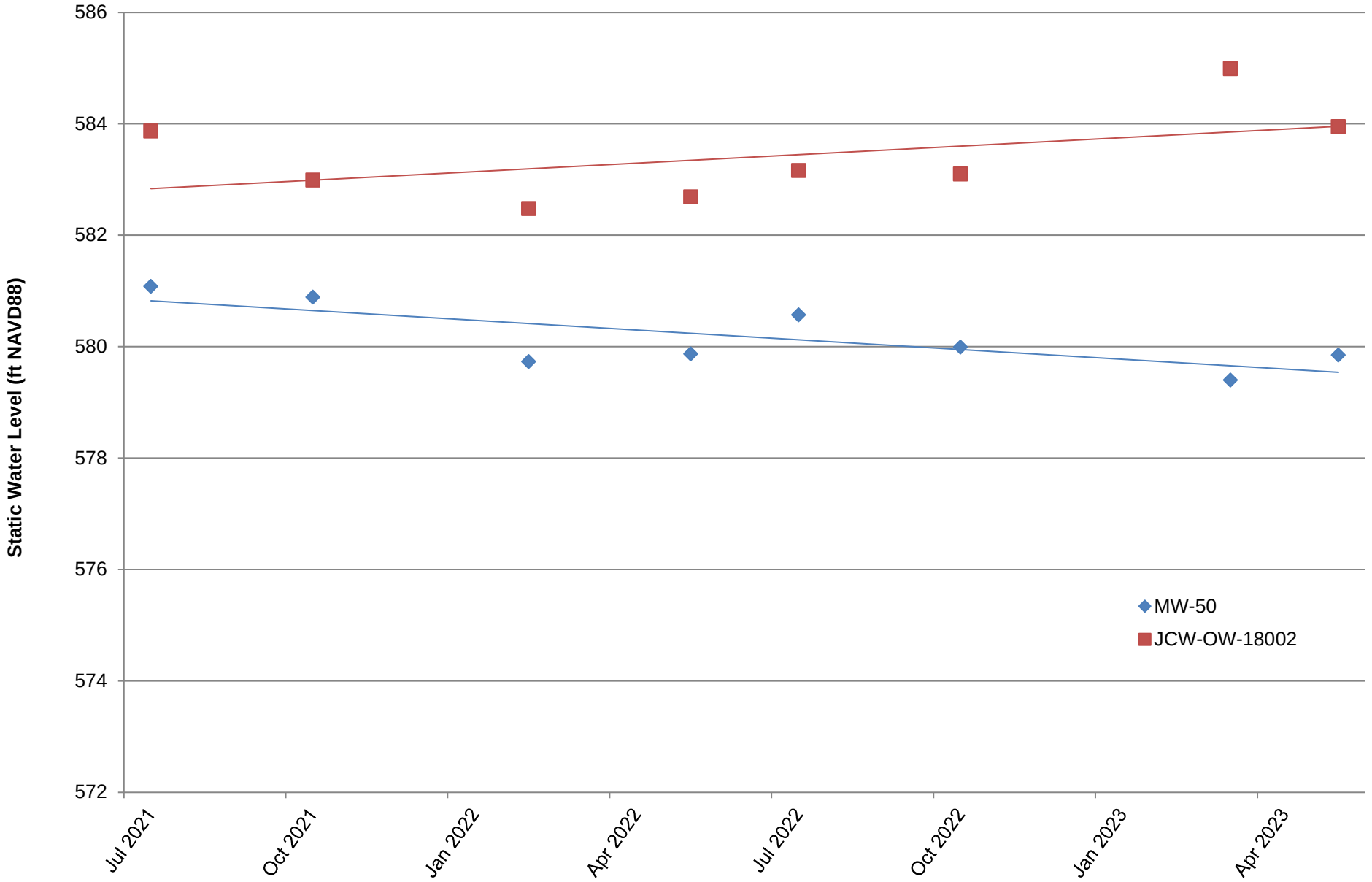
1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above 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^2 = square feet; ft^3/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

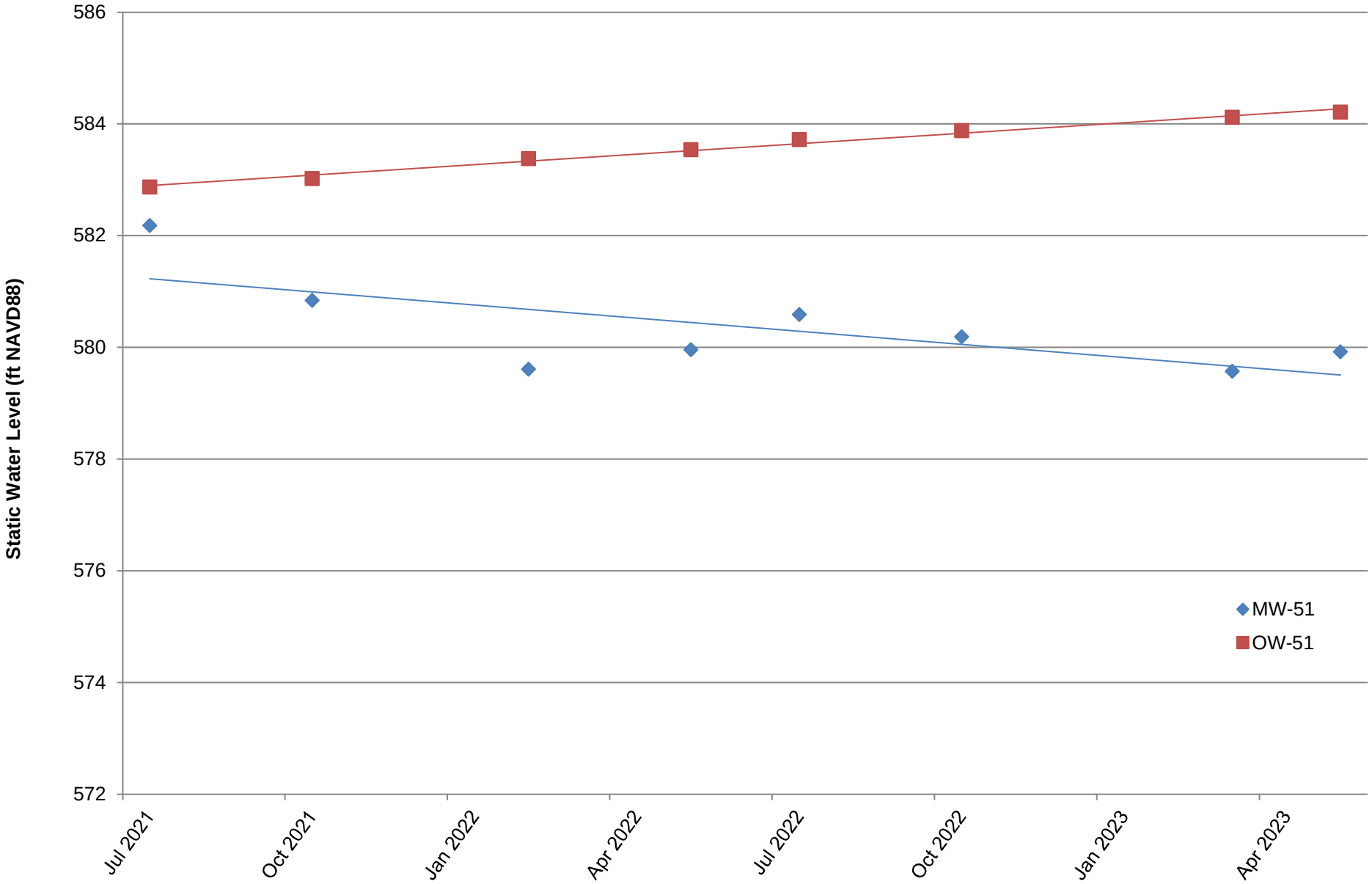
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



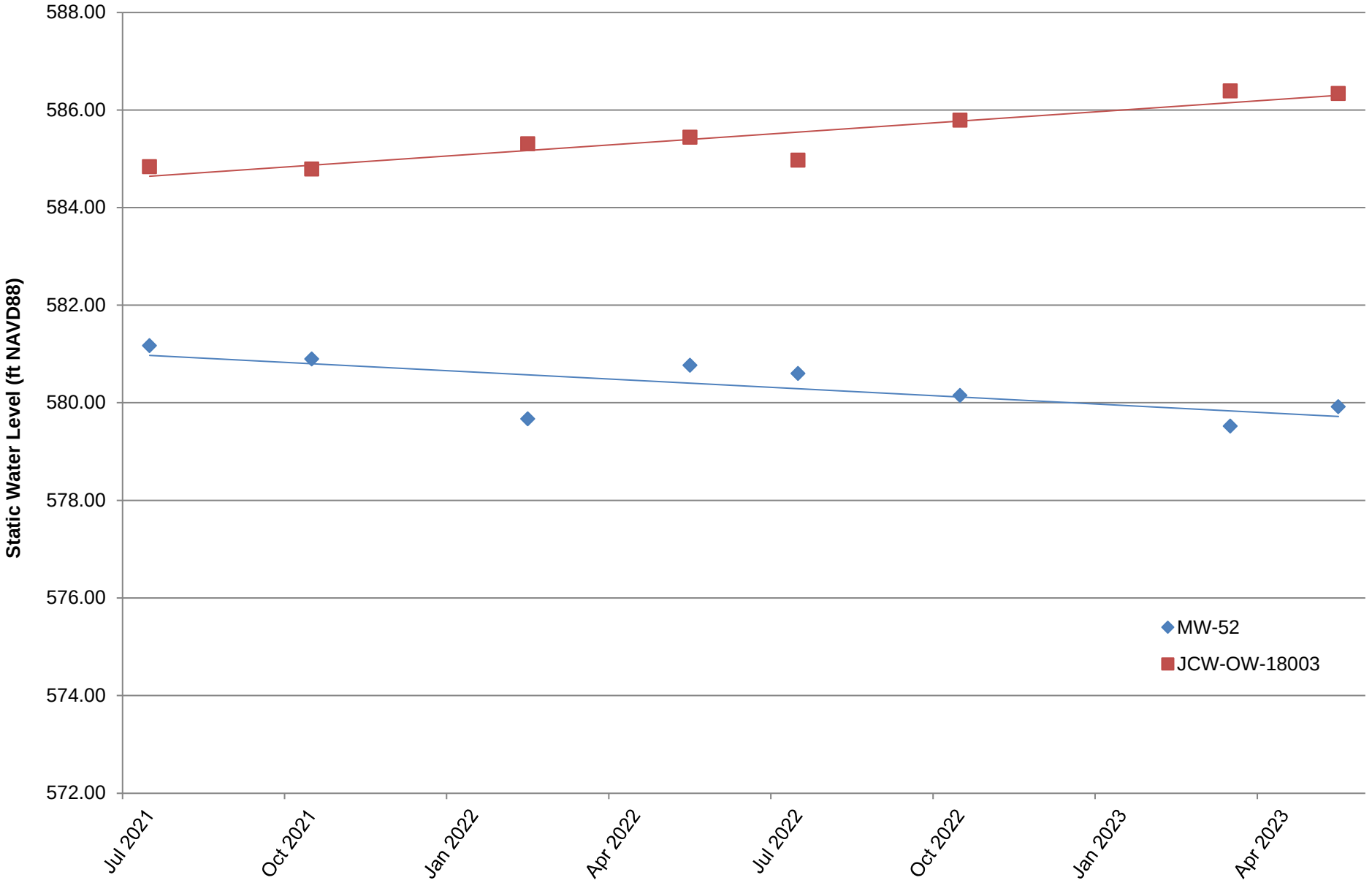
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



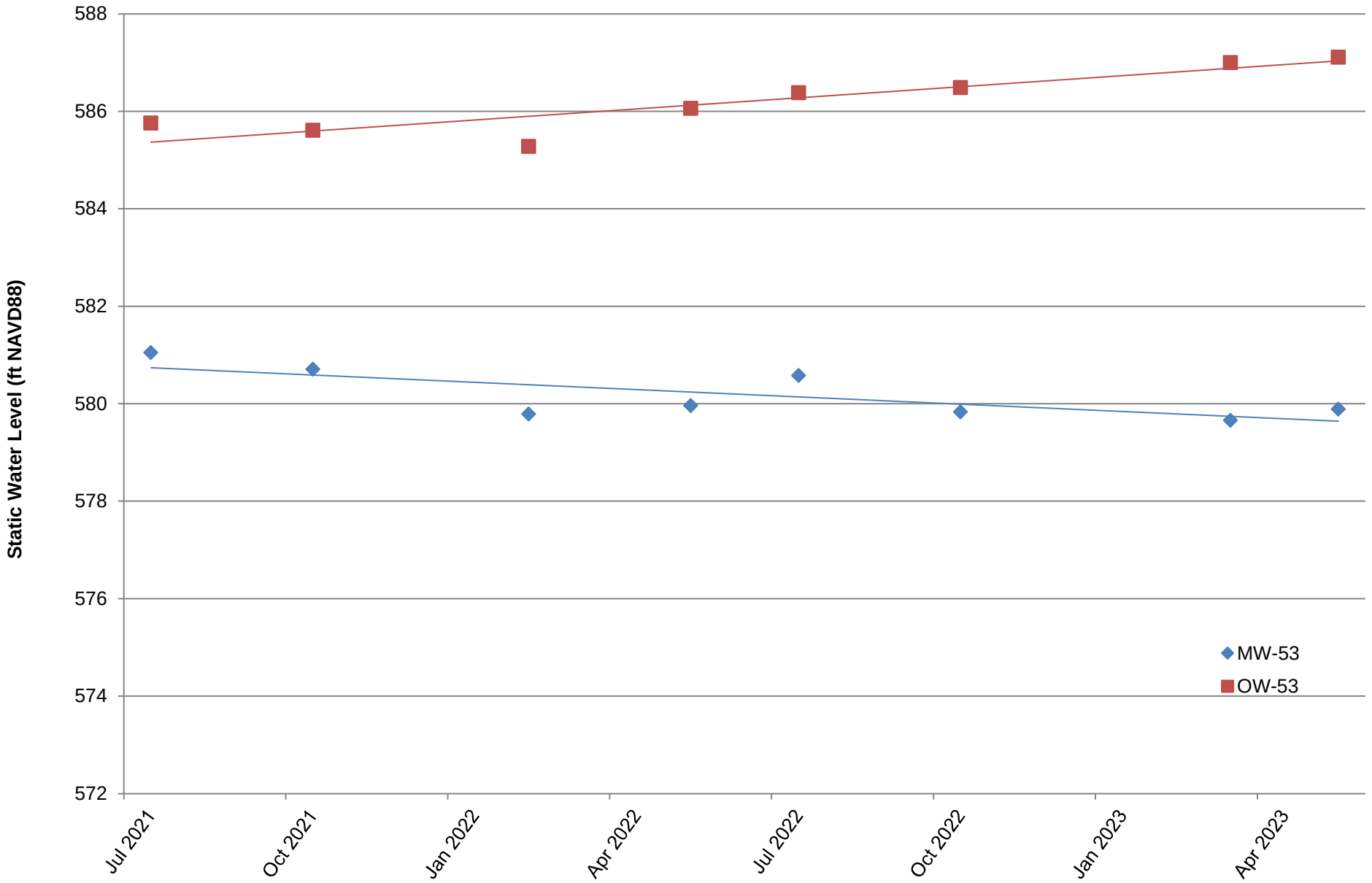
Appendix A
Static Water Level for MW-51 and OW-51



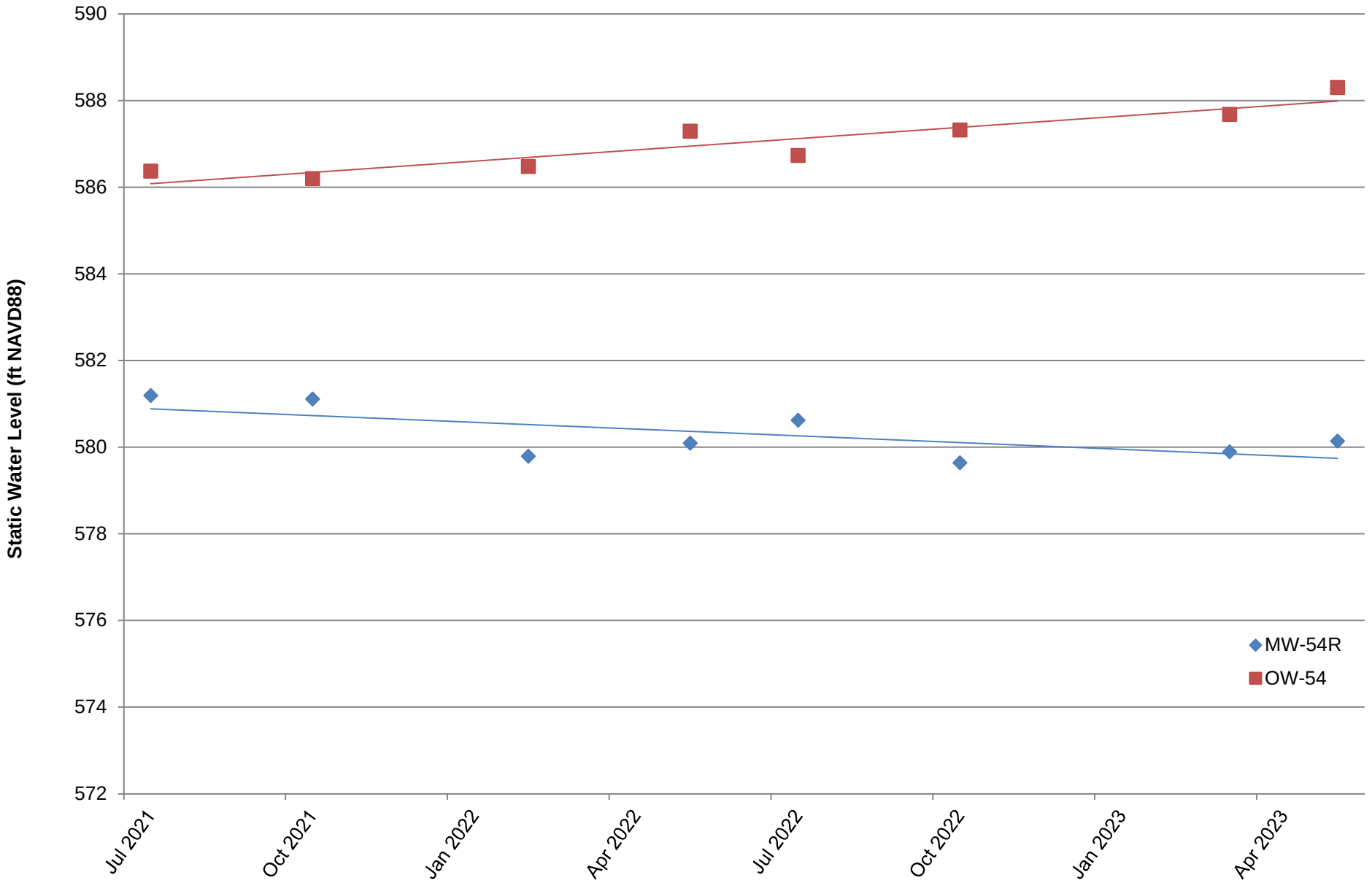
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



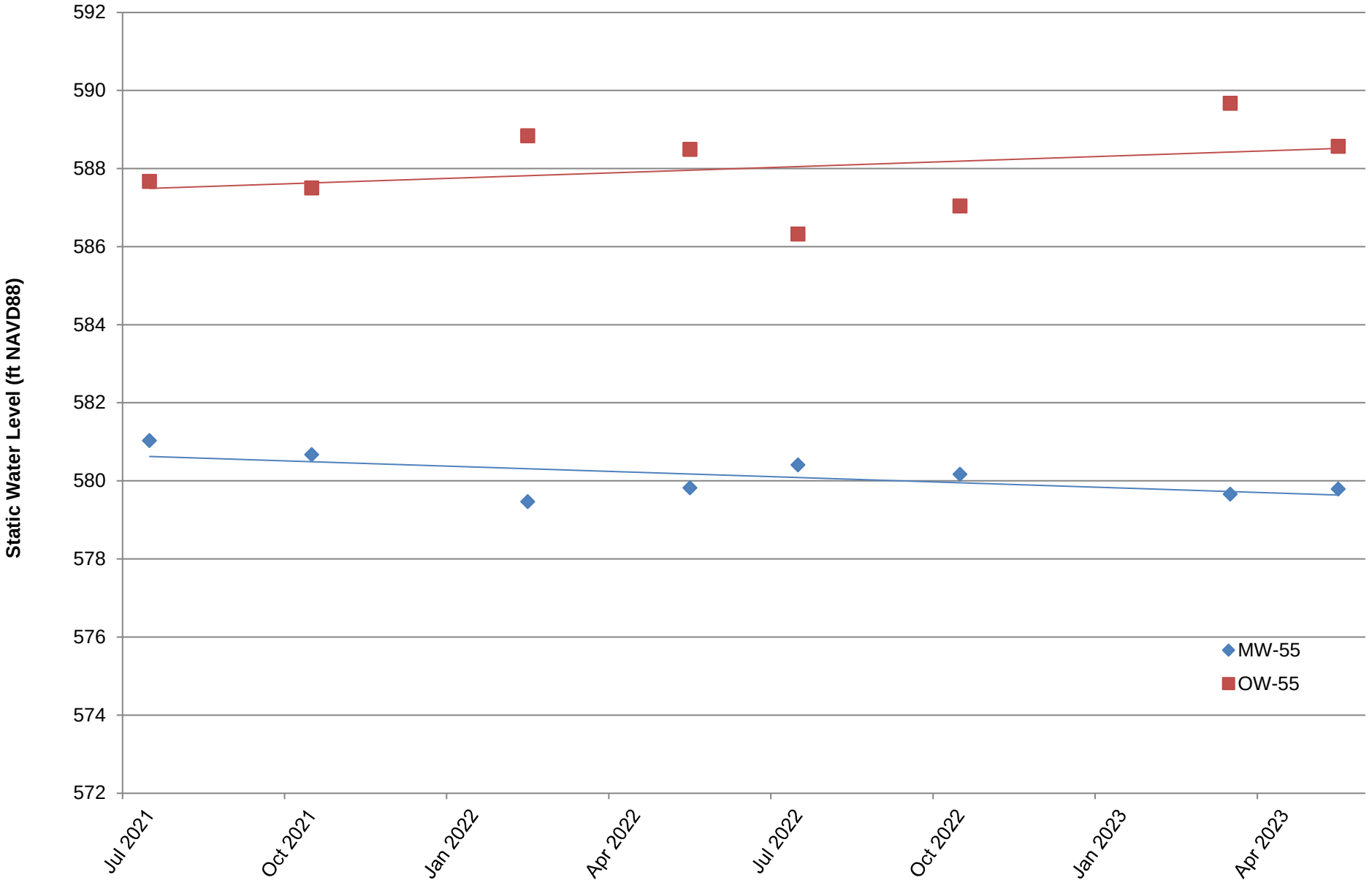
Appendix A
Static Water Level for MW-53 and OW-53



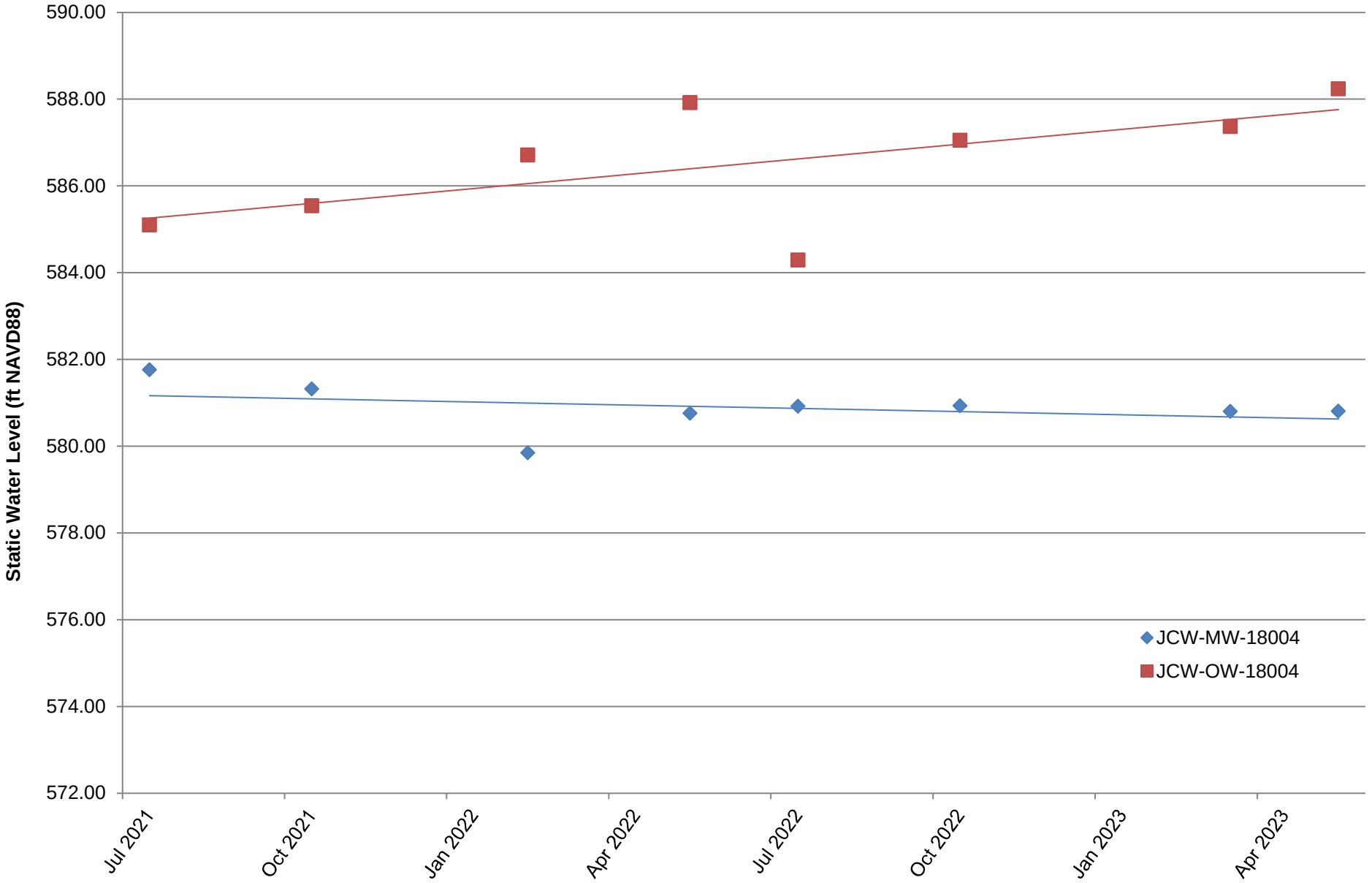
Appendix A
Static Water Level for MW-54R and OW-54



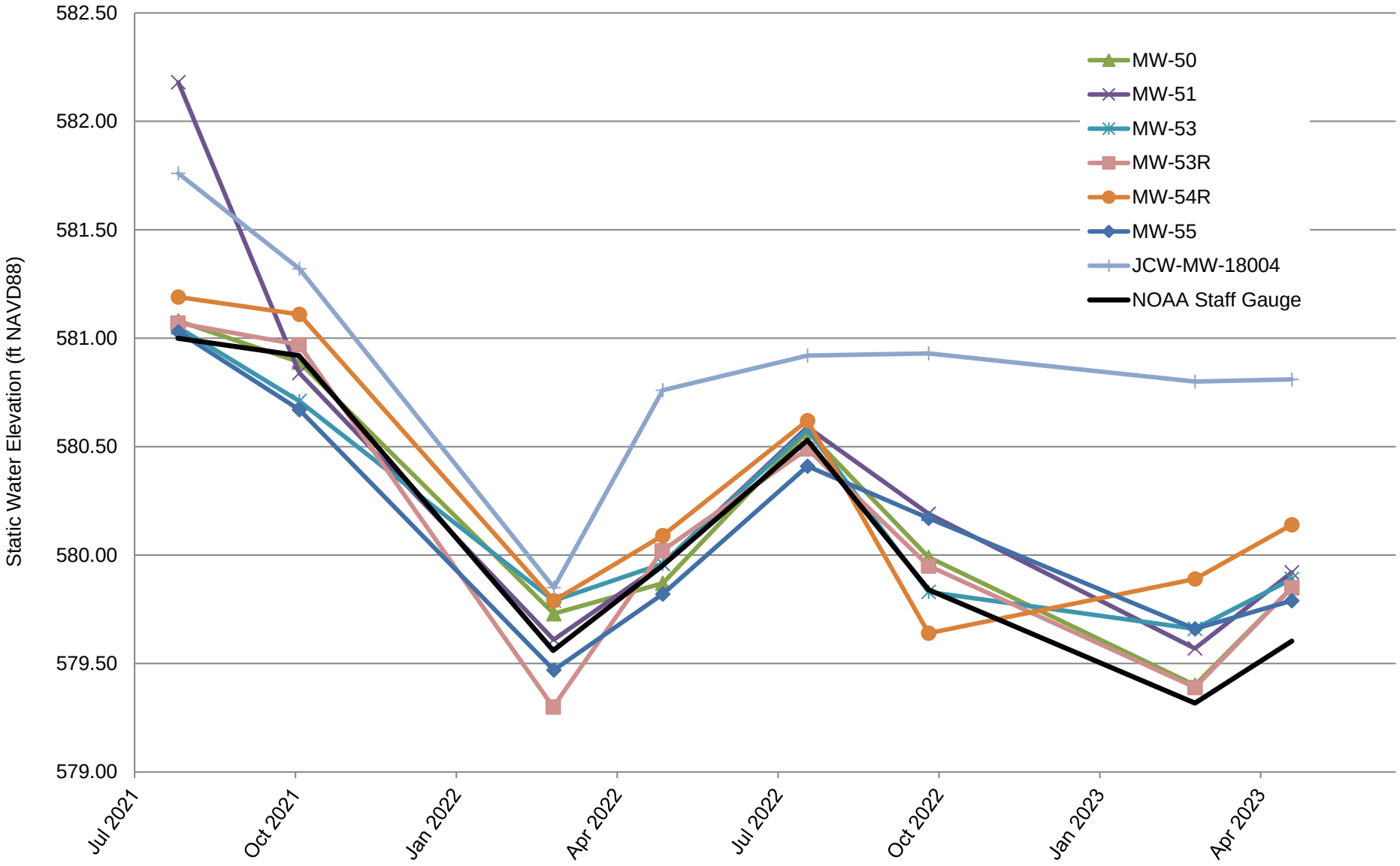
Appendix A
Static Water Level for MW-55 and OW-55



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 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-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 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.
  - 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.
- 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 DUP-BACKGROUND	5/1/2023 5/1/2023	Radium 226	Detected result is potentially a false 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:

- 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 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	Radium 226	Results are potentially biased high due to not undergoing 21-day waiting period prior to analysis.
JCW-MW-18006	5/9/2023		
MW-50	5/8/2023		
MW-51	5/8/2023		
MW-53	5/8/2023		
MW-53R	5/8/2023		
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(1)	O	O	O	O	O	O
Calcium	↑ ASD	O	O	O	↓	↓
Chloride	↓	O	↓*	O	↓	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	O	↓*	O	O	O
pH/Corrosivity(1)	O	O	O	O	O	O
Sulfate	↑ ASD	O	O	O	O	↓
Total Dissolved Solids	O	O	O	O	O	↓

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(1)	O	O	O	↑	O	O
Calcium	O	↓	O	O	O	O
Chloride	↓	O	O	O	O	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	↓*	O	O	O	O
pH/Corrosivity(1)	O	O	O	O	O	O
Sulfate	O	O	O	O	O	O
Total Dissolved Solids	O	↓	O	O	O	O

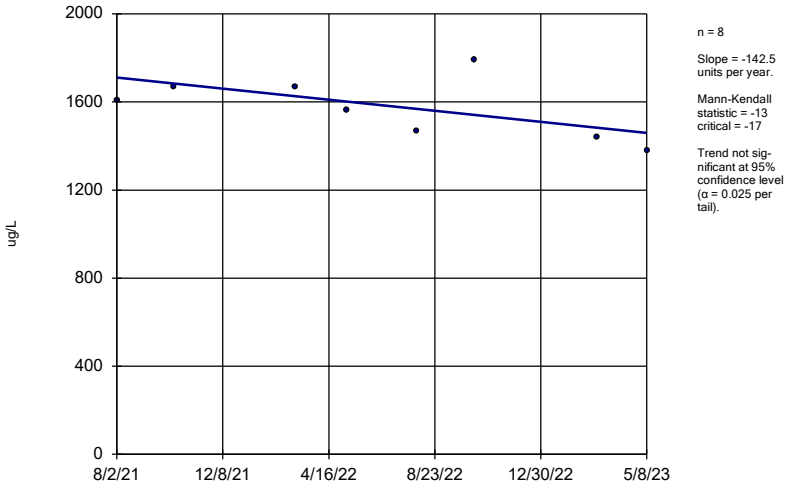
Notes:

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).

Boron, Total

JCW-MW-18001



n = 8

Slope = -142.5 units per year.

Mann-Kendall statistic = -13
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

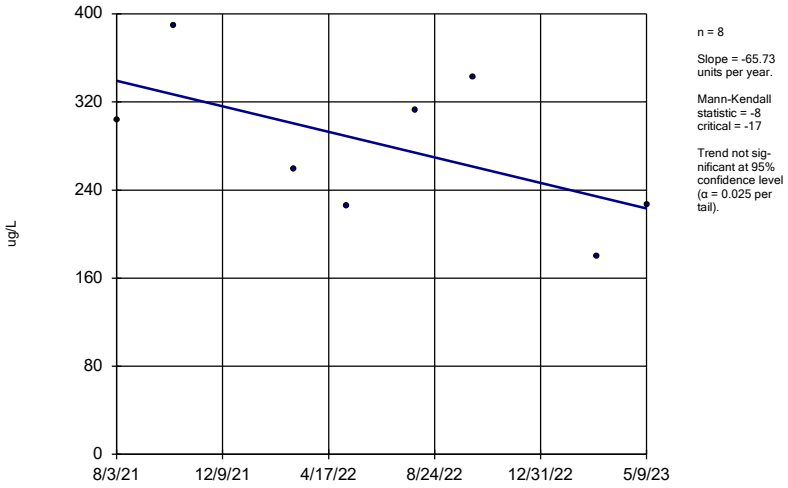
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

JCW-MW-18004



n = 8

Slope = -65.73 units per year.

Mann-Kendall statistic = -8
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

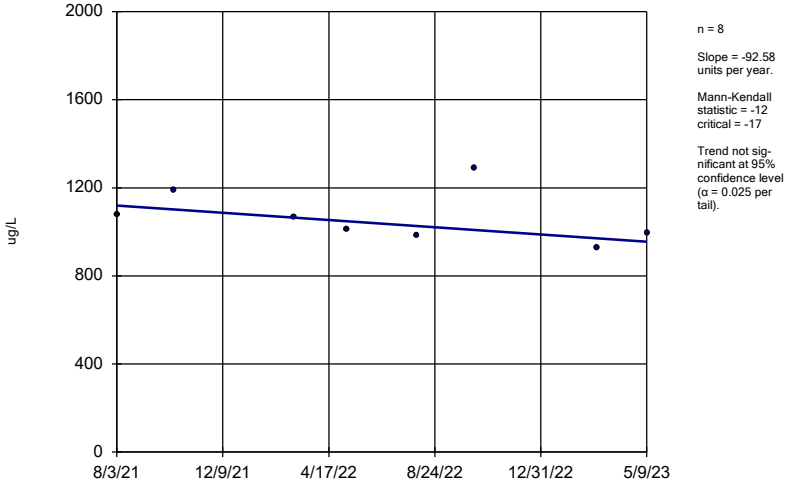
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

JCW-MW-18005



n = 8

Slope = -92.58 units per year.

Mann-Kendall statistic = -12
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

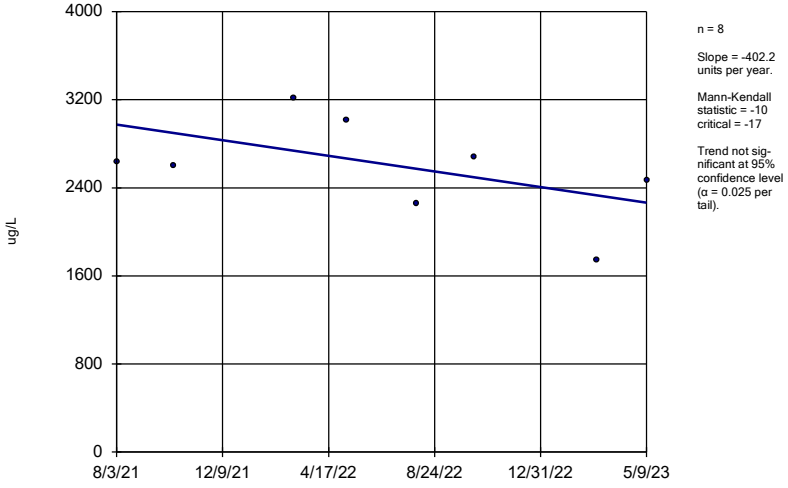
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

JCW-MW-18006



n = 8

Slope = -402.2 units per year.

Mann-Kendall statistic = -10
critical = -17

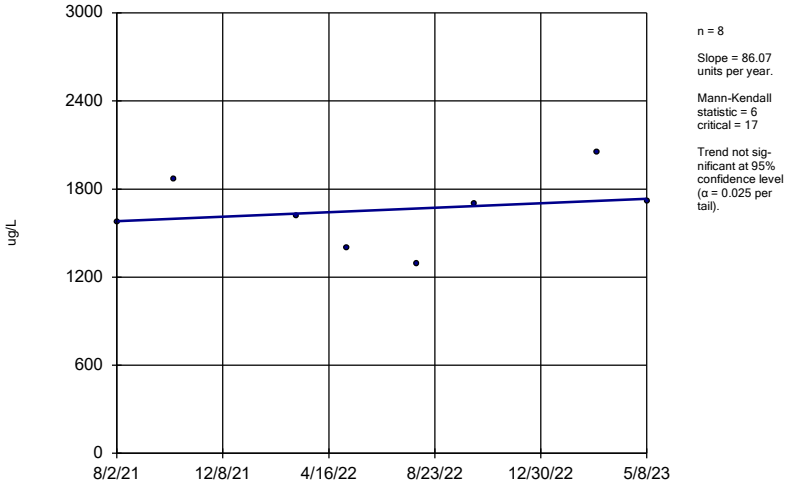
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-50



n = 8

Slope = 86.07 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

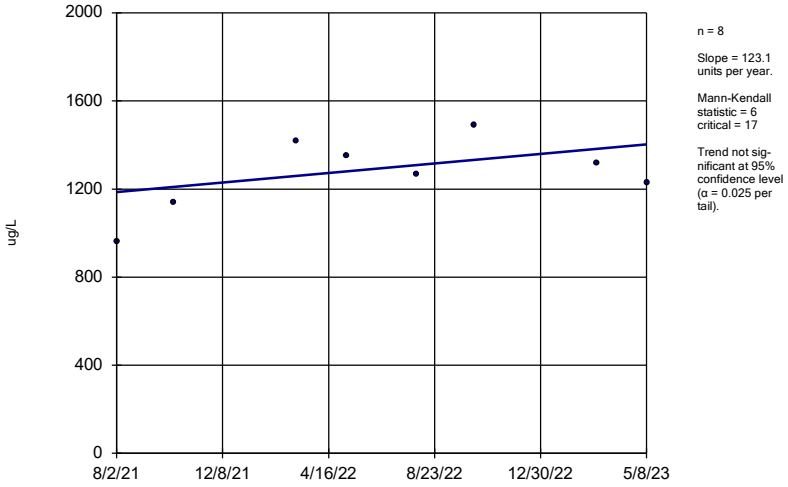
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

MW-51



n = 8

Slope = 123.1 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

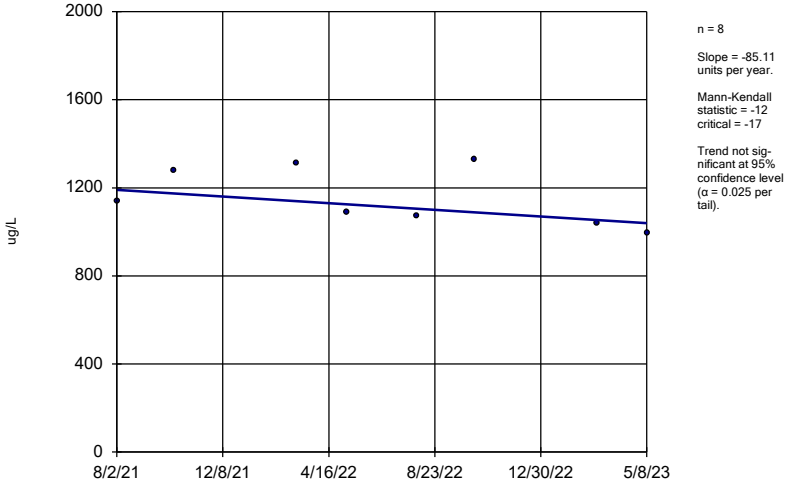
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

MW-52



n = 8

Slope = -85.11 units per year.

Mann-Kendall statistic = -12 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

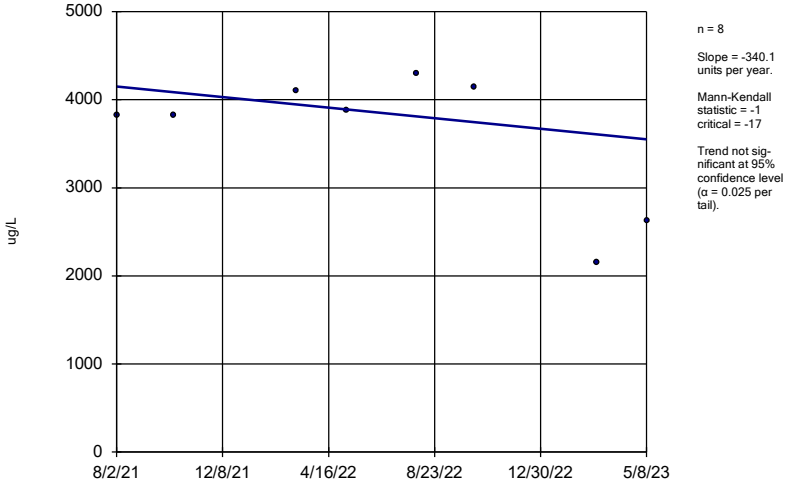
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

MW-53



n = 8

Slope = -340.1 units per year.

Mann-Kendall statistic = -1 critical = -17

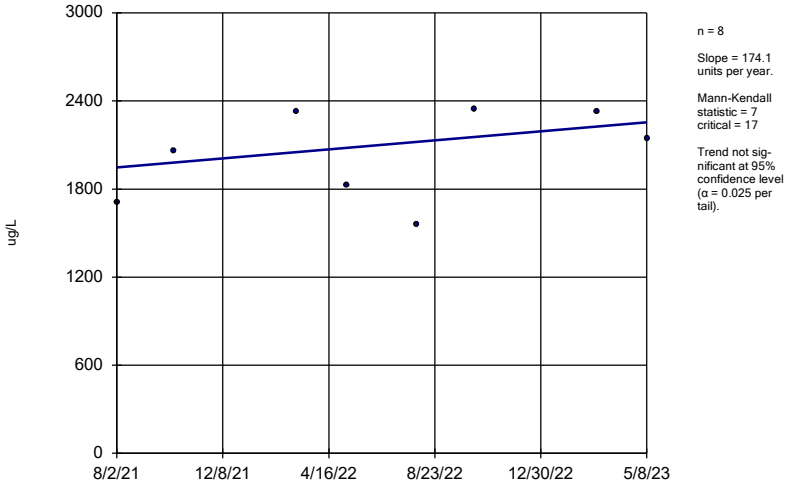
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-53R



n = 8

Slope = 174.1 units per year.

Mann-Kendall statistic = 7 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

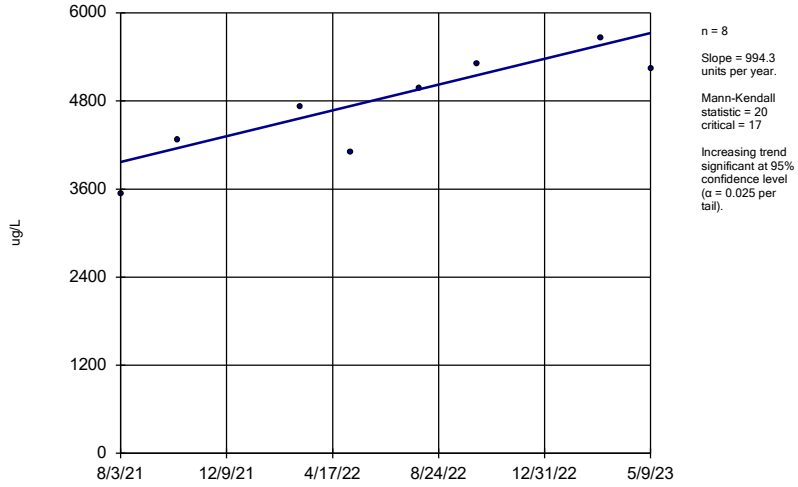
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

MW-54R



n = 8

Slope = 994.3 units per year.

Mann-Kendall statistic = 20 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

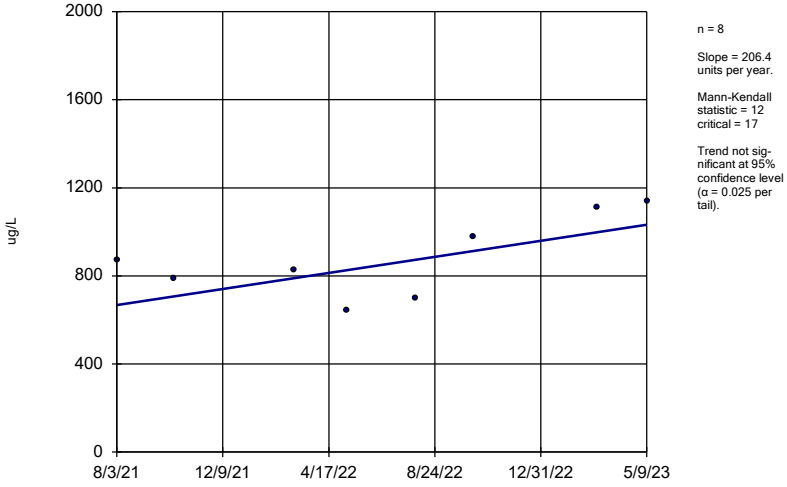
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

MW-55



n = 8

Slope = 206.4 units per year.

Mann-Kendall statistic = 12 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

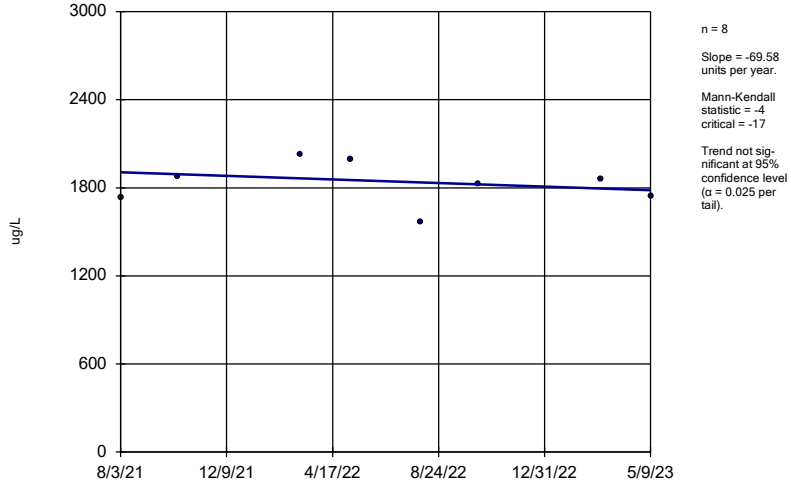
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Boron, Total

OW-57ROUT



n = 8

Slope = -69.58 units per year.

Mann-Kendall statistic = -4 critical = -17

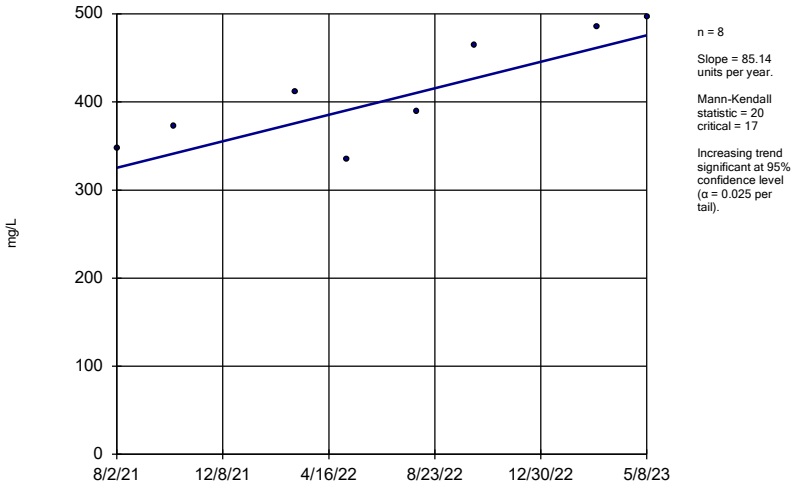
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium, Total

JCW-MW-18001



n = 8

Slope = 85.14 units per year.

Mann-Kendall statistic = 20 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

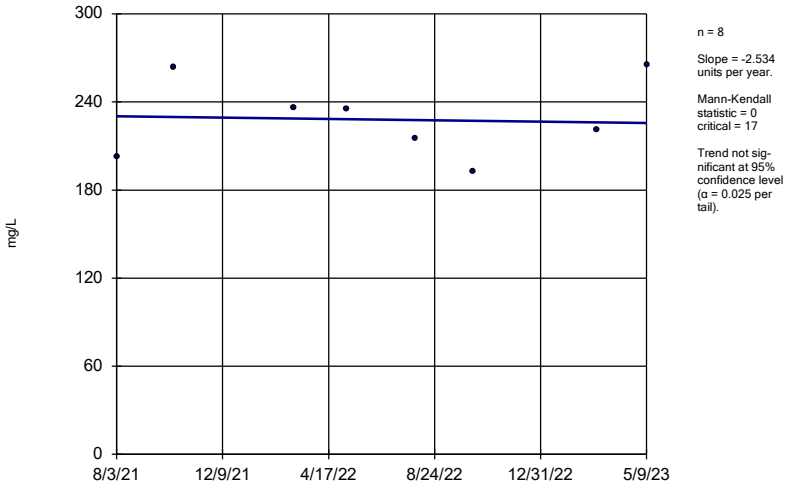
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

JCW-MW-18004



n = 8

Slope = -2.534 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

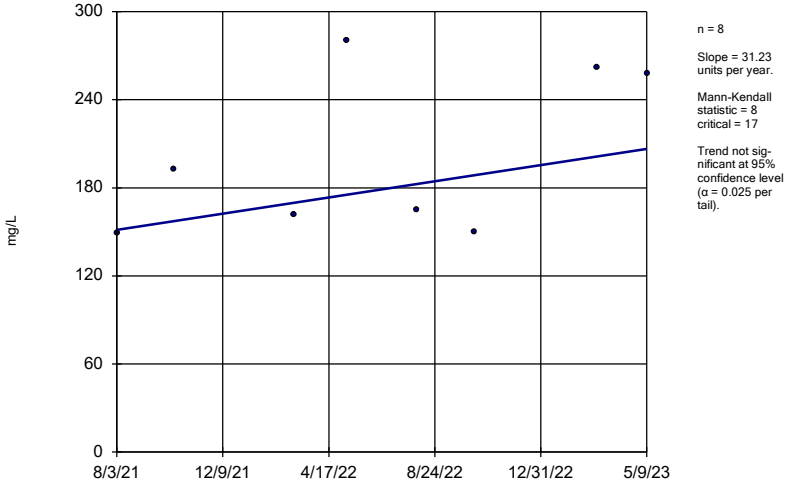
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

JCW-MW-18005



n = 8

Slope = 31.23 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

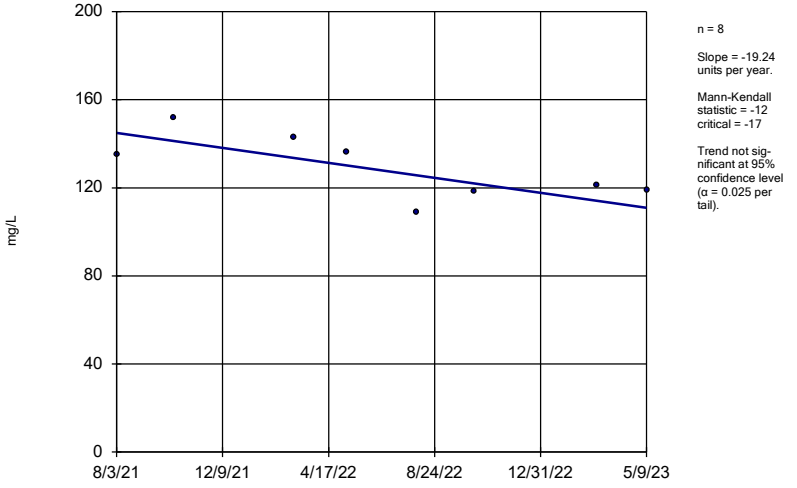
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

JCW-MW-18006



n = 8

Slope = -19.24 units per year.

Mann-Kendall statistic = -12 critical = -17

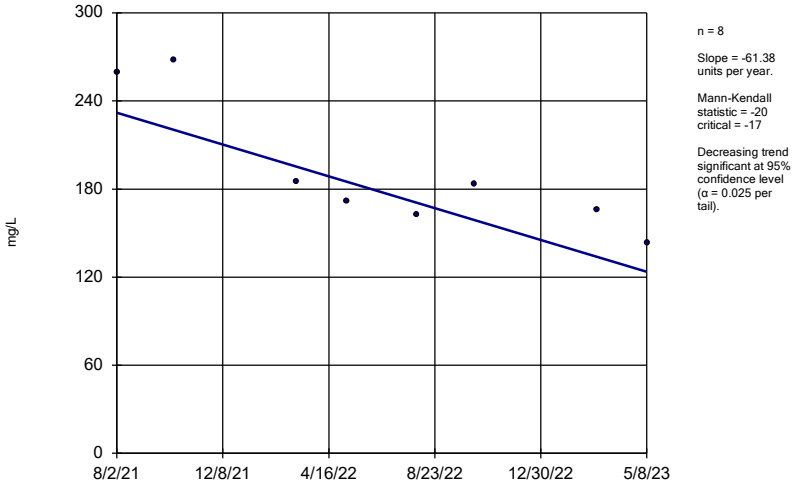
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium, Total

MW-50



n = 8

Slope = -61.38 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

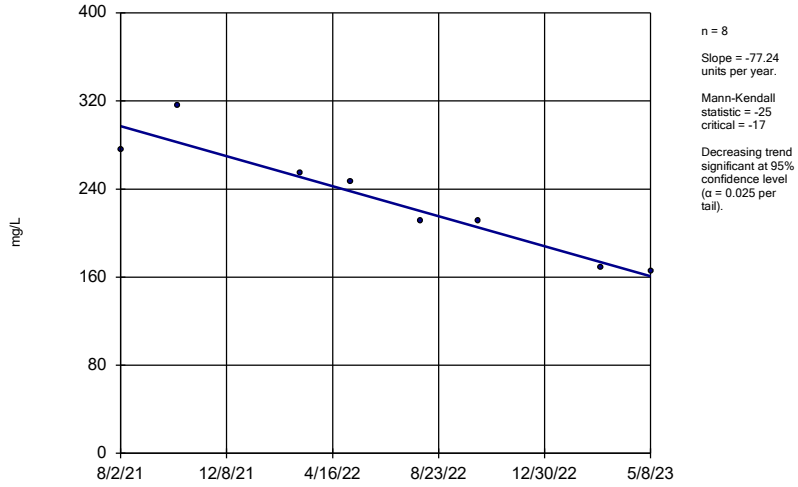
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

MW-51



n = 8

Slope = -77.24 units per year.

Mann-Kendall statistic = -25 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

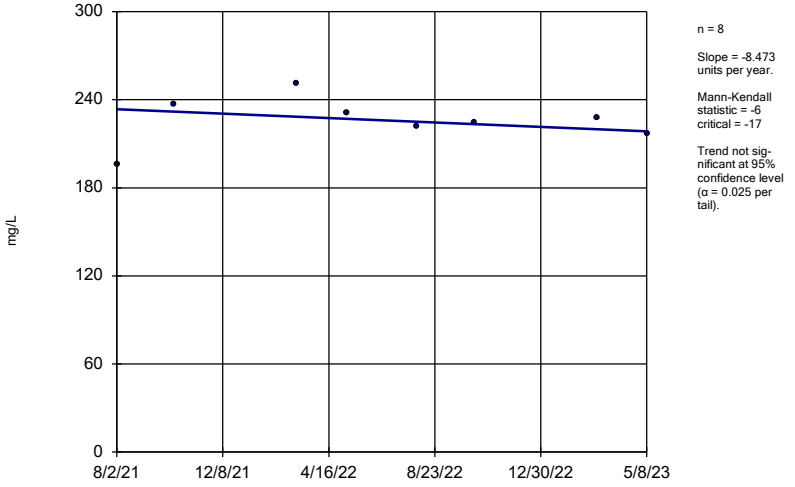
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

MW-52



n = 8

Slope = -8.473 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

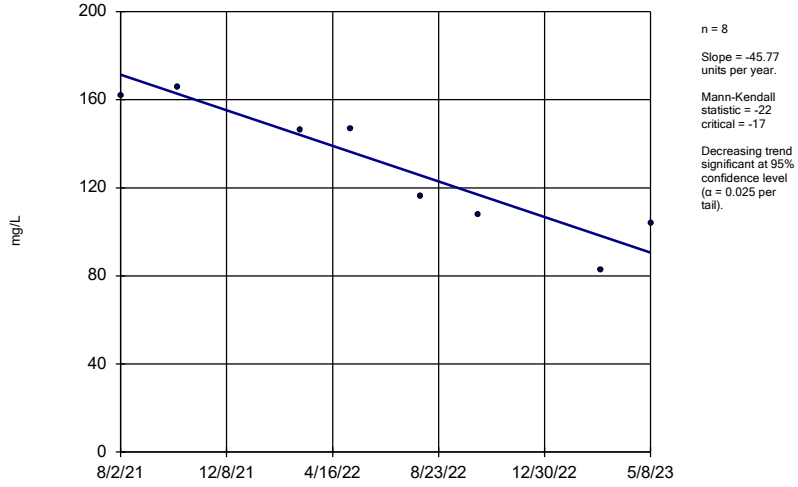
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

MW-53



n = 8

Slope = -45.77 units per year.

Mann-Kendall statistic = -22 critical = -17

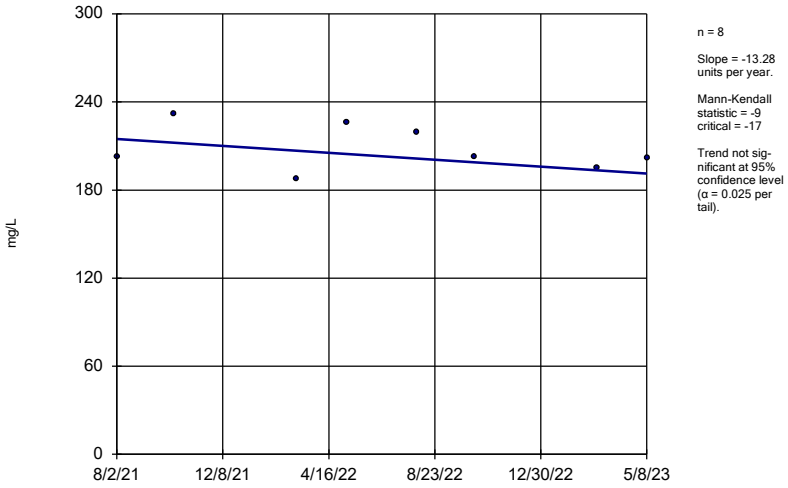
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium, Total

MW-53R



n = 8

Slope = -13.28 units per year.

Mann-Kendall statistic = -9
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

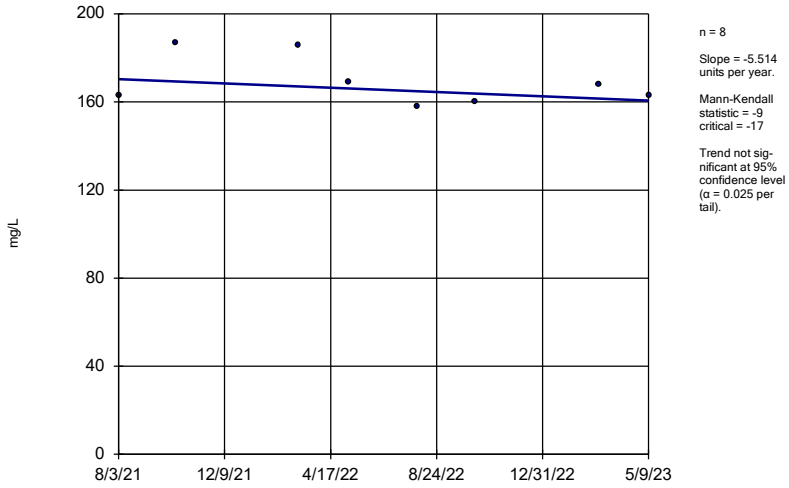
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

MW-54R



n = 8

Slope = -5.514 units per year.

Mann-Kendall statistic = -9
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

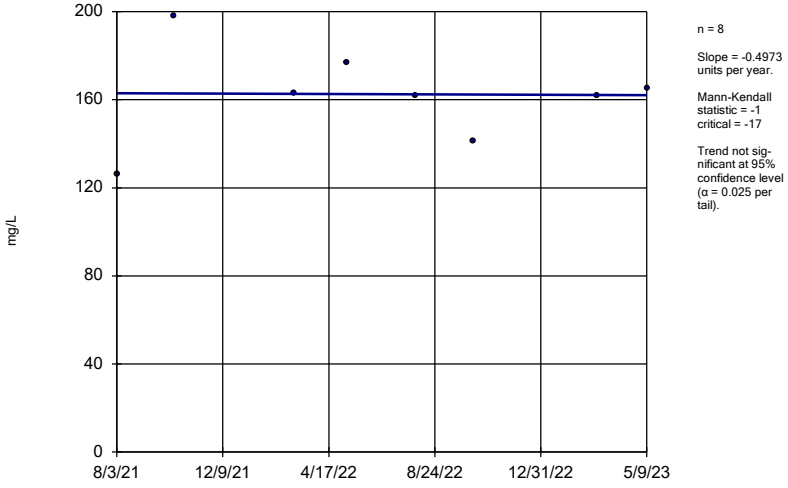
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

MW-55



n = 8

Slope = -0.4973 units per year.

Mann-Kendall statistic = -1
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

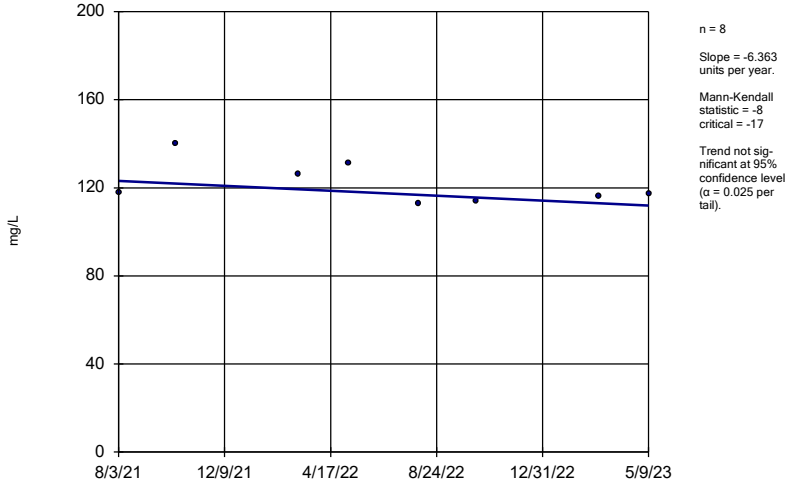
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Calcium, Total

OW-57ROUT



n = 8

Slope = -6.363 units per year.

Mann-Kendall statistic = -8
critical = -17

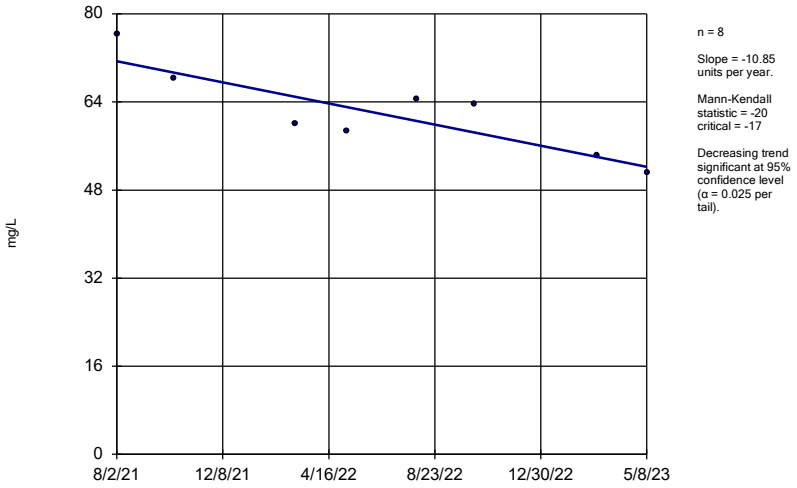
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Chloride

JCW-MW-18001



n = 8

Slope = -10.85 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

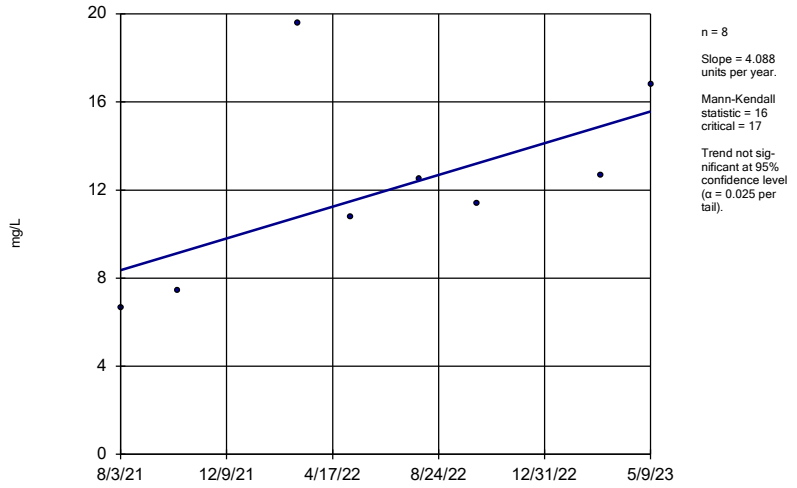
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

JCW-MW-18004



n = 8

Slope = 4.088 units per year.

Mann-Kendall statistic = 16 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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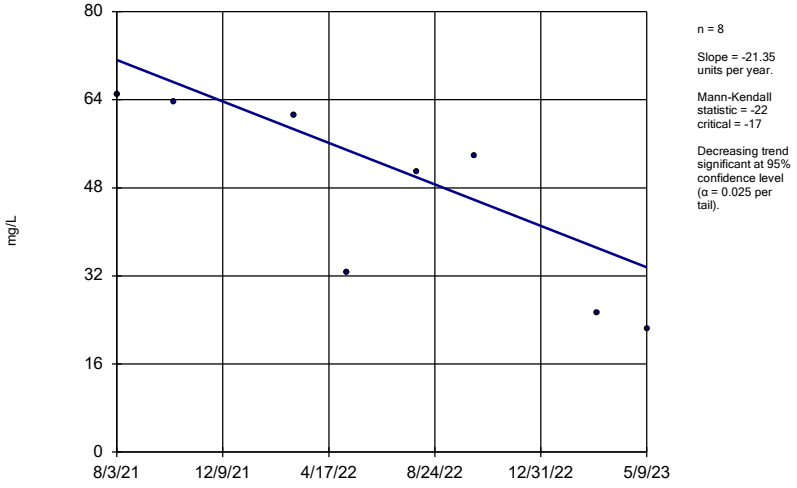
Chloride

JCW-MW-18005



n = 8

Slope = -21.35 units per year.

Mann-Kendall statistic = -22 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

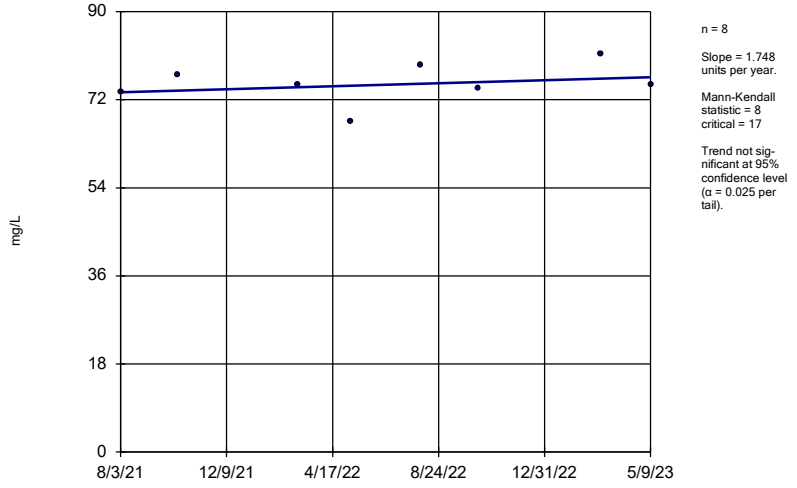
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

JCW-MW-18006



n = 8

Slope = 1.748 units per year.

Mann-Kendall statistic = 8 critical = 17

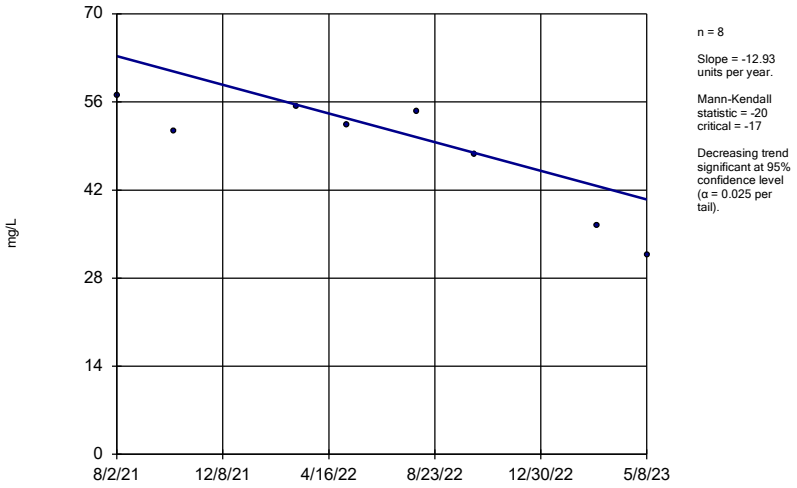
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Chloride

MW-50



n = 8

Slope = -12.93 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

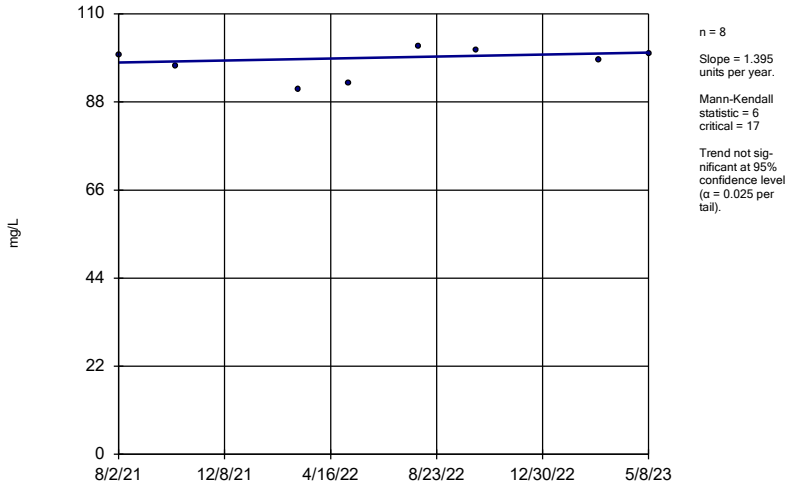
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

MW-51



n = 8

Slope = 1.395 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

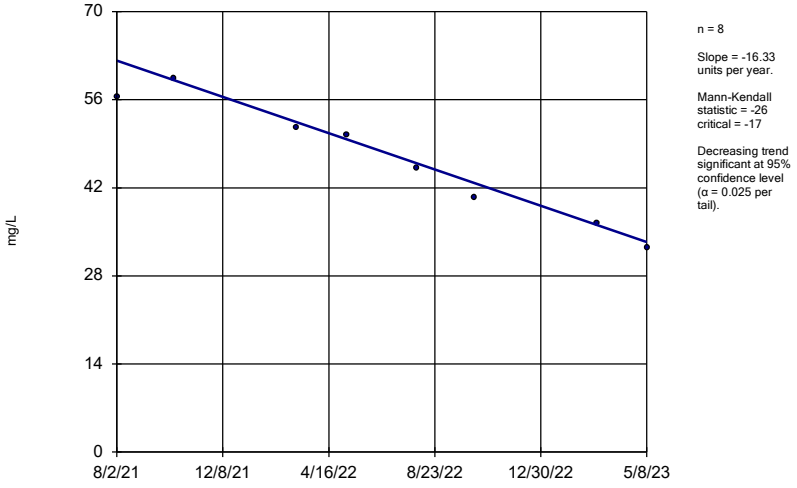
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

MW-52



n = 8

Slope = -16.33 units per year.

Mann-Kendall statistic = -26 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

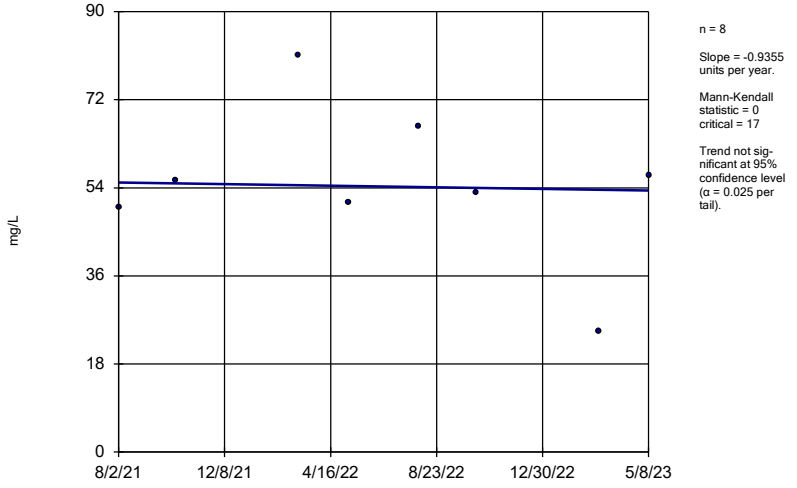
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

MW-53



n = 8

Slope = -0.9355 units per year.

Mann-Kendall statistic = 0 critical = 17

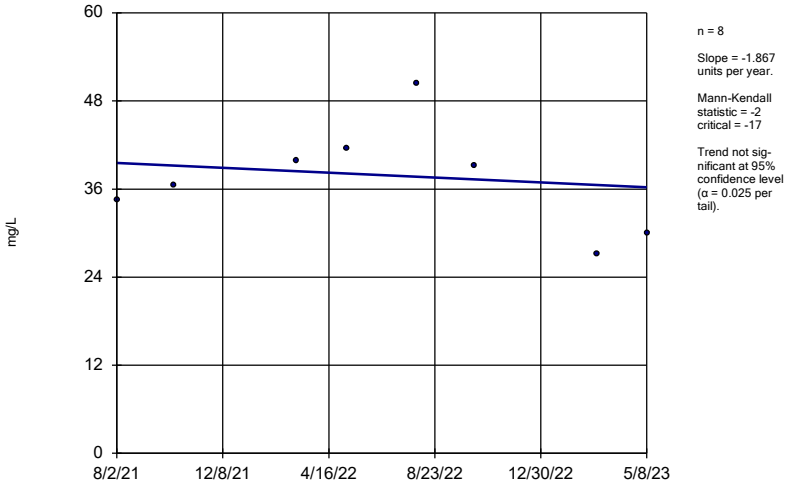
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Chloride

MW-53R



n = 8

Slope = -1.867 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

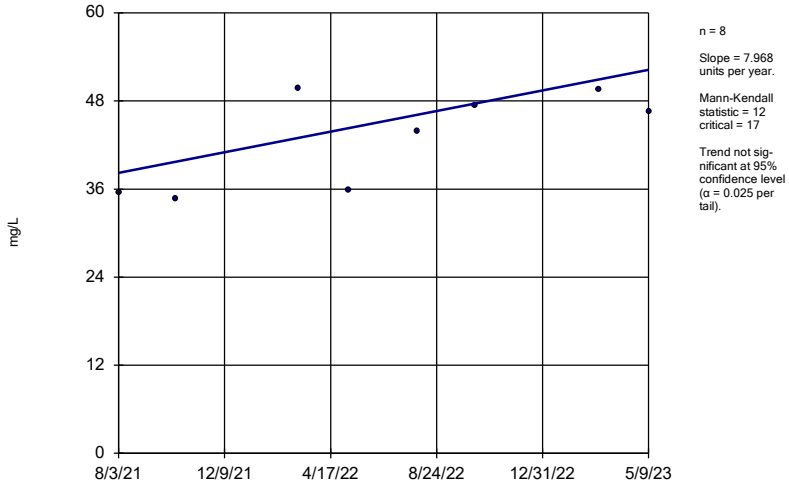
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

MW-54R



n = 8

Slope = 7.968 units per year.

Mann-Kendall statistic = 12 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

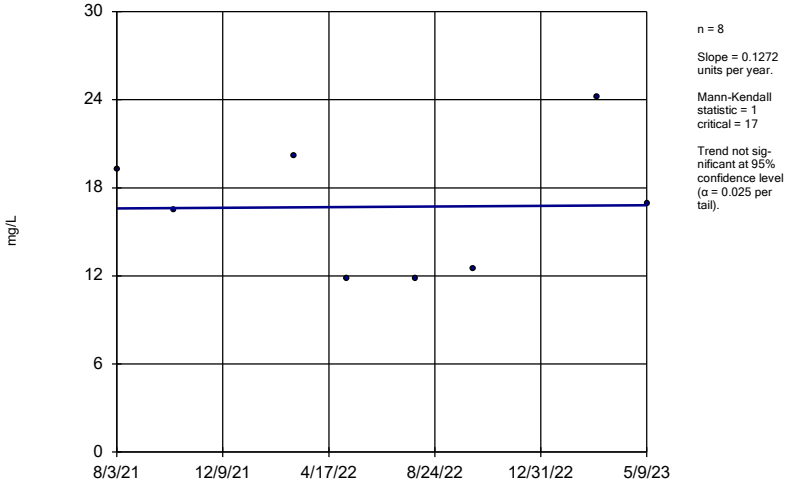
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

MW-55



n = 8

Slope = 0.1272 units per year.

Mann-Kendall statistic = 1 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

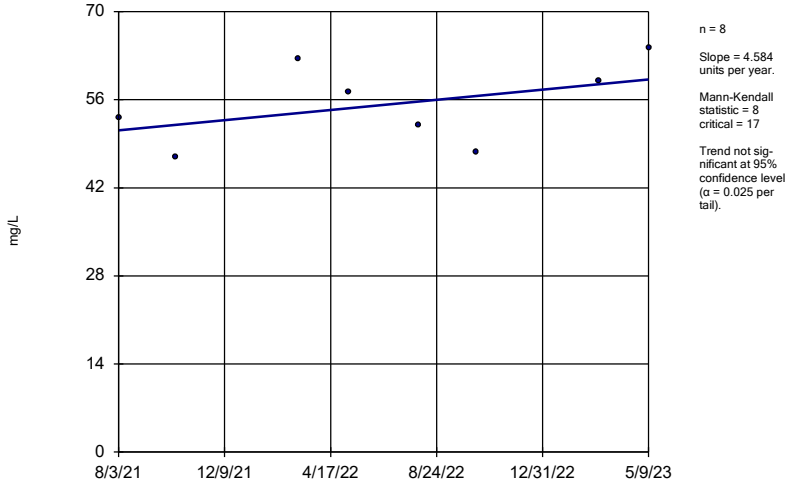
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Chloride

OW-57ROUT



n = 8

Slope = 4.584 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

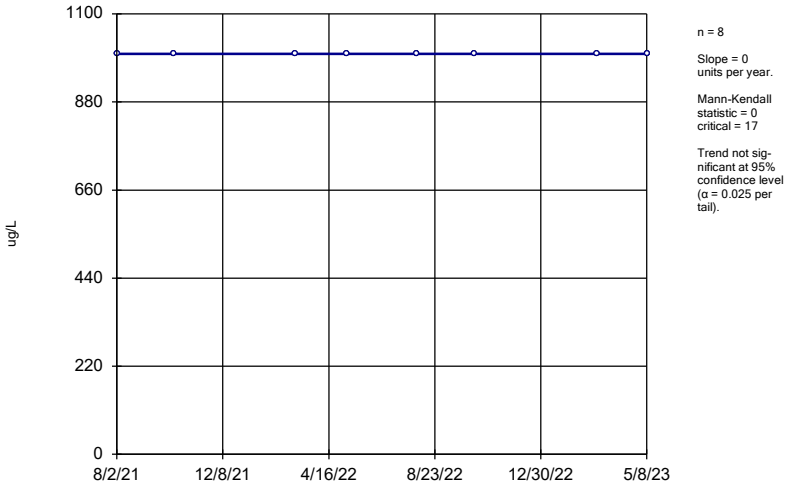
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18001



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

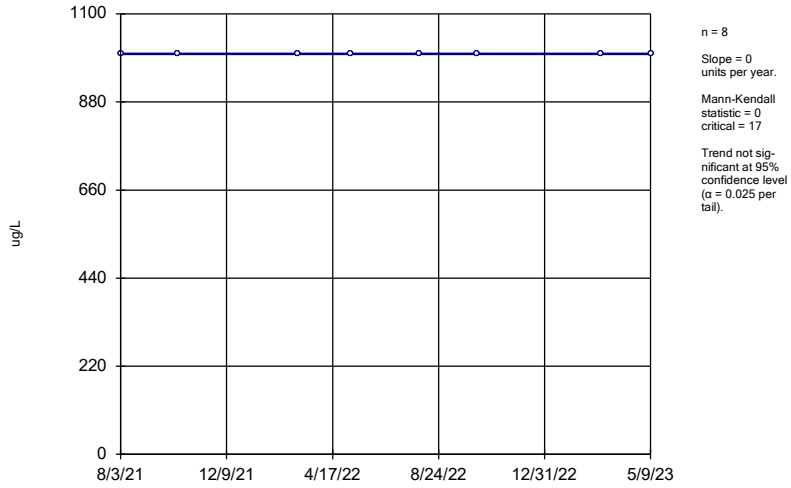
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

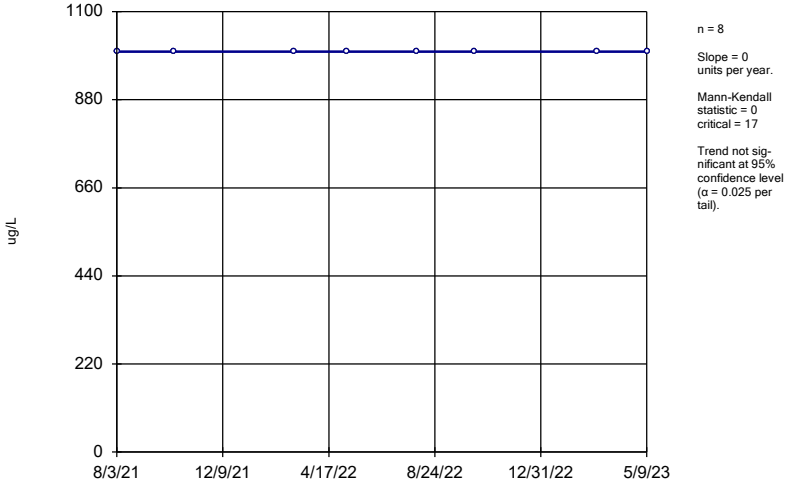
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18005



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

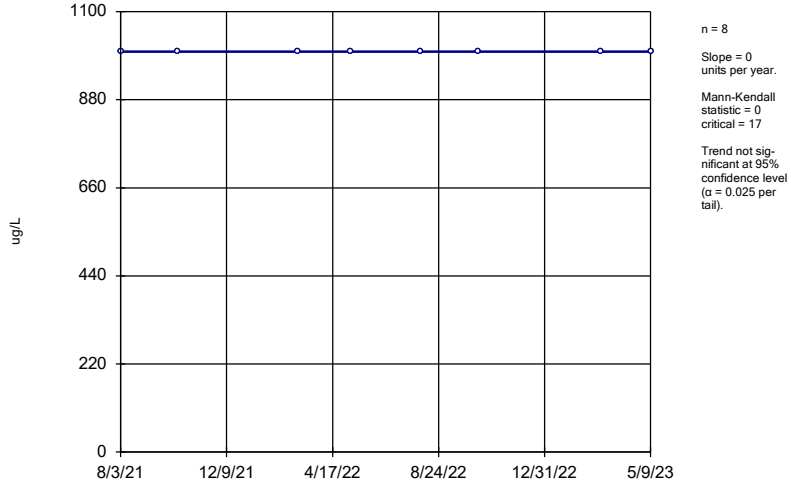
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18006



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

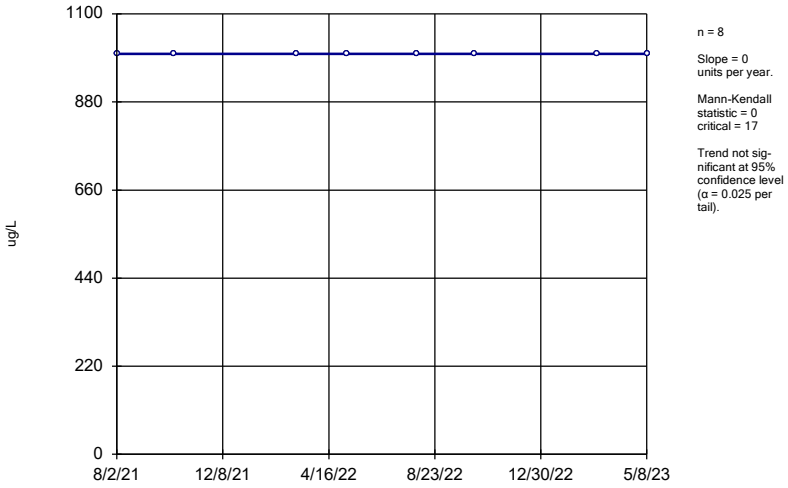
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-50



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

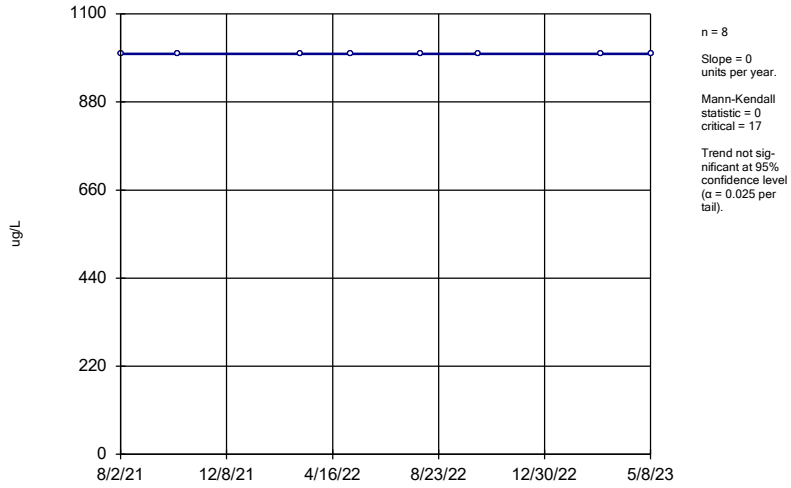
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-51



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

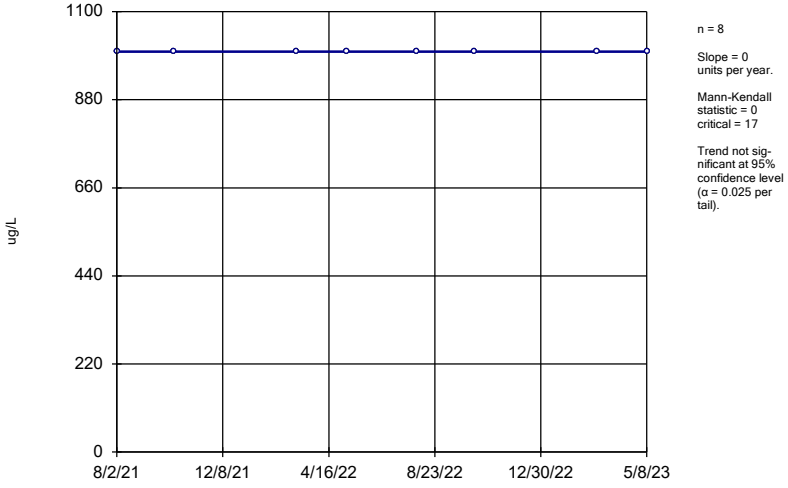
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-52



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

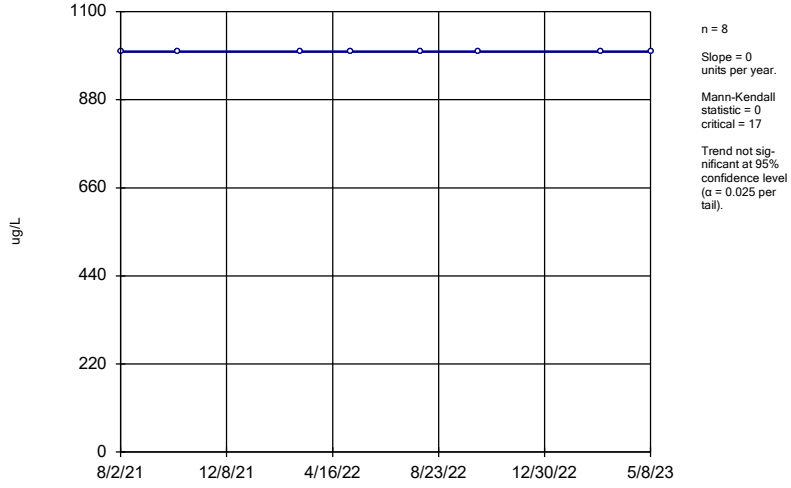
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

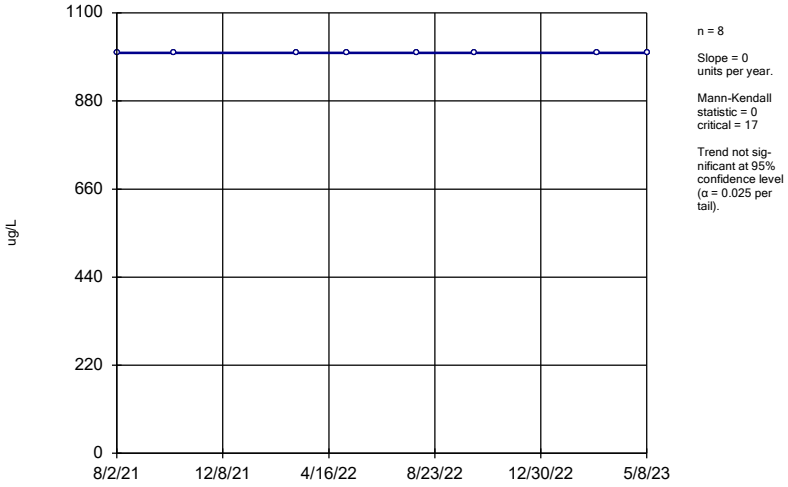
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

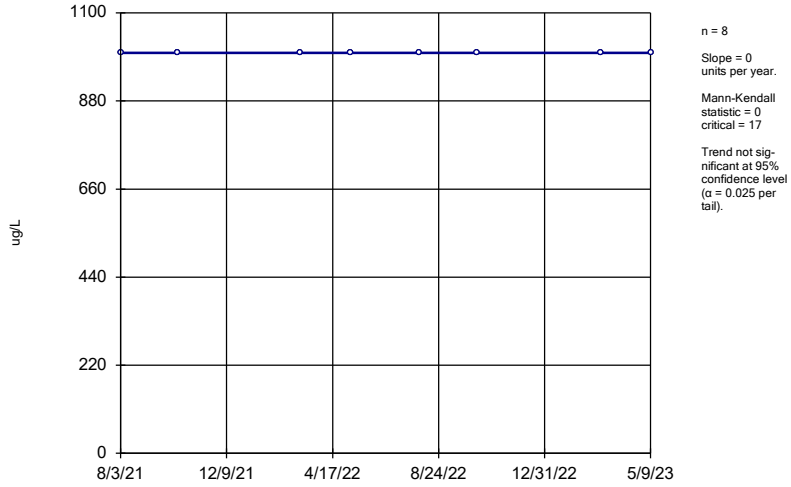
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-54R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

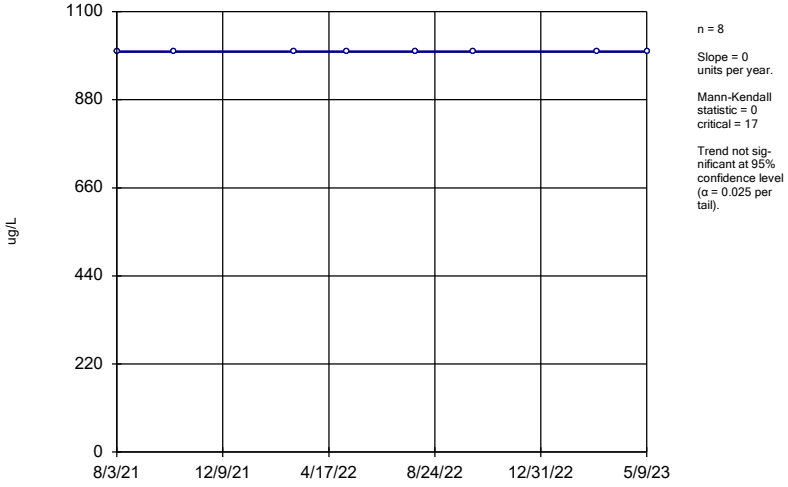
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-55



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

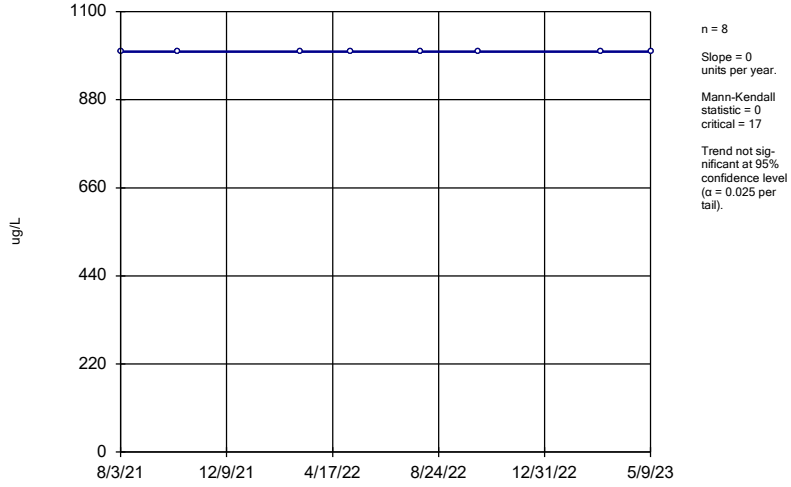
Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

OW-57ROUT



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

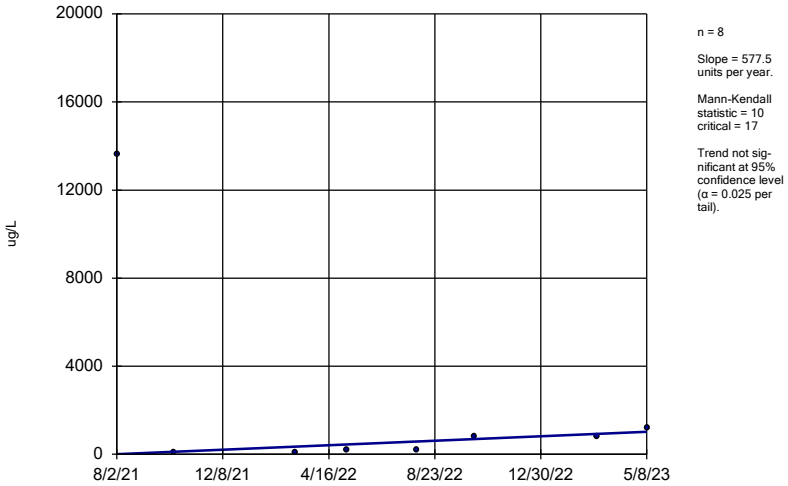
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:28 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

JCW-MW-18001



n = 8

Slope = 577.5 units per year.

Mann-Kendall statistic = 10 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

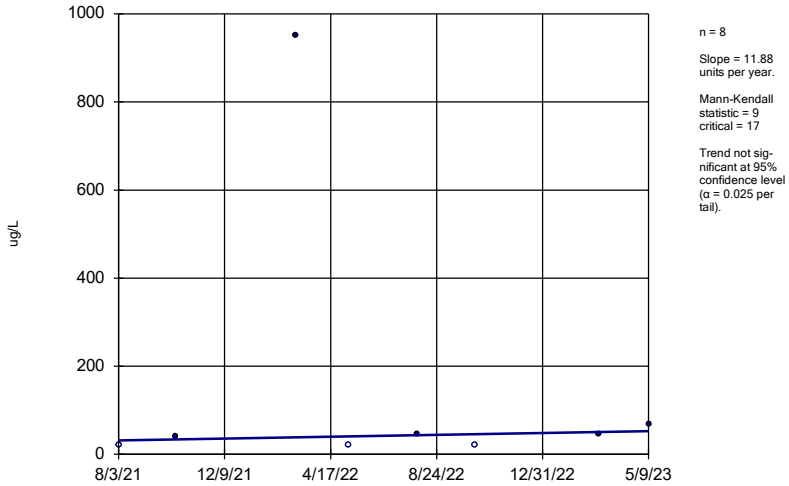
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Iron, Total

JCW-MW-18004



n = 8

Slope = 11.88 units per year.

Mann-Kendall statistic = 9 critical = 17

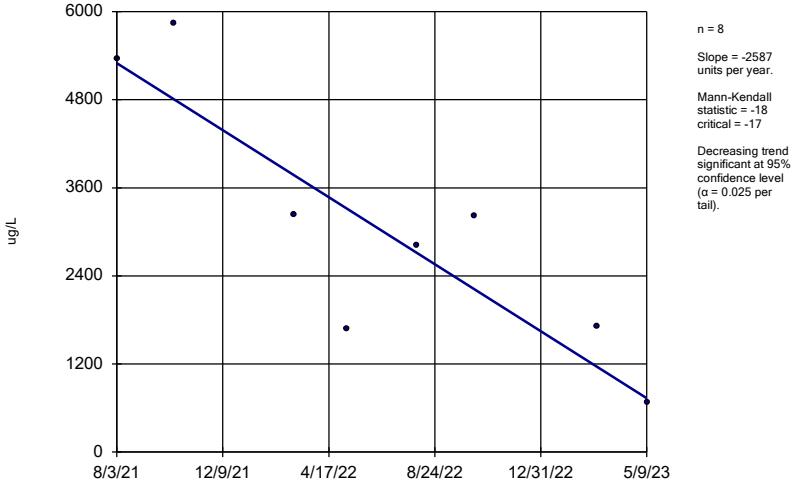
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

JCW-MW-18005



n = 8

Slope = -2587 units per year.

Mann-Kendall statistic = -18 critical = -17

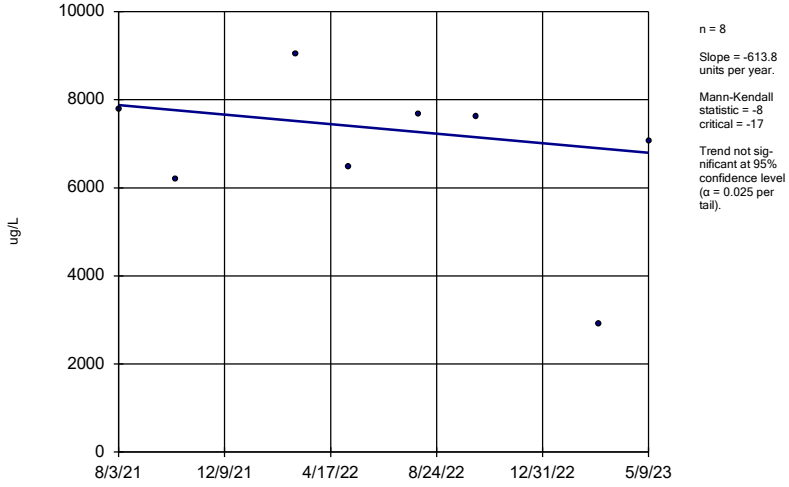
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

JCW-MW-18006



n = 8

Slope = -613.8 units per year.

Mann-Kendall statistic = -8 critical = -17

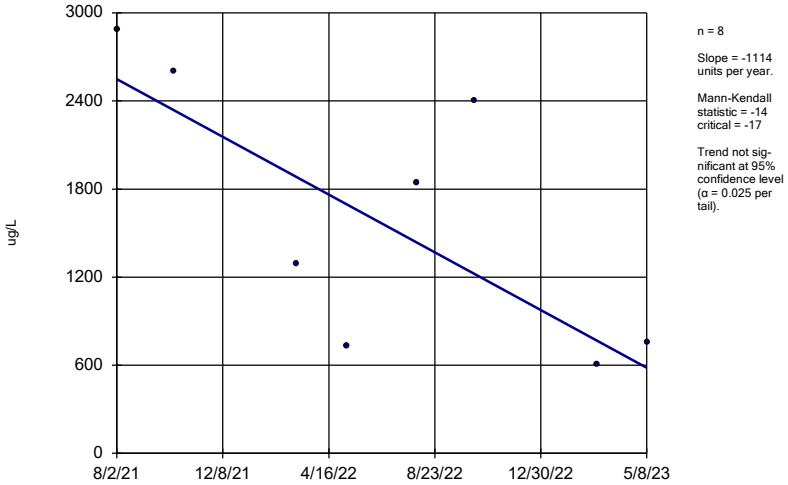
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

MW-50



n = 8

Slope = -1114 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

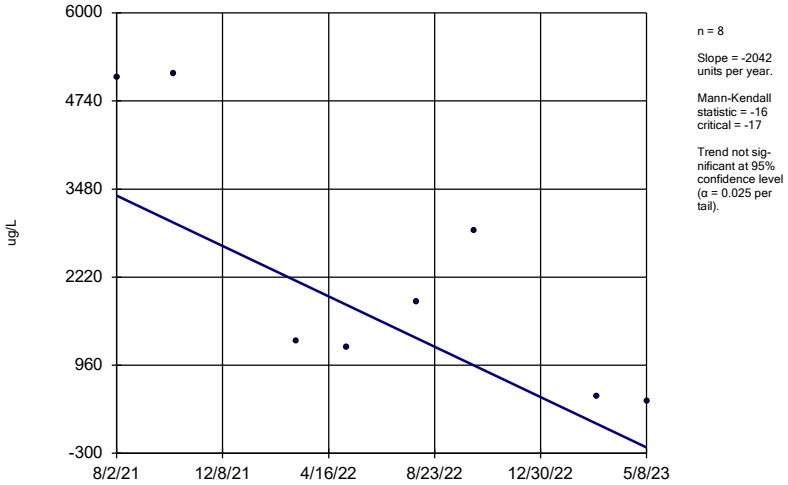
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

MW-51



n = 8

Slope = -2042 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

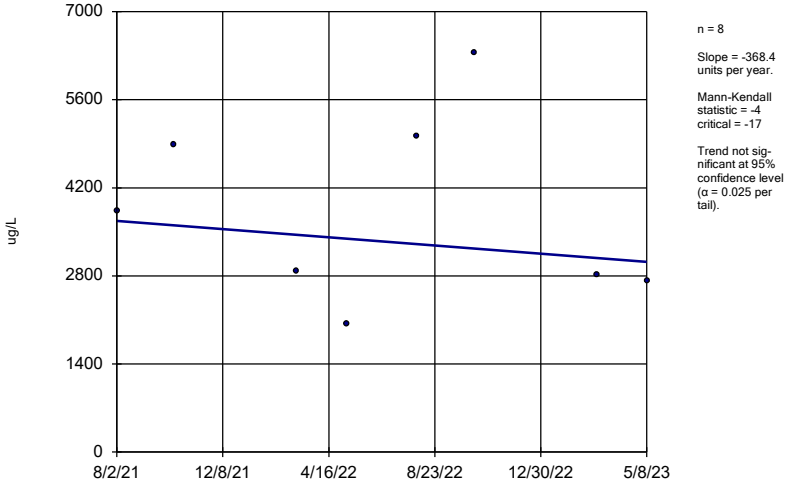
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

MW-52



n = 8

Slope = -368.4 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

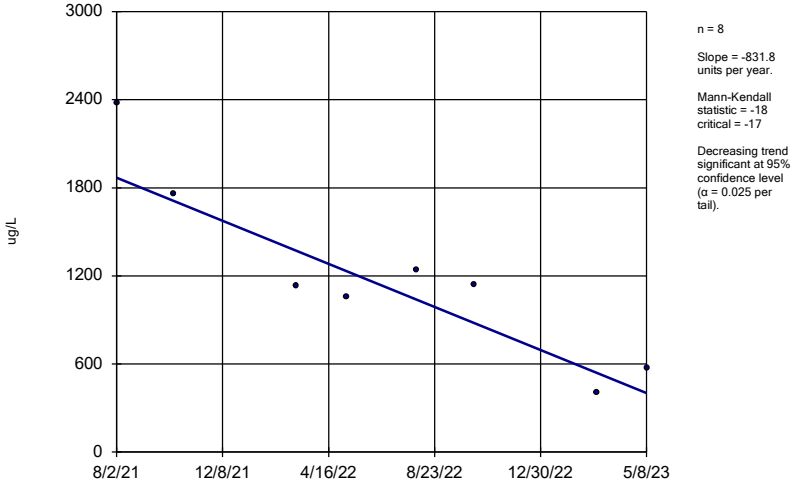
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

MW-53



n = 8

Slope = -831.8 units per year.

Mann-Kendall statistic = -18 critical = -17

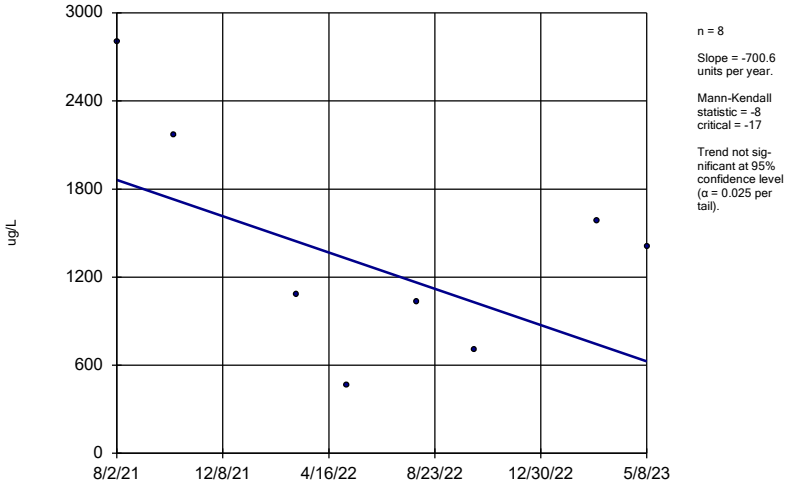
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

MW-53R



n = 8

Slope = -700.6 units per year.

Mann-Kendall statistic = -8
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

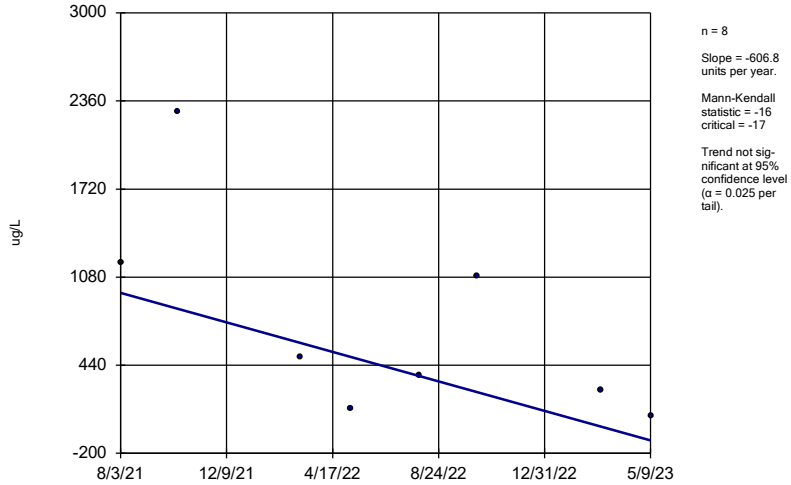
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

MW-54R



n = 8

Slope = -606.8 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

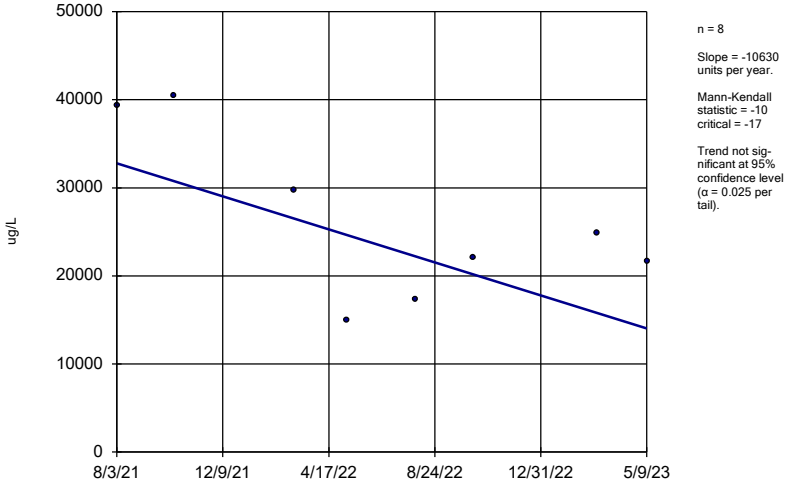
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

MW-55



n = 8

Slope = -10630 units per year.

Mann-Kendall statistic = -10
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

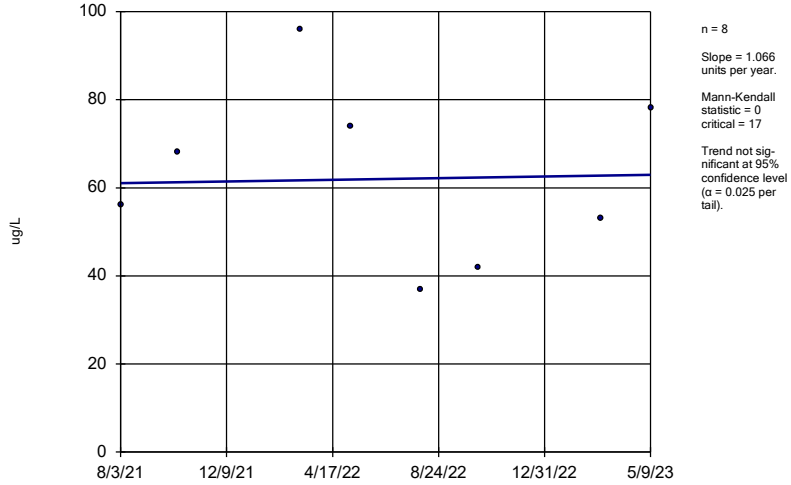
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Iron, Total

OW-57ROUT



n = 8

Slope = 1.066 units per year.

Mann-Kendall statistic = 0
critical = 17

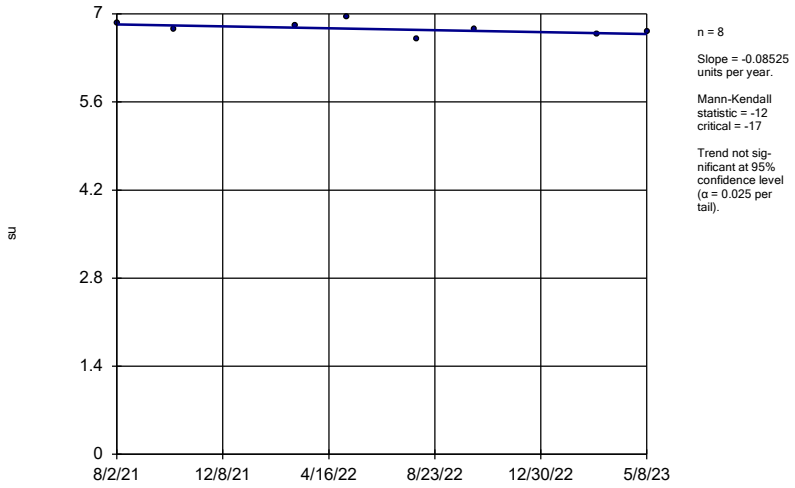
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

pH, Field

JCW-MW-18001



n = 8

Slope = -0.08525 units per year.

Mann-Kendall statistic = -12 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

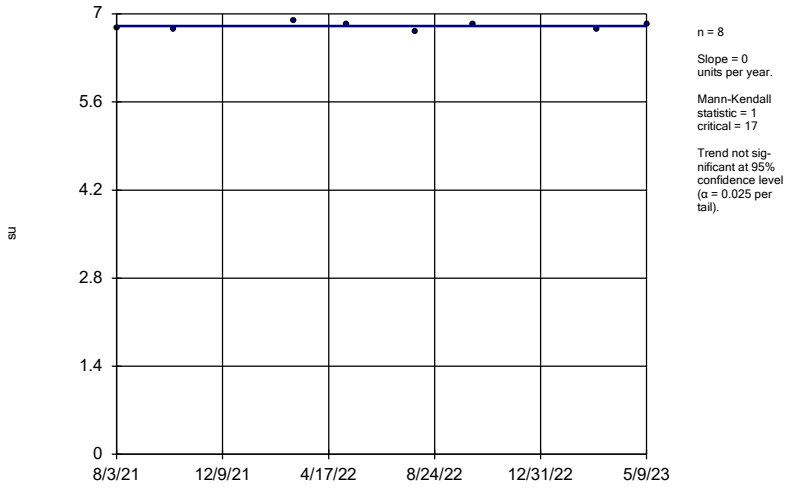
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

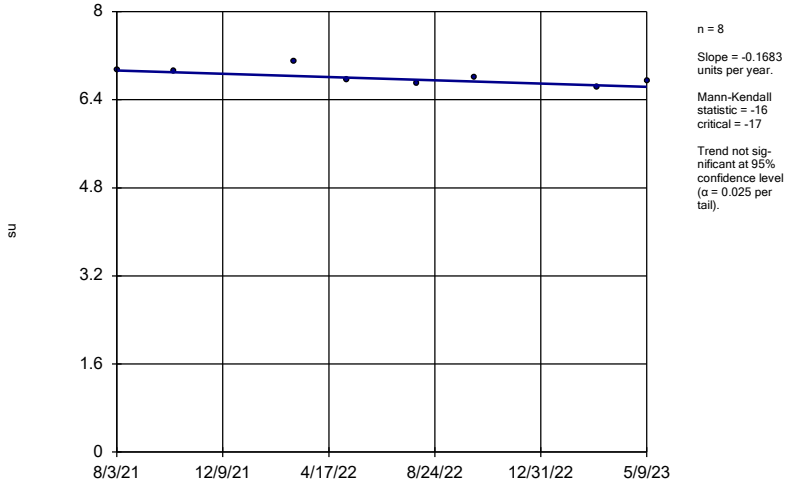
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

JCW-MW-18005



n = 8

Slope = -0.1683 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

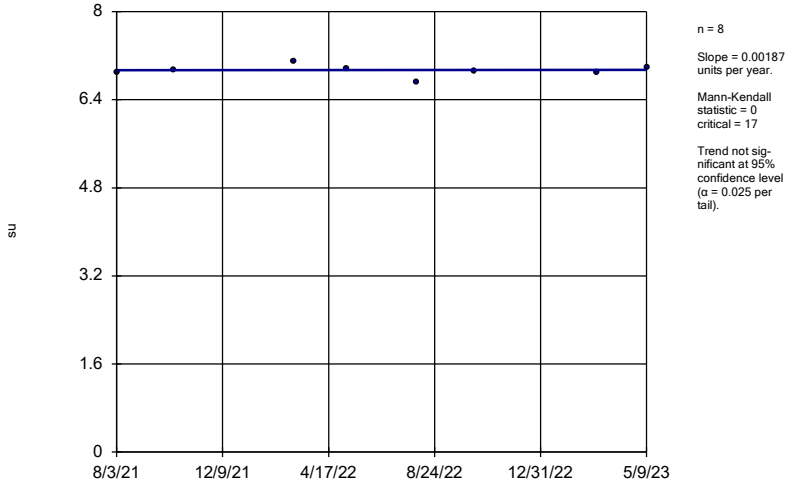
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

JCW-MW-18006



n = 8

Slope = 0.00187 units per year.

Mann-Kendall statistic = 0 critical = 17

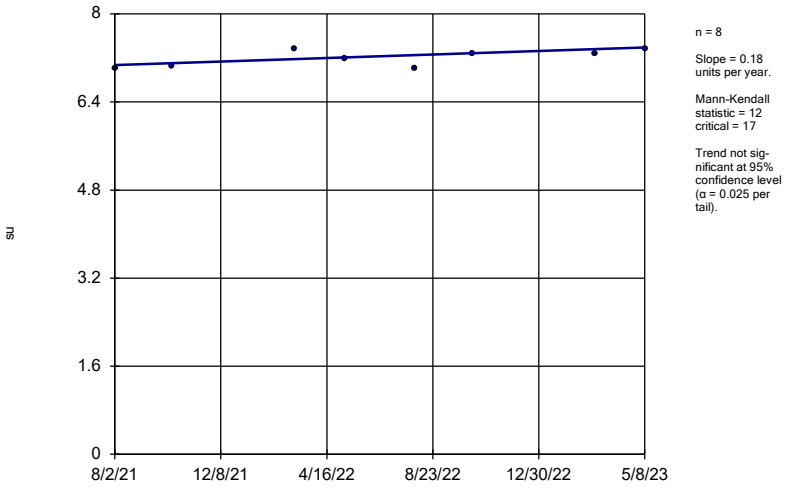
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

pH, Field

MW-50



n = 8

Slope = 0.18 units per year.

Mann-Kendall statistic = 12 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

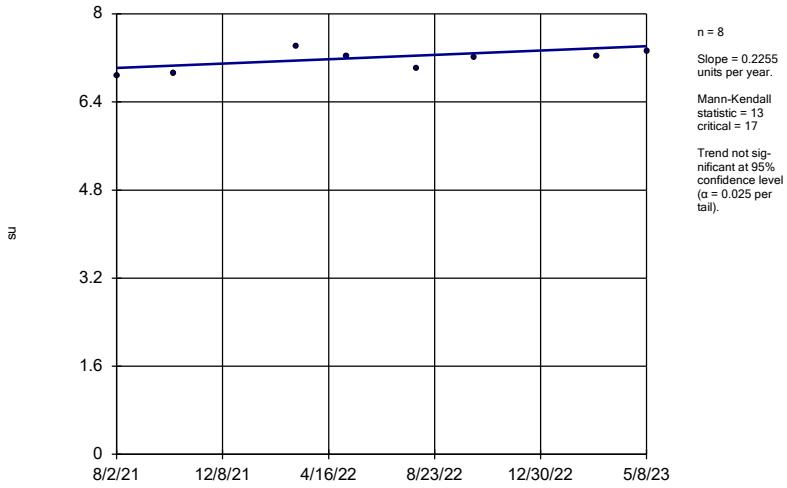
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

MW-51



n = 8

Slope = 0.2255 units per year.

Mann-Kendall statistic = 13 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

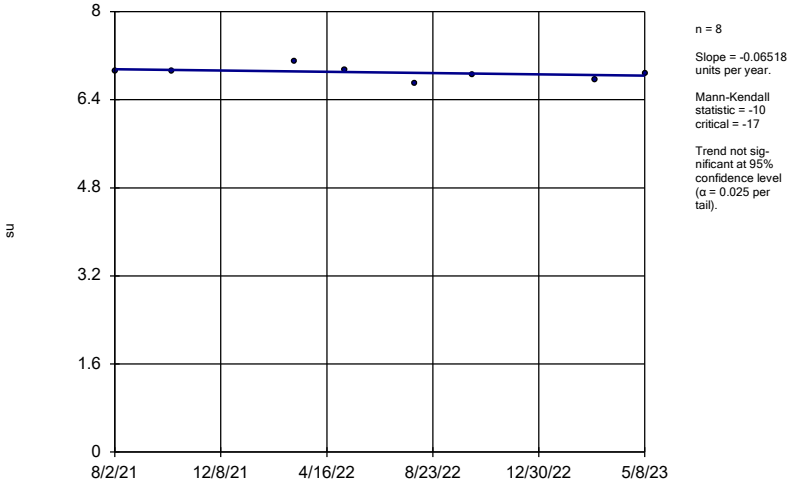
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

MW-52



n = 8

Slope = -0.06518 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

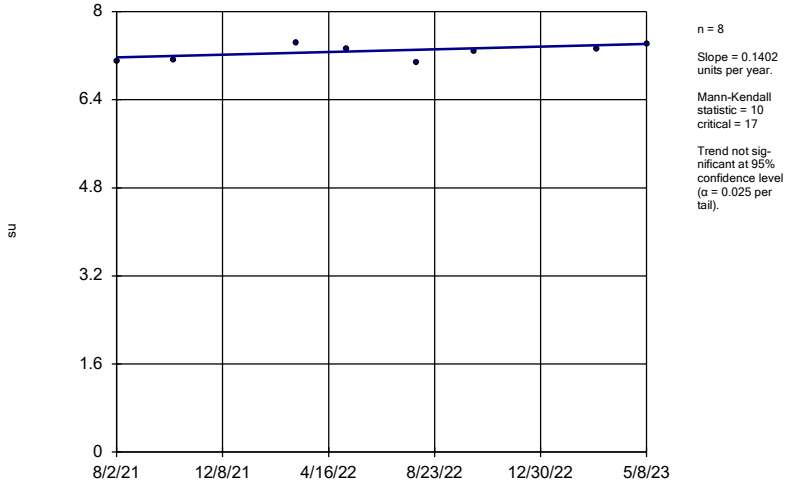
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

MW-53



n = 8

Slope = 0.1402 units per year.

Mann-Kendall statistic = 10 critical = 17

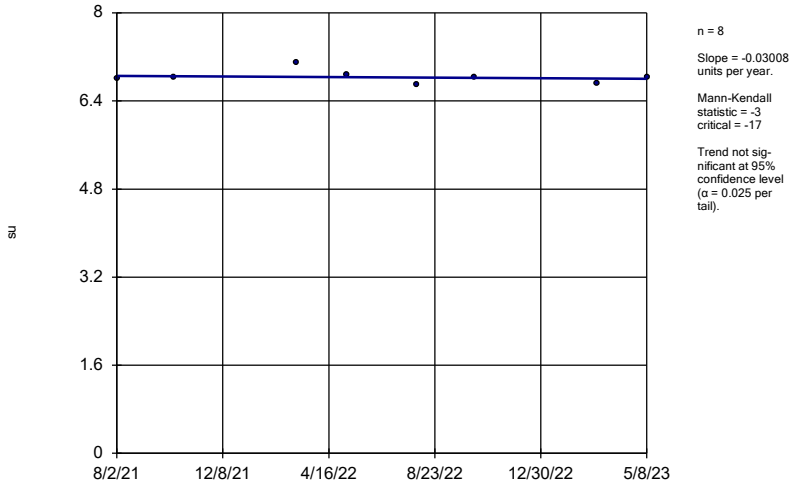
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

pH, Field

MW-53R



n = 8

Slope = -0.03008 units per year.

Mann-Kendall statistic = -3
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

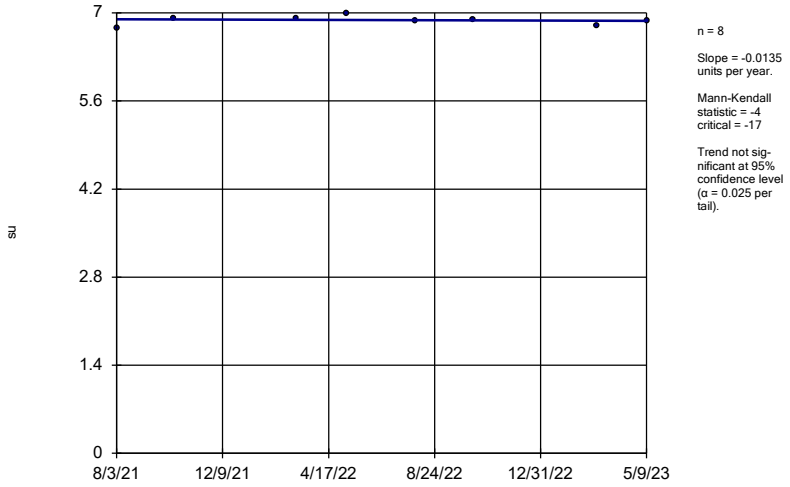
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

MW-54R



n = 8

Slope = -0.0135 units per year.

Mann-Kendall statistic = -4
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

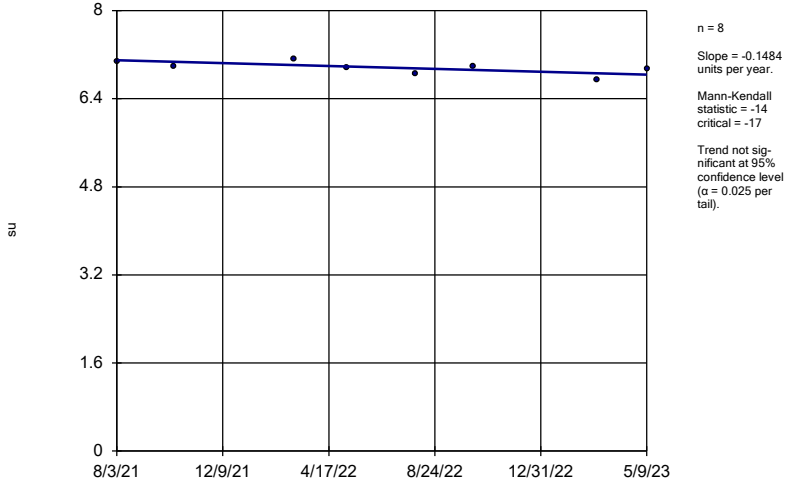
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

MW-55



n = 8

Slope = -0.1484 units per year.

Mann-Kendall statistic = -14
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

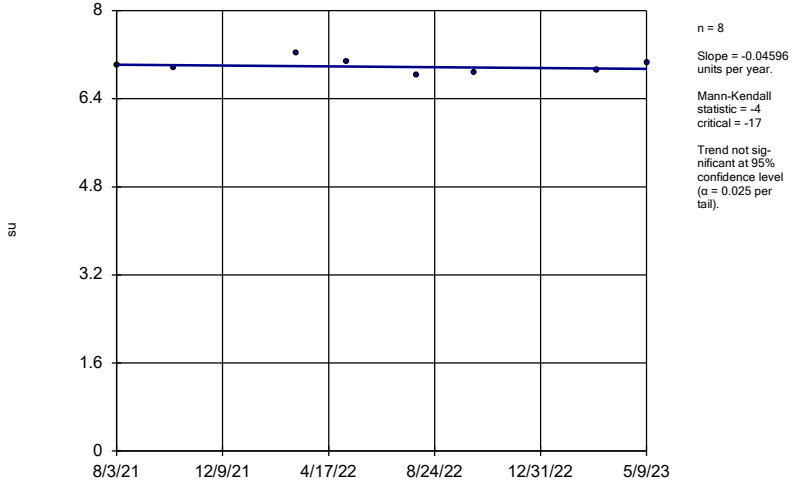
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

pH, Field

OW-57ROUT



n = 8

Slope = -0.04596 units per year.

Mann-Kendall statistic = -4
critical = -17

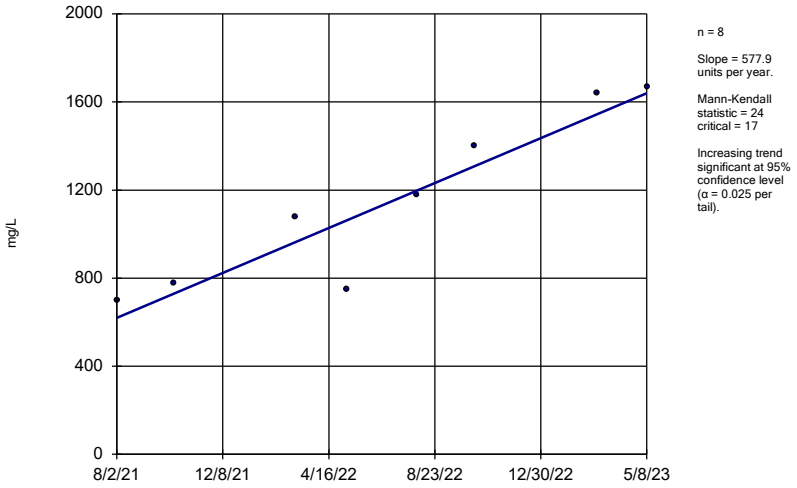
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sulfate

JCW-MW-18001



n = 8

Slope = 577.9 units per year.

Mann-Kendall statistic = 24 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

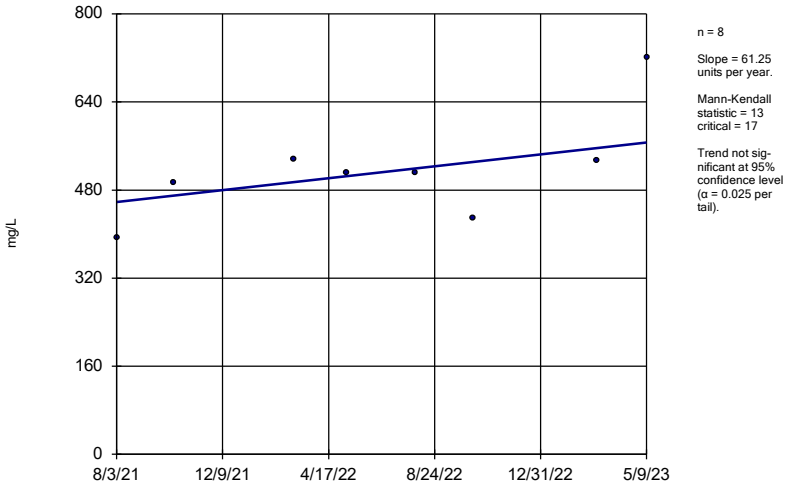
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

JCW-MW-18004



n = 8

Slope = 61.25 units per year.

Mann-Kendall statistic = 13 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

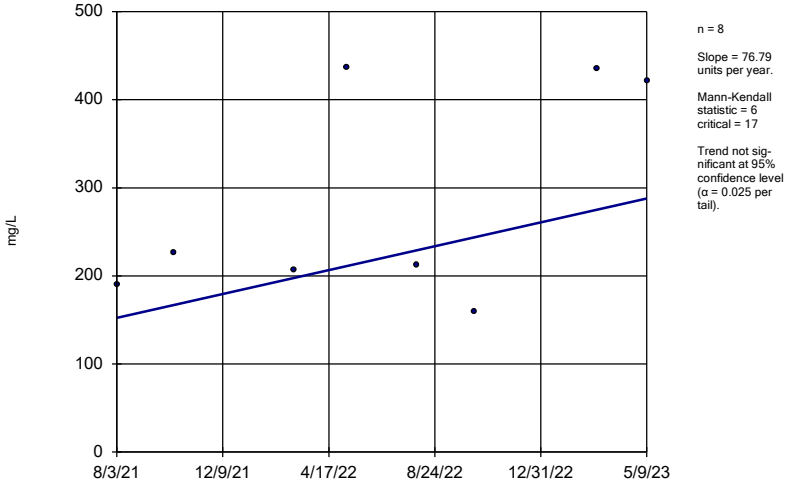
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

JCW-MW-18005



n = 8

Slope = 76.79 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

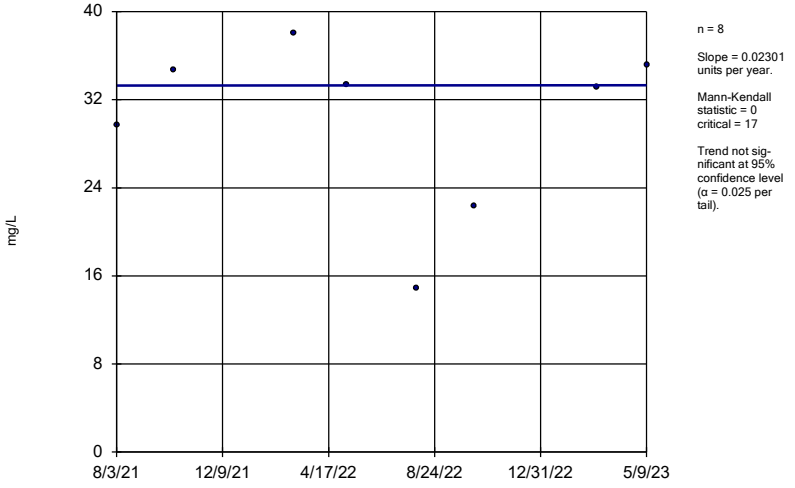
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

JCW-MW-18006



n = 8

Slope = 0.02301 units per year.

Mann-Kendall statistic = 0 critical = 17

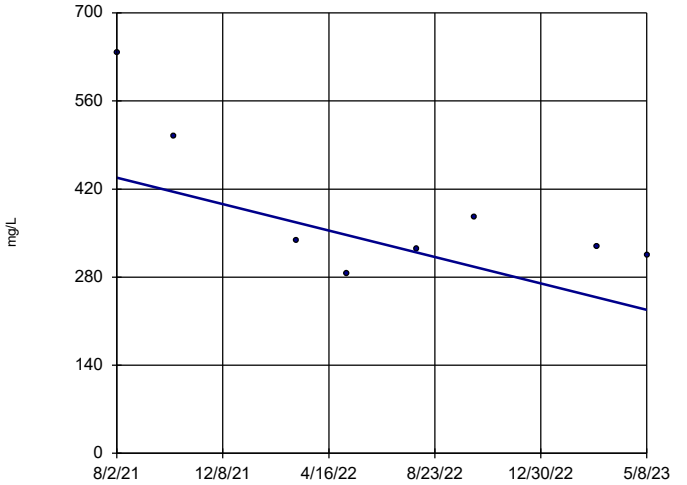
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sulfate

MW-50



n = 8

Slope = -118.9 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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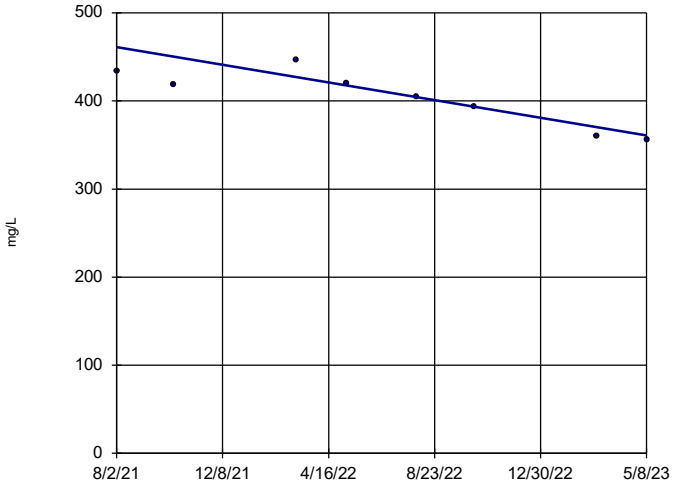
Sulfate

MW-51



n = 8

Slope = -56.88 units per year.

Mann-Kendall statistic = -22 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

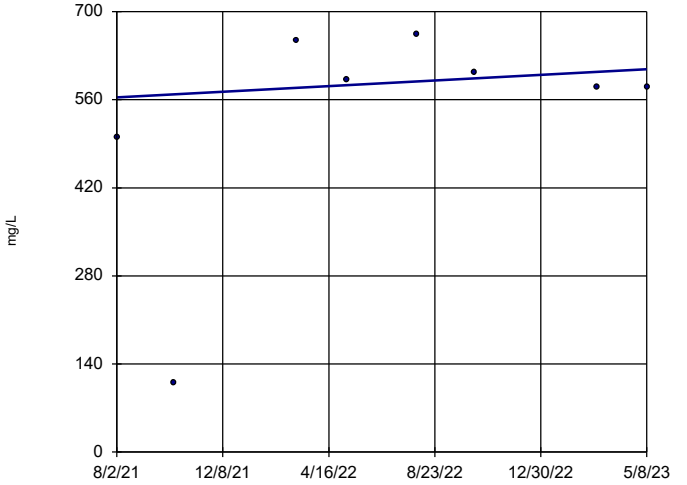
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

MW-52



n = 8

Slope = 25.47 units per year.

Mann-Kendall statistic = 3 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

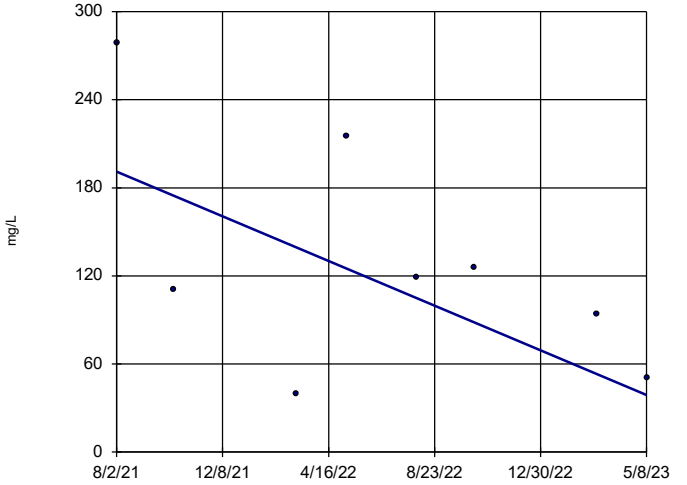
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

MW-53



n = 8

Slope = -86.17 units per year.

Mann-Kendall statistic = -10 critical = -17

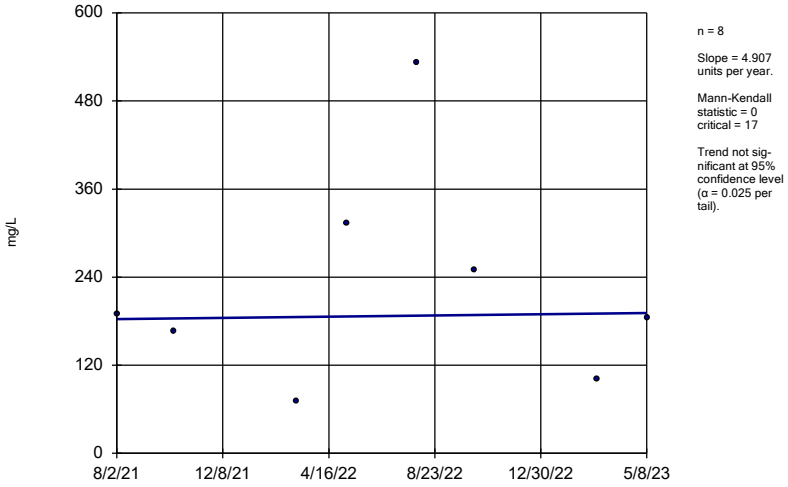
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sulfate

MW-53R



n = 8

Slope = 4.907 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

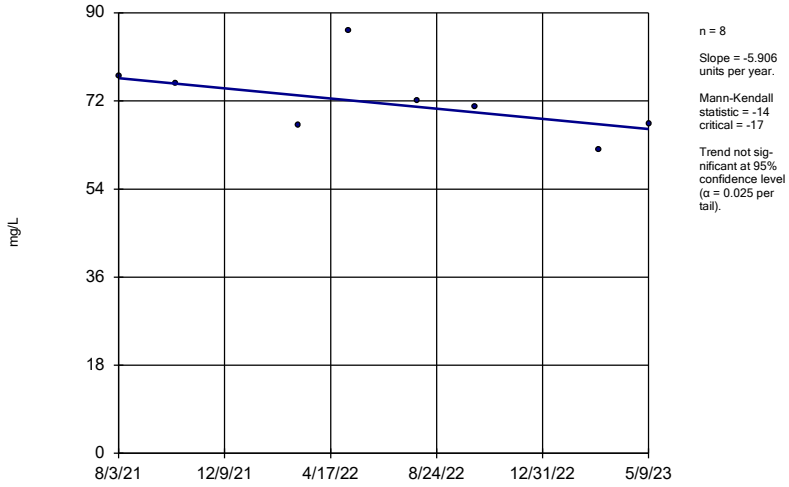
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

MW-54R



n = 8

Slope = -5.906 units per year.

Mann-Kendall statistic = -14
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

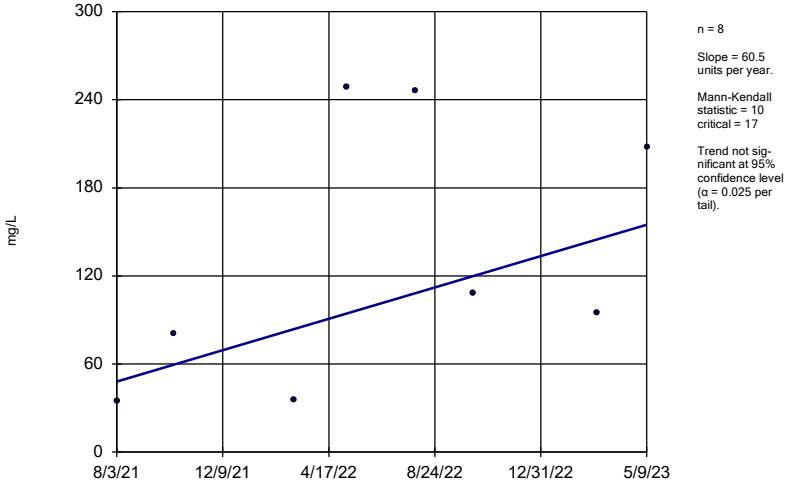
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

MW-55



n = 8

Slope = 60.5 units per year.

Mann-Kendall statistic = 10
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

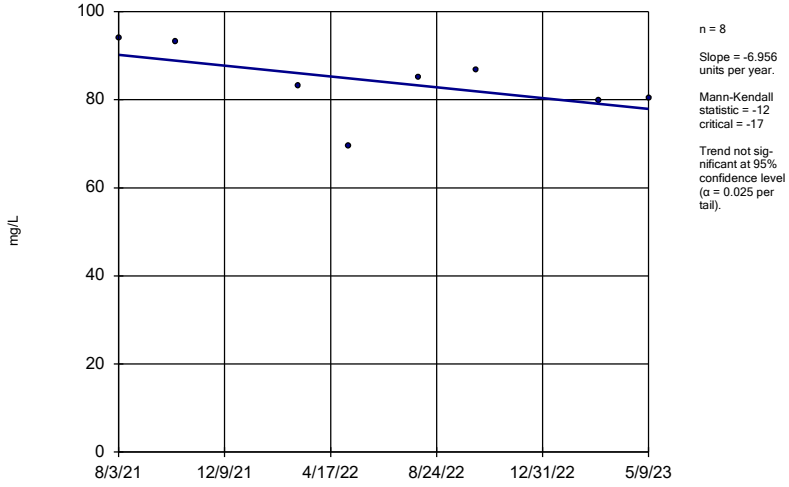
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Sulfate

OW-57ROUT



n = 8

Slope = -6.956 units per year.

Mann-Kendall statistic = -12
critical = -17

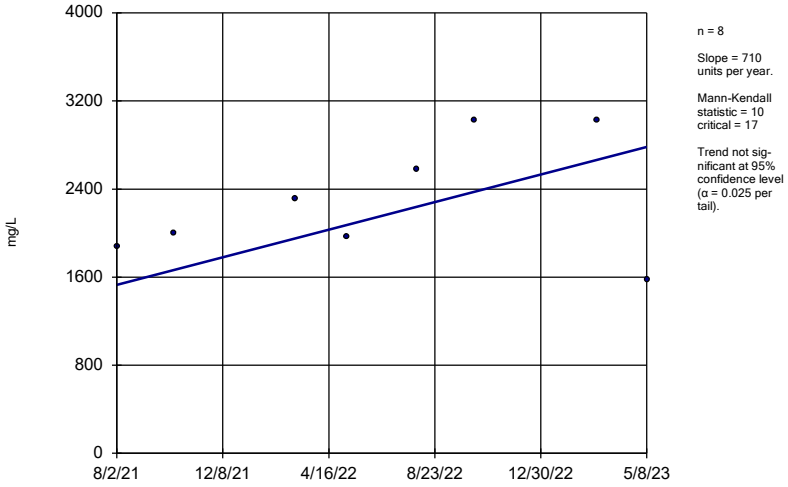
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Total Dissolved Solids

JCW-MW-18001



n = 8

Slope = 710 units per year.

Mann-Kendall statistic = 10 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

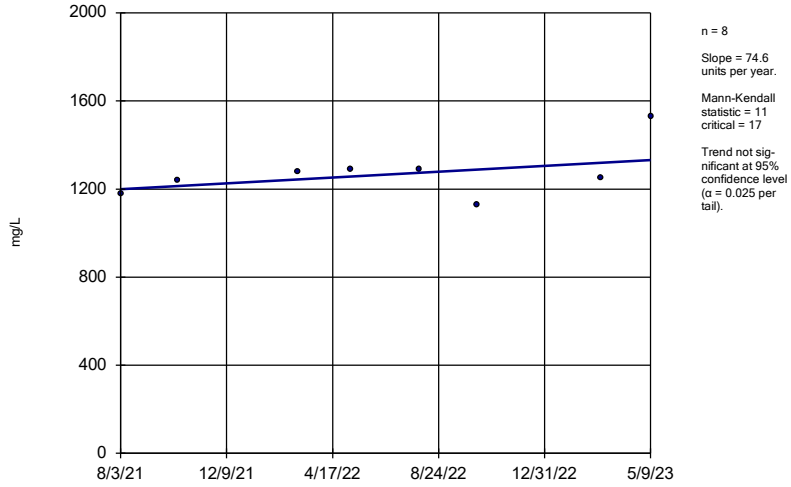
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

JCW-MW-18004



n = 8

Slope = 74.6 units per year.

Mann-Kendall statistic = 11 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

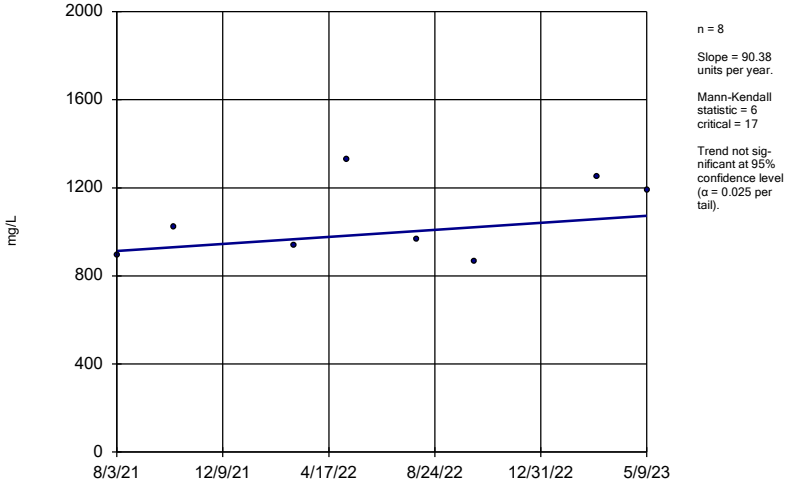
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

JCW-MW-18005



n = 8

Slope = 90.38 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

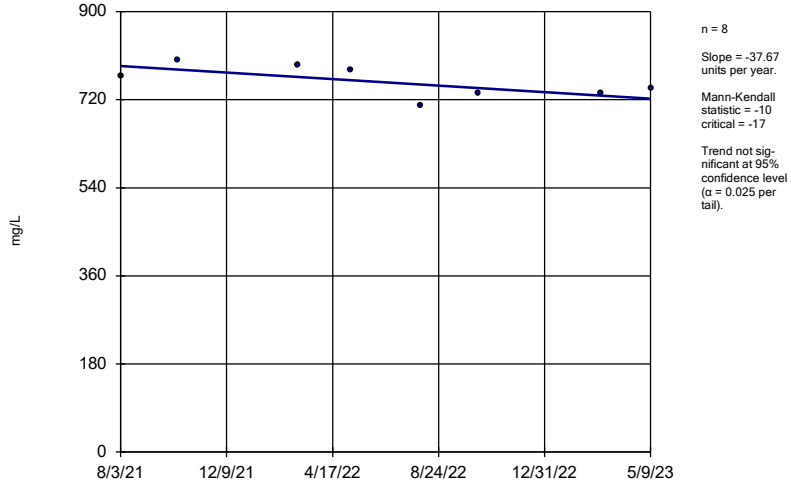
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

JCW-MW-18006



n = 8

Slope = -37.67 units per year.

Mann-Kendall statistic = -10 critical = -17

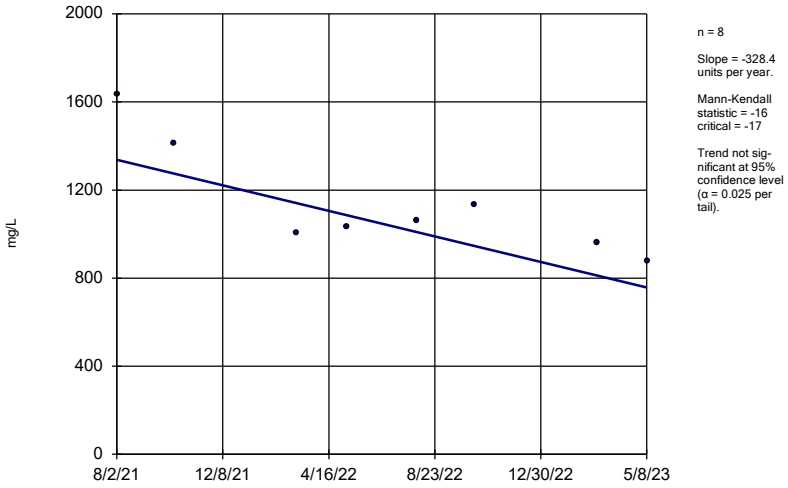
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Total Dissolved Solids

MW-50



n = 8

Slope = -328.4 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

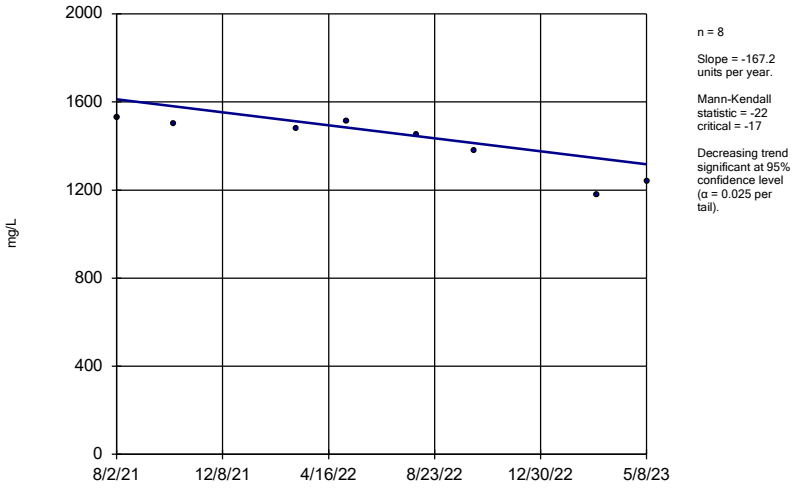
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

MW-51



n = 8

Slope = -167.2 units per year.

Mann-Kendall statistic = -22
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

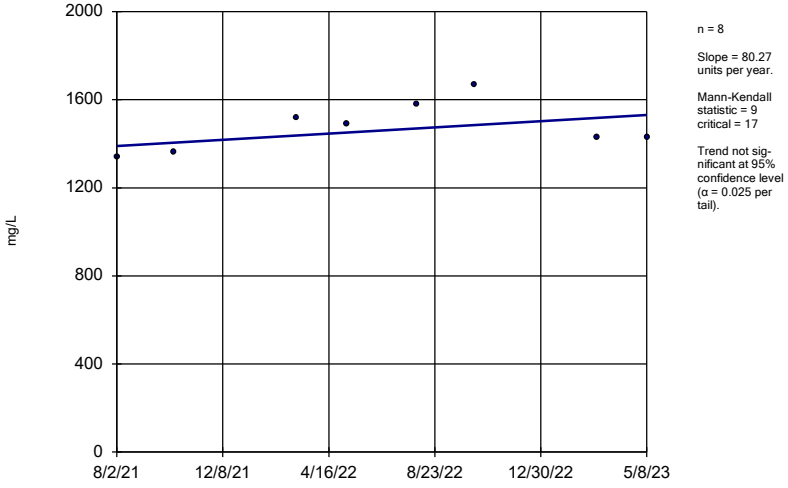
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

MW-52



n = 8

Slope = 80.27 units per year.

Mann-Kendall statistic = 9
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

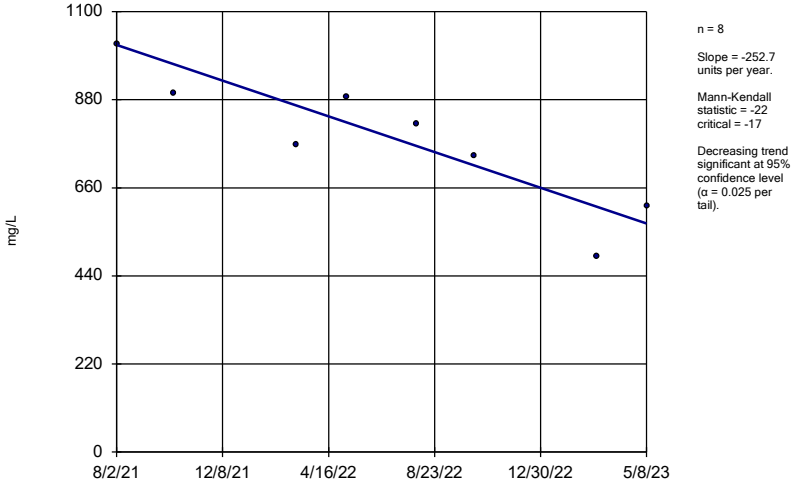
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

MW-53



n = 8

Slope = -252.7 units per year.

Mann-Kendall statistic = -22
critical = -17

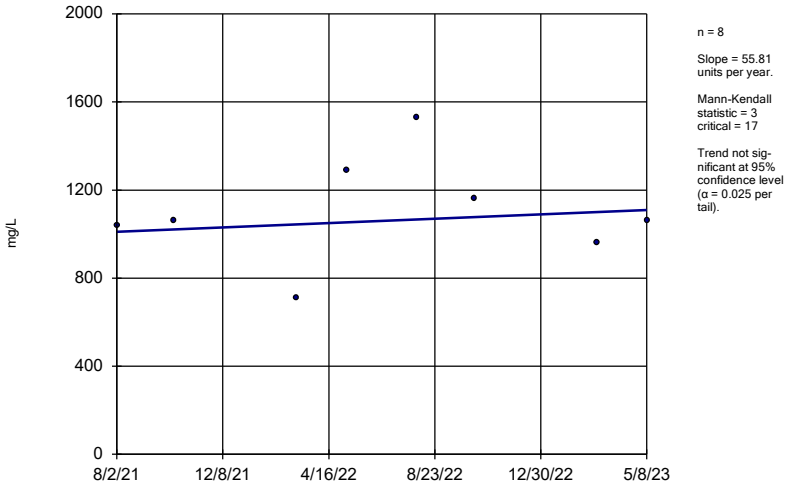
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Total Dissolved Solids

MW-53R



n = 8

Slope = 55.81 units per year.

Mann-Kendall statistic = 3 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

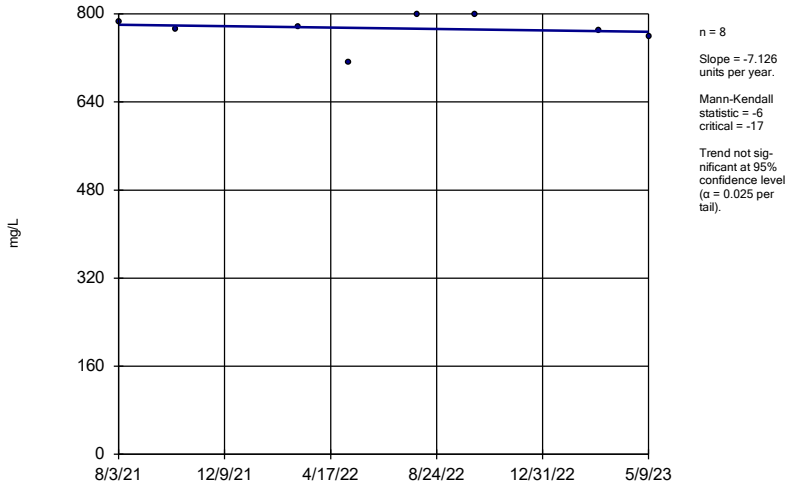
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

MW-54R



n = 8

Slope = -7.126 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

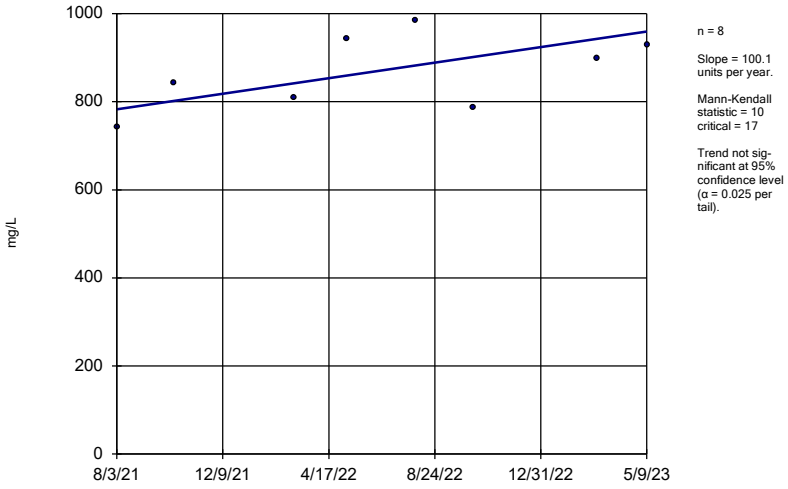
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

MW-55



n = 8

Slope = 100.1 units per year.

Mann-Kendall statistic = 10 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

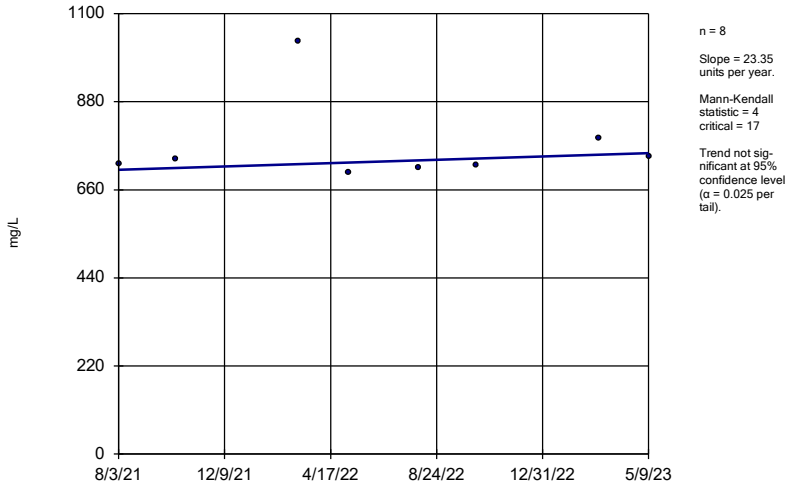
Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Total Dissolved Solids

OW-57ROUT



n = 8

Slope = 23.35 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 12:29 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Appendix D
Assessment Monitoring and GSI Statistical Evaluation

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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 Rule[1] 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 Report[2]. 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.

[1] 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).

[2] 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

[3] 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™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each parameter with a direct exceedance using a per test[4] 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™ 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™ 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.

[4] Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

The Sanitas™ 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™ 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™ 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

		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	GWPS																
Appendix III[1]				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[1]																		
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[2]																		
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 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:	MW-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[(1)]										
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[(1)]										
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.
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:	MW-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[1]										
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[1]										
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		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[1]										
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[1]										
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.
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:	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	GWPS								
Appendix III[1]										
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[1]										
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

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:	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(1)										
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(1)										
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.
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:	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						Field Dup			
Appendix III[1]											
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[1]											
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.

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:	OW-57R 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(1)										
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(1)										
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.
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-MW-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[1]										
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[1]										
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.
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Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, 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[1]										
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[1]										
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.
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-MW-18005								
		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[1]						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[1]											
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-MW-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[1]							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[1]														
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

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**			Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Appendix III[(1)]																					
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[F]	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[(1)]																					
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[H]	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 Parameters[(2)]																					
Iron	ug/L	500,000[EE]	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.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (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-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[(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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	14	20	12	10	15	18	10	8
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	2	2	1	< 1	1	2	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	23	25	10	8	17	20	17	14
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	2	4	1	< 1	2	2	1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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}.

* 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) .

[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) addtional assessment monitoring constituents (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-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**						Field Dup			
Appendix III(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[F]	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(1)														
Arsenic	ug/L	10	100	680	**100**	**204**	**198**	88	48	80	78	**126**	68	44
Chromium	ug/L	11[H]	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 Parameters(2)														
Iron	ug/L	500,000[EE]	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.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, 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	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**								
Appendix III[(1)]													
Boron	ug/L	4,000	44,000	69,000	44,000	304	389	259	226	313	343	180	227
Sulfate	mg/L	1,200[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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}.

* 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) .

[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.

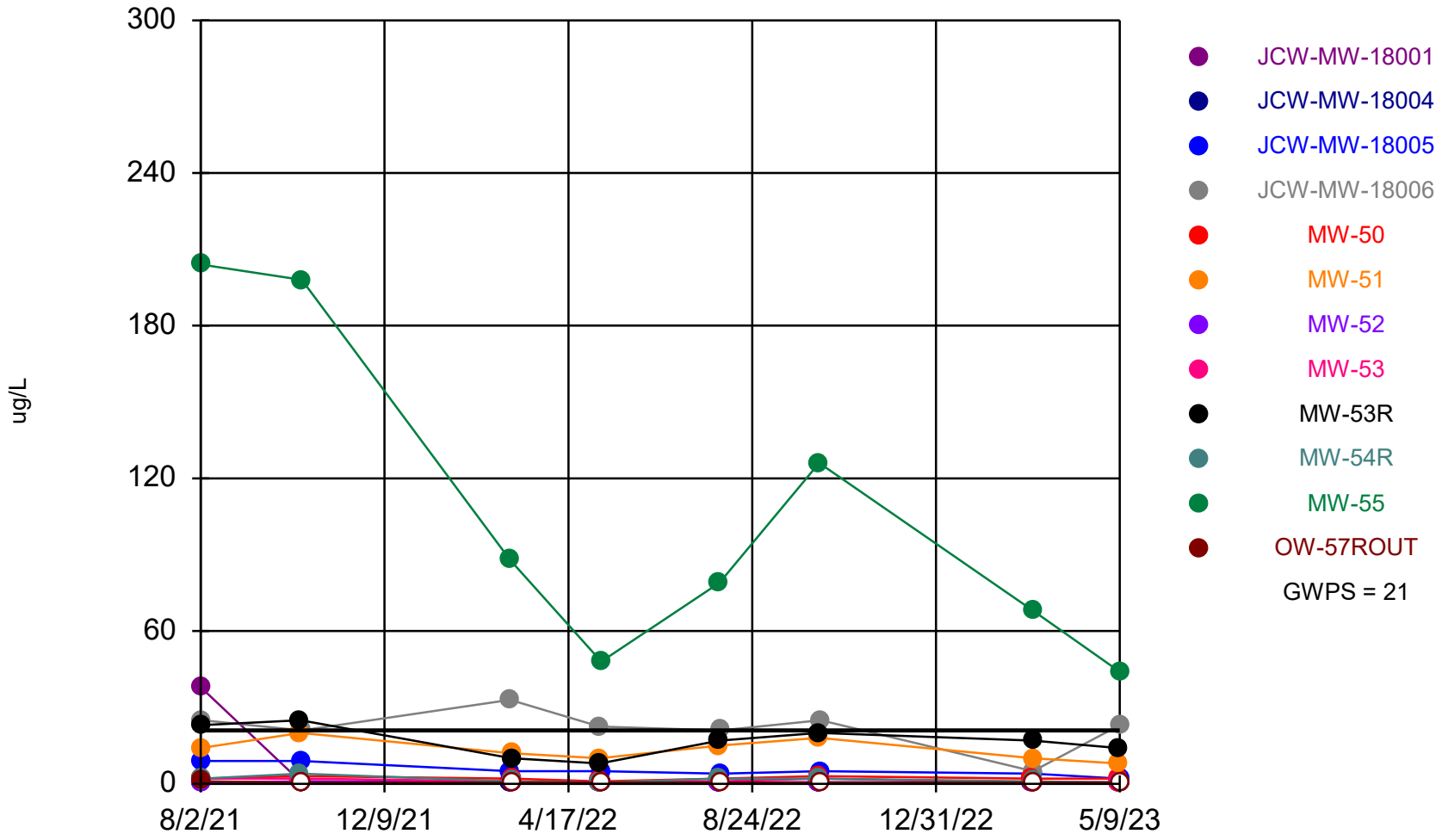
(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Attachment 1
Assessment Monitoring Sanitas™ Output Files

Hollow symbols indicate censored values.

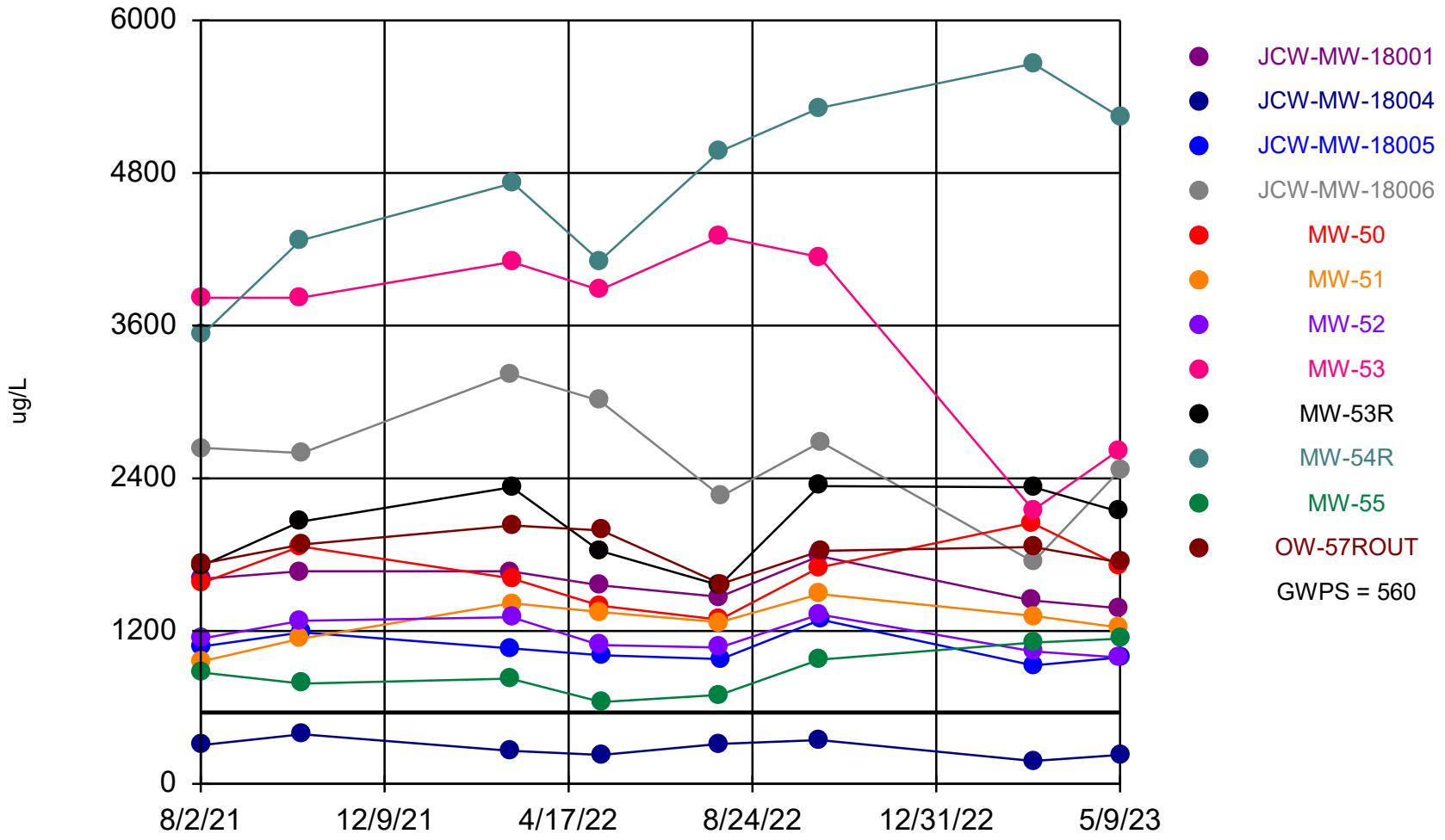
Arsenic Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:24 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

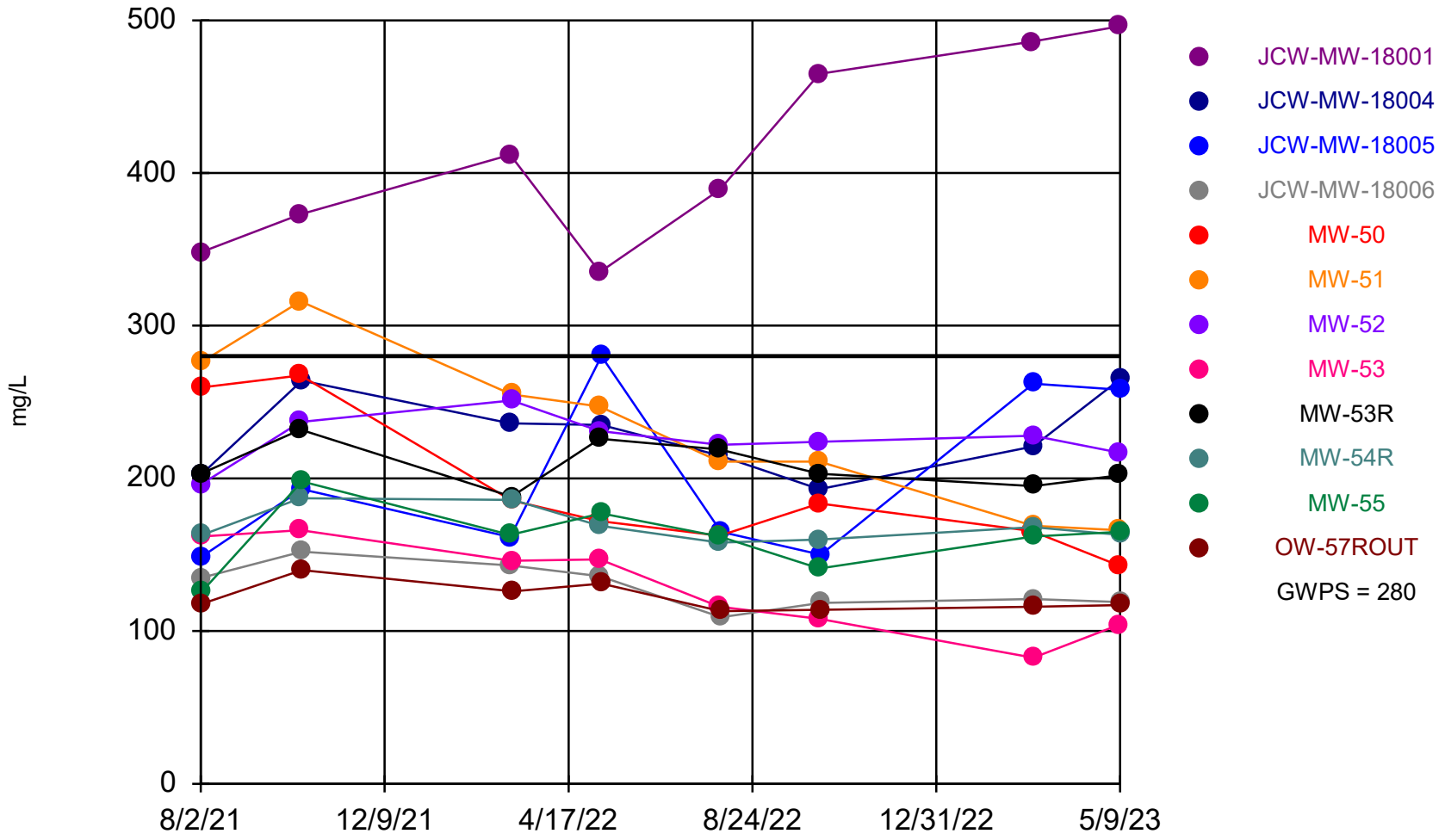
Boron Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:48 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium Comparison to GWPS

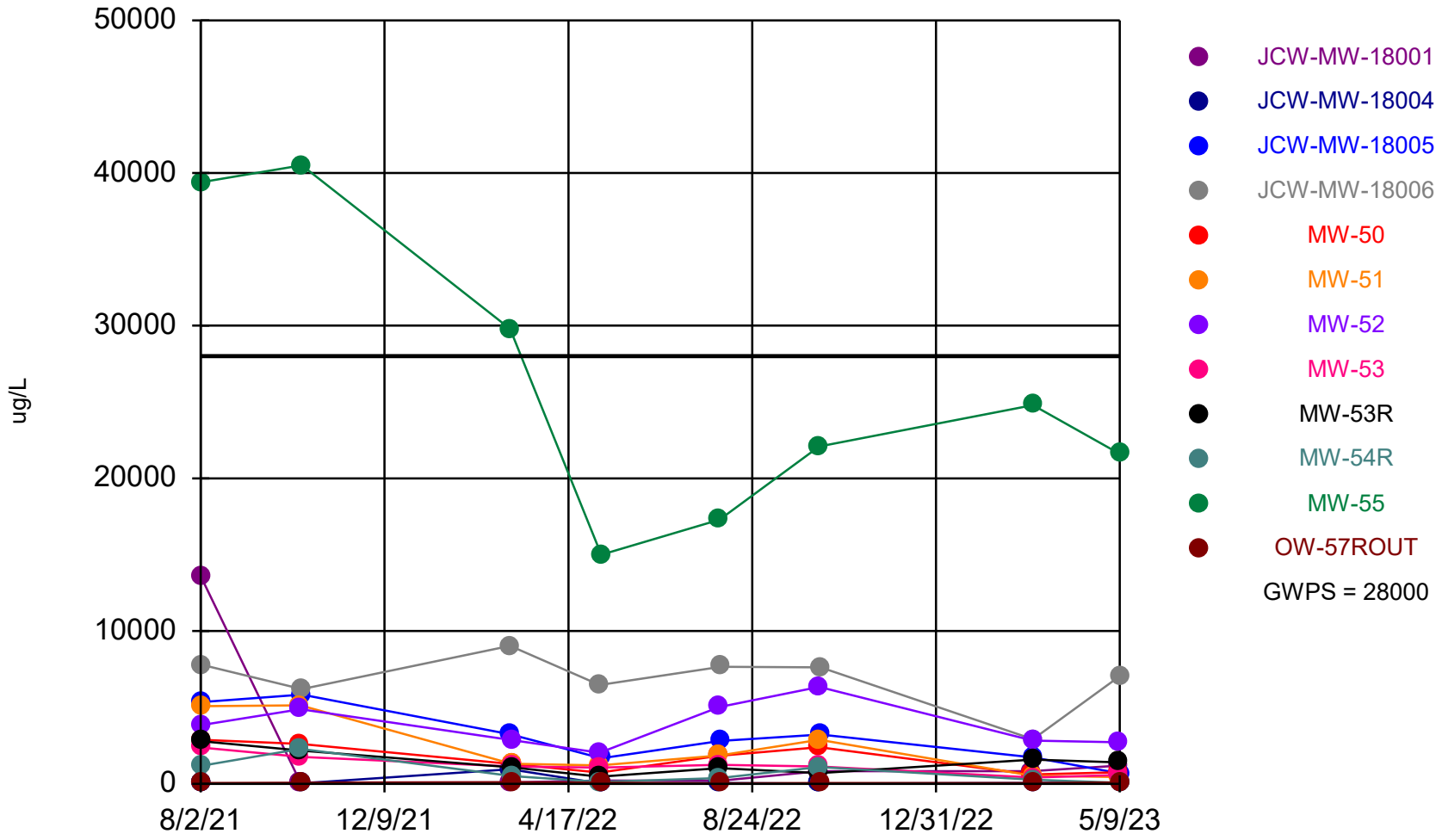


Time Series Analysis Run 5/30/2023 1:50 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

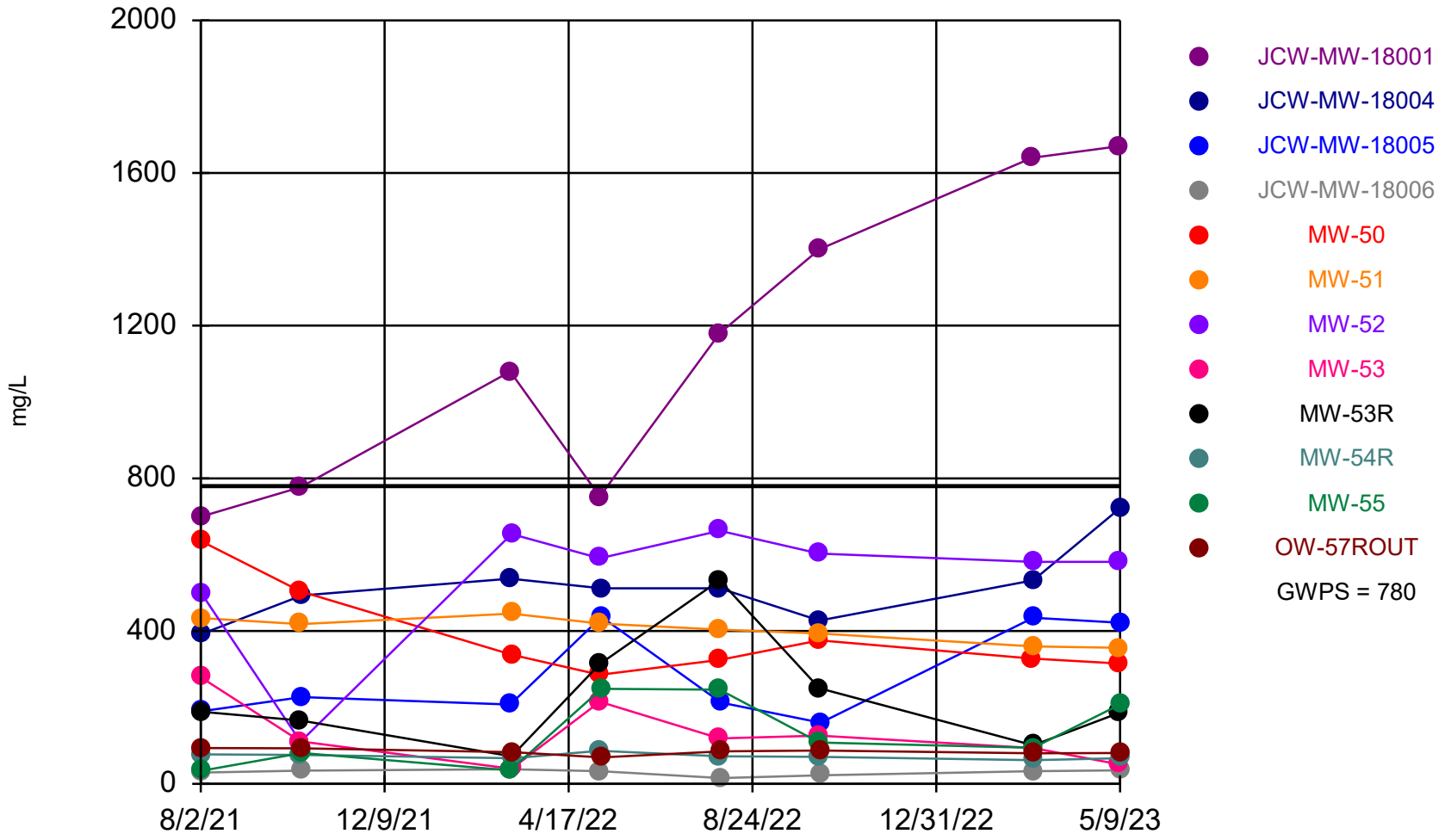
Iron Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:54 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sulfate Comparison to GWPS

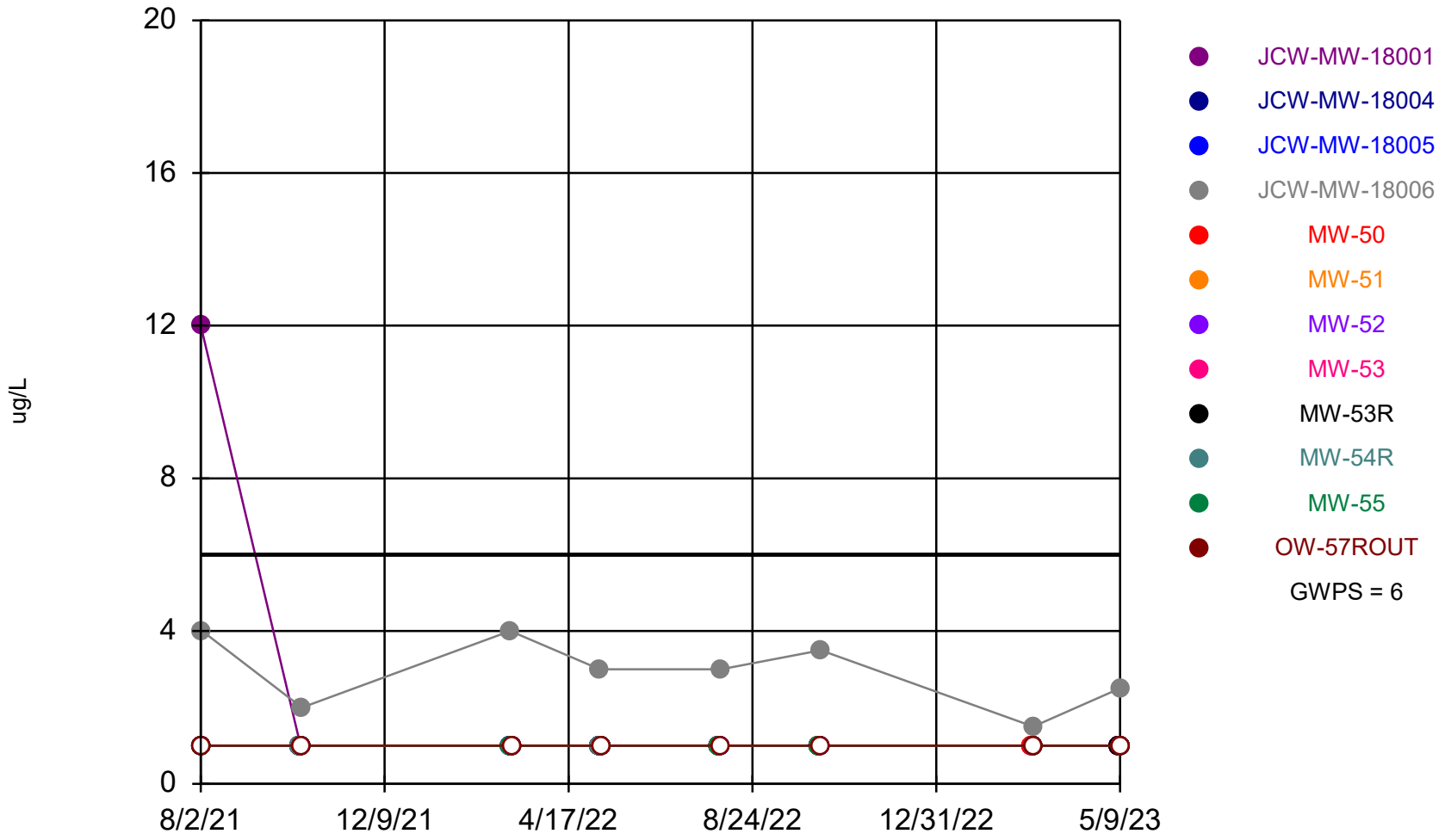


Time Series Analysis Run 5/30/2023 1:55 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Vanadium Comparison to GWPS



Time Series Analysis Run 5/30/2023 1:58 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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
Skewness = 1.971

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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:

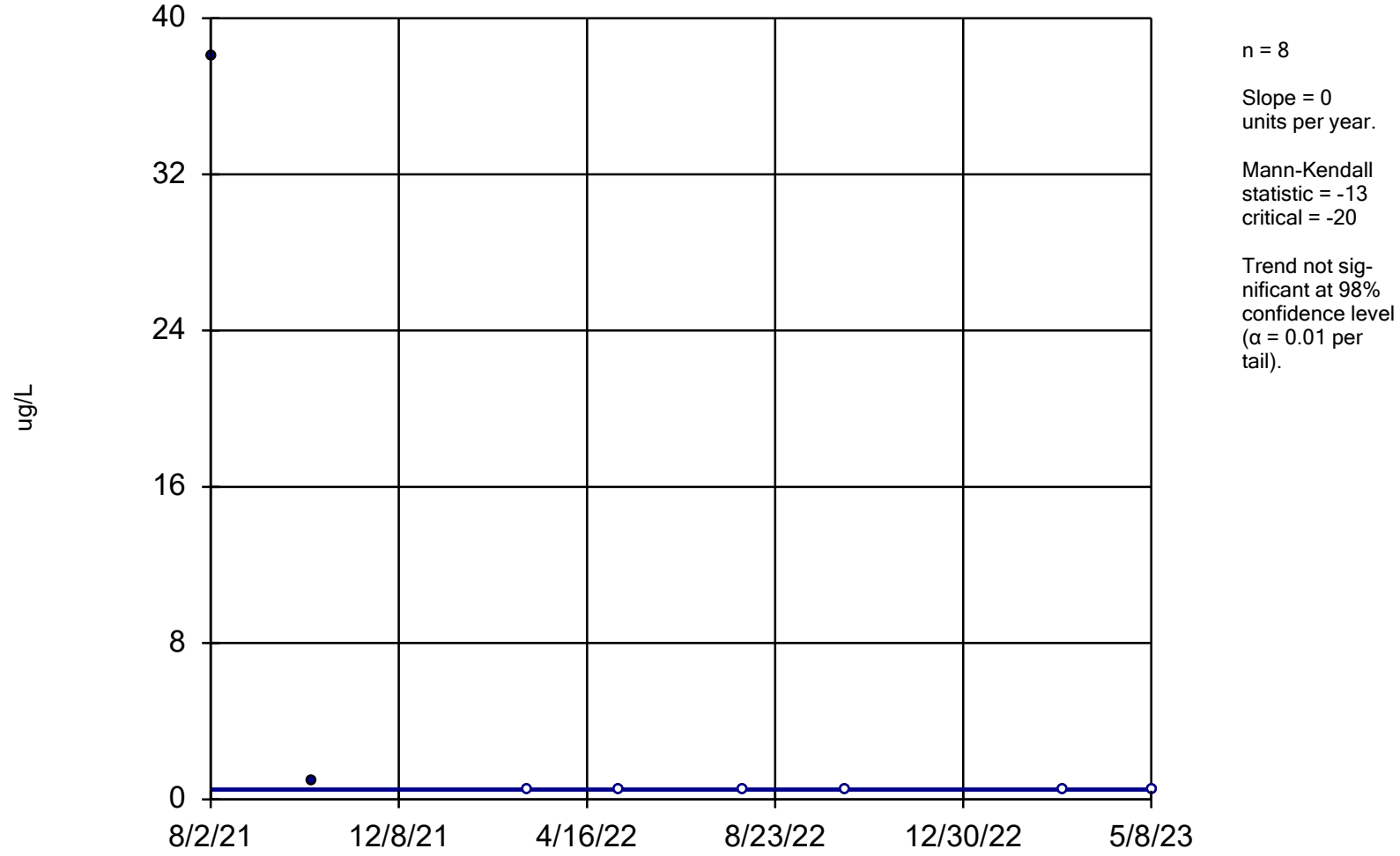
Observations = 96
ND/Trace = 87
Wells = 12
Minimum Value = 1
Maximum Value = 12
Mean Value = 1.276
Median Value = 1
Standard Deviation = 1.254
Coefficient of Variation = 0.9829
Skewness = 6.948

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Hollow symbols indicate censored values.

Arsenic, Total

JCW-MW-18001



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = -13
critical = -20

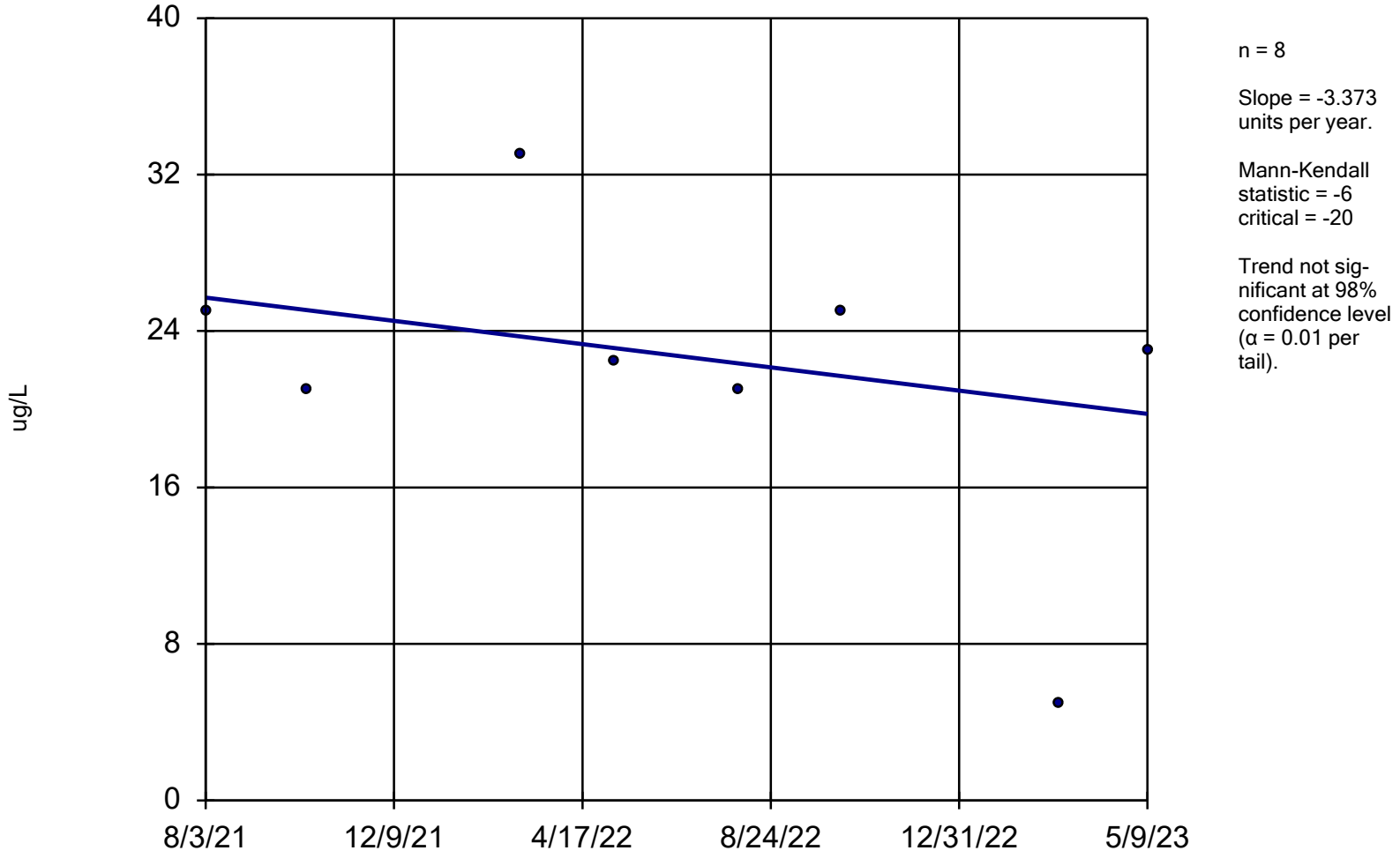
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Arsenic, Total

JCW-MW-18006



n = 8

Slope = -3.373 units per year.

Mann-Kendall statistic = -6
critical = -20

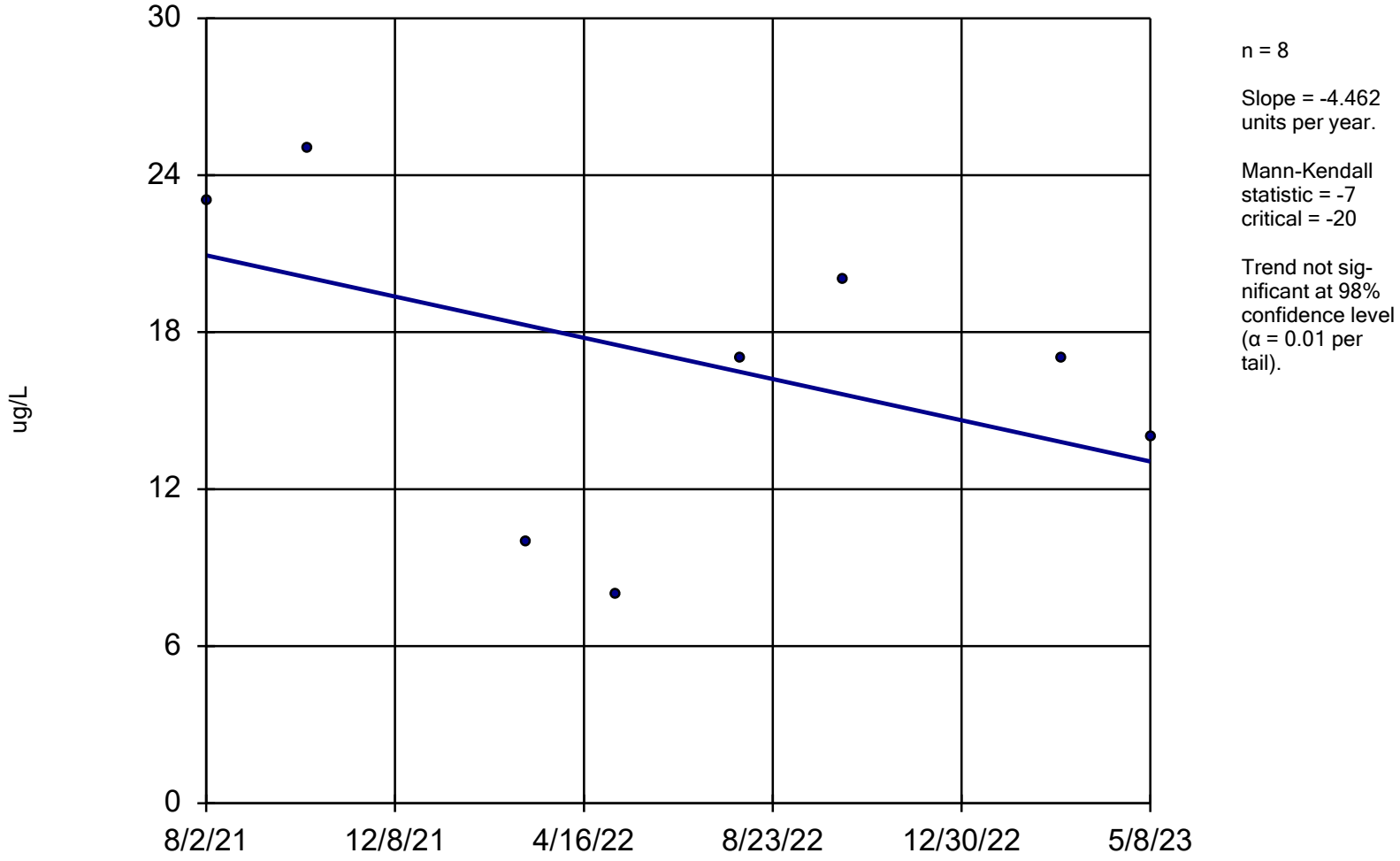
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Arsenic, Total

MW-53R



n = 8

Slope = -4.462 units per year.

Mann-Kendall statistic = -7
critical = -20

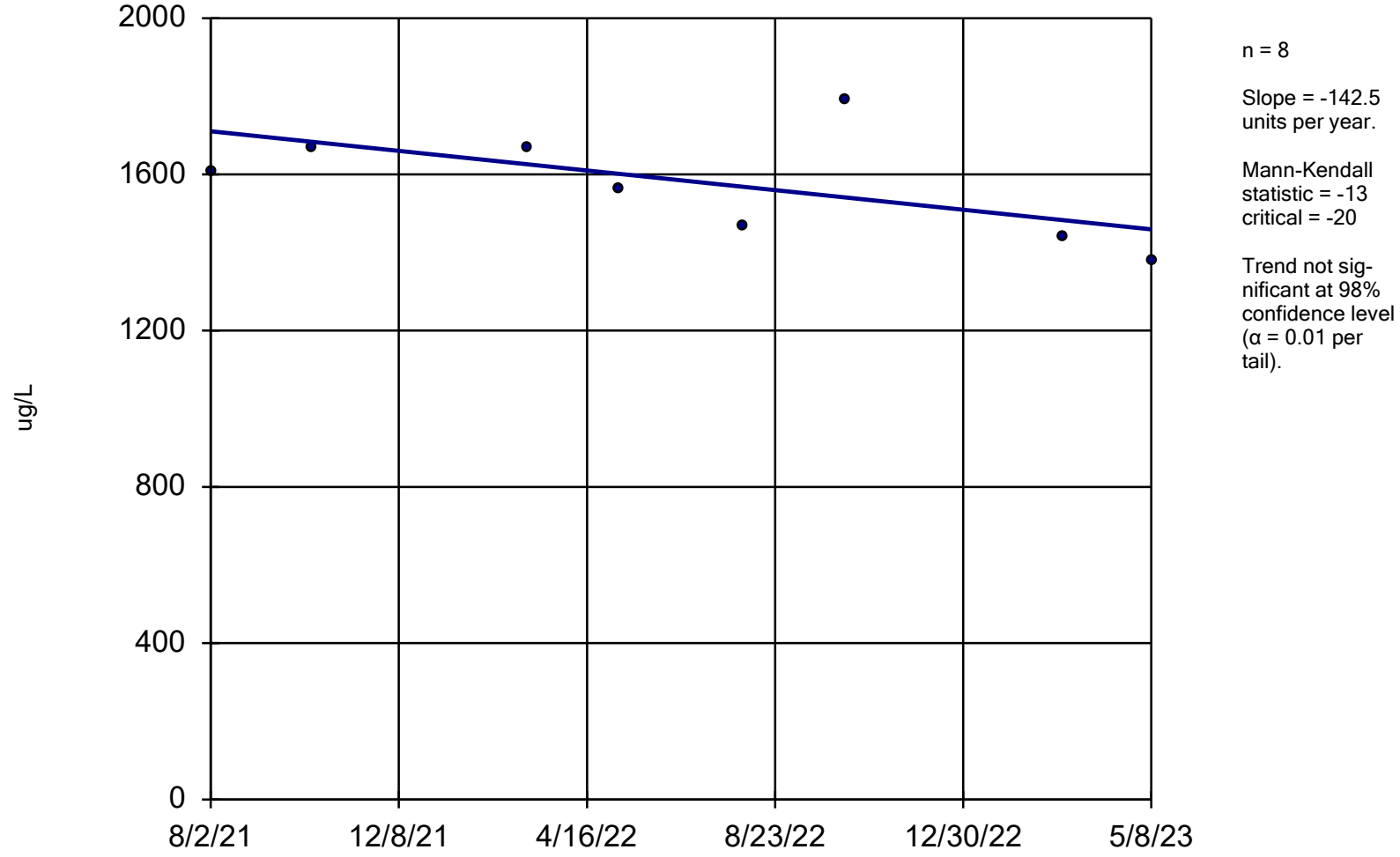
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

JCW-MW-18001



n = 8

Slope = -142.5 units per year.

Mann-Kendall statistic = -13
critical = -20

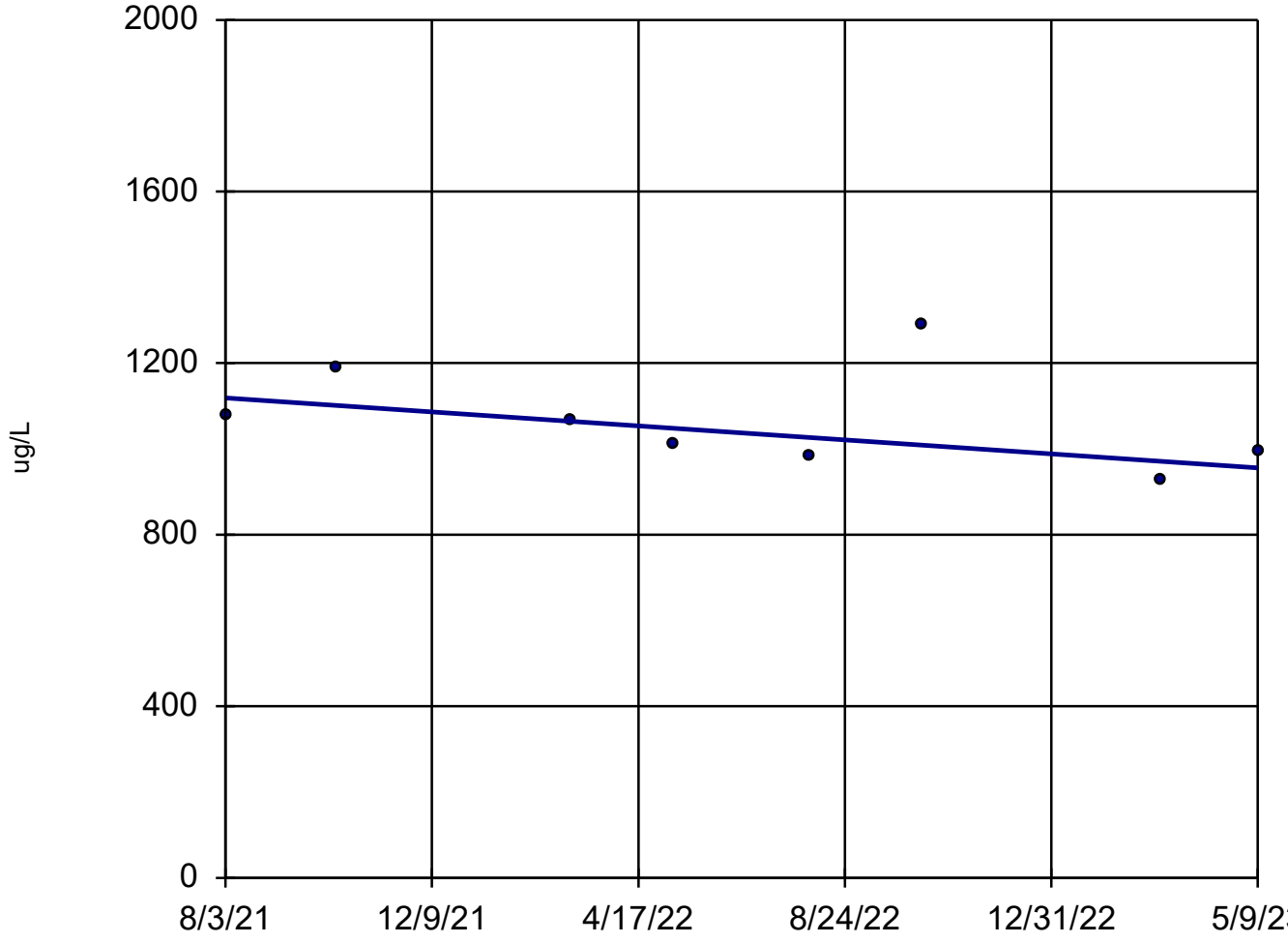
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

JCW-MW-18005



n = 8

Slope = -92.58 units per year.

Mann-Kendall statistic = -12
critical = -20

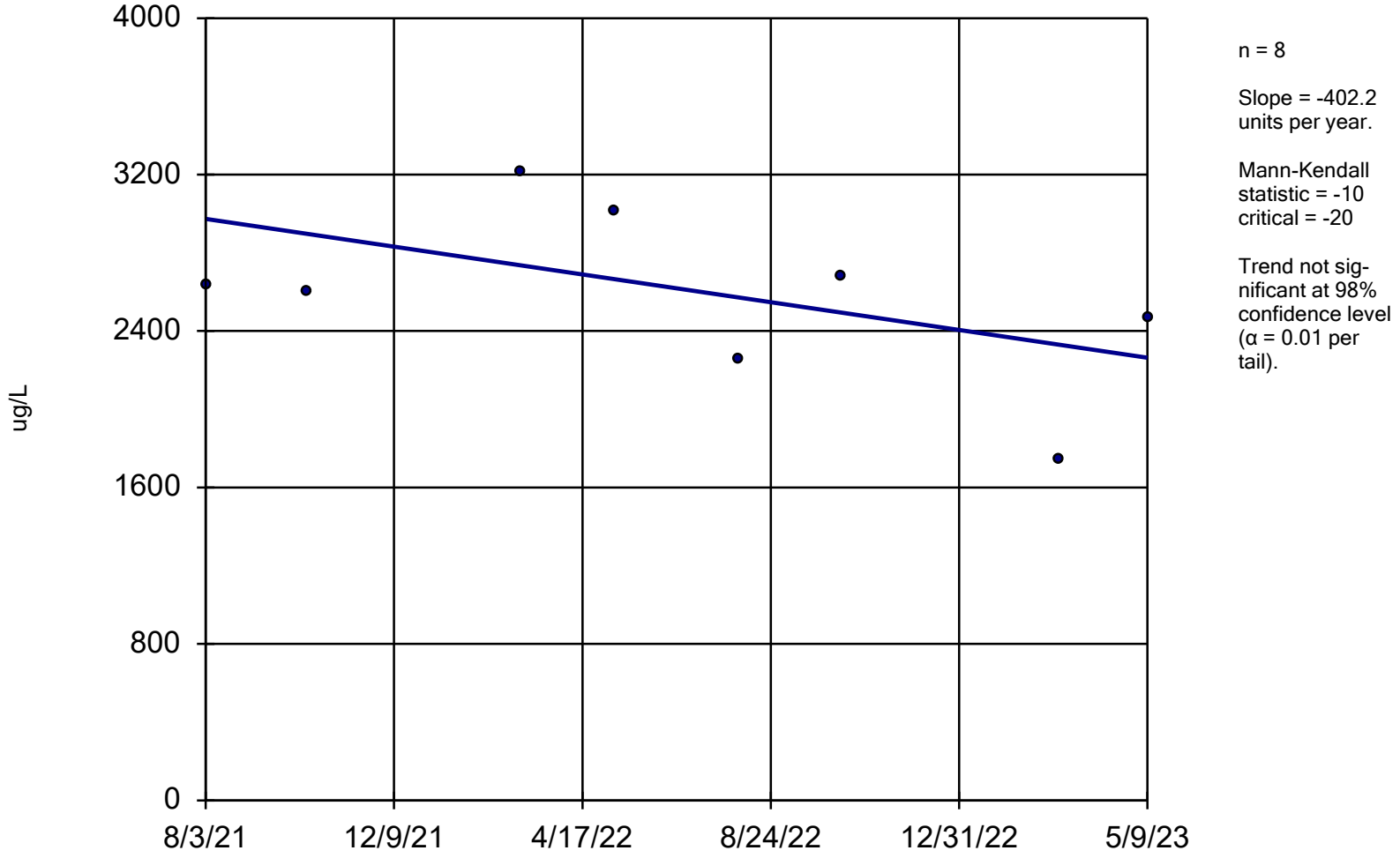
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

JCW-MW-18006



n = 8

Slope = -402.2 units per year.

Mann-Kendall statistic = -10
critical = -20

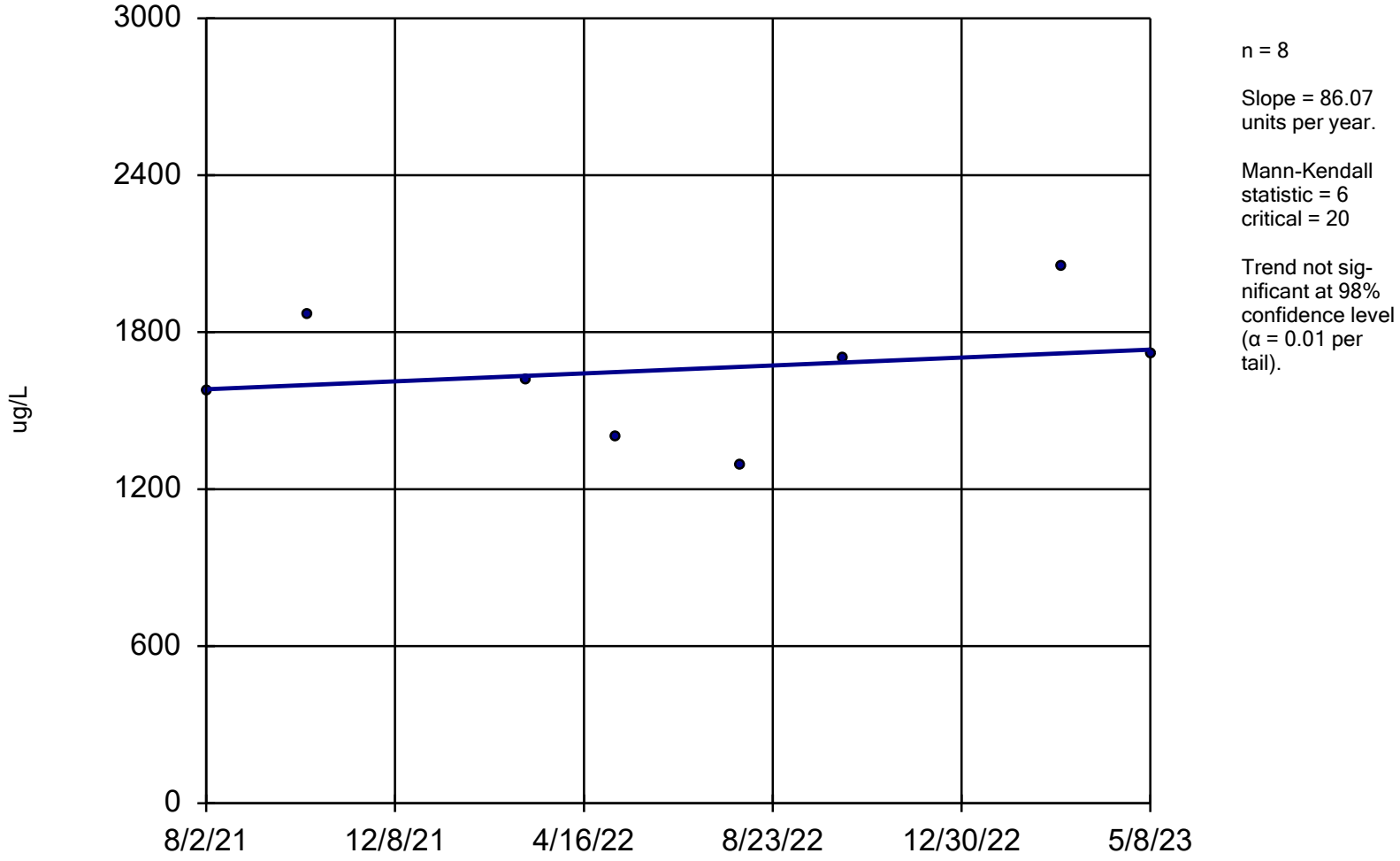
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-50



n = 8

Slope = 86.07 units per year.

Mann-Kendall statistic = 6
critical = 20

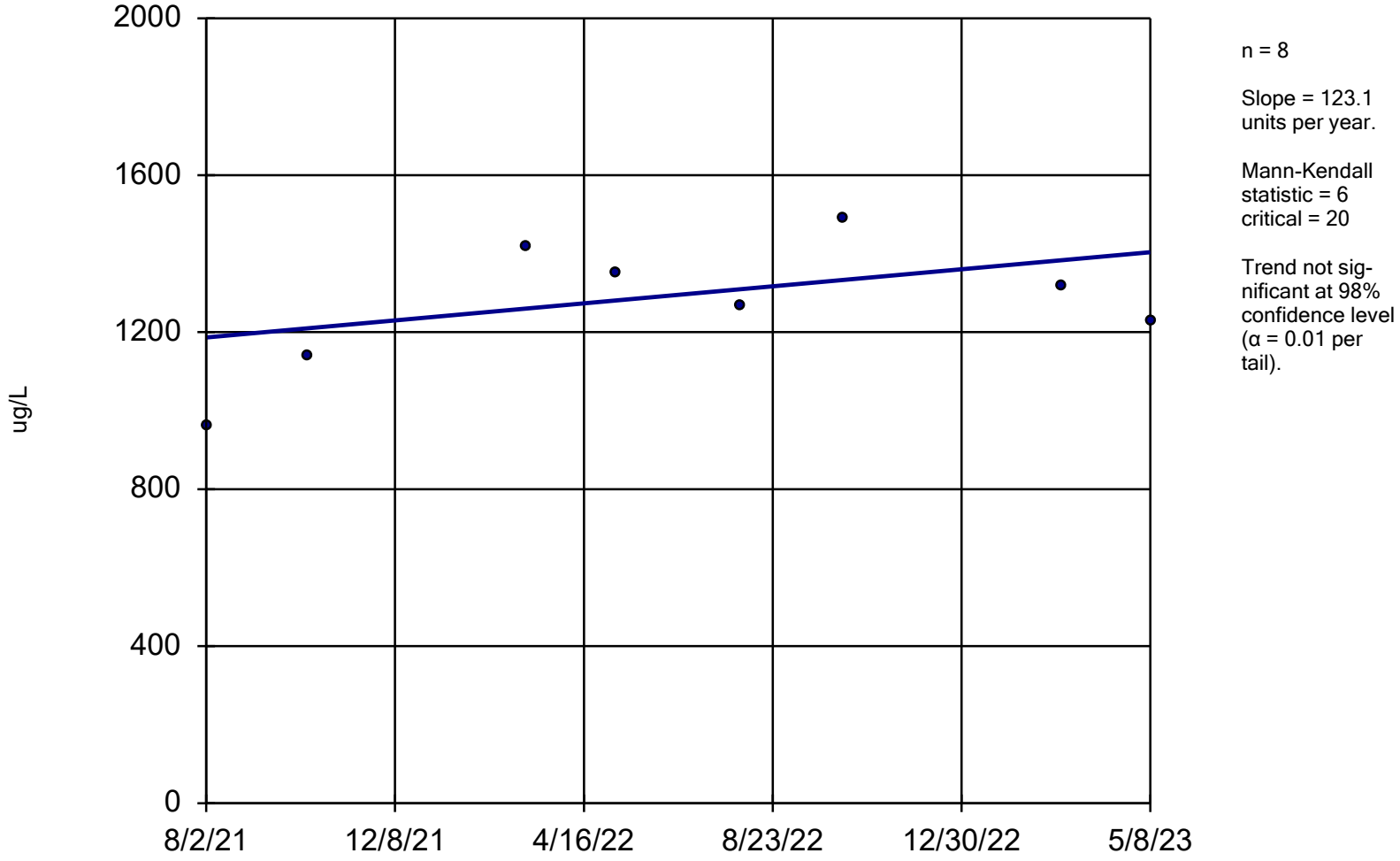
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-51



n = 8

Slope = 123.1 units per year.

Mann-Kendall statistic = 6
critical = 20

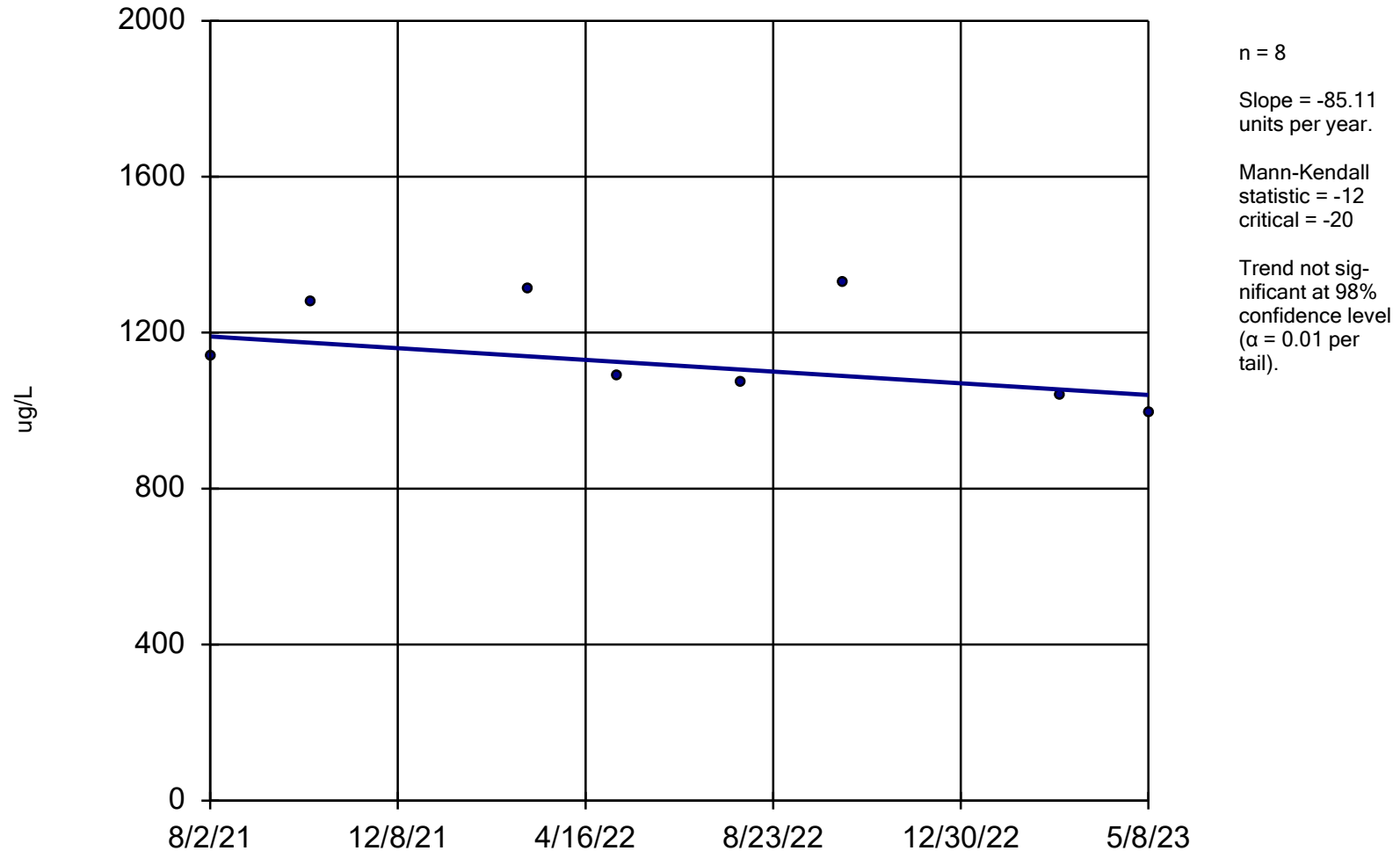
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-52



n = 8

Slope = -85.11 units per year.

Mann-Kendall statistic = -12
critical = -20

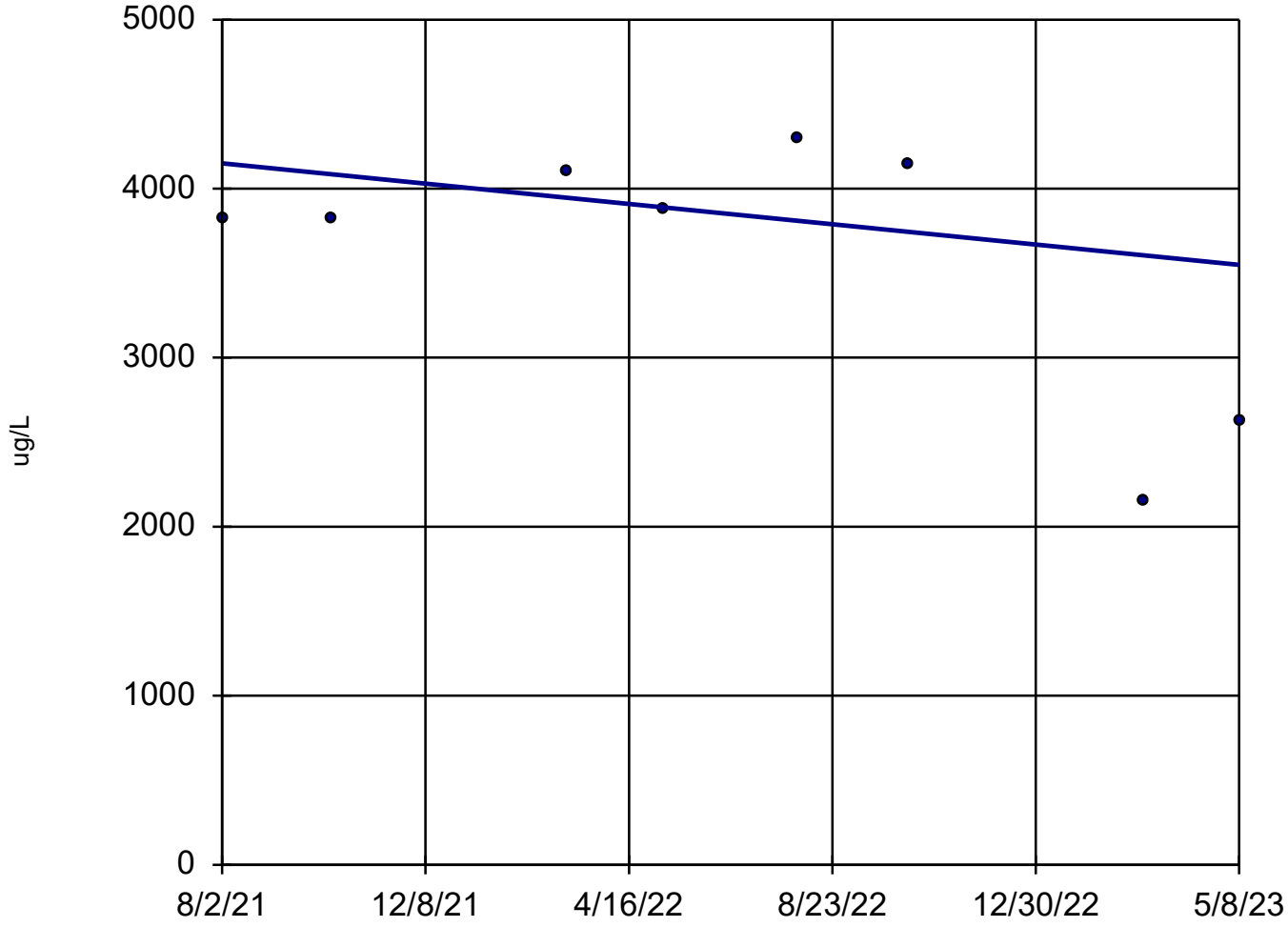
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-53



n = 8

Slope = -340.1 units per year.

Mann-Kendall statistic = -1
critical = -20

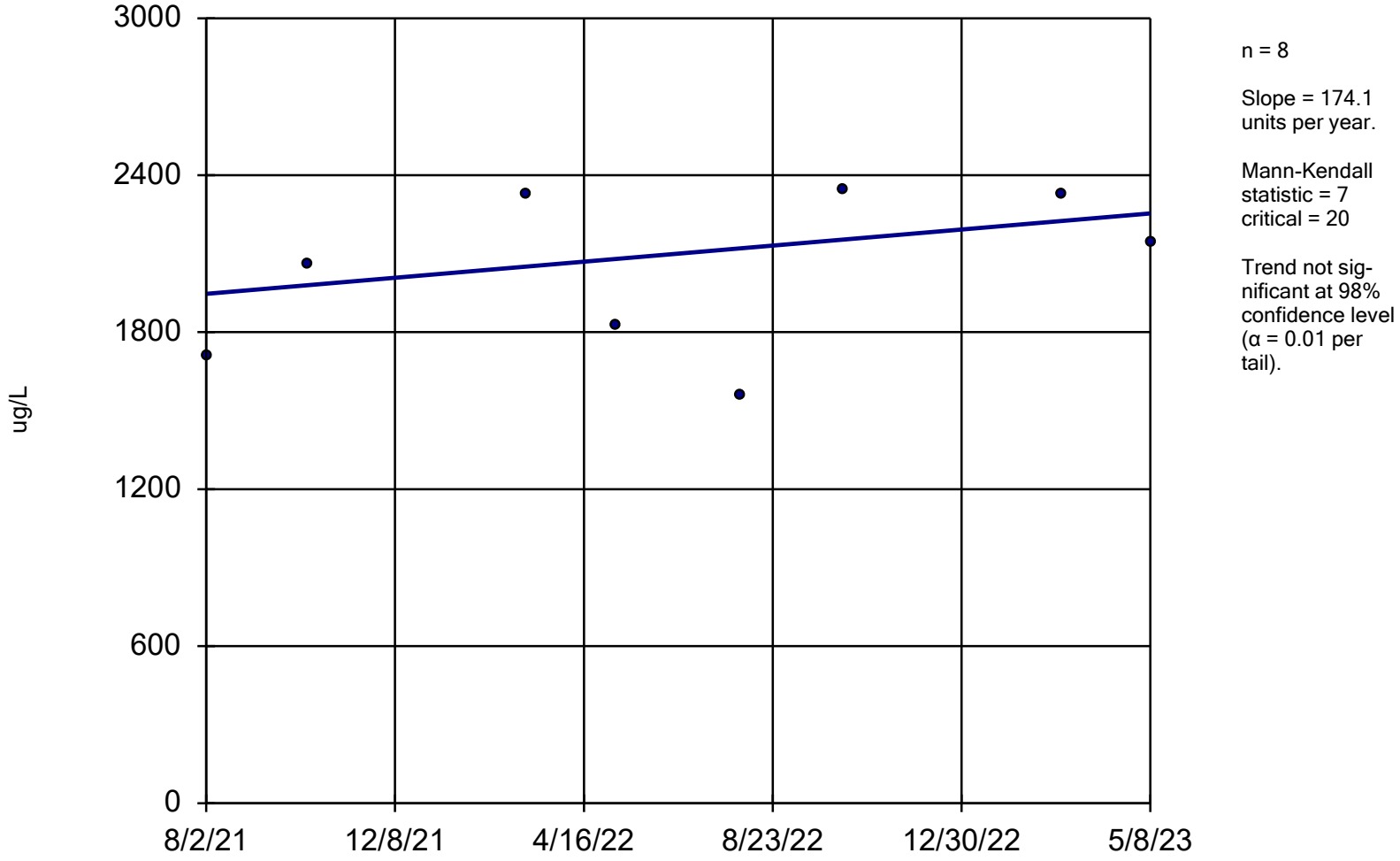
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-53R



n = 8

Slope = 174.1 units per year.

Mann-Kendall statistic = 7
critical = 20

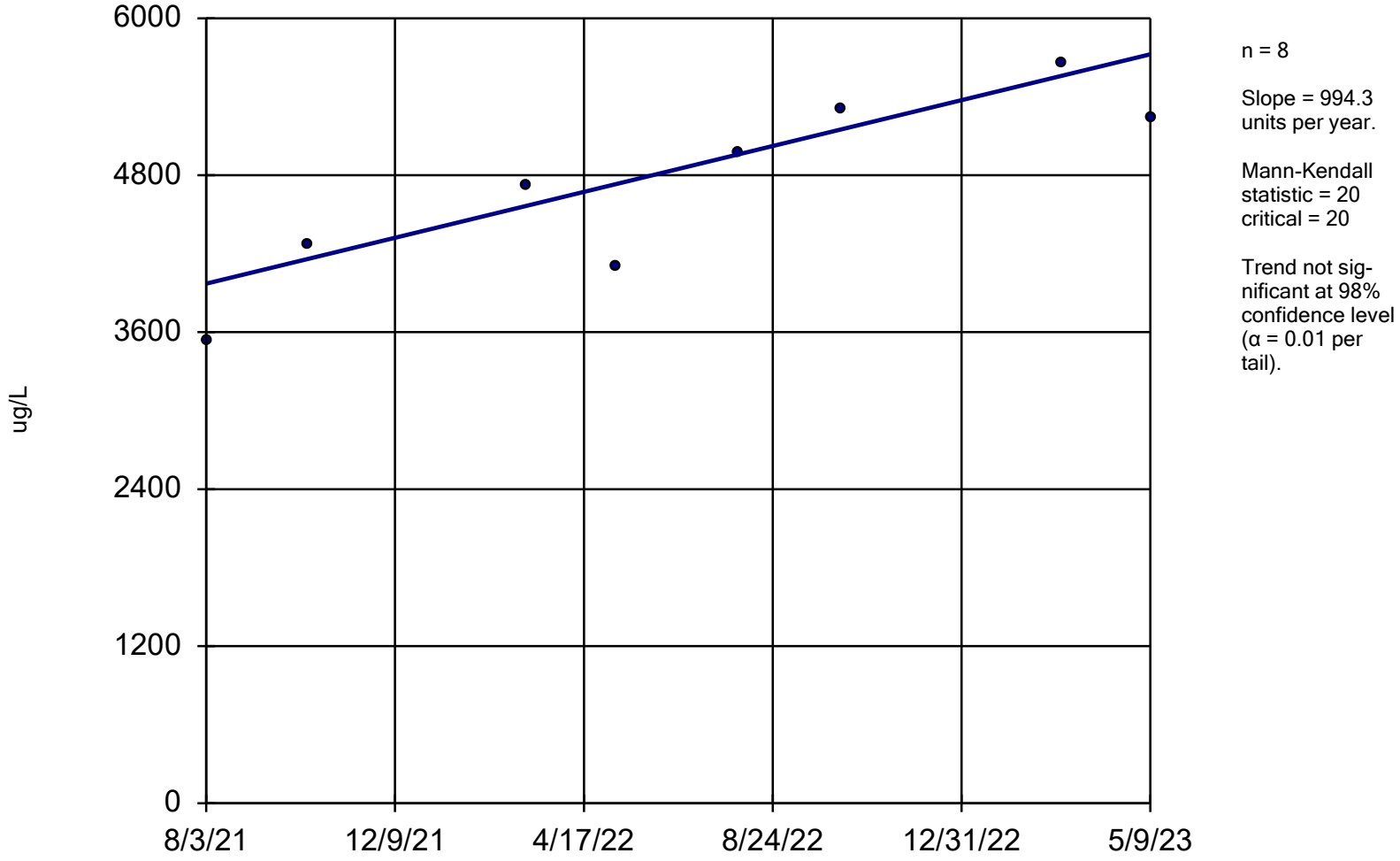
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-54R



n = 8

Slope = 994.3 units per year.

Mann-Kendall statistic = 20
critical = 20

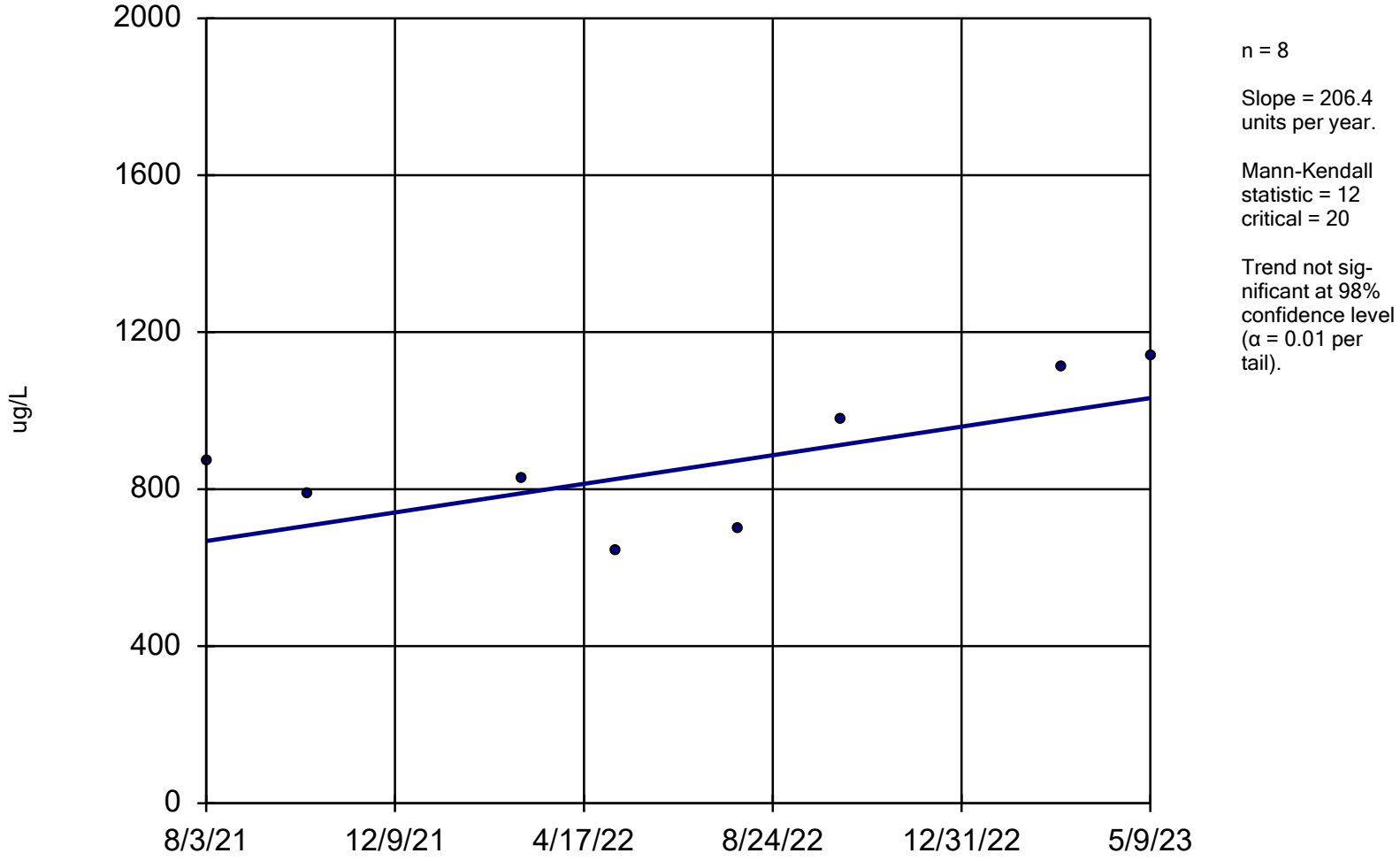
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

MW-55



n = 8

Slope = 206.4 units per year.

Mann-Kendall statistic = 12
critical = 20

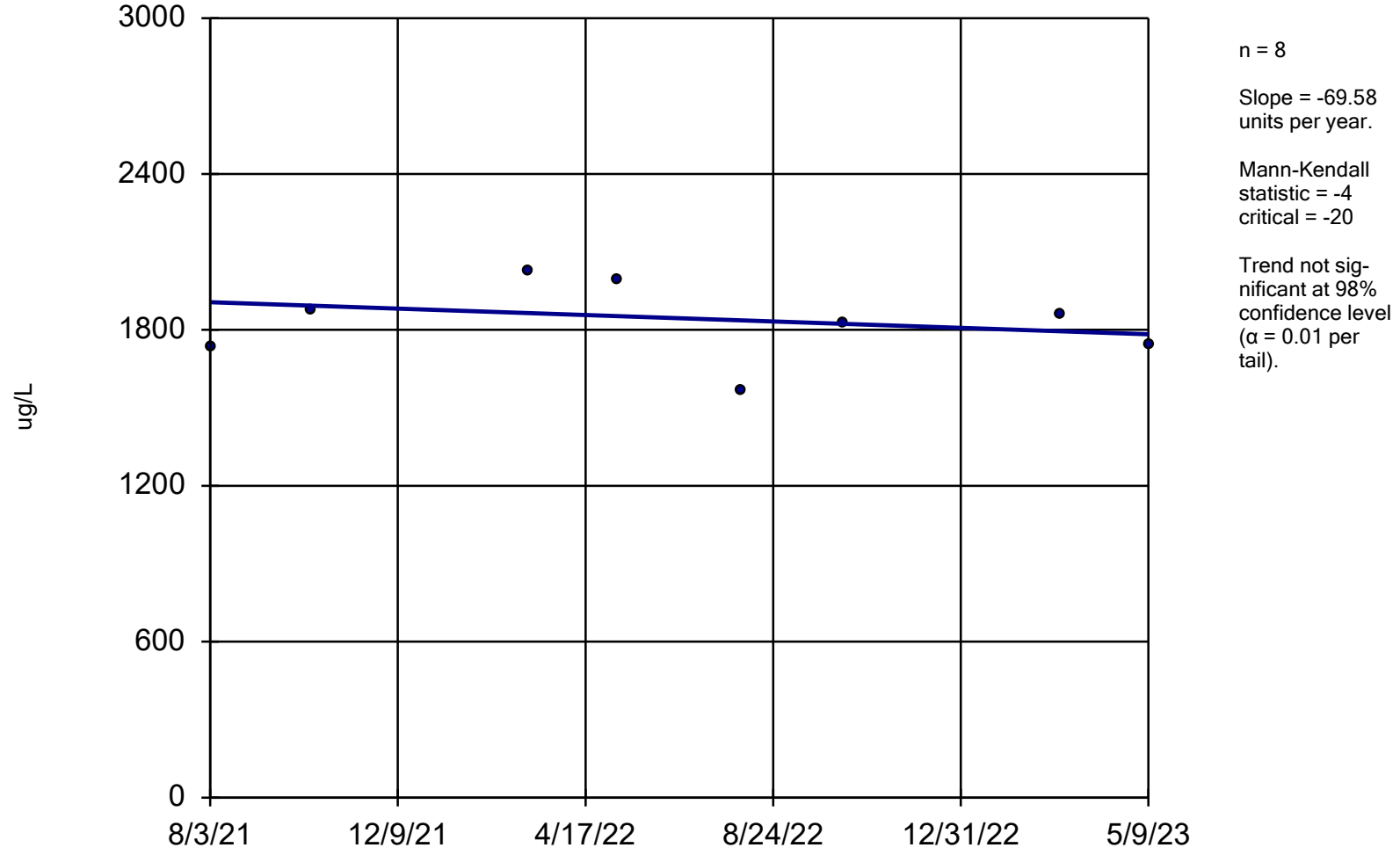
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Boron, Total

OW-57ROUT



n = 8

Slope = -69.58 units per year.

Mann-Kendall statistic = -4
critical = -20

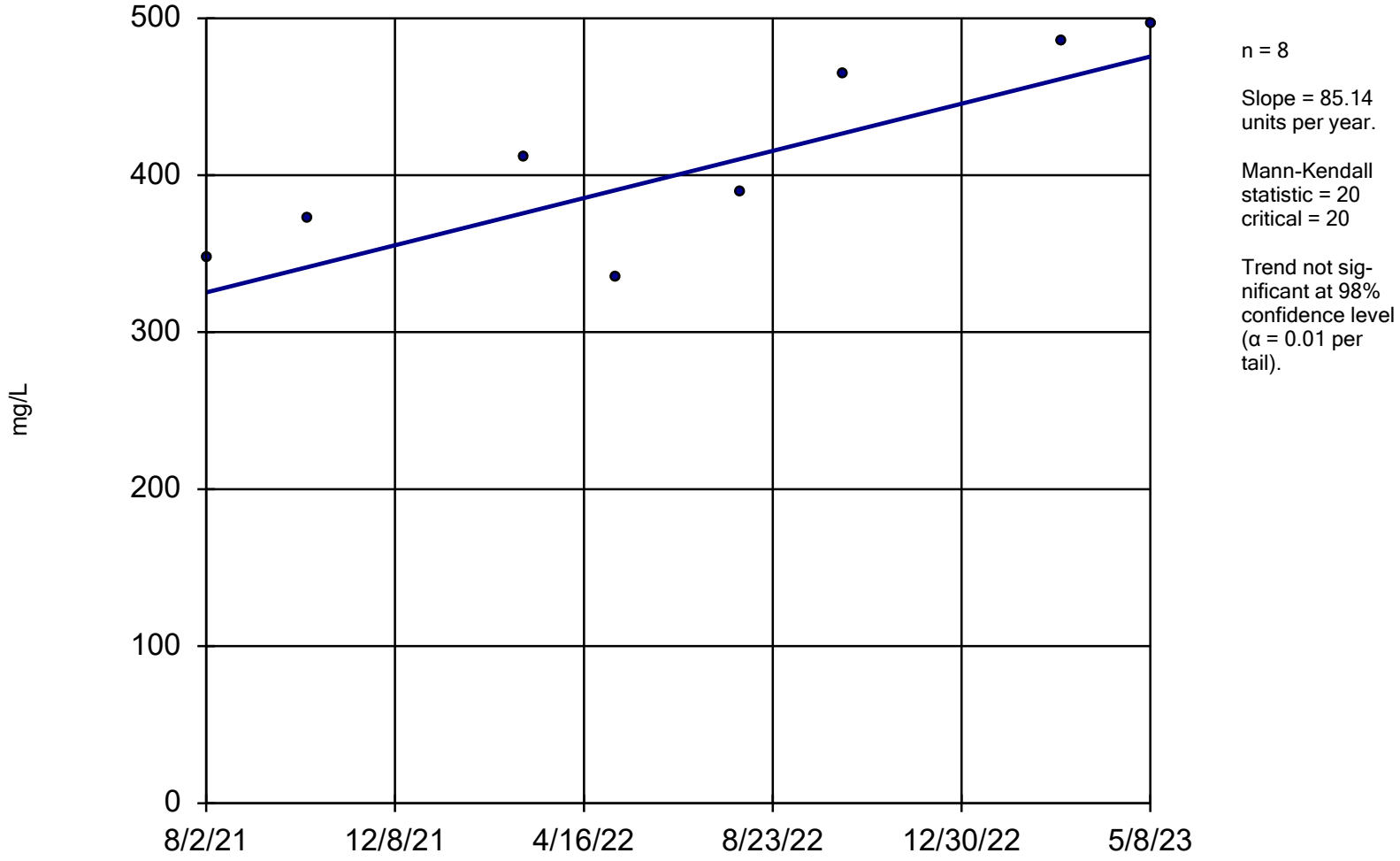
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium, Total

JCW-MW-18001



n = 8

Slope = 85.14 units per year.

Mann-Kendall statistic = 20 critical = 20

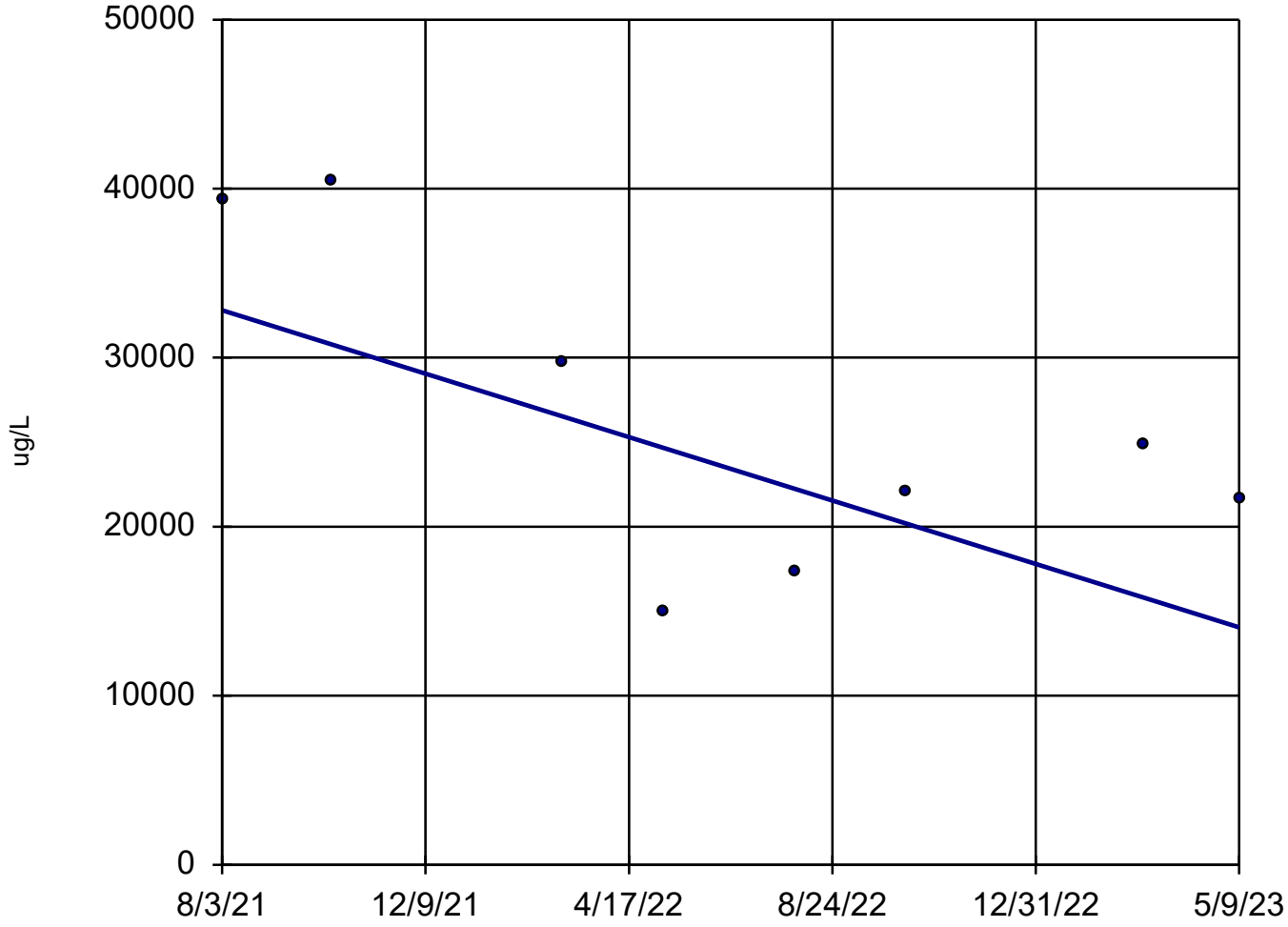
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 5/30/2023 3:47 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Iron, Total

MW-55



n = 8

Slope = -10630 units per year.

Mann-Kendall statistic = -10
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

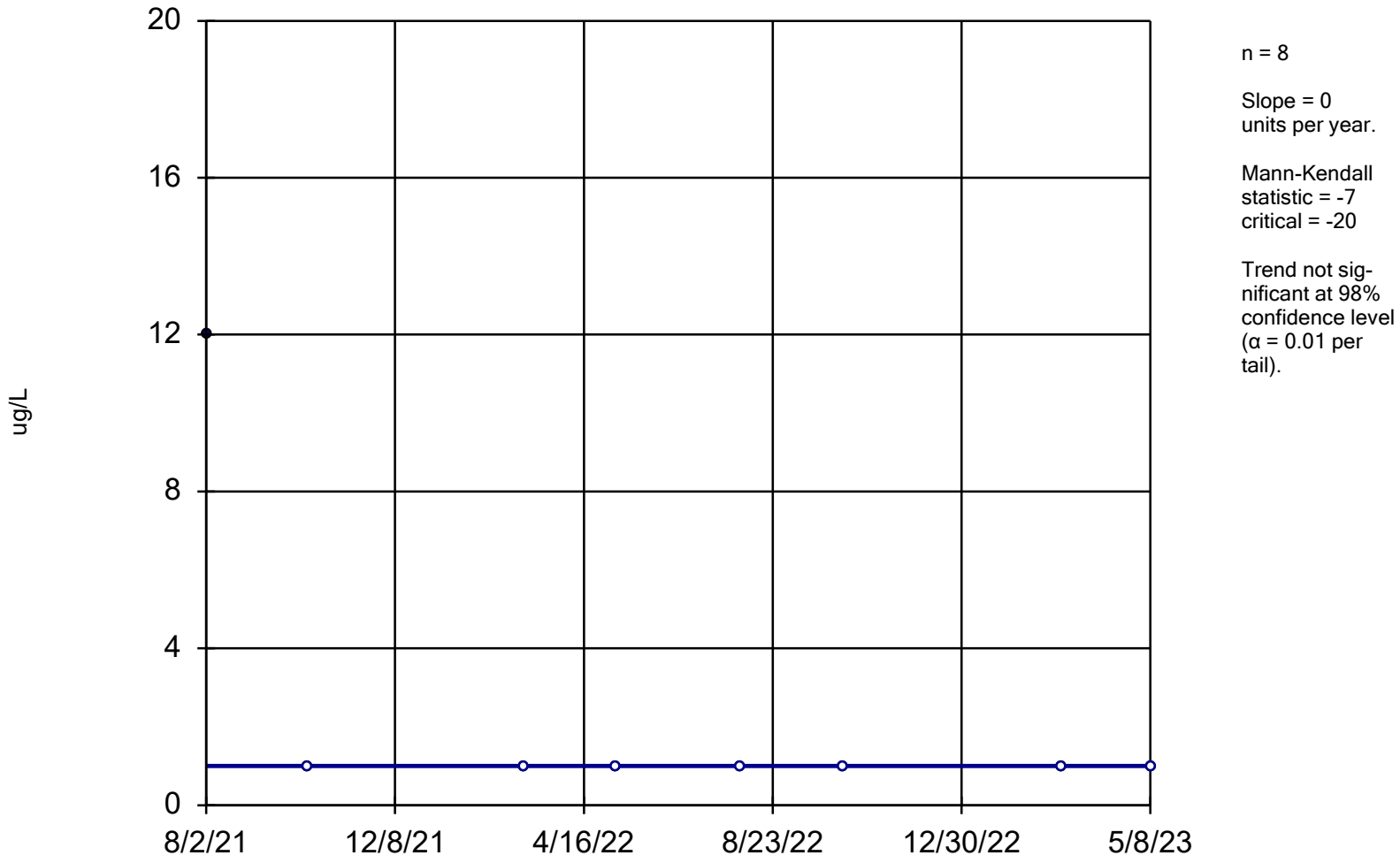
Sen's Slope Estimator Analysis Run 5/30/2023 3:48 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Vanadium, Total

JCW-MW-18001

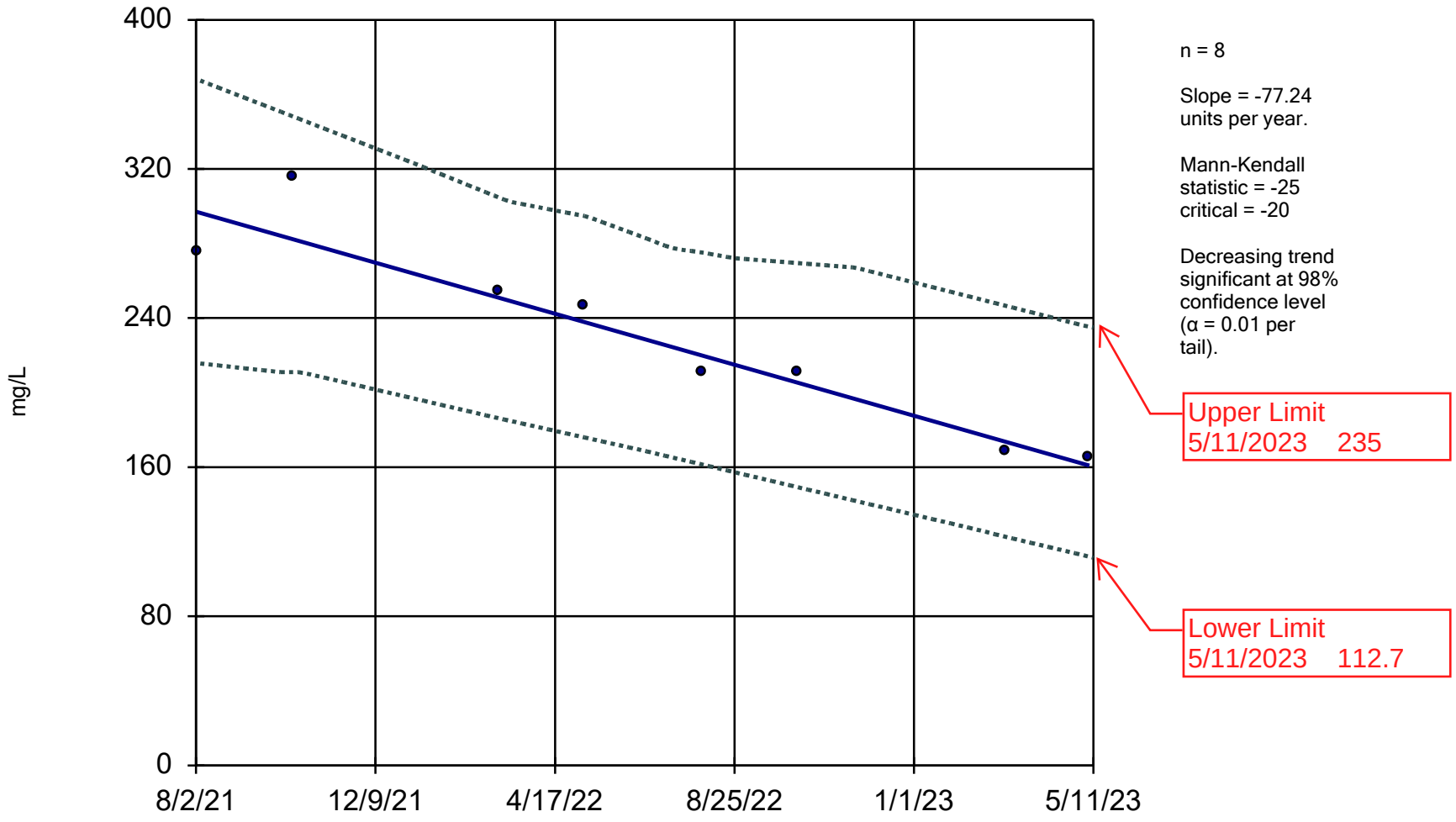


Sen's Slope Estimator Analysis Run 5/30/2023 3:48 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Calcium, Total

MW-51

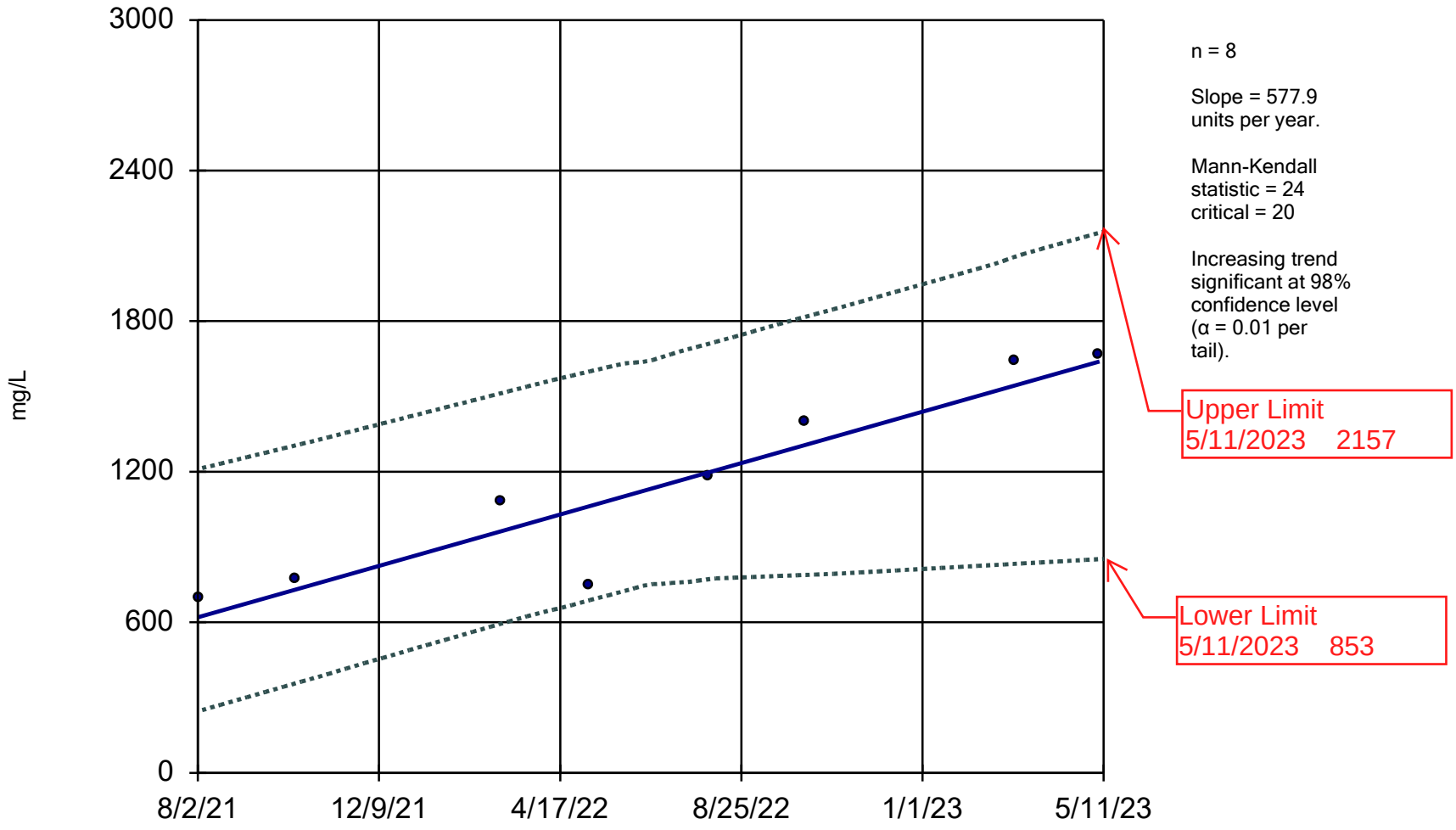


Sen's Slope and 98% Confidence Band Analysis Run 5/30/2023 3:52 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Sulfate

JCW-MW-18001

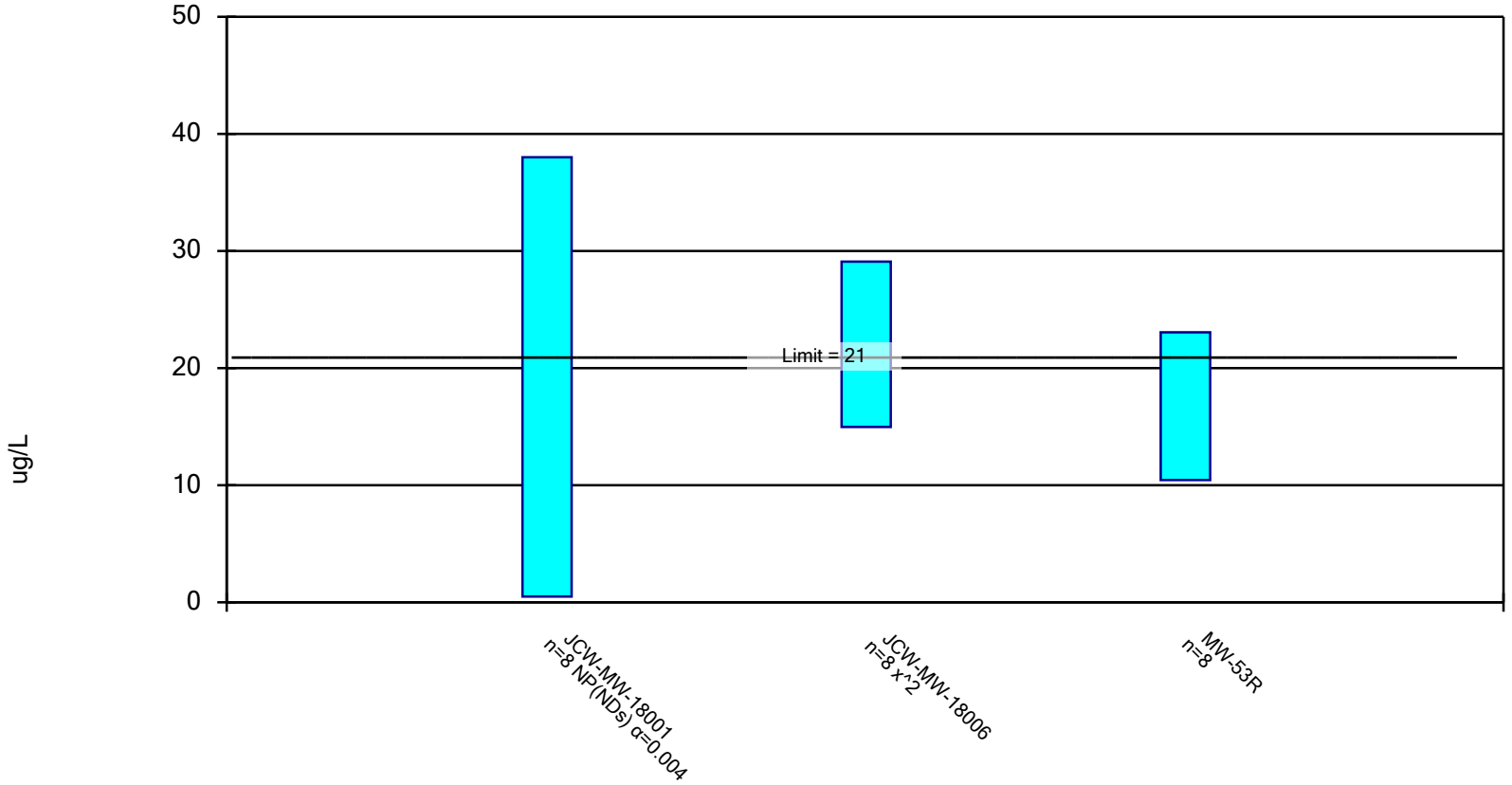


Sen's Slope and 98% Confidence Band Analysis Run 5/30/2023 3:54 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

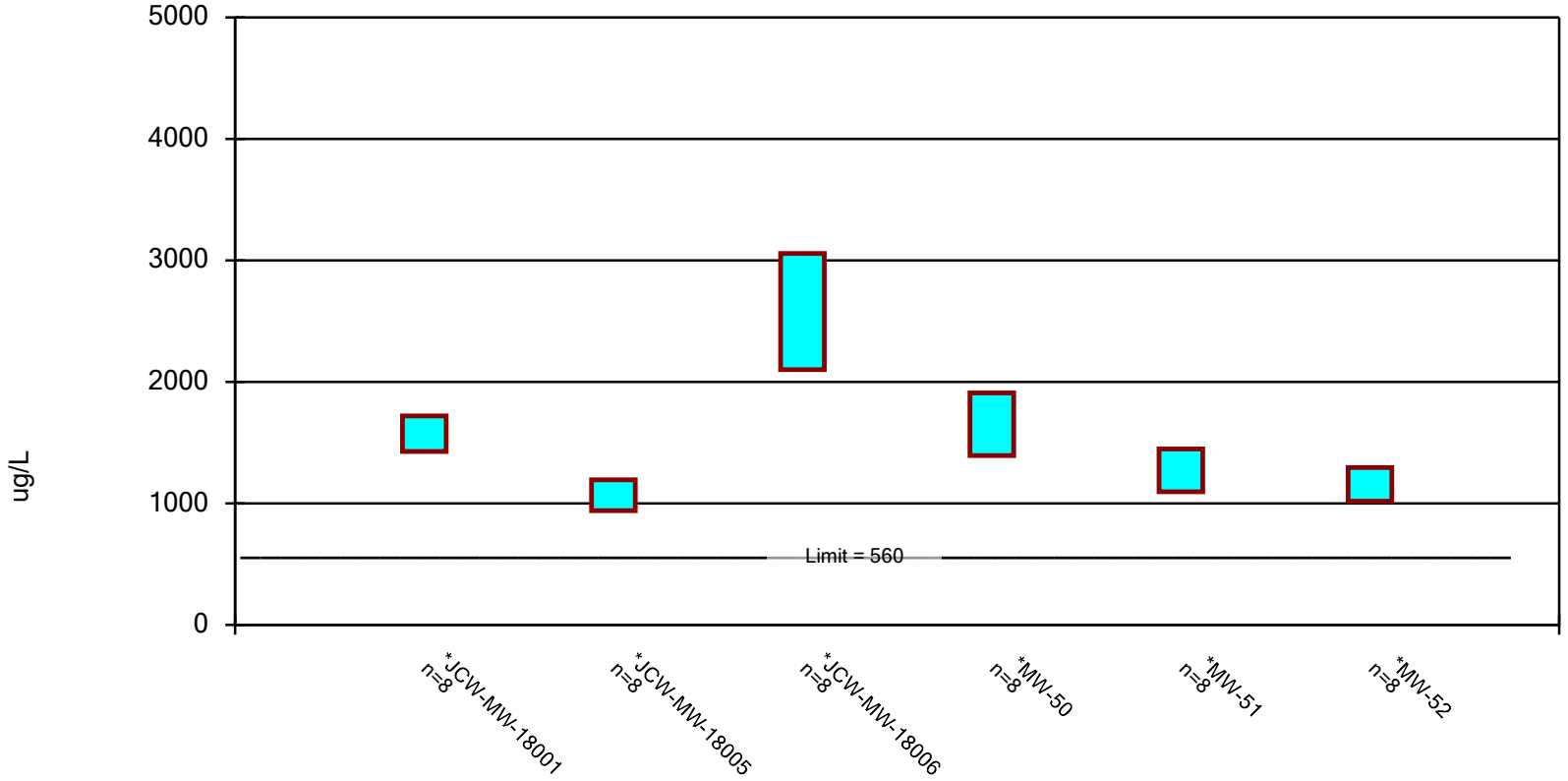
Constituent: Arsenic, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

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

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 5/30/2023 4:01 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

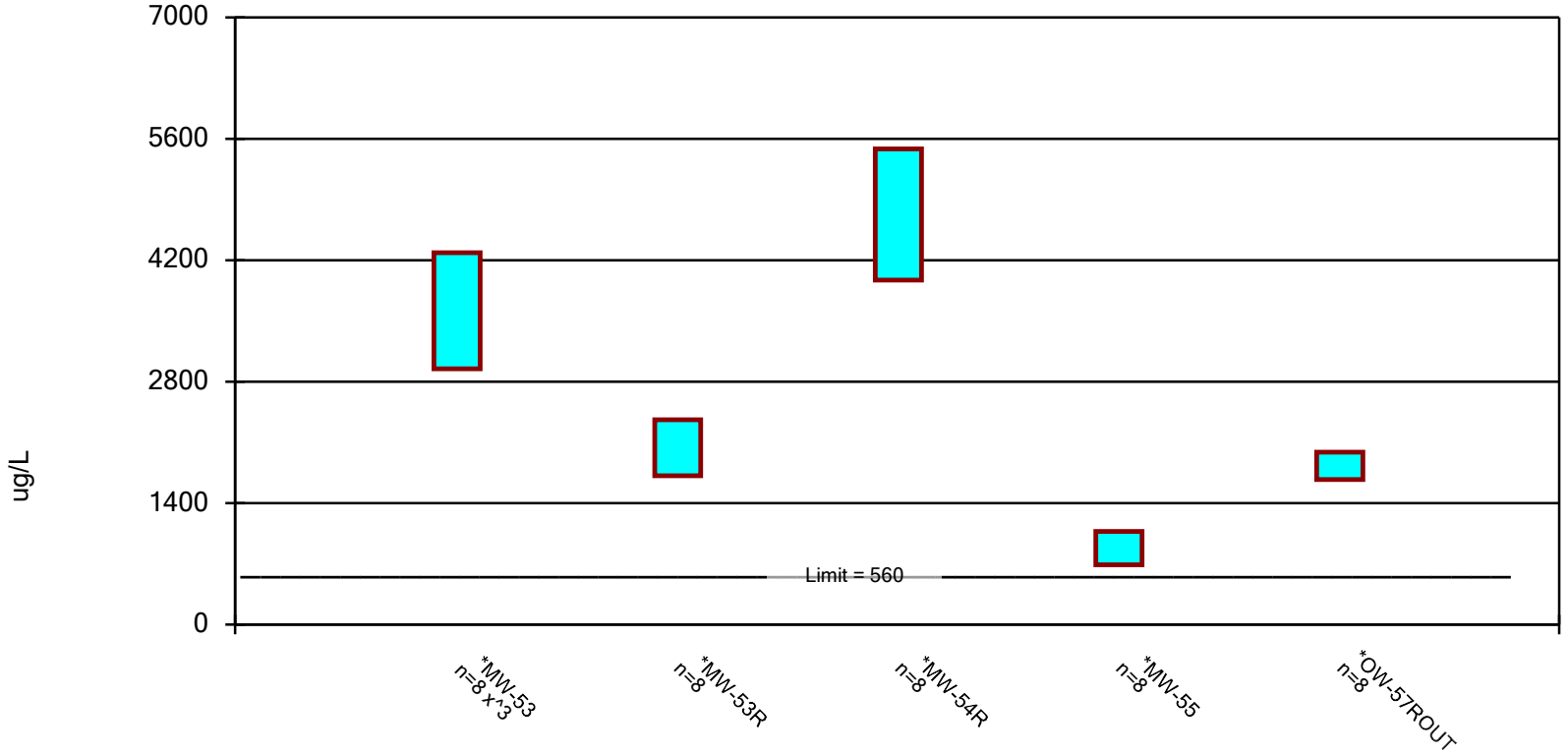
Constituent: Boron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

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

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 5/30/2023 4:01 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

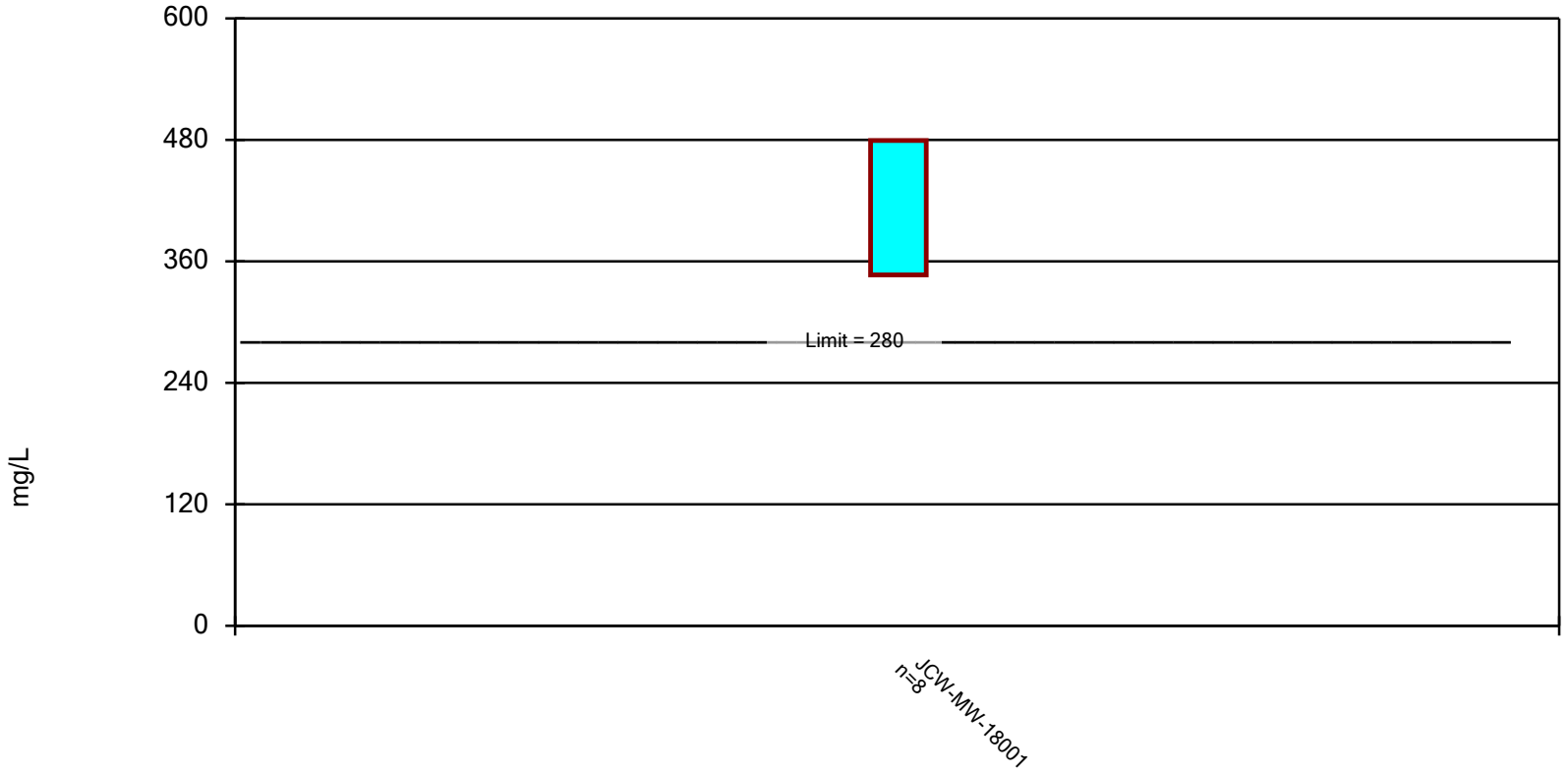
Constituent: Boron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

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

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 5/30/2023 4:01 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

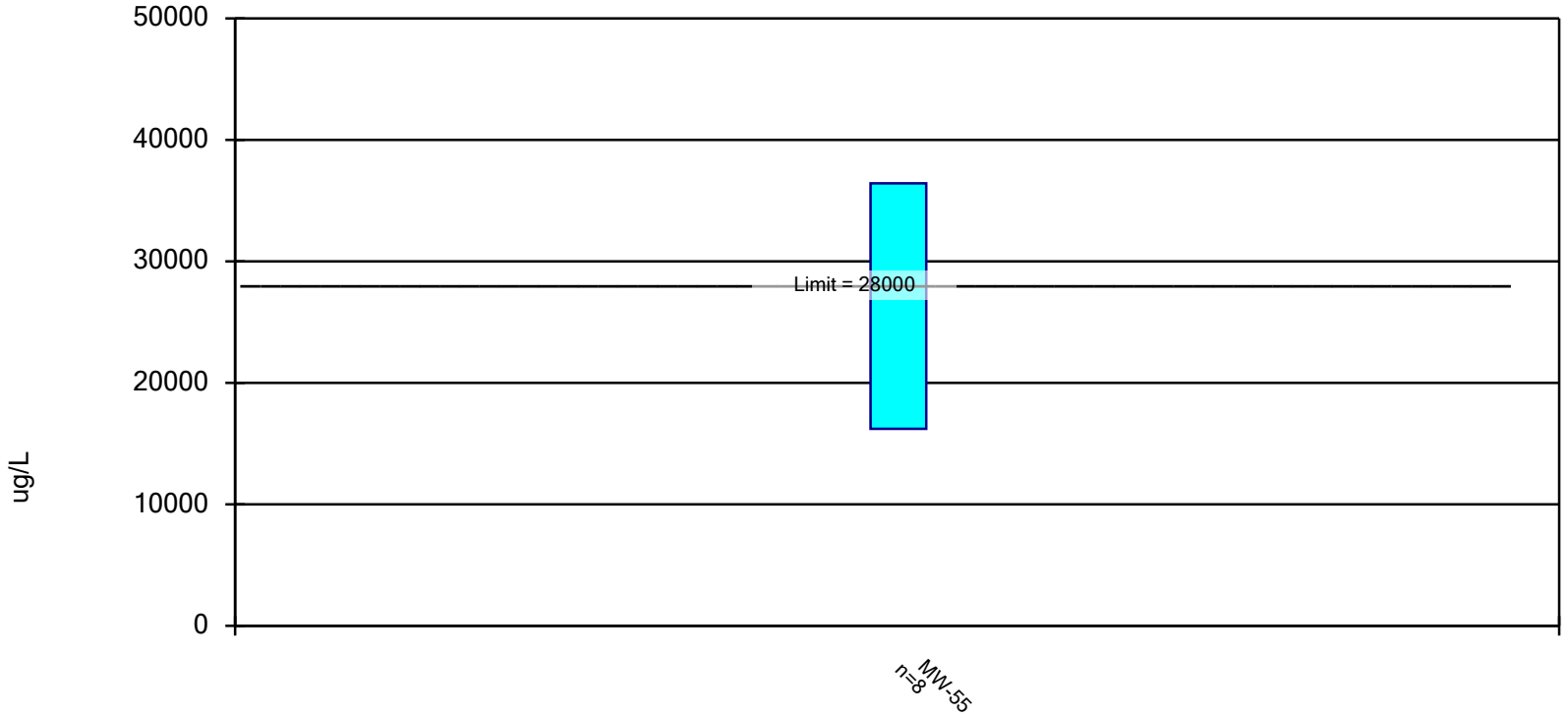
Constituent: Calcium, Total (mg/L) Analysis Run 5/30/2023 4:02 PM

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

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 5/30/2023 4:01 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

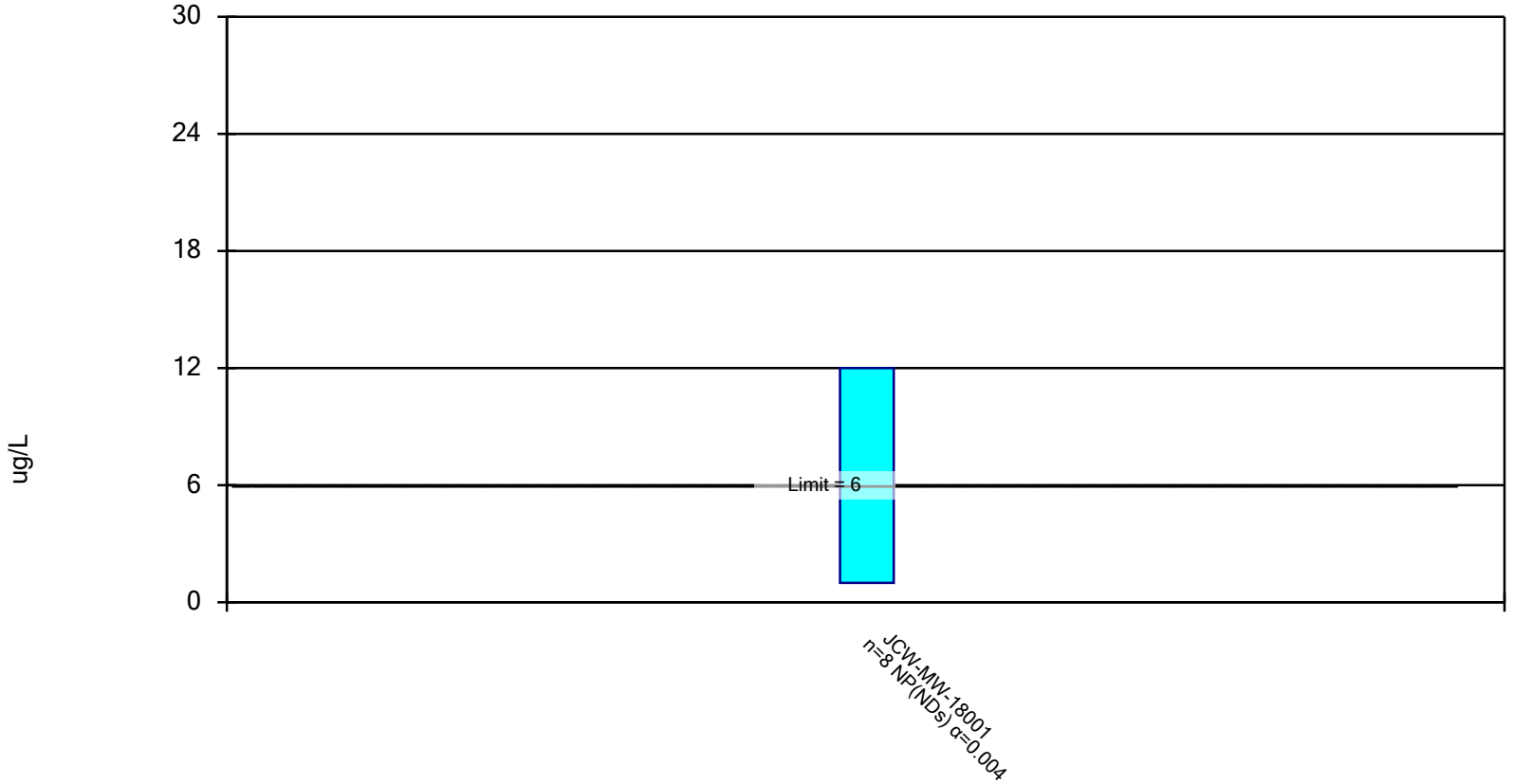
Constituent: Iron, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

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

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Vanadium, Total Analysis Run 5/30/2023 4:01 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

Constituent: Vanadium, Total (ug/L) Analysis Run 5/30/2023 4:02 PM

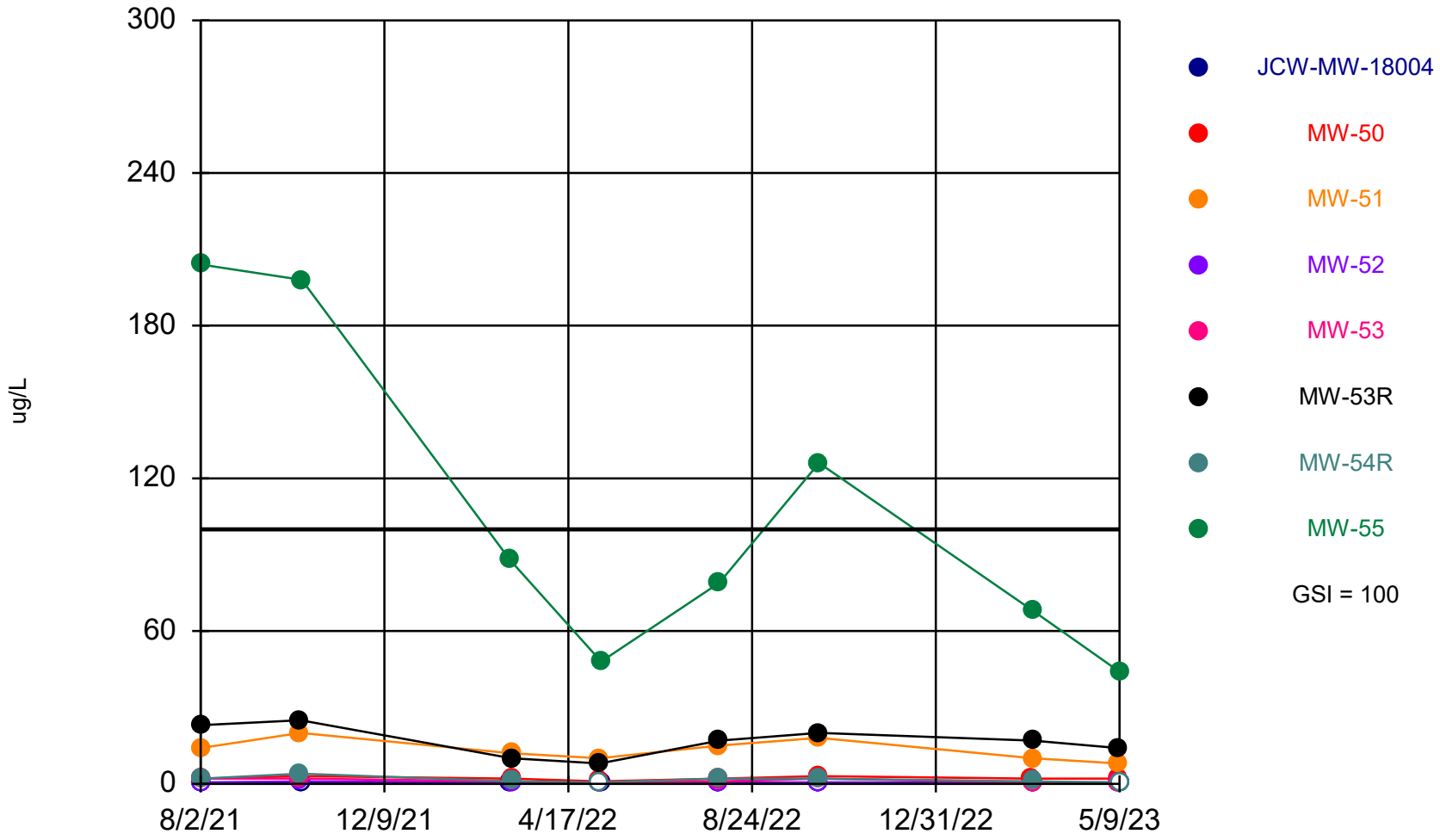
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

	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

Hollow symbols indicate censored values.

Arsenic Comparison to GSI

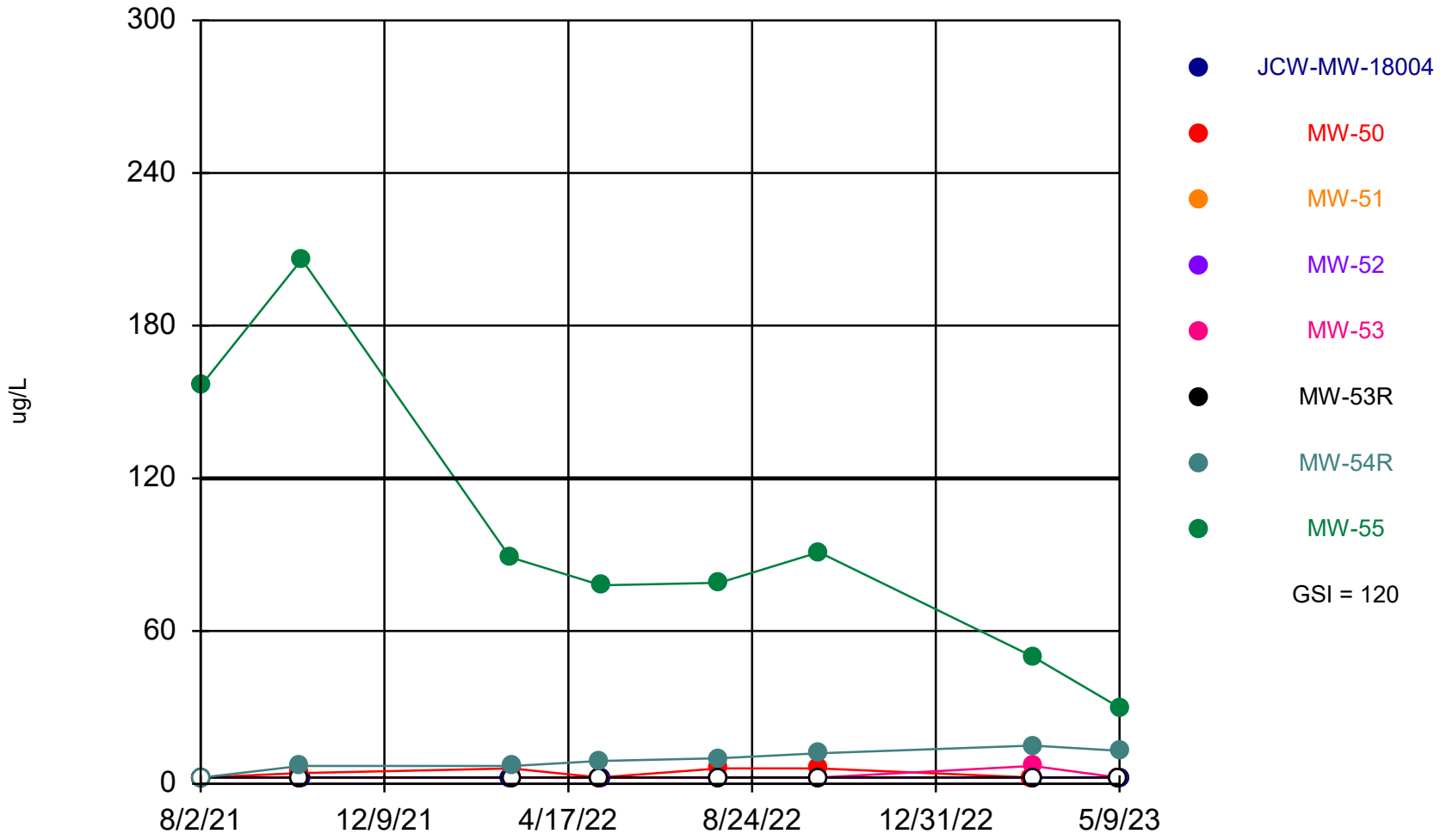


Time Series Analysis Run 5/31/2023 9:56 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Hollow symbols indicate censored values.

Molybdenum Comparison to GSI



Time Series Analysis Run 5/31/2023 9:57 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

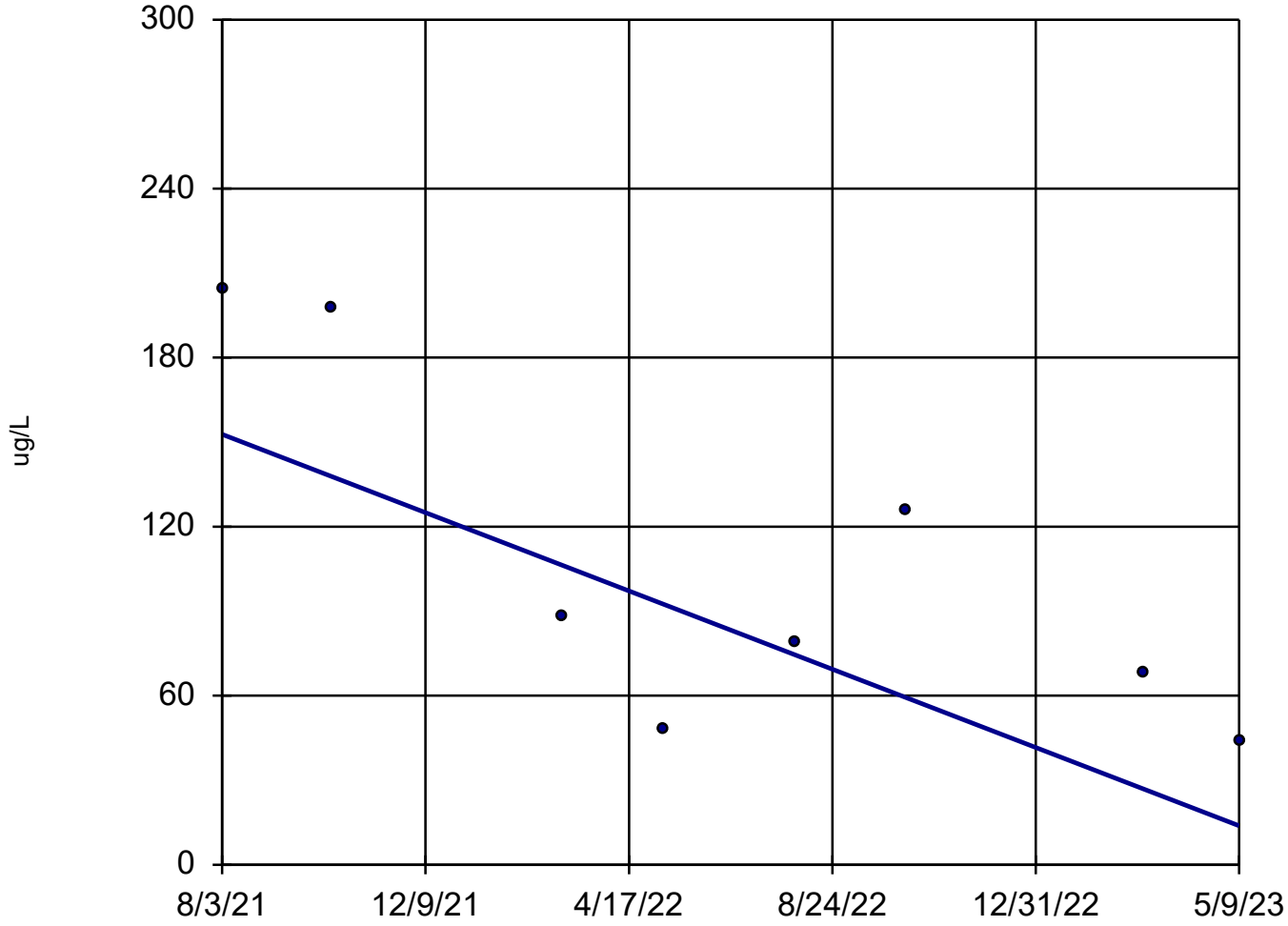
For observations made between 8/2/2021 and 5/9/2023, a summary of the selected data set:

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Arsenic, Total

MW-55



n = 8

Slope = -78.77 units per year.

Mann-Kendall statistic = -18
critical = -20

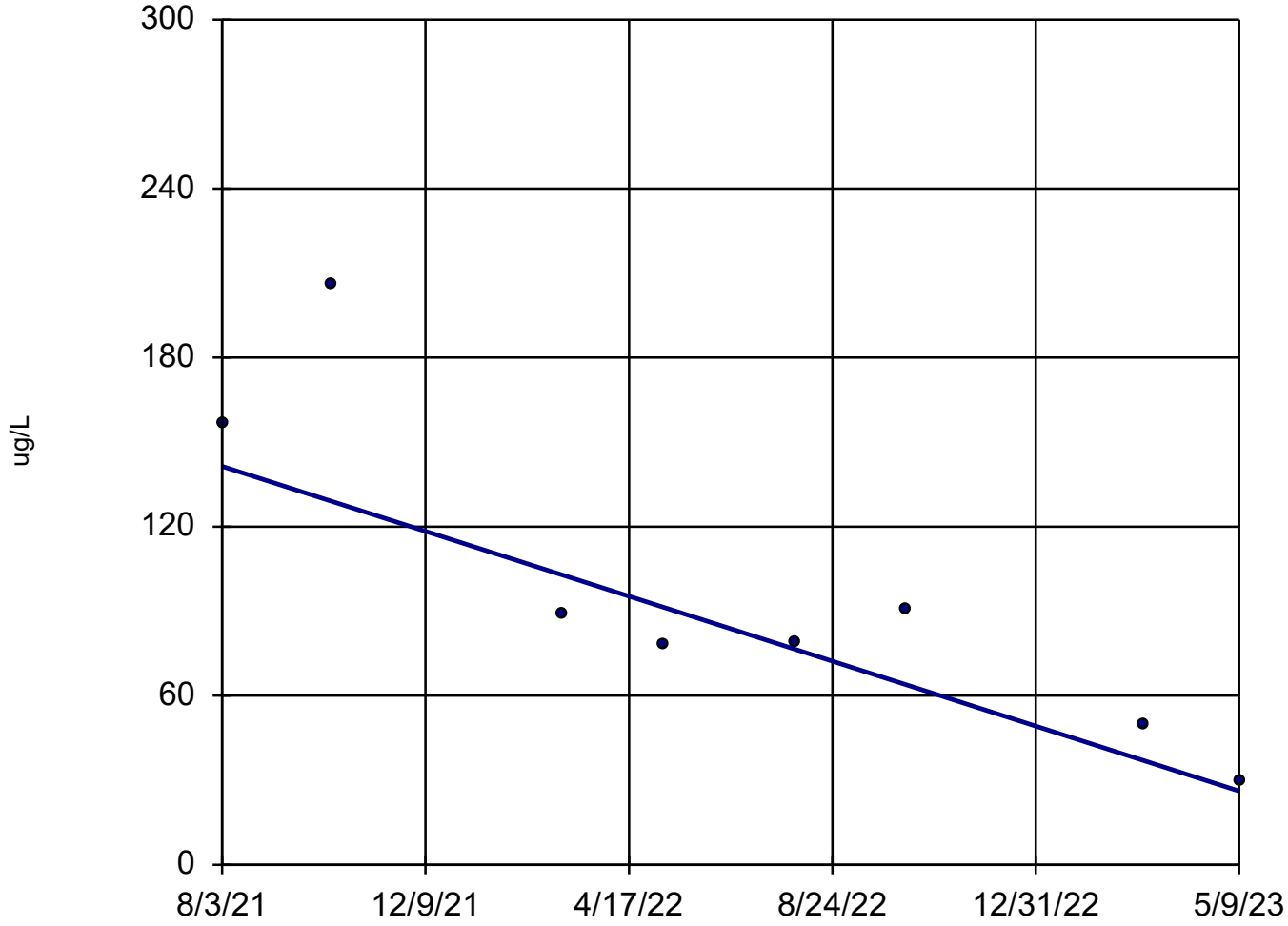
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 6/7/2023 3:25 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Molybdenum, Total

MW-55



n = 8

Slope = -65.32 units per year.

Mann-Kendall statistic = -18
critical = -20

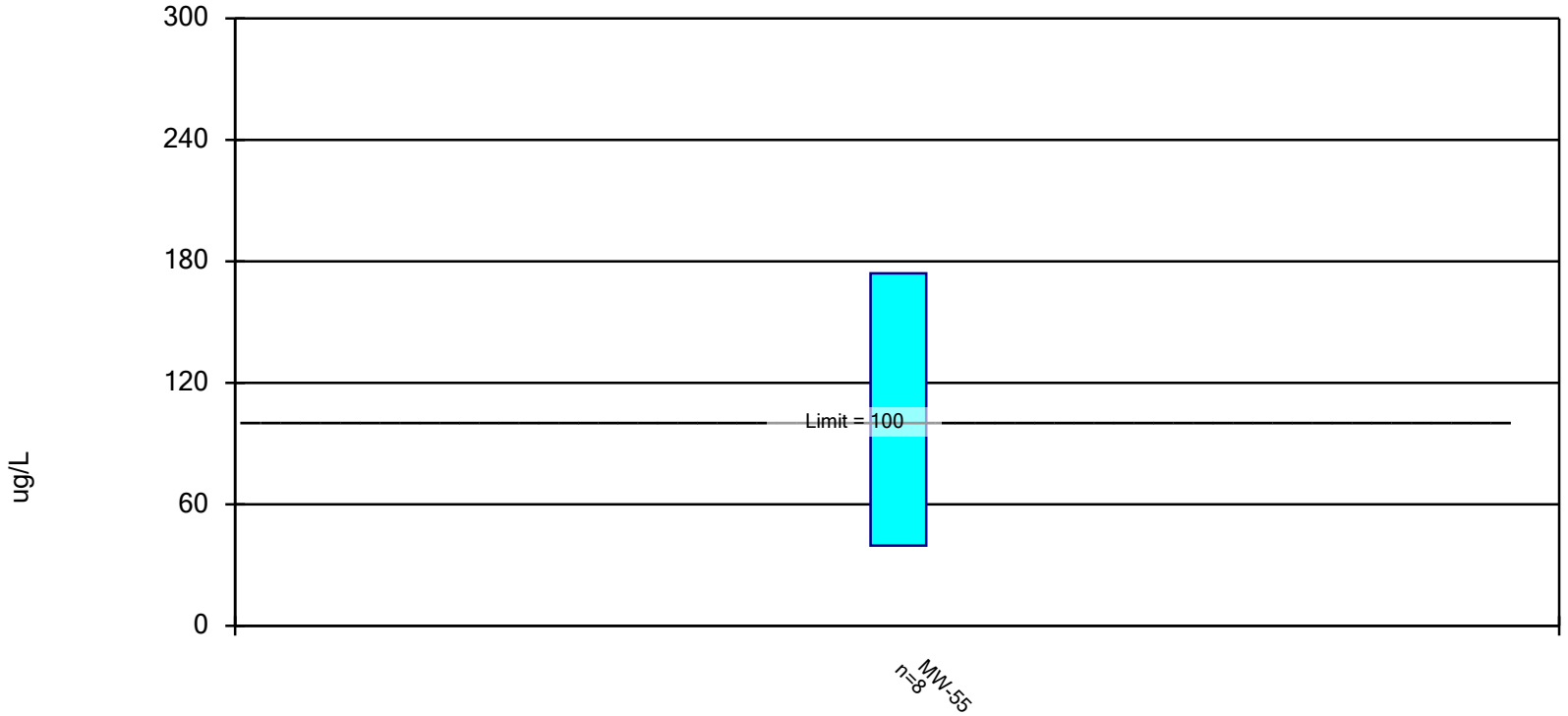
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 6/7/2023 3:25 PM

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 5/31/2023 10:06 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

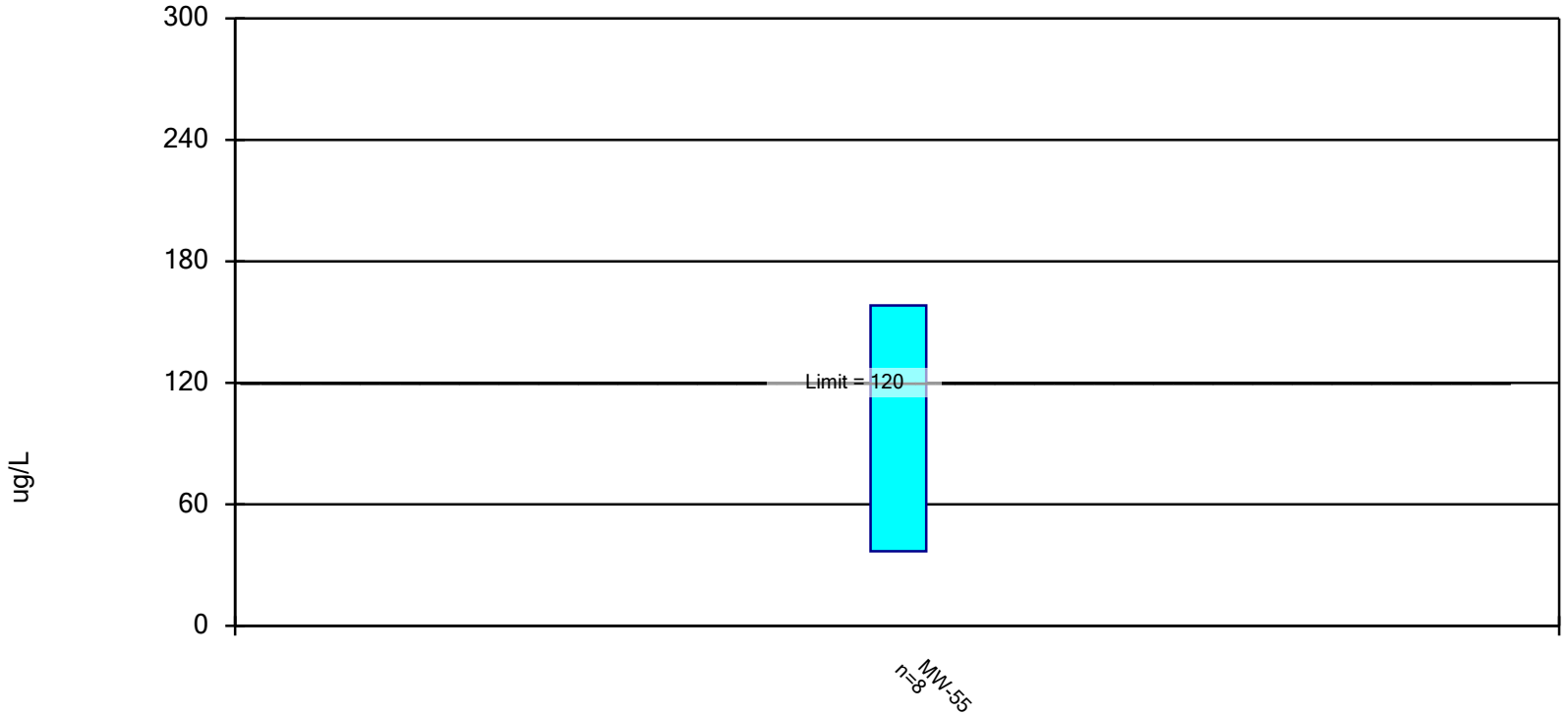
Constituent: Arsenic, Total (ug/L) Analysis Run 5/31/2023 10:11 AM

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

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 5/31/2023 10:06 AM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

Confidence Interval

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

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

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 2nd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0404-01
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 03:01 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-01-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	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, 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, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-01-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 #: 23-0404-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	351		mg/L	10.0	05/04/2023	AB23-0504-07

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0404-02
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 12:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-02-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	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, Aqueous

Aliquot #: 23-0404-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-02-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 #: 23-0404-02-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	877		mg/L	10.0	05/04/2023	AB23-0504-07

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0404-03
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 08:40 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-03-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	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

Aliquot #: 23-0404-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-03-C02-A01 **Analyst: KDR**

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 #: 23-0404-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	889		mg/L	10.0	05/04/2023	AB23-0504-07

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0404-04
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 01:43 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-04-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, Aqueous

Aliquot #: 23-0404-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-04-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 #: 23-0404-04-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0404-05
Matrix: Groundwater

Laboratory Project: **23-0404**
Collect Date: 05/01/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-05-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, Aqueous

Aliquot #: 23-0404-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0404-05-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 #: 23-0404-05-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

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Analytical Report

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: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0404-06-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, Total, Aqueous

Aliquot #: 23-0404-06-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0404

Inspection Date: 5.04.23 **Inspection By:** LMO

Sample Origin/Project Name: Q2-2023 JCW-DEK Background Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: ~~3 977 8026 0844~~ LMO 5.4.23 3977 7534 7119 Shipping Form Attached: Yes X No ____

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

Cooler ____ Cardboard Box ____ Custom Case ____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None _____ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed _____

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC _____ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 0.4 - 2.3 Samples Received on Ice: Yes X No ____

M&TE # and Expiration 27723 5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
250 500 mL (plastic)	5				
Other LMO 5.4.23					

pH strip
Lot # 205522
exp. 2.16.25

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SAMPLING SITE / CUSTOMER: Q2-2023 JCW-DEK Background Wells

PROJECT NUMBER: **23-0404**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed): Total Metals; Anions; TDS

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	REMARKS
23-0404-01	5-1-23	1501	GW	MW-15002	3	2	1						x	x	x	
-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	x	x	
-04	5-1-23	1343	GW	MW-15019	3	2	1						x	x	x	
-05	5-1-23	—	GW	DUP-Background	3	2	1						x	x	x	
-06	5-1-23	1240	W	FB- Background	1								x			

RELINQUISHED BY: [signature] — DATE/TIME: 5-2-23 1600 — RECEIVED BY: Fed Ex

RELINQUISHED BY: Fed Ex — DATE/TIME: 05-03-23 10:20 — RECEIVED BY: [signature]

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: 27723

Temperature: 0.4 - 2.3 °C — Cal. Due Date: 5-25-23

eurofins | Environment Testing

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

See page two for job notes and contact information.

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

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Revision 2

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

Table of Contents

Definitions/Glossary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Qualifiers

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
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

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 0.3º 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/ 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/ 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.

Method Summary

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

Sample Summary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
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	FB-BACKGROUND	Water	05/01/23 12:40	05/05/23 08:00

Client Sample ID: MW-15002 — Lab Sample ID: 240-184759-1

Date Collected: 05/01/23 15:01 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.200	U	0.322	0.322	5.00	0.547	pCi/L		06/08/23 14:39	1

Client Sample ID: MW-15008 — Lab Sample ID: 240-184759-2

Date Collected: 05/01/23 12:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.286	U G	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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.388	U	0.674	0.674	5.00	1.16	pCi/L		06/08/23 14:39	1

Client Sample ID: MW-15016 — Lab Sample ID: 240-184759-3

Date Collected: 05/02/23 08:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.201	U G	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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.134	U	0.529	0.529	5.00	1.01	pCi/L		06/08/23 14:39	1

Client Sample ID: MW-15019 — Lab Sample ID: 240-184759-4

Date Collected: 05/01/23 13:43 — **Matrix: Water**
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.134	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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.792	U	0.546	0.547	5.00	0.859	pCi/L		06/08/23 14:39	1

Client Sample ID: DUP-BACKGROUND
Lab Sample ID: 240-184759-5

Date Collected: 05/01/23 00:00
Matrix: Water
Date Received: 05/05/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.981**		0.570	0.574	5.00	0.883	pCi/L		06/08/23 14:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.226	U	0.354	0.355	5.00	0.593	pCi/L		06/08/23 14:39	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
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 Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
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

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-611074/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	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	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:08*	*06/08/23 06:45*	*1*

Lab Sample ID: LCS 160-611074/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

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

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

Lab Sample ID: LCSD 160-611074/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 615046 — **Prep Batch: 611074**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226			11.3	10.42		1.12	1.00	0.131	pCi/L	92	75 - 113	0.42	1

Carrier	*LCSD %Yield*	*LCSD 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**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.4069	U	0.333	0.335	1.00	0.512	pCi/L	05/11/23 12:51	06/01/23 12:31	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.4*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*
Y Carrier	*79.2*		*30 - 110*	*05/11/23 12:51*	*06/01/23 12:31*	*1*

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

Lab Sample ID: LCS 160-611088/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 614160 — **Prep Batch: 611088**

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

Carrier	*LCS %Yield*	*LCS 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**

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

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

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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. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: MW-15002 — Lab Sample ID: 240-184759-1

Date Collected: 05/01/23 15:01 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-184759-2

Date Collected: 05/01/23 12:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-15016 — Lab Sample ID: 240-184759-3

Date Collected: 05/02/23 08:40 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-184759-4

Date Collected: 05/01/23 13:43 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation. Job ID: 240-184759-1
Project/Site: Karn/Weadock CCR DEK JCW Background Wells

Client Sample ID: DUP-BACKGROUND — Lab Sample ID: 240-184759-5

Date Collected: 05/01/23 00:00 — **Matrix: Water**
Date Received: 05/05/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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. Job ID: 240-184759-1
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
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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

MICHIGAN 190

0-3 / 0-3

Chain of Custody Record

MICHIGAN 190

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Client Information	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-107203-33282.1
Client Contact: Jacob Krenz	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: TRC Environmental Corporation.	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: TBD			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR Background Well	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, Ra226Ra228_GFPC	904.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
MW-15002	5-1-23	1501	G	Water	N	N	X	X		
MW-15008	5-1-23	1240	G	Water	N	N	X	X		
MW-15016	5-2-23	0840	G	Water	N	N	X	X		
MW-15019	5-1-23	1343	G	Water	N	N	X	X		
DUP-Background	5-1-23	—	G	Water	N	N	X	X		
~~EQ-Background~~				~~Water~~						
FB-Background	5-1-23	1240	G	Water	N	N	X	X		

240-184759 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	[signature]	5-4-23 1417	TRC	[signature]	5/4/23 1417	EETA
2	[signature]	5/4/23 1418	EETA	[signature]	5-5-23 800	EETNC
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins - Canton Sample Receipt Form/Narrative Login # : 184759
Barberton Facility

Client TRC Site Name

Cooler Received on 5-5-23 Opened on 5-5-23

Cooler unpacked by:

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

Eurofins Cooler # EC ~~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 1	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels (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?	Yes	No
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?	Yes	No
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

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM Date by via Verbal Voice Mail Other

Concerning

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

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.

Time preserved: Preservative(s) added/Lot number(s):

VOA Sample Preservation - Date/Time VOAs Frozen:

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
MW-15002	240-184759-A-1	Plastic 1 liter - Nitric Acid	<2			
MW-15002	240-184759-B-1	Plastic 1 liter - Nitric Acid	<2			
MW-15008	240-184759-A-2	Plastic 1 liter - Nitric Acid	<2			
MW-15008	240-184759-B-2	Plastic 1 liter - Nitric Acid	<2			
MW-15016	240-184759-A-3	Plastic 1 liter - Nitric Acid	<2			
MW-15016	240-184759-B-3	Plastic 1 liter - Nitric Acid	<2			
MW-15019	240-184759-A-4	Plastic 1 liter - Nitric Acid	<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			
DUP-BACKGROUD	240-184759-B-5	Plastic 1 liter - Nitric Acid	<2			
FB-BACKGROUND	240-184759-A-6	Plastic 1 liter - Nitric Acid	<2			
FB-BACKGROUND	240-184759-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

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-167649.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-184759-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-15002 (240-184759-1)	5/1/23	15:01 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15008 (240-184759-2)	5/1/23	12:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15016 (240-184759-3)	5/1/23	08:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15019 (240-184759-4)	5/1/23	13:43 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-BACKGROUD (240-184759-5)	5/1/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
FB-BACKGROUND (240-184759-6)	5/1/23	12:40 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
										12	

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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 5523 1101	Company EETNC	Received by: fedex
Relinquished by: fedex	Date/Time:	Company	Received by:
Relinquished by:	Date/Time:	Company	Received by:

Received by:	Date/Time:	Company
	Date/Time: 5/8/23 0910	Company ETASTL
	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-184759-1

Login Number: 184759
List Number: 2
Creator: Sharkey-Gonzalez, Briana L

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

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 2nd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: Karn/Weadock Complex
Work Order ID: Q2-2023 Weadock Porewater Wells
Date Received: 5/10/2023
Chemistry Project: 23-0406

Sample #	Field Sample ID	Matrix	Sample Date	Site
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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001**
Lab Sample ID: 23-0406-01
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 06:50 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-01-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	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

Aliquot #: 23-0406-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0406-01-C02-A01 **Analyst: KDR**

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 #: 23-0406-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1580		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0406-01-C04-A01 **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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18004**
Lab Sample ID: 23-0406-02
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 07:39 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-02-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, Aqueous

Aliquot #: 23-0406-02-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, Aqueous

Aliquot #: 23-0406-02-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 2540C

Aliquot #: 23-0406-02-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1530		mg/L	10.0	05/10/2023	AB23-0510-08

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18005**
Lab Sample ID: 23-0406-03
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 09:54 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-03-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, Aqueous

Aliquot #: 23-0406-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0406-03-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 #: 23-0406-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1190		mg/L	10.0	05/10/2023	AB23-0510-08

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18006**
Lab Sample ID: 23-0406-04
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 11:48 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-04-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 #: 23-0406-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0406-04-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 2540C

Aliquot #: 23-0406-04-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-50**
Lab Sample ID: 23-0406-05
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 08:13 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-05-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	114		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	142000		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	755		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	AB23-0511-04
Lithium	55		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, Aqueous

Aliquot #: 23-0406-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0406-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	31500		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	314000		ug/L	1000.0	05/12/2023	AB23-0511-22

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0406-05-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	878		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-51**
Lab Sample ID: 23-0406-06
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 09:20 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-06-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	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, Aqueous

Aliquot #: 23-0406-06-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

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

Aliquot #: 23-0406-06-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	99900		ug/L	1000.0	05/12/2023	AB23-0511-22
Fluoride	ND		ug/L	1000.0	05/12/2023	AB23-0511-22
Sulfate	356000		ug/L	1000.0	05/12/2023	AB23-0511-22

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0406-06-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1240		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-52**
Lab Sample ID: 23-0406-07
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 10:30 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-07-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	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, Aqueous

Aliquot #: 23-0406-07-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, Aqueous

Aliquot #: 23-0406-07-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 #: 23-0406-07-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1430		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53**
Lab Sample ID: 23-0406-08
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 11:25 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-08-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	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, Aqueous

Aliquot #: 23-0406-08-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, Aqueous

Aliquot #: 23-0406-08-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 #: 23-0406-08-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	613		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53R**
Lab Sample ID: 23-0406-09
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 01:00 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-09-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, Aqueous

Aliquot #: 23-0406-09-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, Aqueous

Aliquot #: 23-0406-09-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 #: 23-0406-09-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1060		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-54R**
Lab Sample ID: 23-0406-10
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 06:55 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-10-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	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, Aqueous

Aliquot #: 23-0406-10-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, Aqueous

Aliquot #: 23-0406-10-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 #: 23-0406-10-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-55**
Lab Sample ID: 23-0406-11
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 08:45 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-11-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	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, Aqueous

Aliquot #: 23-0406-11-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, Aqueous

Aliquot #: 23-0406-11-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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 #: 23-0406-11-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	929		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **OW-57ROUT**
Lab Sample ID: 23-0406-12
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 10:52 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-12-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	05/11/2023	AB23-0511-04
Cadmium	ND		ug/L	0.2	05/11/2023	AB23-0511-04
Calcium	117000		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	78		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	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, Aqueous

Aliquot #: 23-0406-12-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, Aqueous

Aliquot #: 23-0406-12-C02-A01 **Analyst: KDR**

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 #: 23-0406-12-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	743		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-58**
Lab Sample ID: 23-0406-13
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 12:50 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-13-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	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	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	13600		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	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, Aqueous

Aliquot #: 23-0406-13-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, Aqueous

Aliquot #: 23-0406-13-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 #: 23-0406-13-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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-01**
Lab Sample ID: 23-0406-14
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/08/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-14-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	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	756		ug/L	20.0	05/11/2023	AB23-0511-04
Lead	ND		ug/L	1.0	05/11/2023	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, Aqueous

Aliquot #: 23-0406-14-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, Aqueous

Aliquot #: 23-0406-14-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	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 #: 23-0406-14-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	880		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-02**
Lab Sample ID: 23-0406-15
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-15-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	1.0	05/11/2023	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, Aqueous

Aliquot #: 23-0406-15-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, Aqueous

Aliquot #: 23-0406-15-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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 #: 23-0406-15-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	751		mg/L	10.0	05/10/2023	AB23-0510-08

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001 MS**
Lab Sample ID: 23-0406-16
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 06:50 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-16-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	109		%	1.0	05/11/2023	AB23-0511-04
Arsenic	105		%	1.0	05/11/2023	AB23-0511-04
Barium	103		%	5.0	05/11/2023	AB23-0511-04
Beryllium	91		%	1.0	05/11/2023	AB23-0511-04
Boron	109		%	20.0	05/11/2023	AB23-0511-04
Cadmium	98.4		%	0.2	05/11/2023	AB23-0511-04
Calcium	109		%	1000.0	05/11/2023	AB23-0511-04
Chromium	94		%	1.0	05/11/2023	AB23-0511-04
Cobalt	90		%	6.0	05/11/2023	AB23-0511-04
Copper	90		%	1.0	05/11/2023	AB23-0511-04
Iron	91		%	20.0	05/11/2023	AB23-0511-04
Lead	89		%	1.0	05/11/2023	AB23-0511-04
Lithium	89		%	10.0	05/11/2023	AB23-0511-04
Molybdenum	117		%	5.0	05/11/2023	AB23-0511-04
Nickel	93		%	2.0	05/11/2023	AB23-0511-04
Selenium	101		%	1.0	05/11/2023	AB23-0511-04
Silver	88.5		%	0.2	05/11/2023	AB23-0511-04
Thallium	91		%	2.0	05/11/2023	AB23-0511-04
Vanadium	102		%	2.0	05/11/2023	AB23-0511-04
Zinc	96		%	10.0	05/11/2023	AB23-0511-04

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0406-16-C01-A02 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	104		%	0.2	05/16/2023	AB23-0516-03

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

Aliquot #: 23-0406-16-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	101		%	1000.0	05/12/2023	AB23-0511-22
Fluoride	93		%	1000.0	05/12/2023	AB23-0511-22
Sulfate	107		%	1000.0	05/12/2023	AB23-0511-22

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001 MSD**
Lab Sample ID: 23-0406-17
Matrix: Groundwater

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 06:50 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-17-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, Aqueous

Aliquot #: 23-0406-17-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, Aqueous

Aliquot #: 23-0406-17-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

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Analytical Report

Report Date: 05/19/23

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 Total Metals Exp

Aliquot #: 23-0406-18-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	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, Total, Aqueous

Aliquot #: 23-0406-18-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, Aqueous

Aliquot #: 23-0406-18-C02-A01 **Analyst: KDR**

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

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Analytical Report

Report Date: 05/19/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **EB-01**
Lab Sample ID: 23-0406-19
Matrix: Water

Laboratory Project: **23-0406**
Collect Date: 05/09/2023
Collect Time: 01:10 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0406-19-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	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, Total, Aqueous

Aliquot #: 23-0406-19-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, Aqueous

Aliquot #: 23-0406-19-C02-A01 **Analyst: KDR**

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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0406

Inspection Date: 5.10.23 **Inspection By:** LMO

Sample Origin/Project Name: Q2-2023 Weadock Pore Water Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 3-9-5.8 Samples Received on Ice: Yes X No ____

M&TE # and Expiration 627723 5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	38				
24 mL vial (glass)					
250 500 mL (plastic)	15				
Other					

LMO 5.10.23

pH Strip Lot #: 205522
Exp: 2.15.25

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q2-2023 Weadock Porewater Wells	PROJECT NUMBER: **23-0406**	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)
SAMPLING TEAM:	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____	REQUESTER: Harold Register	QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____
SEND REPORT TO: Caleb Batts	email:	phone:	
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste		

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0406-01	5/8/23	0610	GW	JCW-MW-18001	5	4	1						x	x	x	x	
-02	5/9/23	0738	GW	JCW-MW-18004	5	4	1						x	x	x		
-03	5/9/23	0954	GW	JCW-MW-18005	5	4	1						x	x	x		
-04	5/4/23	1148	GW	JCW-MW-18006	5	4	1						x	x	x		
-05	5/8/23	0613	GW	MW-50	5	4	1						x	x	x		
-06	5/8/23	0930	GW	MW-51	5	4	1						x	x	x		
-07	5/8/23	1030	GW	MW-52	5	4	1						x	x	x		
-08	5/8/23	1115	GW	MW-53	5	4	1						x	x	x		
-09	5/8/23	1300	GW	MW-53R	5	4	1						x	x	x		
-10	5/4/23	0655	GW	MW-54R	5	4	1						x	x	x		
-11	5/4/23	0845	GW	MW-55	5	4	1						x	x	x		
-12	5/4/23	1058	GW	OW-57ROUT	5	4	1						x	x	x		

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	COMMENTS:
	5/10/23 0715		
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	Received on Ice? ☑ Yes ☐ No M&TE #: LS27723
			Temperature: 3.9 - 5.8 °C Cal. Due Date: 5-25-23

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q2-2023 Weadock Porewater Wells

PROJECT NUMBER: **23-0406**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0406-13	5/9/23	0940	GW	MW-58	5	4	1						x	x	x		
-14	5/8/23	—	GW	DUP-JCW-LF-01	5	4	1						x	x	x		
-15	5/9/23	—	GW	DUP-JCW-LF-02	5	4	1						x	x	x		
-16	5/9/23	0642	GW	JCW-MW-18001 MS	4	3	1						x	x			
-17	5/9/23	0642	GW	JCW-MW-18001 MSD	4	3	1						x	x			
-18	5/9/23	1305	W	FB-01	2	1	1						x	x			
-19	5/9/23	1310	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: — DATE/TIME: 5/10/23 0715 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS 27723

Temperature: 3.9-5.8 °C — Cal. Due Date: 5-25-23

eurofins | Environment Testing

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

See page two for job notes and contact information.

myEOL

Job Notes

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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

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6/9/2023 4:58:05 PM

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

Table of Contents

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

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.

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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: 240-185122-1

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

Sample Summary

Client: TRC Environmental Corporation.
Job ID: 240-185122-1
Project/Site: Karn/Weadock CCR JCW Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-185122-1	JCW-MW-18001	Water	05/08/23 06:10	05/11/23 08:00
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
240-185122-6	MW-51	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
240-185122-8	MW-53	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
240-185122-10	MW-54R	Water	05/09/23 06:55	05/11/23 08:00
240-185122-11	MW-55	Water	05/09/23 08:45	05/11/23 08:00
240-185122-12	OW-57ROUT	Water	05/09/23 10:52	05/11/23 08:00
240-185122-13	MW-58	Water	05/09/23 12:50	05/11/23 08:00
240-185122-14	DUP-01	Water	05/08/23 00:00	05/11/23 08:00
240-185122-15	EB-01	Water	05/09/23 13:10	05/11/23 08:00
240-185122-16	DUP #02	Water	05/09/23 00:00	05/11/23 08:00

Client Sample ID: JCW-MW-18001 — Lab Sample ID: 240-185122-1

Date Collected: 05/08/23 06:10 — **Matrix: Water**
Date Received: 05/11/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.192	U	0.320	0.321	5.00	0.547	pCi/L		06/09/23 12:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.0500	U	0.306	0.306	5.00	0.600	pCi/L		06/09/23 12:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.134		0.0923	0.0931	1.00	0.129	pCi/L	05/22/23 16:52	06/08/23 20:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.5*		*30 - 110*	*05/22/23 16:52*	*06/08/23 20:08*	*1*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
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	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.5*		*30 - 110*	*05/22/23 16:55*	*06/02/23 13:18*	*1*
Y Carrier	*86.7*		*30 - 110*	*05/22/23 16:55*	*06/02/23 13:18*	*1*

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.331	U	0.347	0.348	5.00	0.573	pCi/L		06/09/23 12:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.746		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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.08		0.445	0.450	5.00	0.622	pCi/L		06/09/23 12:39	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.155		0.0886	0.0897	1.00	0.110	pCi/L	05/22/23 16:52	06/08/23 20:10	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.8*		*30 - 110*	*05/22/23 16:52*	*06/08/23 20:10*	*1*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.841		0.418	0.423	5.00	0.590	pCi/L		06/09/23 12:39	1

Client Sample ID: MW-51
Lab Sample ID: 240-185122-6

Date Collected: 05/08/23 09:20
Matrix: Water
Date Received: 05/11/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.15		0.472	0.481	5.00	0.633	pCi/L		06/09/23 12:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.425	U	0.371	0.372	5.00	0.594	pCi/L		06/09/23 12:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.700**		0.365	0.368	5.00	0.518	pCi/L		06/09/23 12:39	1

Client Sample ID: MW-53R

Date Collected: 05/08/23 13:00
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-9

Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.765		0.348	0.352	5.00	0.487	pCi/L		06/09/23 12:39	1

Client Sample ID: MW-54R
Date Collected: 05/09/23 06:55
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-10
Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.105	U	0.454	0.454	5.00	0.836	pCi/L		06/09/23 12:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.824	U	0.583	0.586	5.00	0.916	pCi/L		06/09/23 12:39	1

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 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.578	U	0.427	0.429	5.00	0.663	pCi/L		06/09/23 12:39	1

Client Sample ID: MW-58
Date Collected: 05/09/23 12:50
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-13
Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.558	U	0.547	0.548	5.00	0.948	pCi/L		06/09/23 12:39	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.633**		0.400	0.403	5.00	0.606	pCi/L		06/09/23 12:39	1

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 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0730	U	0.398	0.398	5.00	0.709	pCi/L		06/09/23 12:39	1

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 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.308	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)
		Ba
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

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
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

Tracer/Carrier Legend

Ba = Ba Carrier

Tracer/Carrier Summary

Client: TRC Environmental Corporation.
Job ID: 240-185122-1
Project/Site: Karn/Weadock CCR JCW Landfill

Y = Y Carrier

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

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	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	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*80.5*		*30 - 110*	*05/22/23 16:52*	*06/08/23 20:08*	*1*

Lab Sample ID: LCS 160-612687/2-A
Matrix: Water
Analysis Batch: 615045

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612687

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	10.47		1.13	1.00	0.153	pCi/L	92	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*80.3*		*30 - 110*

Lab Sample ID: LCSD 160-612687/3-A
Matrix: Water
Analysis Batch: 615045

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 612687

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226			11.3	10.53		1.13	1.00	0.153	pCi/L	93	75 - 125	0.02	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*83.3*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-612689/1-A
Matrix: Water
Analysis Batch: 614271

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 612689

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.3164	U	0.409	0.410	1.00	0.681	pCi/L	05/22/23 16:55	06/02/23 13:16	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*80.5*		*30 - 110*	*05/22/23 16:55*	*06/02/23 13:16*	*1*
Y Carrier	*82.2*		*30 - 110*	*05/22/23 16:55*	*06/02/23 13:16*	*1*

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

Lab Sample ID: LCS 160-612689/2-A
Matrix: Water
Analysis Batch: 614271

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612689

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			8.15	9.544		1.40	1.00	0.750	pCi/L	117	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*80.3*		*30 - 110*
Y Carrier	*83.4*		*30 - 110*

Lab Sample ID: LCSD 160-612689/3-A
Matrix: Water
Analysis Batch: 614271

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 612689

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228			8.15	8.671		1.29	1.00	0.597	pCi/L	106	75 - 125	0.32	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*83.3*		*30 - 110*
Y Carrier	*81.1*		*30 - 110*

Rad

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	

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-185122-1

Client Sample ID: JCW-MW-18001

Lab Sample ID: 240-185122-1

Date Collected: 05/08/23 06:10

Matrix: Water

Date Received: 05/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-18005

Lab Sample ID: 240-185122-3

Date Collected: 05/09/23 09:54

Matrix: Water

Date Received: 05/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Matrix: Water

Date Received: 05/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-185122-1

Client Sample ID: MW-50
Date Collected: 05/08/23 08:13
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Client Sample ID: MW-51
Date Collected: 05/08/23 09:20
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Client Sample ID: MW-52
Date Collected: 05/08/23 10:30
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Client Sample ID: MW-53
Date Collected: 05/08/23 11:25
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-185122-1

Client Sample ID: MW-53R
Date Collected: 05/08/23 13:00
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Sample ID: MW-54R
Date Collected: 05/09/23 06:55
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Sample ID: MW-55
Date Collected: 05/09/23 08:45
Date Received: 05/11/23 08:00

Lab Sample ID: 240-185122-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Sample ID: 240-185122-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Chronicle

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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: EB-01
Lab Sample ID: 240-185122-15
Date Collected: 05/09/23 13:10
Matrix: Water
Date Received: 05/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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
Matrix: Water
Date Received: 05/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Accreditation/Certification Summary

Client: TRC Environmental Corporation. Job ID: 240-185122-1
Project/Site: Karn/Weadock CCR JCW Landfill

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
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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

MICHIGAN 190

Chain of Custody Record

MICHIGAN 190

eurofins | Environment Testing

Client Information	Sampler: JAvier JAsso	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-107205-29048.1
Client Contact: Jacob Krenz	Phone: 734 904 3310	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 2
Company: TRC Environmental Corporation.	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 178828			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Kam/Weadock CCR JCW Lanfill	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	D	X	
JCW-MW-18001	5/8/23	0620	G	Water	N	N	F	F	2	
JCW-MW-18004	5/4/23	0738	G	Water	N	N	F	F	2	
JCW-MW-18005	5/4/23	0954	G	Water	N	N	F	F	2	
JCW-MW-18006	5/4/23	1148	G	Water	N	N	F	F	2	
MW-50	5/8/23	0813	G	Water	N	N	F	F	2	
MW-51	5/8/23	0930	G	Water	N	N	F	F	2	
MW-52	5/8/23	1030	G	Water	N	N	F	F	2	
MW-53	5/8/23	1131	G	Water	N	N	F	F	2	
MW-53R	5/8/23	1300	G	Water	N	N	F	F	2	
MW-54R	5/4/23	0655	G	Water	N	N	F	F	2	
MW-55	5/4/23	0845	G	Water	N	N	F	F	2	

240-185122 Chain of Custody

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		5/10/23 0815	TRC		5/10/23	EEM
2		5/10/23	EEM		5-11-23 800	EETNC
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

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

MICHIGAN 190

Chain of Custody Record

MICHIGAN 190

eurofins | Environment Testing

Client Information	Sampler: Sauer, Jake	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-107205-29048.2
Client Contact: Jacob Krenz	Phone: 734 904 3710	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: TRC Environmental Corporation.	PWSID:			Job #:

Address: 1540 Eisenhower Place	Due Date Requested:	
City: Ann Arbor	TAT Requested (days):	
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No	
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 178828	
Email: JKrenz@trccompanies.com	WO #:	
Project Name: Karn/Weadock CCR JCW Lanfill	Project #: 24024154	
Site:	SSOW#:	

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
OW-57ROUT	5/9/23	1055	G	Water	N	N	F	F	3	
MW-58	5/9/23	1250	G	Water	N	N	F	F	2	
DUP-01	5/8/23	—	G	Water	N	N	F	F	2	
EB-01	5/9/23	1310	G	Water	N	N	F	F	2	
Dup#02	5/9/23	—	G	Water	N	N	F	F	2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		5/10/23 0815	TC		5/10/23	EEN
2		5/10/23	EEN		5-11-23 800	EEN
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins - Canton Sample Receipt Form/Narrative Login # : 185122
Barberton Facility

Client TRC Site Name _____ Cooler unpacked by: Nancy Reyn

Cooler Received on 5-11-23 Opened on 5-11-23

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # ES 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 1each	Yes No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes No
-Were tamper/custody seals intact and uncompromised?	Yes No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes No
4. Did custody papers accompany the sample(s)?	Yes No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes No
7. Did all bottles arrive in good condition (Unbroken)?	Yes No
8. Could all bottle labels (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)?	Yes No
10. Were correct bottle(s) used for the test(s) indicated?	Yes No
11. Sufficient quantity received to perform indicated analyses?	Yes No
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?	Yes No
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

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

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.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
JCW-MW-18001	240-185122-A-1	Plastic 1 liter - Nitric Acid	<2			
JCW-MW-18001	240-185122-B-1	Plastic 1 liter - Nitric Acid	<2			
JCW-MW-18004	240-185122-A-2	Plastic 1 liter - Nitric Acid	<2			
JCW-MW-18004	240-185122-B-2	Plastic 1 liter - Nitric Acid	<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			
JCW-MW-18006	240-185122-A-4	Plastic 1 liter - Nitric Acid	<2			
JCW-MW-18006	240-185122-B-4	Plastic 1 liter - Nitric Acid	<2			
MW-50	240-185122-A-5	Plastic 1 liter - Nitric Acid	<2			
MW-50	240-185122-B-5	Plastic 1 liter - Nitric Acid	<2			
MW-51	240-185122-A-6	Plastic 1 liter - Nitric Acid	<2			
MW-51	240-185122-B-6	Plastic 1 liter - Nitric Acid	<2			
MW-52	240-185122-A-7	Plastic 1 liter - Nitric Acid	<2			
MW-52	240-185122-B-7	Plastic 1 liter - Nitric Acid	<2			
MW-53	240-185122-A-8	Plastic 1 liter - Nitric Acid	<2			
MW-53	240-185122-B-8	Plastic 1 liter - Nitric Acid	<2			
MW-53R	240-185122-A-9	Plastic 1 liter - Nitric Acid	<2			
MW-53R	240-185122-B-9	Plastic 1 liter - Nitric Acid	<2			
MW-54R	240-185122-A-10	Plastic 1 liter - Nitric Acid	<2			
MW-54R	240-185122-B-10	Plastic 1 liter - Nitric Acid	<2			
MW-55	240-185122-A-11	Plastic 1 liter - Nitric Acid	<2			
MW-55	240-185122-B-11	Plastic 1 liter - Nitric Acid	<2			
OW-57ROUT	240-185122-A-12	Plastic 1 liter - Nitric Acid	<2			
OW-57ROUT	240-185122-B-12	Plastic 1 liter - Nitric Acid	<2			
MW-58	240-185122-A-13	Plastic 1 liter - Nitric Acid	<2			
MW-58	240-185122-B-13	Plastic 1 liter - Nitric Acid	<2			
DUP-01	240-185122-A-14	Plastic 1 liter - Nitric Acid	<2			
DUP-01	240-185122-B-14	Plastic 1 liter - Nitric Acid	<2			
EB-01	240-185122-A-15	Plastic 1 liter - Nitric Acid	<2			
EB-01	240-185122-B-15	Plastic 1 liter - Nitric Acid	<2			
DUP #02	240-185122-A-16	Plastic 1 liter - Nitric Acid	<2			
DUP #02	240-185122-B-16	Plastic 1 liter - Nitric Acid	<2			

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

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-167969.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-185122-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/12/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Kam/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
JCW-MW-18001 (240-185122-1)	5/8/23	06:10 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18004 (240-185122-2)	5/9/23	07:38 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18005 (240-185122-3)	5/9/23	09:54 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
JCW-MW-18006 (240-185122-4)	5/9/23	11:48 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-50 (240-185122-5)	5/8/23	08:13 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-51 (240-185122-6)	5/8/23	09:20 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-52 (240-185122-7)	5/8/23	10:30 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-53 (240-185122-8)	5/8/23	11:25 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-53R (240-185122-9)	5/8/23	13:00 Eastern		Water			X	X	X	2	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 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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:	Date/Time: 5/23 1545	Company EETNC	Received by: fedex	Date/Time:	Company		
Relinquished by: fedex	Date/Time:	Company	Received by: Chantrey - Hanza	Date/Time: 5/12/23 0840	Company ETASTL		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

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6/9/2023

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-167969.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-185122-1
Address: 13715 Rider Trail North,	Due Date Requested: 6/12/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-54R (240-185122-10)	5/9/23	06:55 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-55 (240-185122-11)	5/9/23	08:45 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-57ROUT (240-185122-12)	5/9/23	10:52 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-58 (240-185122-13)	5/9/23	12:50 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-01 (240-185122-14)	5/8/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EB-01 (240-185122-15)	5/9/23	13:10 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP #02 (240-185122-16)	5/9/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
											30

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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		5/12/23 1545	ETNC	fedex		
2	fedex			Brianna Sharkey - Hazard	5/12/23 0840	ETNC
3						

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
Δ Yes Δ No		

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6/9/2023

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-185122-1

Login Number: 185122
List Number: 2
Creator: Sharkey-Gonzalez, Briana L

List Source: Eurofins St. Louis
List Creation: 05/12/23 12:17 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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	

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:	5/8/23 TO 5/10/23 ~~5/1/2023~~ TO ~~5/10/2023~~
PURPOSE OF FIELDWORK:	Second Quarter HMP Sampling Event
WORK PERFORMED BY:	Javier Jasso

5/11/23
SIGNED DATE

5-11-23
CHECKED BY DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 5/8/23	TIME ARRIVED: 0550
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1330

WEATHER		
TEMPERATURE: 48 °F	WIND: 15 to 2 MPH	VISIBILITY: over cast

WORK / SAMPLING PERFORMED

Jaw mw 1800, MS, MSD, JWOW 1801, MW-50, Dup#01
MW-51, MW-52, 53, 53R

getting supplies

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Caleb Batts	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

5/11/23
SIGNED DATE

5-11-23
CHECKED BY DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 5/9/23	TIME ARRIVED: 0550
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1320

WEATHER		
TEMPERATURE: 46 °F	WIND: 10 MPH	VISIBILITY: Overcast

WORK / SAMPLING PERFORMED

MW 54R, JCW-MW-18004, MW-55, JCW-MW-18005, OW-57Rout, JCW-MW-18006, Dup #2, MW-58, FB#01, EB#01

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Caleb Batts	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

SIGNED 5/11/23 DATE

CHECKED BY 5-11-23 DATE

TRC

EQUIPMENT SUMMARY

PROJECT NAME:	CEC Weadock LF: 2023 GW Co	SAMPLER NAME:	Javier Jasso
PROJECT NO.:	514403.0000.0000		

WATER LEVEL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PURGING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

SAMPLING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTERATION DEVICE	FILTER TYPE AND SIZE
DEDICATED POLY TUBING	☑ LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

☑ GROUND ☐ DRUM ☐ POTW ☐ POLYTANK ☐ OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
5/11/23	5-11-23
SIGNED / DATE	CHECKED BY / DATE

REVISED 04/2019

TRC

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: 5/8/23

PH CALIBRATION CHECK

pH 7 (LOT #): 26H 7604 (EXP. DATE): 8/24	pH 4 / 10 (LOT #): 261 3044 (EXP. DATE): 9/24	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
700 / 700	400 / 400	☑ WITHIN RANGE	0800
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 26H 1493 (EXP. DATE): 8/23	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
1309 / 1309	20.1	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 22G-100350 (EXP. DATE): 7/23	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
223 / 223	19.6	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING /SATURATED AIR			
8.87 / 8.87	20.0	☑ WITHIN RANGE	0800
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A1007 (EXP. DATE): 7/23	(LOT #): (EXP. DATE):	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
0 / 0	/	☑ WITHIN RANGE	0800
100 / 100	/	☑ WITHIN RANGE	0800
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):	☑ STANDARD SOLUTION (S) LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES [1]
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ _____	[1] CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ _____	

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED _____ 5/11/23 DATE

CHECKED BY _____ 5-11-23 DATE

TRC

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 (LOT #): 261764 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 261306 (EXP. DATE): 9/24 POST-CAL. READING / STANDARD	CAL. RANGE	TIME
700 / 700	400 / 400	☑ WITHIN RANGE	0500
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 261493 (EXP. DATE): 8/23 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1309 / 1309	21	☑ WITHIN RANGE	0500
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 220100356 (EXP. DATE): 7/23 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
223 / 223	20	☑ WITHIN RANGE	0500
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL. READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
8.87 / 8.81	20.0	☑ WITHIN RANGE	0500
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A1007 (EXP. DATE): 7/23 POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 / 0	/	☑ WITHIN RANGE	0500
100 / 100	/	☑ WITHIN RANGE	0500
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):	☑ STANDARD SOLUTION (S) LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ _____	

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED _____ 5/11/23 DATE

CHECKED BY _____ 5-11-23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE:	5/11/23
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
JCW-MW-18001	0657	TOC	16.92	23.75	NA	NM
JCW-MW-18004	0723	TOC	12.23	14.72	NA	NM
JCW-MW-18005	0741	TOC	8.22	14.28	NA	NM
JCW-MW-18006	0684	TOC	12.39	23.63	NA	NM
JCW-OW-18001	0638	TOC	6.51	20.25	NA	NM
JCW-OW-18002	0643	TOC	9.68	19.73	NA	NM
JCW-OW-18003	0654	TOC	7.65	18.60	NA	NM
JCW-OW-18004	0724	TOC	5.95	14.85	NA	NM
JCW-OW-18006	0803	TOC	6.43	23.47	NA	NM
LH-103R	0711	TOC	22.26	33.46	NA	NM
LH-104	0730	TOC	7.46	14.00	NA	NM
~~JCW-MW-20~~		~~TOC~~			~~NA~~	~~NM~~
MW-50	0648	TOC	13.51	19.40	NA	NM
MW-51	0647	TOC	14.37	20.00	NA	NM
MW-52	0653	TOC	14.98	19.74	NA	NM
MW-53	0700	TOC	13.79	18.18	NA	NM
MW-53R	0704	TOC	14.40	18.80	NA	NM
MW-54R	0717	TOC	13.75	17.20	NA	NM
MW-55	0734	TOC	14.03	14.36	NA	NM
MW-58	0803	TOC	5.27	18.28	NA	NM
OW-51	0648	TOC	9.41	17.28	NA	NM
OW-53	0701	TOC	6.53	18.00	NA	NM
OW-54	0719	TOC	5.80	16.48	NA	NM
OW-55	0735	TOC	6.10	18.42	NA	NM
OW-56	0746	TOC	5.70	DNM	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 5/11/23 DATE

CHECKED 5-11-23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 5/11/23
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	0747	TOC	5.70	DWM	NA	NM
OW-57 IN	0757	TOC	5.38	20.14	NA	NM
OW-57R IN	0758	TOC	5.53	19.66	NA	NM
OW-57 OUT	0751	TOC	10.0	19.48	NA	NM
OW-57R OUT	0750	TOC	9.65	20.30	NA	NM
JCW-MW-15007	0607	TOC	3.24	8.75	NA	NM
JCW-MW-15009	0616	TOC	8.76	13.66	NA	NM
JCW-MW-15010	0624	TOC	17.19	19.57	NA	NM
JCW-MW-15028	0610	TOC	6.91	25.16	NA	NM
MW-15002	0834	TOC	6.41	16.88	NA	NM
MW-15008	0817	TOC	4.31	17.00	NA	NM
MW-15016	0838	TOC	3.21	8.10	NA	NM
MW-15019	0829	TOC	5.21	16.81	NA	NM
~~OW~~ MW-61	0837		6.46	37.07		
JCW-MW-15035	0827		5.53	DWM		
JCW MW 15036	0804		14.70	DWM		
MW-16R	0746		14.06	19.85		
JCW MW-15031	0738		15.44	DWM		
JCW- MW 20	0743		5.86	DWM		
JCW- MW-19	0806		8.33	20.83		
MW-15030	0830		5.60	17.17		
MW-16B	0824		4.59	32.76		
MW-15034	0826		5.74	17.17		
MW-15018	0831		6.08	9.94		
JCW MW 15001	0835		8.88	DWM		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR
(E.G., 1.1 + 0.00 T/PVC).

SIGNED 5/11/23 DATE

CHECKED 5-11-23 DATE

REVISED 04/2019

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ, (JK) DATE: 5-1-23	BY: HS DATE: 5/10/23

SAMPLE ID: MW-15002 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1414	DATE: 5-1-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 6.50 T/ PVC

DEPTH TO BOTTOM: ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 9 ☒ LITERS ☐ GALLONS

COLOR: clear w/ iron backwash ODOR: none

TURBIDITY ☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1501	DATE: 5-1-23

PH: 7.20 SU CONDUCTIVITY: 413.3 umhos/cm

ORP: -80.3 mV DO: 0.48 mg/L

TURBIDITY: 3.13 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.0 °C OTHER: ~~~

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: ~~~ FILTRATE ODOR: ~~~

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1416	200	7.36	415.0	-55.6	2.26	11.22	9.0	6.55	INITIAL
1421	200	7.31	357.3	-39.7	1.60	27.1	8.9	6.55	1
1426	200	7.29	353.2	-4.8	1.69	10.66	9.0	6.55	2
1431	200	~~7.29~~ 7.27	363.2	-55.0	1.47	7.15	9.0	6.55	3
1436	200	7.26	364.5	-58.9	1.23	4.42	9.0	6.55	4
1441	200	7.24	377.8	-62.4	0.98	4.51	9.2	6.55	5
1446	200	7.23	396.2	-67.4	0.65	3.42	9.1	6.55	6
1451	200	7.21	405.7	-72.5	0.49	3.21	9.1	6.55	7
1456	200	7.21	407.6	-76.5	0.48	3.25	9.1	6.55	8
1501	200	7.20	413.3	-80.3	0.48	3.13	9.0	6.55	9

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	125mL	Plastic	B	☐ Y ☒ N					☐ Y ☐ N
1	125mL	"	A	☐ Y ☒ N					☐ Y ☐ N
1	250mL	"	A	☐ Y ☒ N					☐ Y ☐ N
2	1L	"	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Fedex DATE SHIPPED: 5-2-23 AIRBILL NUMBER: ~~~

COC NUMBER: ~~~ SIGNATURE: [signature] DATE SIGNED: 5-9-23

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2023 GW Compl	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ, JK DATE: 5-1-23	BY: LS DATE: 5/10/23

SAMPLE ID: MW-15049 15019 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1312	DATE: 5-1-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 5.22 T/ PVC

DEPTH TO BOTTOM: 16.89 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS

COLOR: Clear ODOR: None

TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1343	DATE: 5-1-23

PH: 6.56 SU CONDUCTIVITY: 1457 umhos/cm

ORP: -99.3 mV DO: 0.49 mg/L

TURBIDITY: 3.47 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 8.1 °C OTHER:

COLOR: Clear ODOR: None

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☒ DUP- Background

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1313	200	6.67	1488	-51.8	2.61	8.57	9.0	5.25	INITIAL
1318	200	6.59	1474	-69.8	0.51	3.64	8.4	5.25	1
1323	200	6.58	1468	-78.0	0.50	3.31	8.2	5.25	2
1328	200	6.57	1462	-87.0	0.51	2.94	8.1	5.25	3
1333	200	6.57	1462	-92.0	0.50	2.94	8.1	5.25	4
1338	200	6.57	1455	-97.8	0.49	2.76	8.0	5.25	5
1343	200	6.56	1457	-99.3	0.49	3.47	8.1	5.25	6

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
2	125mL	Plastic	B	☐ Y ☒ N					☐ Y ☐ N
2	125mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
2	500mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
4	1L	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Fedex DATE SHIPPED: 5-2-23 AIRBILL NUMBER: _____

COC NUMBER: _____ SIGNATURE: [signature] DATE SIGNED: 5-9-23

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2023 GW Compl	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ (JK) DATE: 5-2-23	BY: HS DATE: 5/10/23

SAMPLE ID: MW-1501B WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0758	DATE: 5-2-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 3.18 T/ PVC

DEPTH TO BOTTOM: 7.76 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 8 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0840	DATE: 5-2-23

PH: 6.89 SU CONDUCTIVITY: 914 umhos/cm

ORP: -43.9 mV DO: 0.37 mg/L

TURBIDITY: 3.01 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 8.1 °C OTHER: ~~~

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: ~~~ FILTRATE ODOR: ~~~

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0800	200	7.03	666	-6.6	2.50	10.11	8.0	3.22	INITIAL
0805	200	6.90	722	5.44	0.37	5.14	8.0	3.22	1
0810	200	6.88	804	7.1	0.38	5.16	8.0	3.22	2
0815	200	6.89	857	-11.8	0.37	4.86	8.0	3.22	3
0820	200	6.89	869	-17.4	0.37	4.50	8.0	3.22	4
0825	200	6.89	882	-29.1	0.37	3.04	8.0	3.22	5
0830	200	6.89	898	-41.0	0.38	3.07	8.0	3.22	6
0835	200	6.89	909	-42.1	0.37	2.95	8.1	3.22	7
0840	200	6.89	914	-43.9	0.37	3.01	8.1	3.22	8

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	125mL	Plastic	B	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
1	250mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
2	1L	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Fedex DATE SHIPPED: 5-2-23 AIRBILL NUMBER: ~~~

COC NUMBER: ~~~ SIGNATURE: [signature] DATE SIGNED: 5-9-23

WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2023 GW Compl	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ, JK DATE: 5-1-23	BY: HS DATE: 5/10/23

SAMPLE ID: MW-1500S WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1212	DATE: 5-1-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 4.70 T/ PVC

DEPTH TO BOTTOM: ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 5 ☒ LITERS ☐ GALLONS

COLOR: Clear ODOR: none

TURBIDITY

☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1240	DATE: 5-1-23

PH: 6.61 SU CONDUCTIVITY: 1032 umhos/cm

ORP: -106.3 mV DO: 0.22 mg/L

TURBIDITY: 8.87 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.0 °C OTHER: ____

COLOR: Clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: ____ FILTRATE ODOR: ____

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS: FB collected

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1215	200	6.93	945	-67.3	0.55	15.45	9.2	4.32	INITIAL
1220	200	6.69	998	-79.7	0.08	12.80	9.4	4.32	1
1225	200	6.65	998	-94.7	0.10	9.31	9.1	4.32	2
1230	200	6.63	1019	-102.7	0.22	9.91	9.0	4.32	3
1235	200	6.62	1029	-106.0	0.22	9.84	9.0	4.32	4
1240	200	6.61	1032	-106.3	0.22	8.87	9.0	4.32	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	125mL	Plastic	B	☐ Y ☑ N	1	125mL	Plastic	B	☐ Y ☒ N
1	125mL	↓	A	☐ Y ☒ N		↓			☐ Y ☐ N
1	500mL		A	☐ Y ☑ N					☐ Y ☐ N
2	1L	↓	B	☐ Y ☑ N		FB			☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Fedex DATE SHIPPED: 5-2-23 AIRBILL NUMBER: ____

COC NUMBER: ____ SIGNATURE: [signature] DATE SIGNED: 5-9-23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/4/23	BY: SK	DATE: 5-11-23

SAMPLE ID: XW-MW16001 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0620	DATE: 5/8/23	SAMPLE	TIME: 0650	DATE: 5/8/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.71 SU	CONDUCTIVITY: 3458 umhos/cm	
			ORP: -190.5 mV	DO: 0.24 mg/L	
DEPTH TO WATER: 16.93 T/ PVC			TURBIDITY: 6.9 NTU		
DEPTH TO BOTTOM: 23.71 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 11.5 °C	OTHER:	
VOLUME REMOVED: 6 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: Brownish ODOR: none			FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☒ MS/MSD	☐ DUP-	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0620	200	6.71	1627	223	0.87	750	11.8	16.73	INITIAL
0625		6.66	3476	-94.5	0.08	17.5	11.5	16.82	1
0630		6.70	3428	-130.1	0.04	12.5	11.4	16.82	2
0635		6.70	3431	-168.8	0.36	9.7	11.3	16.82	3
0640		6.70	3441	-189.5	0.29	7.0	11.3	16.82	4
0645		6.71	3456	-190.3	0.25	7.0	11.3	16.82	5
0650		6.71	3458	-190.5	0.24	6.9	11.3	16.82	6

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
2	1L	Glass	A	☐ Y ☒ N					☐ Y ☐ N
	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
3	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
3	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	11/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: JCW-OW-18001 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0706	DATE: 5/8/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 6.51 T/ PVC

DEPTH TO BOTTOM: 20.5 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 5 ☒ LITERS ☐ GALLONS

COLOR: cloudy ODOR: none

TURBIDITY

☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0733	DATE: 5/8/23

PH: 6.70 SU CONDUCTIVITY: 1753 umhos/cm

ORP: -169.0 mV DO: 0.25 mg/L

TURBIDITY: 5.9 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.9 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0706	200	7.20	866	-117.5	10.0	17.1	10.3	6.49	INITIAL
0713		6.71	1767	-160.0	1.08	5.9	9.7	6.60	1
0718		6.66	1756	-163.5	0.53	5.1	9.8	6.60	2
0723		6.70	1754	-168.5	0.40	5.1	9.9	6.60	3
0728		6.70	1753	-168.5	0.30	6.0	9.9	6.60	4
0733		6.70	1753	-169.0	0.25	5.9	9.9	6.60	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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
2	125	glass	A	☐ Y ☑ N					☐ Y ☐ N
1	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☑ N					☐ Y ☐ N
~~2~~	~~40~~	~~PL~~	~~B~~	☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED			CHECKED		
PROJECT NUMBER:	514403.0000.0000	BY:	JJ	DATE: 5/11/23	BY: SK	DATE: 5-11-23	

SAMPLE ID: MW--50 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0743	DATE: 5/8/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 13.51 T/ PVC

DEPTH TO BOTTOM: 19.46 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 6 ☑ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0813	DATE: 5/8/23

PH: 7.34 SU CONDUCTIVITY: 1231 umhos/cm

ORP: -134.3 mV DO: 038 mg/L

TURBIDITY: 4.1 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 10.0 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☑ DUP- #01

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0743	200	7.53	796	-70.5	9.5	12	10.5	13.31	INITIAL
0748		7.26	1512	-84.0	1.5	6.2	10.0	1340	1.0
0753		7.36	1239	-104.0	1.06	5.2	9.9	1340	2.0
0758		7.37	1224	-122.5	0.79	4.6	10.0	1340	3.0
0803		7.37	1222	-138.5	050	4.4	10.0	1340	4.0
0808		7.36	1228	-139.0	042	4.4	10.0	1340	5.0
0813		7.36	1231	-134.3	038	4.1	10.0	1340	6.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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
~~2~~	~~1L~~	~~glass~~	~~A~~	☐ Y ☑ N					☐ Y ☐ N
2	250	P	A	☐ Y ☑ N					☐ Y ☐ N
2	1L	P	A	☐ Y ☑ N					☐ Y ☐ N
2	1L	P	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P	B	☐ Y ☑ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/16/23	BY: JK	DATE: 5-11-23

SAMPLE ID: MW 51 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0850	DATE: 5/16/23	SAMPLE	TIME: 0920	DATE: 5/16/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.33 SU	CONDUCTIVITY: 1765 umhos/cm	
			ORP: -159.3 mV	DO: 0.29 mg/L	
DEPTH TO WATER: 14.37 T/ PVC			TURBIDITY: 5.4 NTU		
DEPTH TO BOTTOM: 20.01 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 9.2 °C	OTHER:	
VOLUME REMOVED: 3 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: cloudy	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0850	100	7.74	1635	-90.0	8.5	70.0	10.9	1414	INITIAL
0855		7.46	1692	-125.0	2.4	13.2	9.3	14.20	.5
0900		7.40	1721	-135.3	1.1	7.1	9.2	1420	1
0905		7.37	1743	-150.0	0.64	6.4	9.2	1420	1.5
0910		7.34	1753	-158.2	0.52	5.4	9.2	1420	2
0915		7.33	1758	-159.0	0.31	5.4	9.2	1420	2.5
0920		7.33	1765	-159.3	0.29	5.4	9.2	1420	3

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	250	PI	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PI	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PI	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	PI	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/16/23

TRC WATER SAMPLE LOG

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER: 514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: SK	DATE: 5-11-23

SAMPLE ID: MW-53 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0955	DATE: 5/8/23	SAMPLE	TIME: 10:30	DATE: 5/8/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.88 SU	CONDUCTIVITY: 1800 umhos/cm	
			ORP: -145.7 mV	DO: 0.21 mg/L	
DEPTH TO WATER: 14.98 T/ PVC			TURBIDITY: 4.5 NTU		
DEPTH TO BOTTOM: 19.74 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 9.6 °C	OTHER:	
VOLUME REMOVED: 3.5 ☑ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: cloudy	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0955	100	7.79	820	-101.5	9.8	27	12.3	14.75	INITIAL
1000		7.02	1767	-132.5	1.8	10.5	9.7	14.90	.5
1005		6.90	1776	-138.5	0.66	6.2	9.6	14.90	1
1010		6.89	1787	-139.0	0.45	6.0	9.6	14.90	1.5
1015		6.89	1793	-138.8	0.31	5.4	9.6	14.90	2
1020		6.89	1798	-141.5	0.26	4.9	9.6	14.90	2.5
1025		6.88	1799	-145.8	0.23	4.7	9.6	14.90	3
1030		6.88	1800	-145.7	0.21	4.5	9.6	14.96	3.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off	DATE SHIPPED: 5-10-23	AIRBILL NUMBER:
COC NUMBER:	SIGNATURE:	DATE SIGNED: 5/11/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: SK	DATE: 5-11-23

SAMPLE ID: MW-53 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1100	DATE: 5/8/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 13.79 T/ PVC

DEPTH TO BOTTOM: 18.18 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 2.5 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1125	DATE: 5/8/23

PH: 7.41 SU CONDUCTIVITY: 1014 umhos/cm

ORP: -174.3 mV DO: 0.33 mg/L

TURBIDITY: 4.2 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.1 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1100	100	7.74	38	-84.5	9.6	6.9	11.3	13.57	INITIAL
1105		7.51	956	-136.0	3.2	6.6	9.5	13.61	.5
1110		7.45	972	-156.0	084	4.5	9.1	13.61	1
1115		7.42	996	-173.1	049	4.3	9.1	13.61	1.5
1120		7.41	1006	-174.5	039	4.2	9.1	13.65	2
1125		7.41	1014	-174.3	033	4.2	9.1	13.65	2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: MW 532 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1157	DATE: 5/8/23	SAMPLE	TIME: 1300	DATE: 5/8/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.84 SU	CONDUCTIVITY: 1590 umhos/cm	
			ORP: 154.0 mV	DO: 0.19 mg/L	
DEPTH TO WATER: 14.46 T/ PVC			TURBIDITY: 80 NTU		
DEPTH TO BOTTOM: 18.80 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 9.4 °C	OTHER:	
VOLUME REMOVED: 6.0 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Brown	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1157	100	7.09	1773	-102.3	8.9	2600	10.7	13.93	INITIAL
1200		6.86	1614	-114.3	1.65	1400	10.5	14.03	.5
1205		6.85	1775	-119.5	0.96	400	9.6	14.03	1
1210		6.85	1710	-128.0	0.70	72.5	9.5	14.03	1.5
1215		6.84	1690	-135.0	0.59	69.0	9.5	14.03	2
1220		6.84	1663	-139.5	0.47	37.5	9.5	14.03	2.5
1225		6.84	1620	-141.0	0.38	64	9.5	14.03	3
1230		6.84	1611	-144.5	0.31	16	9.4	14.03	3.5
1235		6.84	1610	-149.5	0.26	12.0	9.3	14.03	4
1240		6.84	1620	-150.5	0.25	9.8	9.4	14.03	4.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P-1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC

WATER SAMPLE LOG

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Weadock LF: 2023 GW Co	PREPARED			CHECKED		
PROJECT NUMBER:	514403.0000.0000	BY:	JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23	

SAMPLE ID: MW-532

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1245	100	6.89	1609	-153.5	023	9.2	9.4	1403	.5
1250		6.84	1594	-154.5	022	8.0	9.4	1403	5.5
1255		6.84	1593	-154.0	020	8.0	9.4	1403	6
1300		6.84	1590	-154.0	019	8.0	9.4	1403	6.5

SIGNATURE: 5/11/23

checked by/ DATE SIGNED: 5-11-23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: MW 542 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0610	DATE: 5/9/23	SAMPLE	TIME: 0615	DATE: 5/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.67 SU	CONDUCTIVITY: 1214 umhos/cm	
			ORP: -116.0 mV	DO: 0.58 mg/L	
DEPTH TO WATER: 13.71 T/ PVC			TURBIDITY: 6.4 NTU		
DEPTH TO BOTTOM: 17.20 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 7.8 °C	OTHER:	
VOLUME REMOVED: 9 ☑ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Brown	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0610	200	4.00	460	223	8.6	360	17.3	13.71	INITIAL
0615		6.88	1203	-91.5	3.3	73	8.1	13.75	1
0620		6.90	1206	-70.3	2.40	18.9	7.9	13.75	2
0625		6.89	1208	-50.0	2.6	10.7	7.9	13.75	3
0630		6.89	1210	-65	1.9	8.0	7.8	13.75	4
0635		6.87	1211	-90.0	1.2	7.0	7.9	13.75	5
0640		6.87	1213	-95.7	091	6.9	7.9	13.75	6
0645		6.87	1214	-115.3	064	6.7	7.9	13.75	7
0650		6.87	1214	-116.0	059	6.4	7.8	13.75	8
0655		6.87	1214	-116.0	058	6.4	7.8	13.75	9

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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/4/23	BY: JK	DATE: 5-11-23

SAMPLE ID: JCW-MW-18004 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0714	DATE: 5/4/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 12.43 T/ PVC

DEPTH TO BOTTOM: 14.22 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 2 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0736	DATE: 5/4/23

PH: 6.64 SU CONDUCTIVITY: 1814 umhos/cm

ORP: -26.5 mV DO: 2.7 mg/L

TURBIDITY: 5.7 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 9.0 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0714	100	7.14	1745	-29.1	10.5	20	9.3	1208	INITIAL
0723		6.65	1807	-34.0	8.9	5.5	8.7	1231	.5
0728		6.64	1807	-27.0	7.7	6.0	8.9	1251	1
0733		6.64	1814	-27.0	7.8	5.8	9.0	1270	1.5
0738		6.64	1814	-26.5	7.7	5.7	9.0	1285	2
									~~2.5~~

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/4/23	BY: JK	DATE: 5-11-23

SAMPLE ID: MW 55 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0810	DATE: 5/4/23	SAMPLE	TIME: 0845	DATE: 5/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.94 SU	CONDUCTIVITY: 1421 umhos/cm	
DEPTH TO WATER:	14.03 T/ PVC		ORP: -150.1 mV	DO: 0.31 mg/L	
DEPTH TO BOTTOM:	16.38 T/ PVC		TURBIDITY: 7.1 NTU		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
VOLUME REMOVED:	7 ☒ LITERS ☐ GALLONS		TEMPERATURE: 9.6 °C	OTHER:	
COLOR:	Brown ODOR: none		COLOR: Clear	ODOR: none	
TURBIDITY			FILTRATE (0.45 um) ☐ YES	☑ NO	
☐ NONE ☐ SLIGHT ☐ MODERATE	☑ VERY		FILTRATE COLOR:	FILTRATE ODOR:	
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		QC SAMPLE: ☐ MS/MSD	☐ DUP-	
			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0810	200	7.24	1617	-95.1	0.7	220	10.0	13.75	INITIAL
0815		6.98	1415	-150.5	1.20	54	9.5	13.80	1
0820		6.96	1417	-151.0	0.60	25	9.5	13.80	2
0825		6.95	1421	-149.0	0.40	10.0	9.5	13.80	3
0830		6.94	1421	-148.5	0.31	8.9	9.6	13.80	4
0835		6.94	1421	-150	0.26	7.2	9.6	13.80	
0840		6.94	1421	-150.5	0.23	7.1	9.6	13.80	6
0845		6.94	1421	-150.5	0.31	7.1	9.6	13.80	7

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	250	PI	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PI	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PI	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PI	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: XW-MW 18005 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0914	DATE: 5/4/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 8.22 T/ PVC

DEPTH TO BOTTOM: 16.05 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 4 ☒ LITERS ☐ GALLONS

COLOR: Brown ODOR: none

TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0954	DATE: 5/4/23

PH: 6.75 SU | CONDUCTIVITY: 1535 umhos/cm

ORP: -116.5 mV | DO: 0.30 mg/L

TURBIDITY: 10.0 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 10.2 °C | OTHER:

COLOR: Clear | ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0914	100	7.24	4881	-62	9.58	600	14.0	8.38	INITIAL
0919		6.76	1614	-53.1	1.66	92	10.4	9.15	.1
0924		6.75	1613	-62	0.82	52	10.3	9.46	1
0929		6.75	1610	-74.6	0.61	10.5	10.2	9.61	1.5
0934		6.75	1594	-90.0	0.46	25	10.3	9.83	2
0939		6.76	1537	-100.0	0.46	14.7	10.3	9.92	2.5
0944		6.76	1519	-115.1	0.31	10.0	10.2	10.0	3
0949		6.76	1530	-116.0	0.31	10.0	10.2	10.0	3.5
0954		6.75	1535	-116.5	0.30	10.0	10.2	10.0	4

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: GW-57ROut | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1032	DATE: 5/9/23	SAMPLE	TIME: 1052	DATE: 5/9/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 9.65 T/ PVC

DEPTH TO BOTTOM: 20.20 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 2 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

PH: 7.05 SU | CONDUCTIVITY: 1253 umhos/cm

ORP: -115.3 mV | DO: 1.4 mg/L

TURBIDITY: 5.9 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 11.2 °C | OTHER:

COLOR: clear | ODOR: non

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1032	100	7.50	582	-96.5	9.6	10.3	16.2	953	INITIAL
1037		7.08	1256	-130.0	2.6	7.0	11.4	1041	.5
1042		7.05	1252	-114.8	1.8	6.0	11.3	1120	1
1047		7.05	1253	-115.0	1.7	6.0	11.3	1179	1.5
1052		7.05	1253	-115.3	1.4	5.9	11.2	1225	2
									~~2.5~~
									3

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: JCW-MW-18006 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1123	DATE: 5/9/23	SAMPLE	TIME: 1148	DATE: 5/9/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 12.39 T/ PVC

DEPTH TO BOTTOM: 23.63 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 5 ☒ LITERS ☐ GALLONS

COLOR: Cloudy ODOR: NON

TURBIDITY: ☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.48 SU | CONDUCTIVITY: 1252 umhos/cm

ORP: -160 mV | DO: 0.30 mg/L

TURBIDITY: 6.4 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 13.4 °C | OTHER:

COLOR: Clear | ODOR: NON

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☑ DUP JCW-02

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1123	200	7.28	5021	-130.5	9.1	30.0	14.6	1273	INITIAL
1128		6.99	1217	-151.5	1.0	8.4	12.4	1290	1
1133		6.98	1224	-157.5	0.52	6.4	13.4	1290	2
1138		6.98	1234	-160.5	0.41	6.3	13.4	1290	3
1143		6.96	1248	-160.5	0.34	6.3	13.4	1290	4
1148		6.98	1252	-160	0.30	6.4	13.4	1290	5
									~~6~~

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
2	250	P1	A	☐ Y ~~☑~~ N					☐ Y ☐ N
2	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
2	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
4	1L	P1	B	☐ Y ~~☑~~ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: MW-58 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1230	DATE: 5/9/23	SAMPLE	TIME: 1250	DATE: 5/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.00 SU	CONDUCTIVITY: 1425 umhos/cm	
			ORP: -128.3 mV	DO: 0.40 mg/L	
DEPTH TO WATER:	5.57 T/ PVC		TURBIDITY: 4.3 NTU		
DEPTH TO BOTTOM:	18.56 T/ PVC		☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 10.0 °C	OTHER:	
VOLUME REMOVED:	4 ☐ LITERS ☐ GALLONS		COLOR: Clear	ODOR: NONE	
COLOR:	clear ODOR: NONE		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1230	200	7.36	791	-141.0	9.0	7.0	16.98	5.57	INITIAL
1235		6.97	2037	-126.0	1.0	4.3	10.1	5.76	1
1240		6.96	1950	-128.8	0.63	4.2	10.0	5.76	2
1245		6.99	1919	-129.3	0.46	4.3	10.0	5.76	3
1250		7.00	1425	-129.3	0.40	4.3	10.0	5.76	4
									~~5~~
									~~6~~

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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

REVISED 04/2019

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: CBH1 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: T/ PVC

DEPTH TO BOTTOM: T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: ☐ LITERS ☐ GALLONS

COLOR: ODOR:

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1310	DATE: 5/9/23

PH: NA SU | CONDUCTIVITY: NA umhos/cm

ORP: NA mV | DO: NA mg/L

TURBIDITY: NA NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NA °C | OTHER:

COLOR: Clear | ODOR: NON

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: | FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	5/11/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 5/11/23	BY: JK	DATE: 5-11-23

SAMPLE ID: FB H1 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: ____ T/ PVC

DEPTH TO BOTTOM: ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: ____ ☐ LITERS ☐ GALLONS

COLOR: ____ ODOR: ____

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1315	DATE: 5/4/23

PH: NR SU | CONDUCTIVITY: NR umhos/cm

ORP: NR mV | DO: NR mg/L

TURBIDITY: NR NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NR °C | OTHER: ____

COLOR: Clear | ODOR: non

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: ____ | FILTRATE ODOR: ____

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	125	PI	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PI	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	5-10-23	AIRBILL NUMBER:	____
COC NUMBER:	____	SIGNATURE:		DATE SIGNED:	5/11/23

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SAMPLING SITE / CUSTOMER: Q2-2023 JCW-DEK Background Wells

PROJECT NUMBER: 23-0404

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	REMARKS
23-0404-01	5-1-23	1501	GW	MW-15002	3	2	1						x	x	x	
-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	x	x	
-04	5-1-23	1343	GW	MW-15019	3	2	1						x	x	x	
-05	5-1-23	—	GW	DUP-Background	3	2	1						x	x	x	
-06	5-1-23	1240	W	FB- Background	1								x			

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CHAIN OF CUSTODY

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

SAMPLING SITE / CUSTOMER: Q2-2023 Weadock Porewater Wells

PROJECT NUMBER: **23-0406**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
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-02	5/9/23	0738	GW	JCW-MW-18004	5	4	1						x	x	x		
-03	5/9/23	0954	GW	JCW-MW-18005	5	4	1						x	x	x		
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-06	5/8/23	0830	GW	MW-51	5	4	1						x	x	x		
-07	5/8/23	1030	GW	MW-52	5	4	1						x	x	x		
-08	5/8/23	1157	GW	MW-53	5	4	1						x	x	x		
-09	5/8/23	1300	GW	MW-53R	5	4	1						x	x	x		
-10	5/9/23	0645	GW	MW-54R	5	4	1						x	x	x		
-11	5/9/23	0847	GW	MW-55	5	4	1						x	x	x		
-12	5/9/23	1057	GW	OW-57ROUT	5	4	1						x	x	x		

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COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS27723

Temperature: 3.9-5.8 °C Cal. Due Date: 5-25-23

pg 5 of 28

CHAIN OF CUSTODY

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SAMPLING SITE / CUSTOMER: Q2-2023 Weadock Porewater Wells

PROJECT NUMBER: **23-0406**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity					REMARKS
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-14	5/8/23	—	GW	DUP-JCW-LF-01	5	4	1						x	x	x						
-15	5/9/23	—	GW	DUP-JCW-LF-02	5	4	1						x	x	x						
-16	5/9/23	0620	GW	JCW-MW-18001 MS	4	3	1						x	x							
-17	5/9/23	0620	GW	JCW-MW-18001 MSD	4	3	1						x	x							
-18	5/9/23	1305	W	FB-01	2	1	1						x	x							
-19	5/9/23	1310	W	EB-01	2	1	1						x	x							

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RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS 27723

Temperature: 3.9-5.8 °C Cal. Due Date: 5-25-23

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q2-2023 Weadock ASD	PROJECT NUMBER: 23-0407	SAP CC or WO#:	
SAMPLING TEAM.	TURNAROUND TIME REQUIRED ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____	REQUESTER: Harold Register	
SEND REPORT TO: Caleb Batts	email:	phone:	
COPY TO. Harold Register / TRC	MATRIX CODES: GW = Groundwater, WW = Wastewater, W = Water / Aqueous Liquid, S = Soil / General Solid, O = Oil, OX = Other _____, SL = Sludge, A = Air, WP = Wipe, WT = General Waste		

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT:

☐ NPDES
☒ TNI
☐ ISO 17025
☐ 10 CFR 50 APP B
☐ INTERNAL INFO
☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
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RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:

COMMENTS.

Received on Ice? ☒ Yes ☐ No M&TE #. LS27723

Temperature: 3.9 - 5.8 °C Cal. Due Date: 5-25-23

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Appendix G
Alternate Source Demonstration Supporting Information

Consumers Energy
Count on Us®

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.

Harold D. Register, Jr.

Signature

July 21, 2023

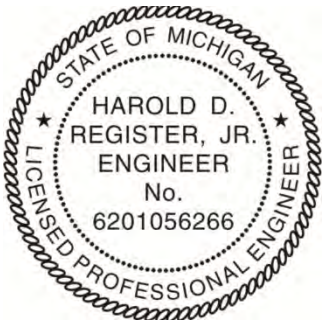
Date of Certification

Harold D. Register, Jr., P.E.

Name

6201056266

Professional Engineer Certification Number

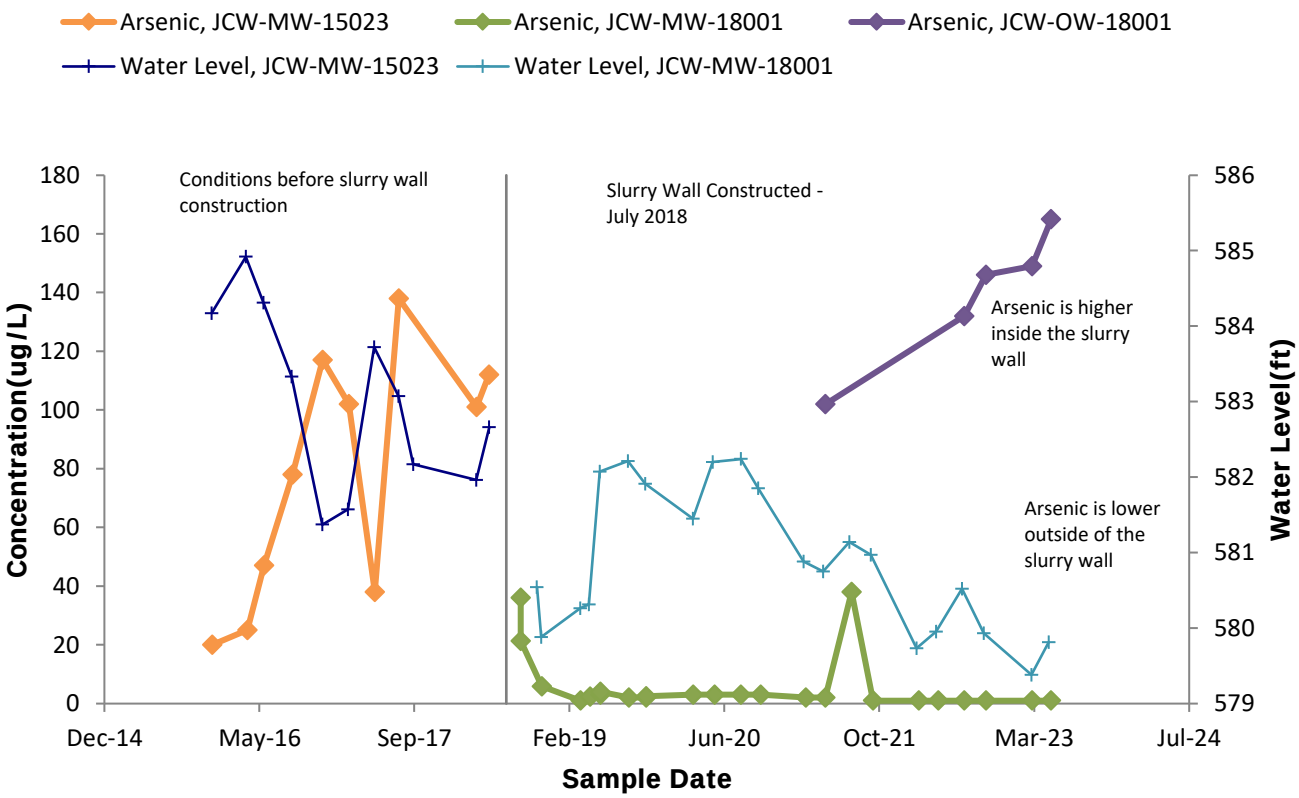


07/21/2023

References

TRC (July 2023). *2023 Semiannual Groundwater Monitoring Report/Second Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Landfill Solid Waste Disposal Area, Essexville, Michigan*

Figure G1: Time Series Plots for JCW-MW-18001 ASD



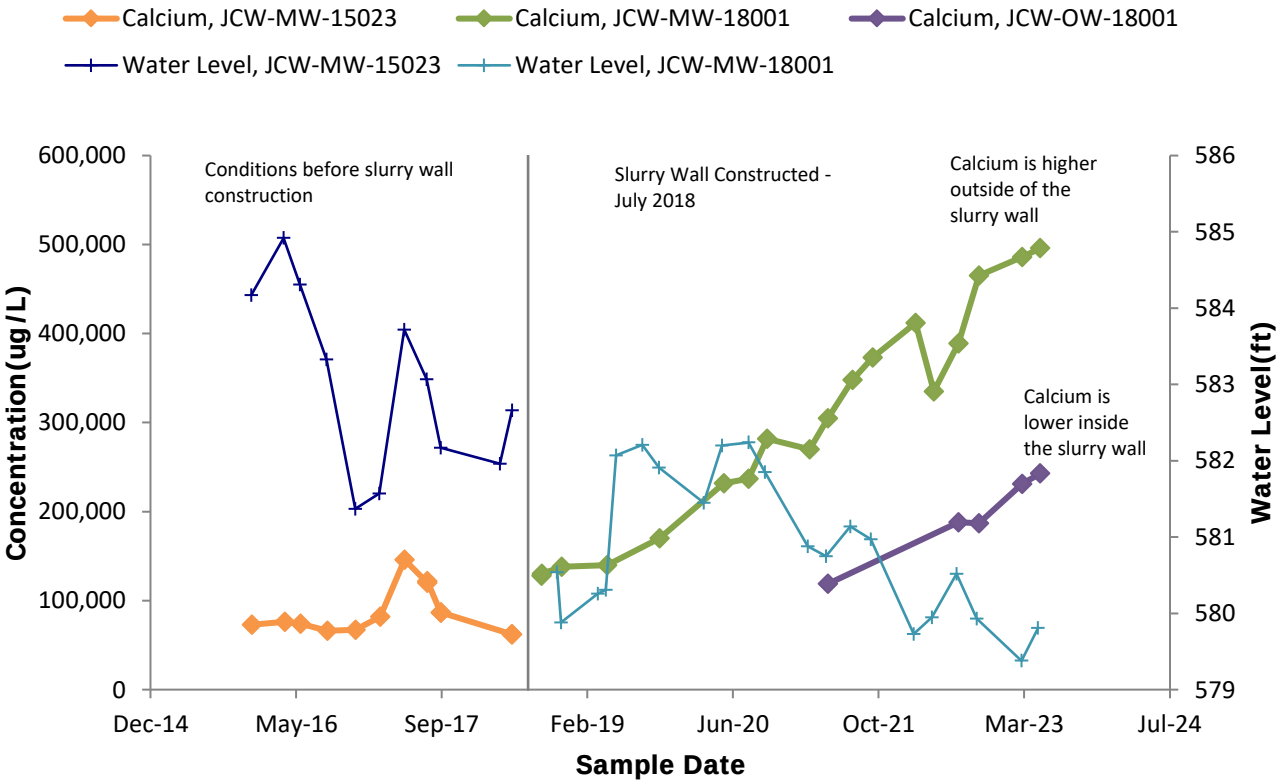
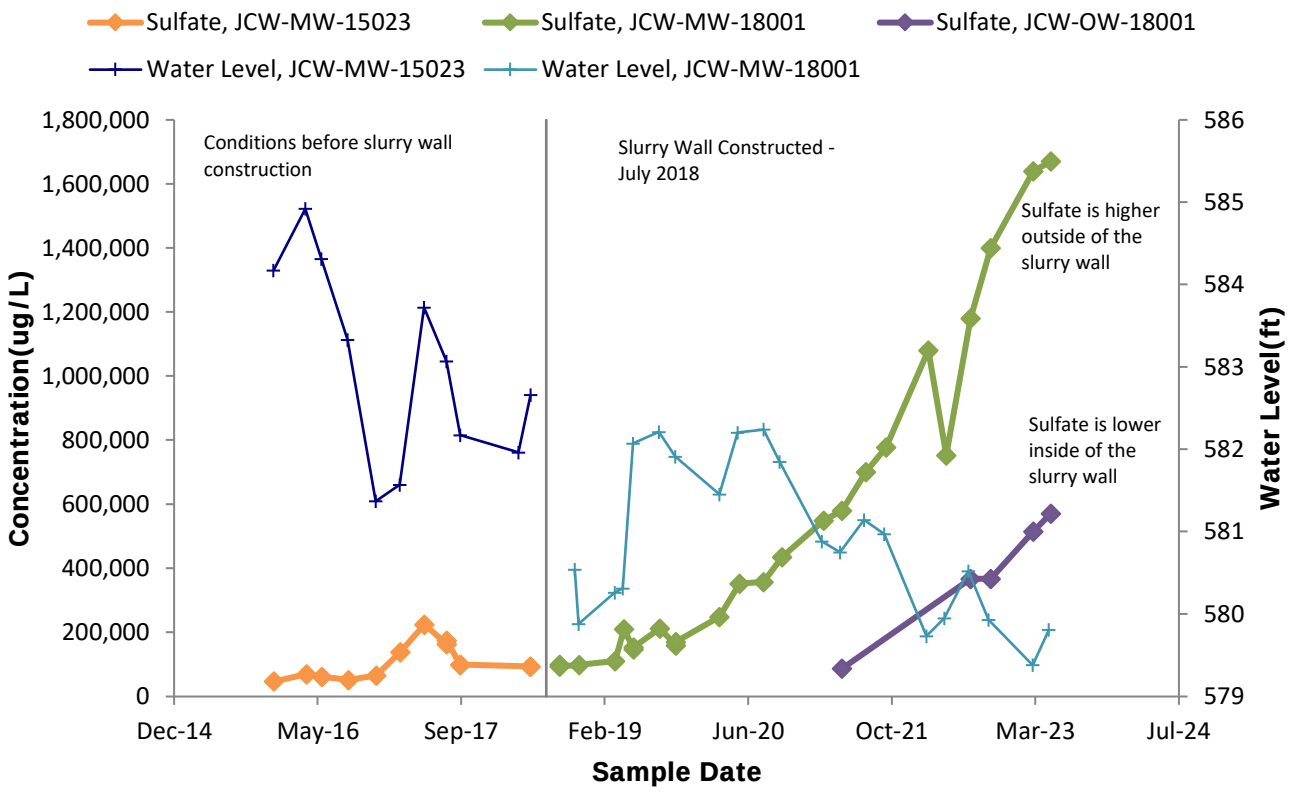
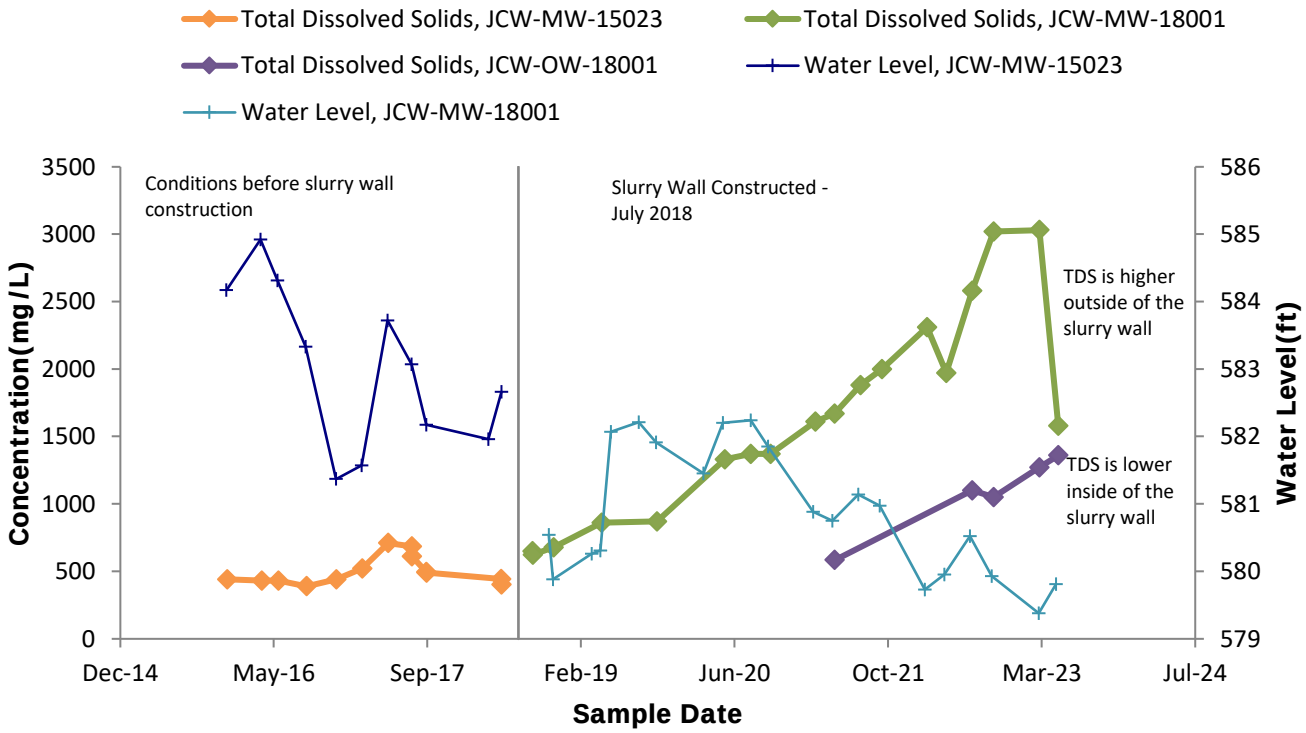


Figure G1: Time Series Plots for JCW-MW-18001 ASD





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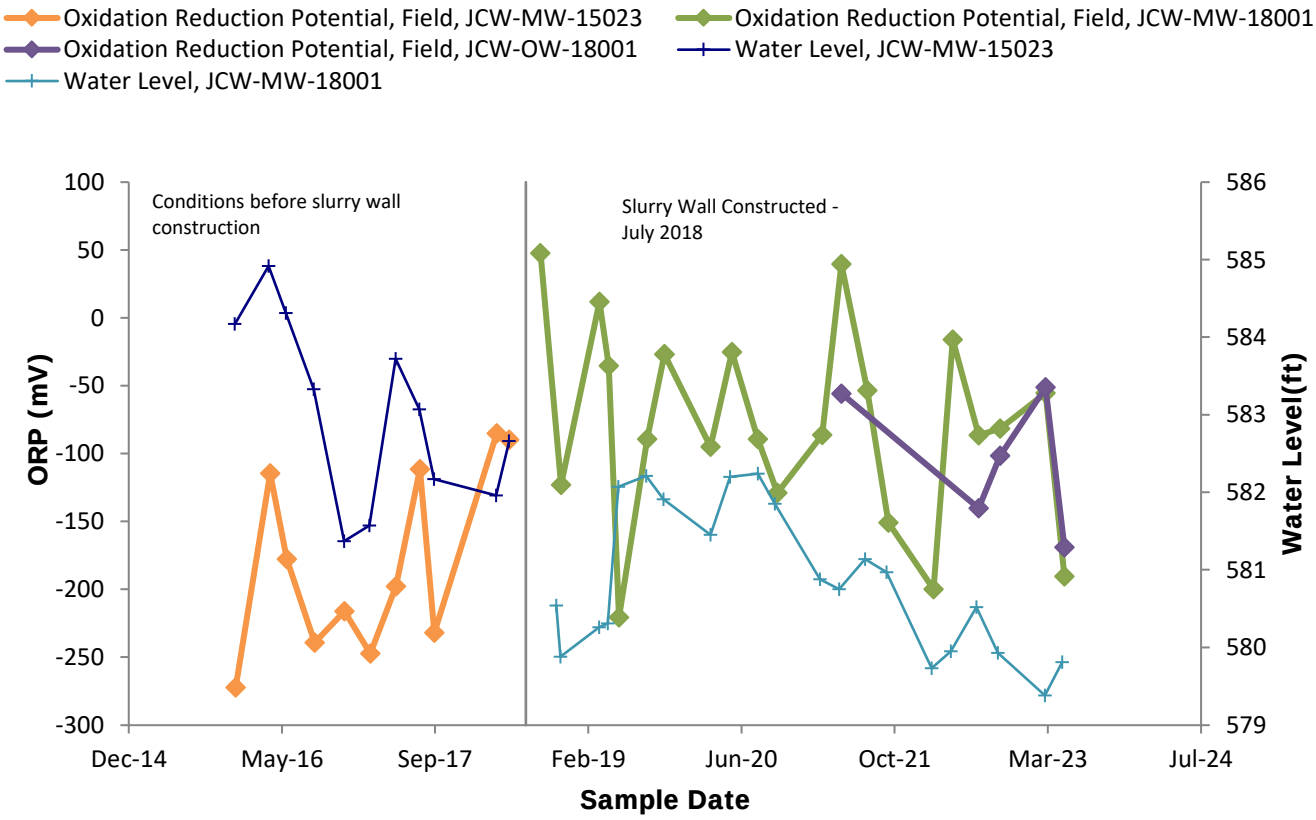


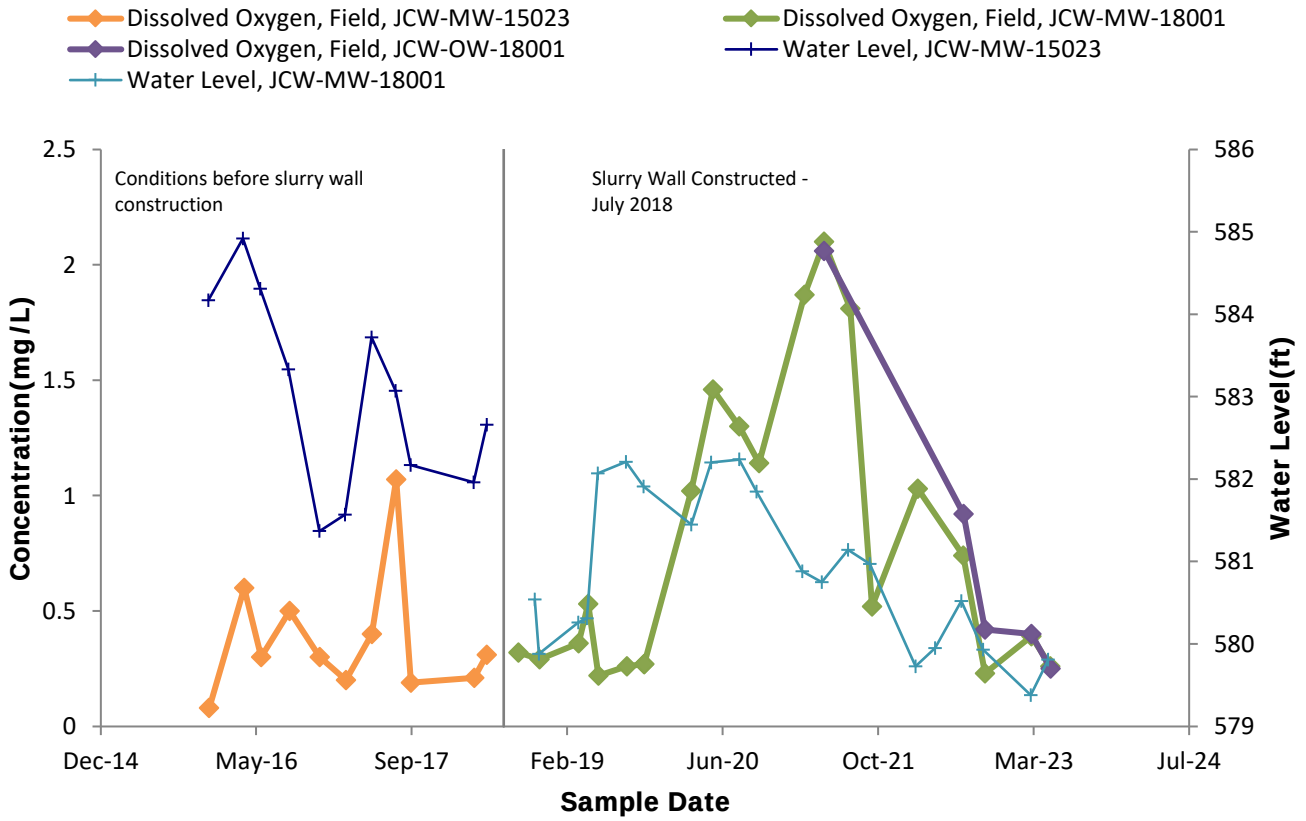
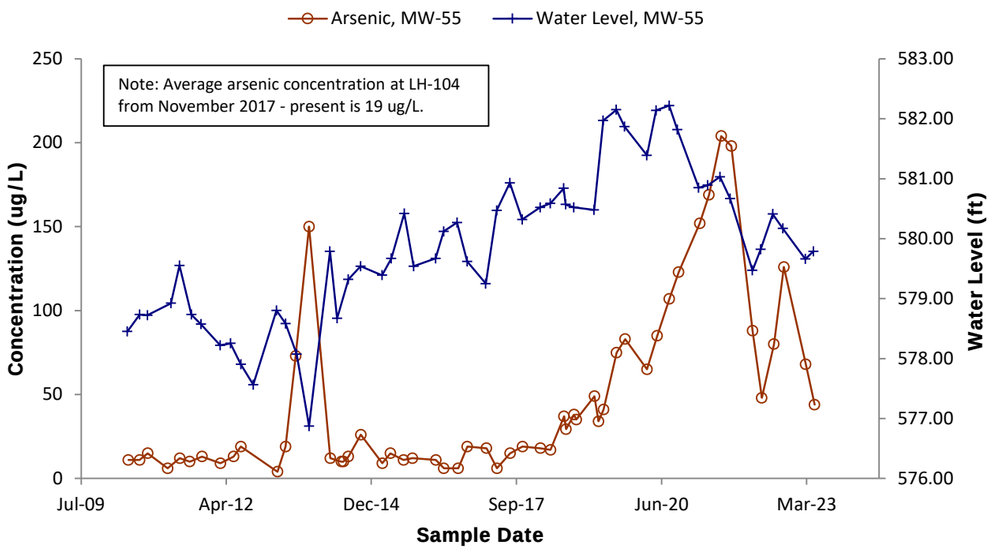
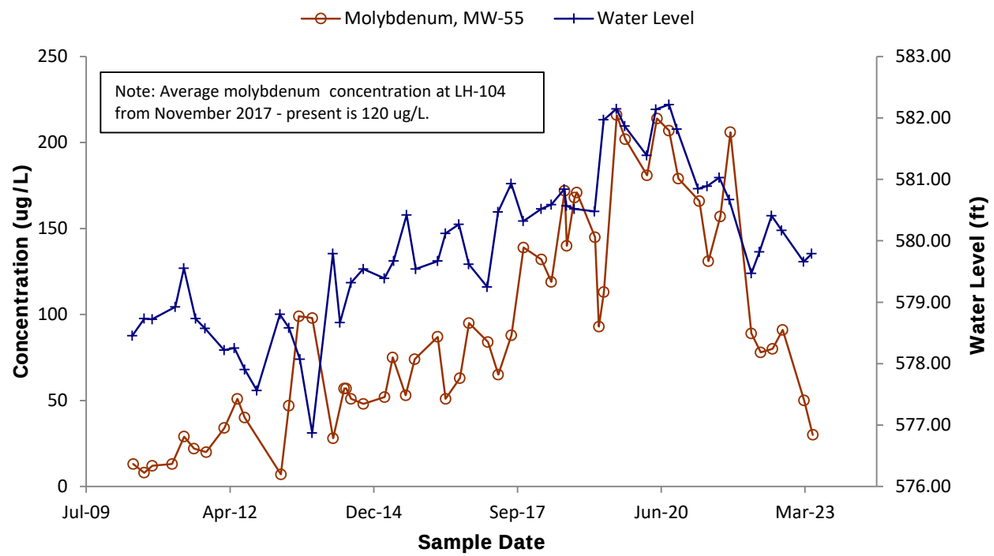
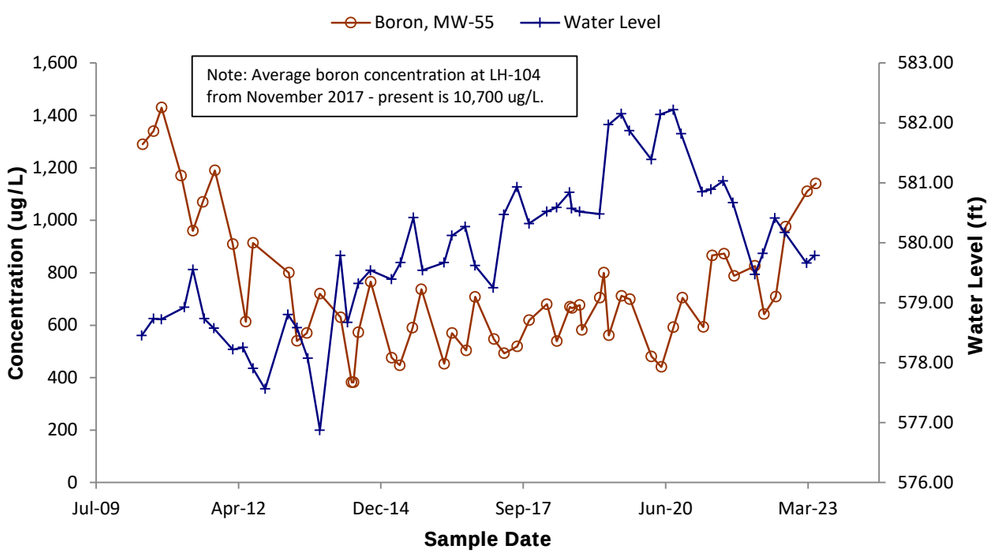
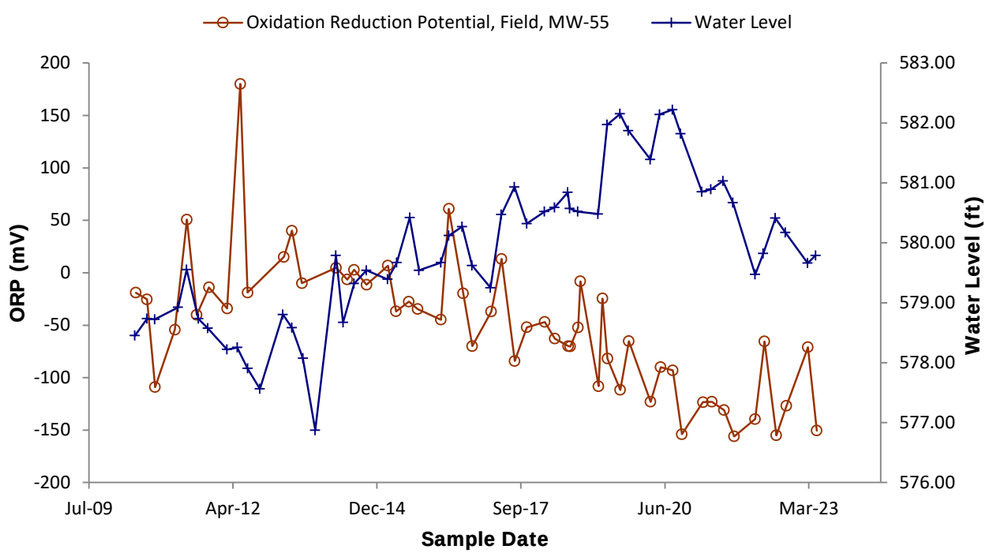


Figure G2: Time Series Plots for MW-55 ASD

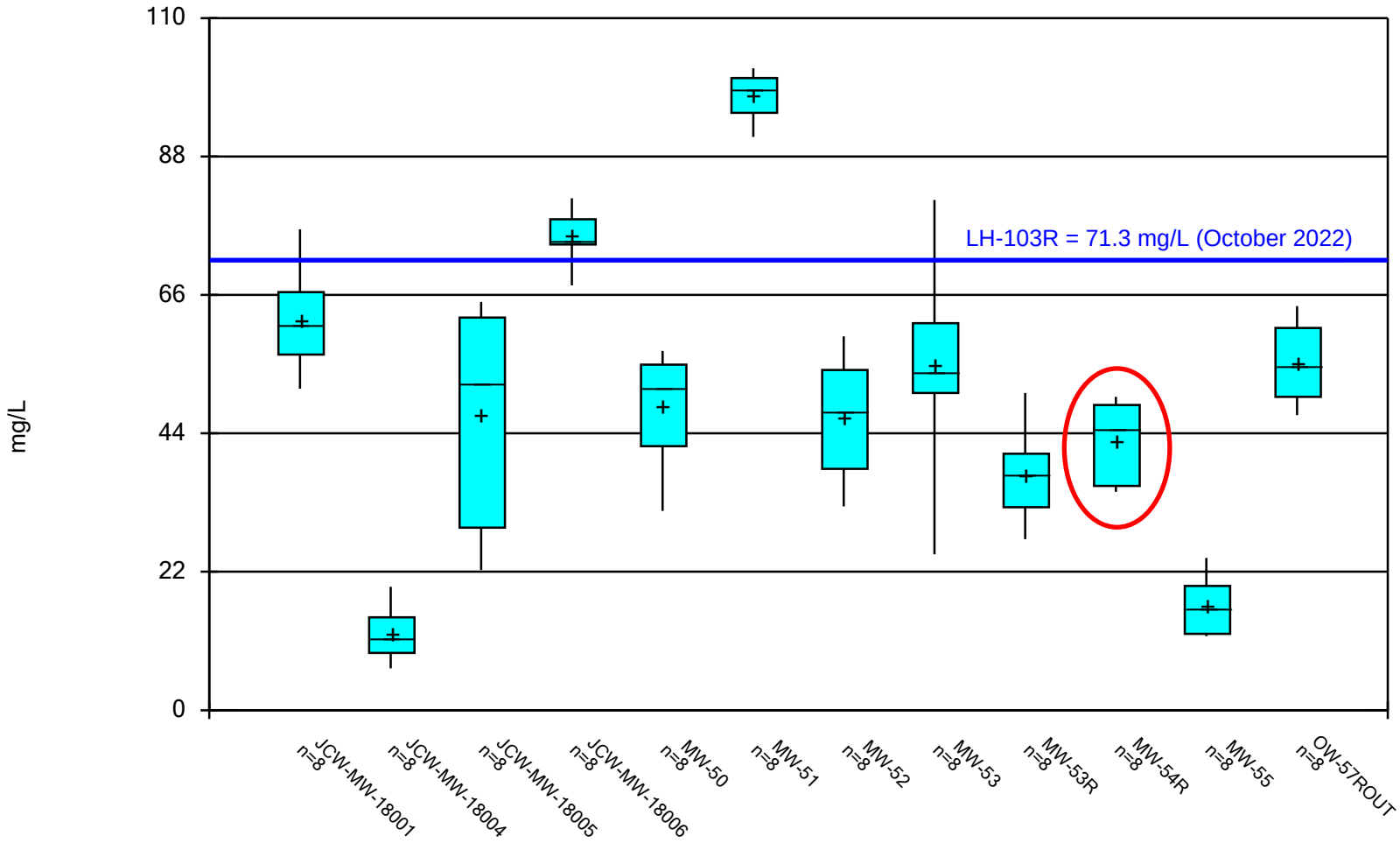








Chloride



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Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q2

2023 Third Quarter Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

Essexville, Michigan

October 2023

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Darby Litz
Project Manager/Hydrogeologist

Kristin Lowery, P.E.
Project Engineer

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TABLES

FIGURES

APPENDICES

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) – Assessment Monitoring Constituents	
Boron	Antimony	Lithium
Calcium	Arsenic	Mercury
Chloride	Barium	Molybdenum
Fluoride	Beryllium	Nickel
Iron	Cadmium	Selenium
pH	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™ 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™ 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 on-site. 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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Tables

Table 1
Summary of Groundwater Elevation Data
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			July 24, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring 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: Downgradient Monitoring 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: Downgradient Monitoring Wells (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 Headwells							
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 Solid Waste Disposal Area – Hydrogeological 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	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.

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:	7/26/2023	7/24/2023	7/26/2023	7/24/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	**500**	**500**	4,000	146	149	**572**	275
Calcium	mg/L	NC	NC	NC	500[EE]	221	123	240	174
Chloride	mg/L	**250****	**250**[E]**	**250**[E]**	**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[E]	250[E]	500[EE]	2.16	19	138	105
Total Dissolved Solids	mg/L	**500****	**500**[E]**	**500**[E]**	**500**	**2,100**	**526**	**660**	**671**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	6.6	6.5	6.8	6.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300**[E]**	**300**[E]**	500,000[EE]	**13,500**	**20,800**	**15,100**	**23,500**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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}.
[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) addtional 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 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:	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[1]													
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	**500[EE]**	NC	NC	**555**	229	202	126	188	162
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**1,770**	**478**	216	39.4	**392**	**308**
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**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[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.78	6.81	6.75	6.87	7.38	7.38
Appendix IV[1]													
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 115[2]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**2,790**	24	171	**6,910**	**1,960**	**1,290**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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	5,000[E]	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) addtional 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 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:	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[1]													
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[EE]**	NC	NC	247	146	220	162	150	124
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**569**	7.39	217	73.8	129	79
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**1,520**	**792**	**1,150**	**761**	**827**	**762**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.6	7.1	6.71	6.84	6.91	6.9
Appendix IV[1]													
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 115[2]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**6,720**	**1,390**	**1,180**	111	**21,900**	30
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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) addtional 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 5
Summary of Confidence Interval Evaluation: July 2023
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Assessment Monitoring Statistical Evaluation

Constituent	Units	GWPS	MW-50		MW-51		MW-52		MW-53		MW-53R		MW-54R		MW-55		OW-57R OUT		JCW-MW-18001		JCW-MW-18005		JCW-MW-18006	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron[1]	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	--	--	98	190	--	--	--	--	--	--	--	--	--	--	--	--	**390**	640	--	--	--	--
Sulfate	mg/L	780	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1,200**	2,200	--	--	--	--
Arsenic	ug/L	21	--	--	--	--	--	--	--	--	10	22	--	--	--[2]	--[2]	--	--	--	--	--	--	13	29
Molybdenum	ug/L	73	--	--	--	--	--	--	--	--	--	--	--	--	--[2]	--[2]	--	--	--	--	--	--	--	--
Iron	ug/L	28,000	--	--	--	--	--	--	--	--	--	--	--	--	16,000	33,000	--	--	--	--	--	--	--	--

GSI Statistical Evaluation

Constituent	Units	GSI	MW-55	
			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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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.

Table 6
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)	3 Qtr. 2023 (**bold** >201)	2 Qtr. 2023 (**bold** >201)	1 Qtr. 2023 (**bold** >201)	4 Qtr. 2022 (**bold** >201)

No Exceedances at Compliance Locations

Figures

0 1,500 3,000

FEET

1:38,680 1" = 3,223'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

PROJECT:

CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

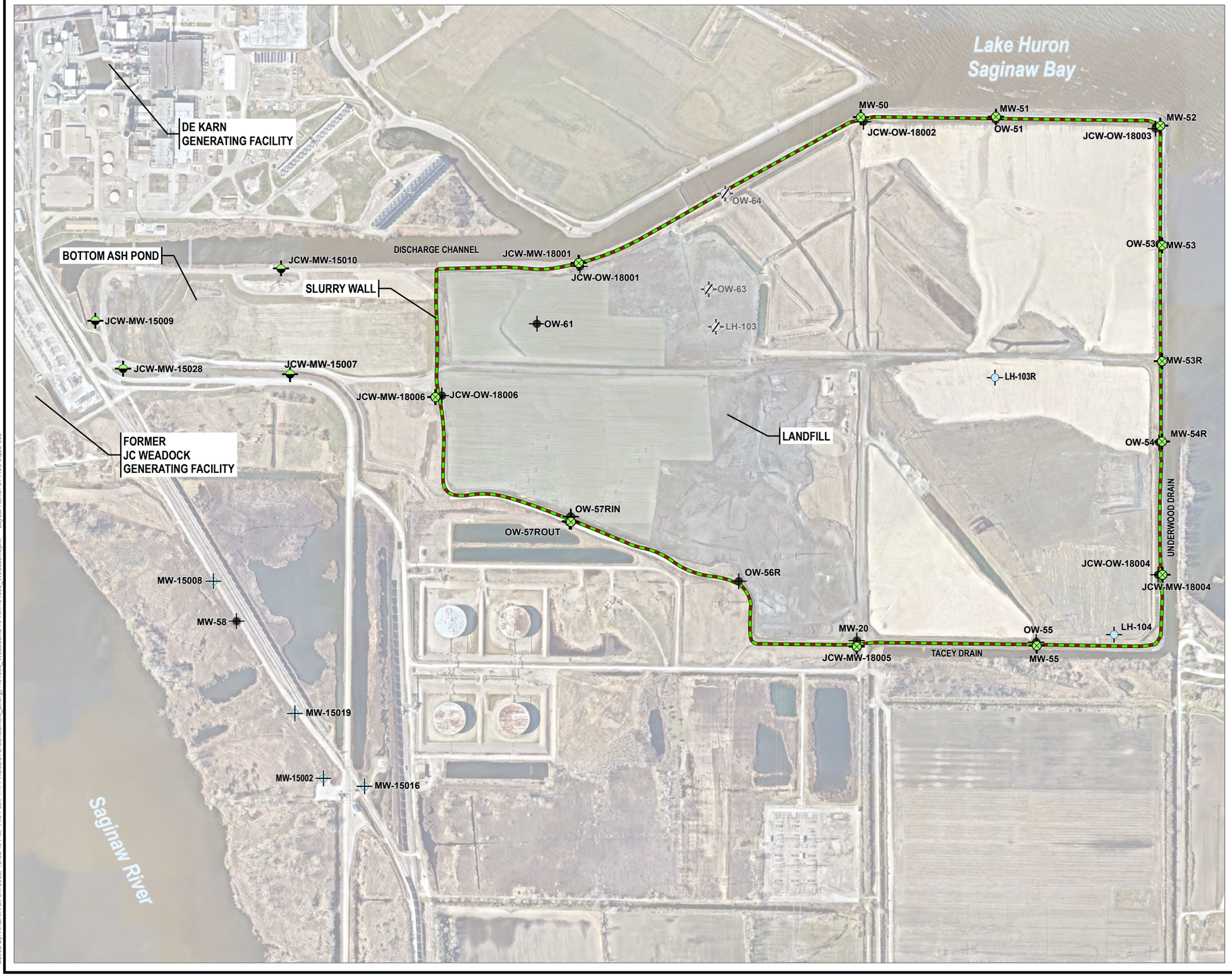
TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0000
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	OCTOBER 2023		

TRC
999 FOURIER DRIVE
SUITE 101
MADISON, WI 53717
PHONE: 608.826.3663

FILE: 464096_WEADOCK



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
SITE MAP

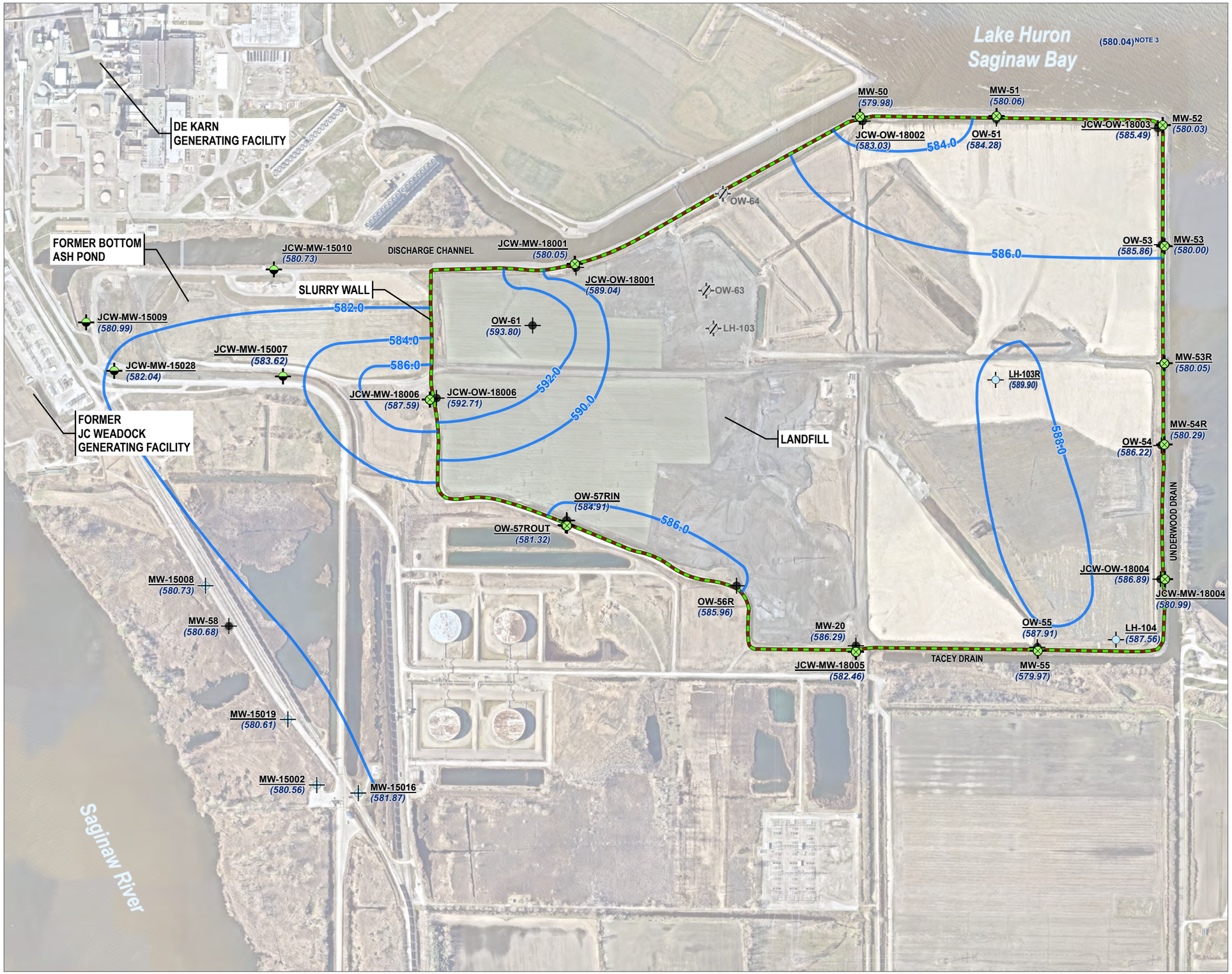
DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	OCTOBER 2023		

FIGURE 2

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 9/7/2023, 12:56:40 PM; File Path: T:\1 PROJECTS\Consumers_Energy\464096_Weadock\3-APRX\464096_Weadock.aprx; Layout Name: 514403-3Q23-002



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
1" = 600'
0 600 1,200 FEET

PROJECT: CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE: POTENTIOMETRIC SURFACE MAP
JULY 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		FIGURE 3
APPROVED BY:	D. LITZ		
DATE:	OCTOBER 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
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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)[(1)]
MW-50	7/24/2023	579.98	580.04	-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		-0.04
MW-53R	7/24/2023	580.05		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**		

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 Discharge Channel	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
JCW-OW-18001	589.04		22.4	4.02E-01	2.00	2.88	1,010	2.30E-08	0.40	2,904	7.61E-02	0.57	208
JCW-MW-18001		580.05			3.75								
JCW-OW-18002	583.03		28.9	1.06E-01	4.00	4.25	970		0.11	4,123	2.84E-02	0.21	78
MW-50		579.98			4.50								

Monitoring Well Pair Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-51	584.28		14.4	2.93E-01	4.00	4.38	1,850	2.30E-08	0.29	8,103	1.55E-01	1.16	423
MW-51		580.06			4.76								
JCW-OW-18003	585.49		33.9	1.61E-01	3.50	3.87	740		0.16	2,864	3.01E-02	0.23	82
MW-52		580.03			4.24								
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								

Monitoring Well Pair Non-Adjacent Zone	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-54	586.22		21.2	2.79E-01	2.00	2.25	510	2.30E-08	0.28	1,148	2.09E-02	0.16	57
MW-54R		580.29			2.50								
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								
OW-55	587.91		24	3.32E-01	2.00	1.99	1,220		0.33	2,422	5.23E-02	0.39	143
MW-55		579.97			1.97								
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								

Calculated Groundwater Discharge from JC Weadock (gal per day)	**=**	**3.36**
(cubic ft per day)	**=**	**0.45**
(cubic ft per min)		**3.1E-04**
Calculated Groundwater Discharge from JC Weadock (gal per yr)	**=**	**1,228**
(cubic ft per yr)	**=**	**164**
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**

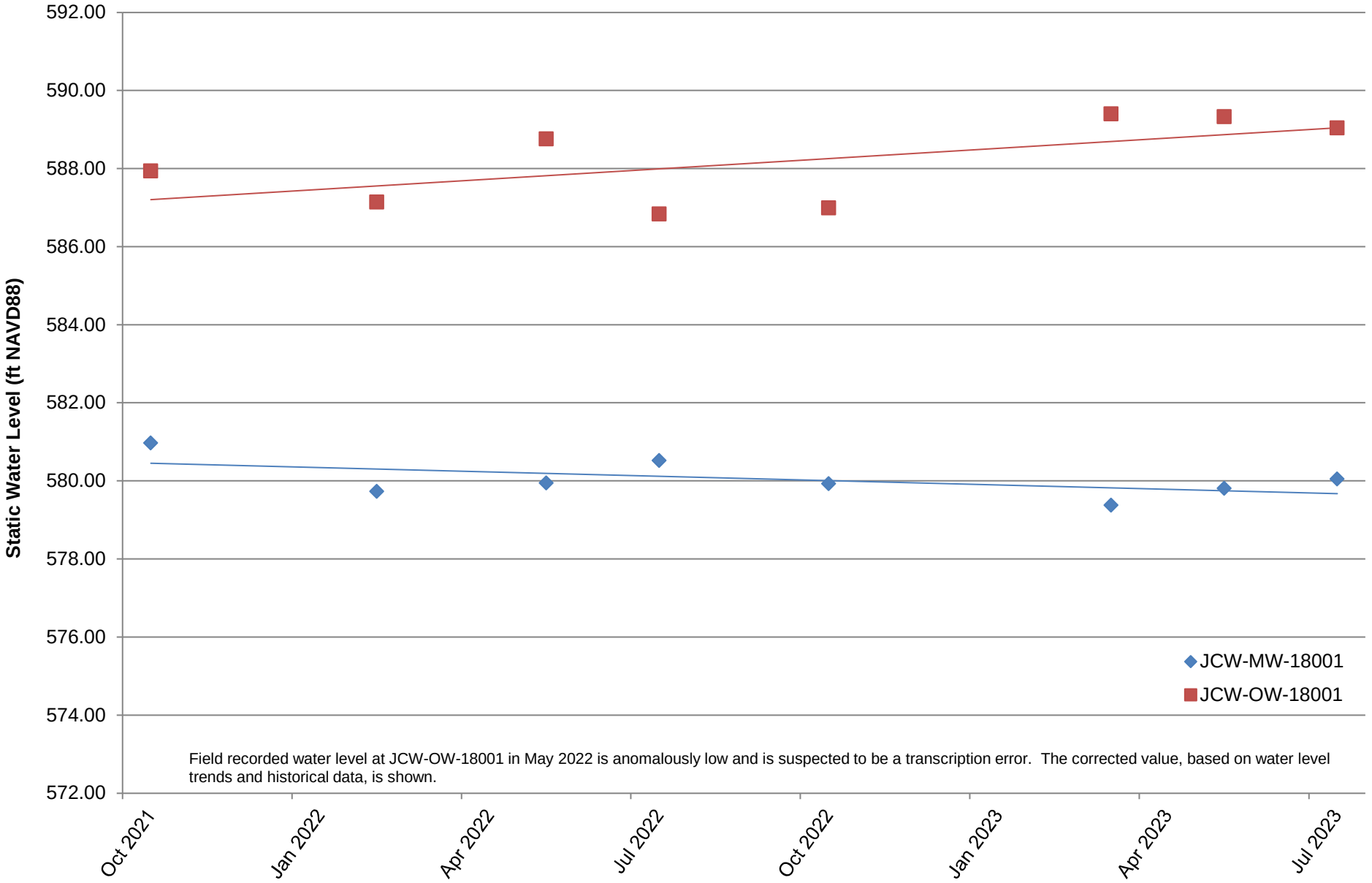
Notes:

Water level data collected on July 24, 2023 are shown by yellow cells:

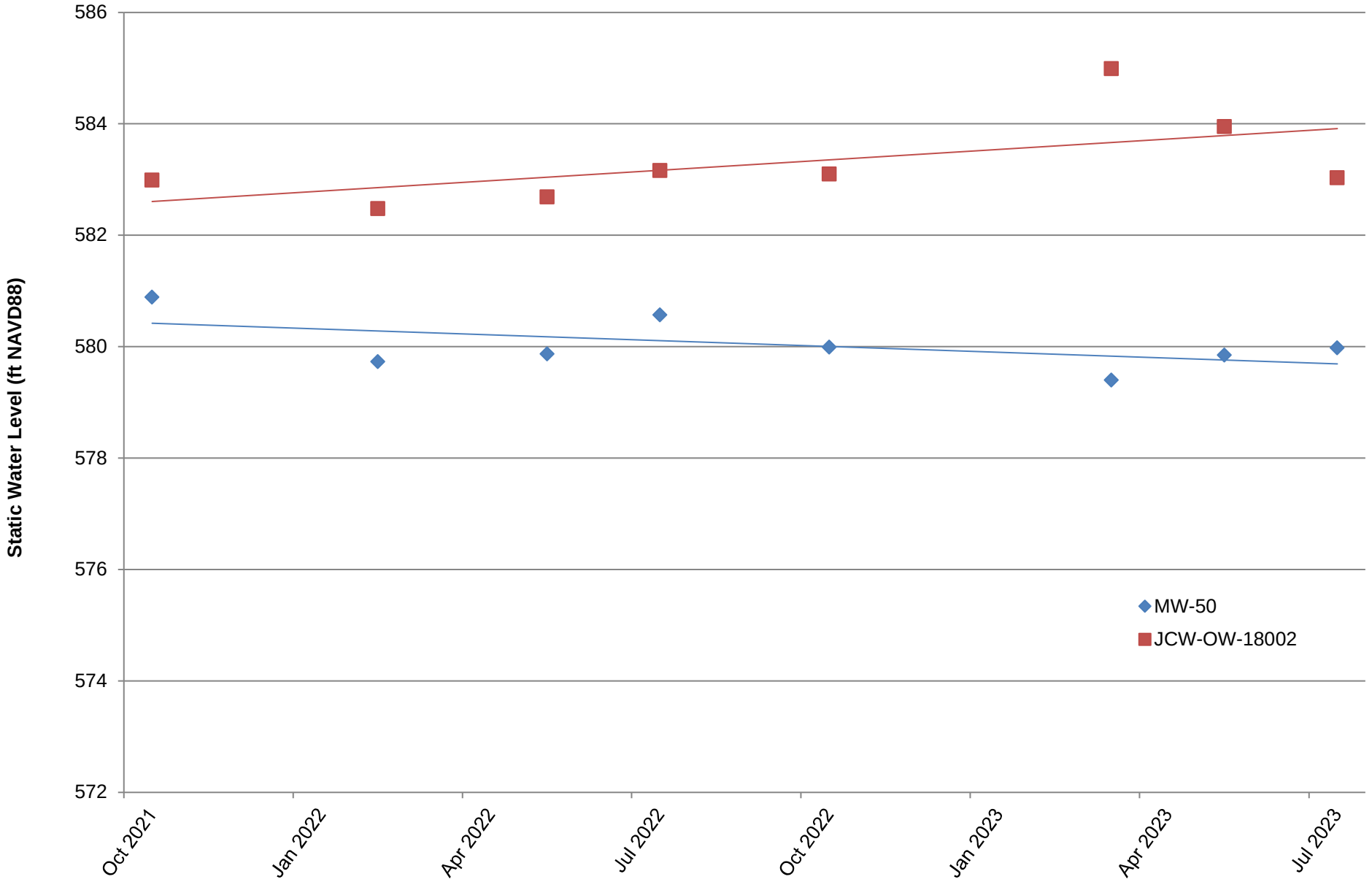
1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above 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^2 = square feet; ft^3/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

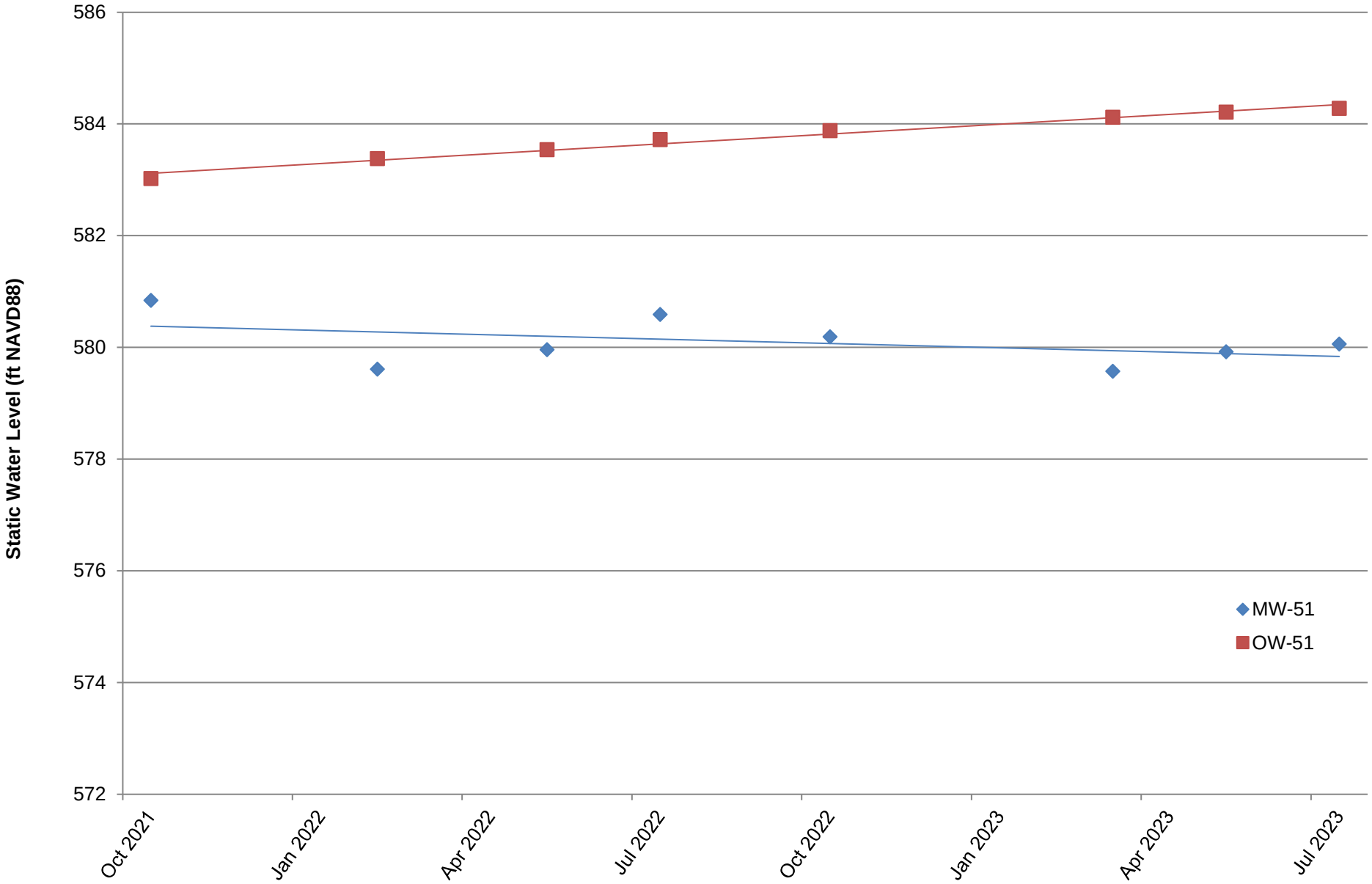
Appendix A
Static Water Level for JCW-MW-18001 and JCW-OW-18001



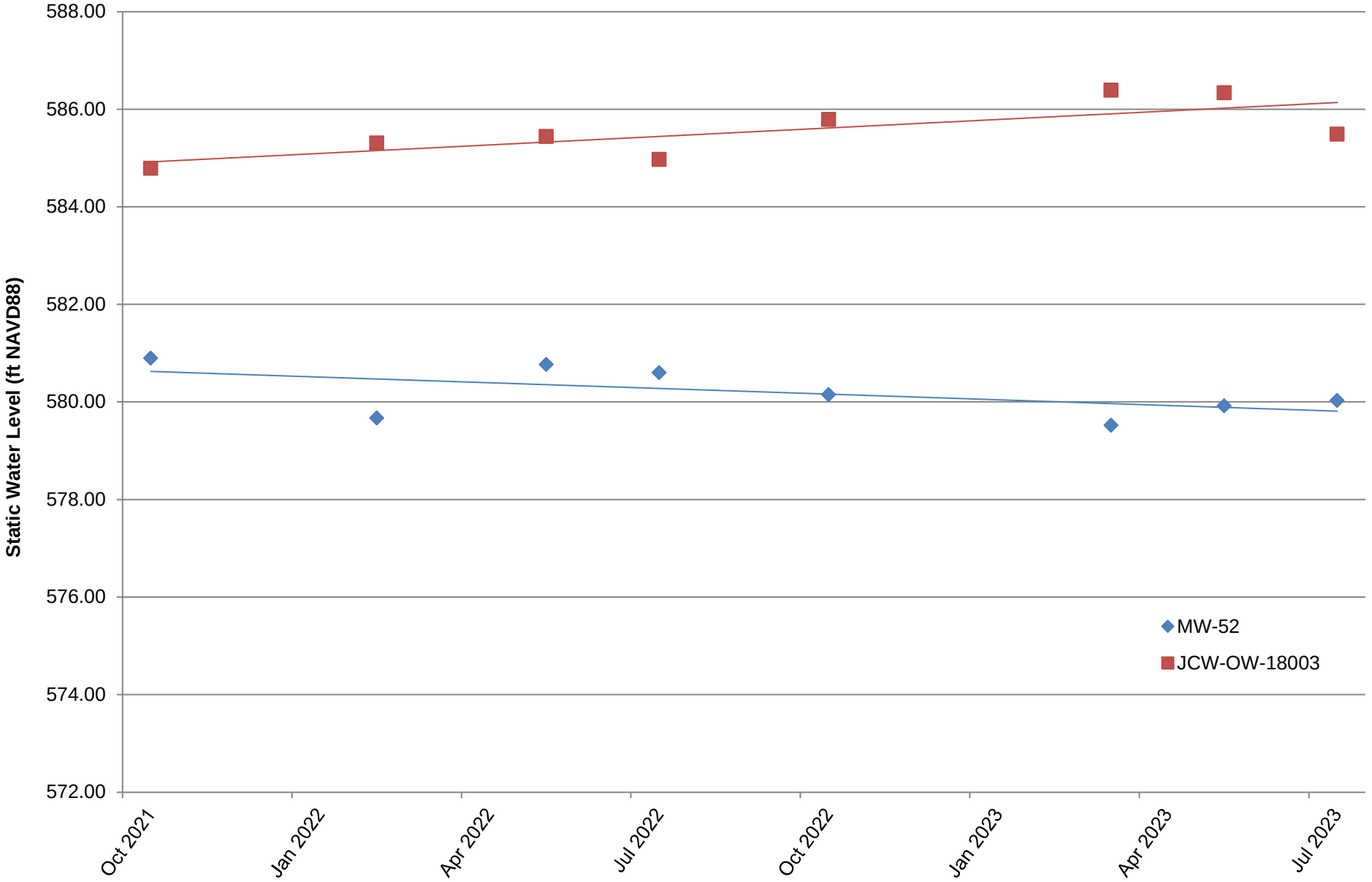
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



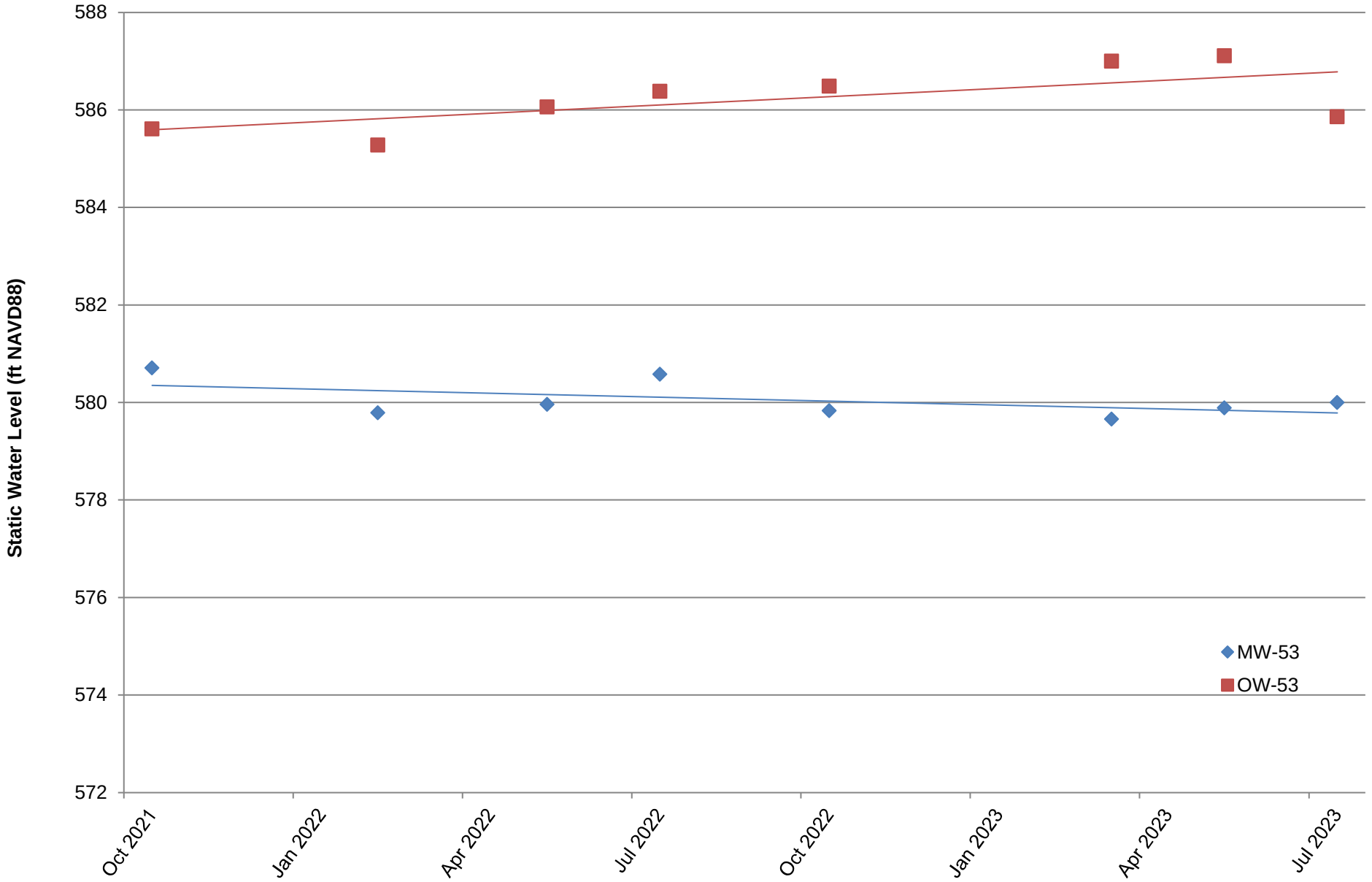
Appendix A
Static Water Level for MW-51 and OW-51



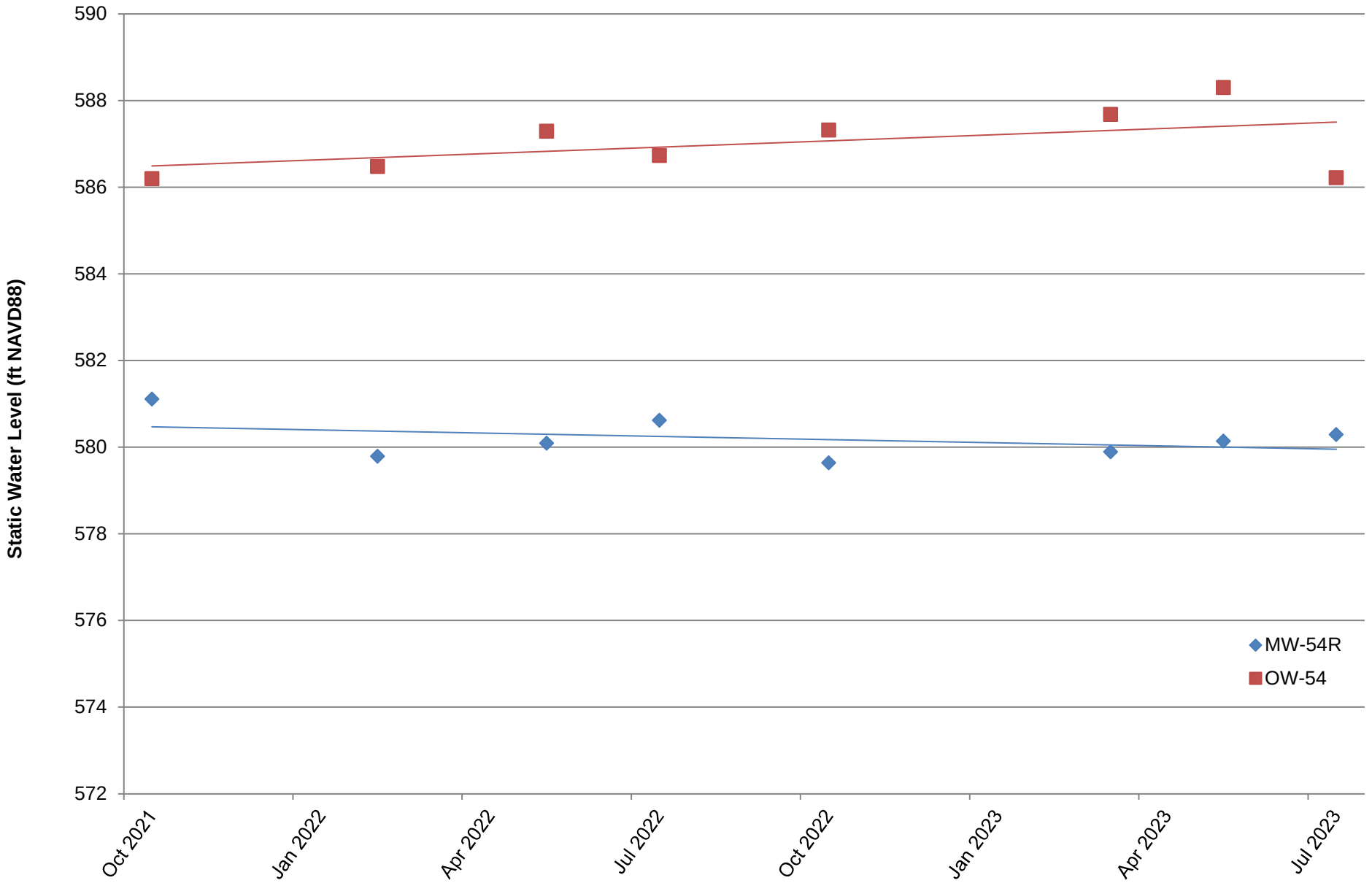
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



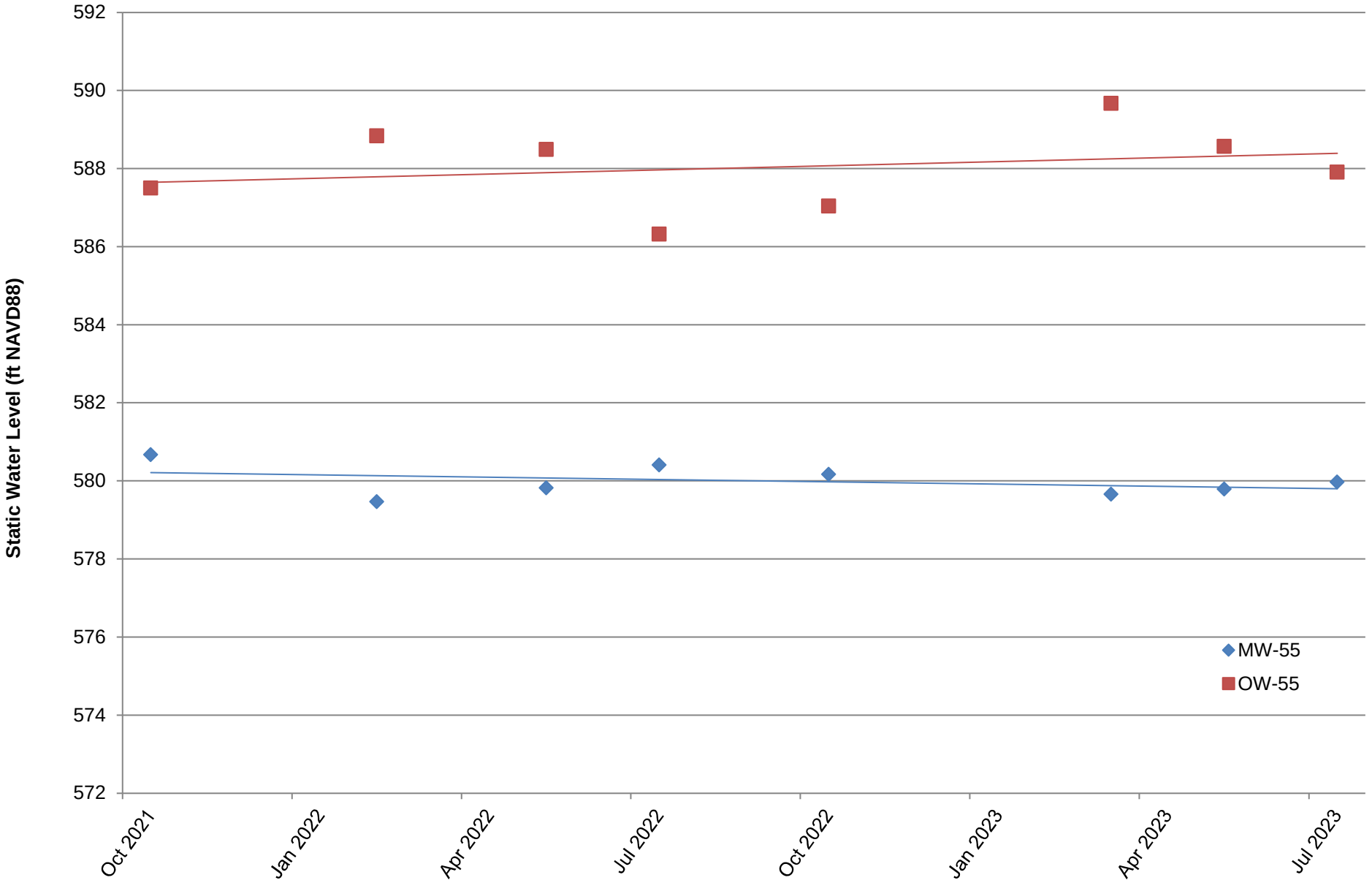
Appendix A
Static Water Level for MW-53 and OW-53



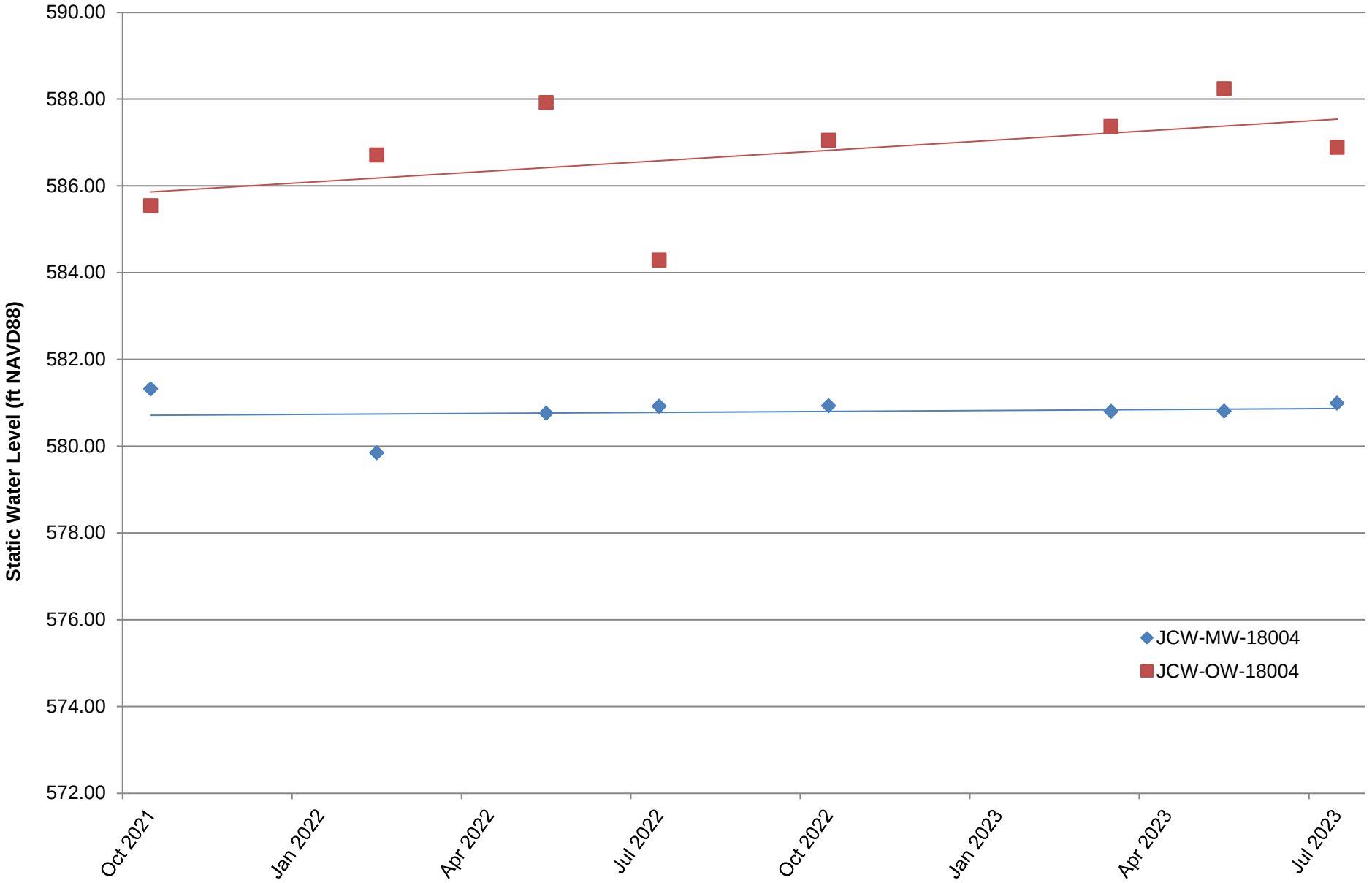
Appendix A
Static Water Level for MW-54R and OW-54



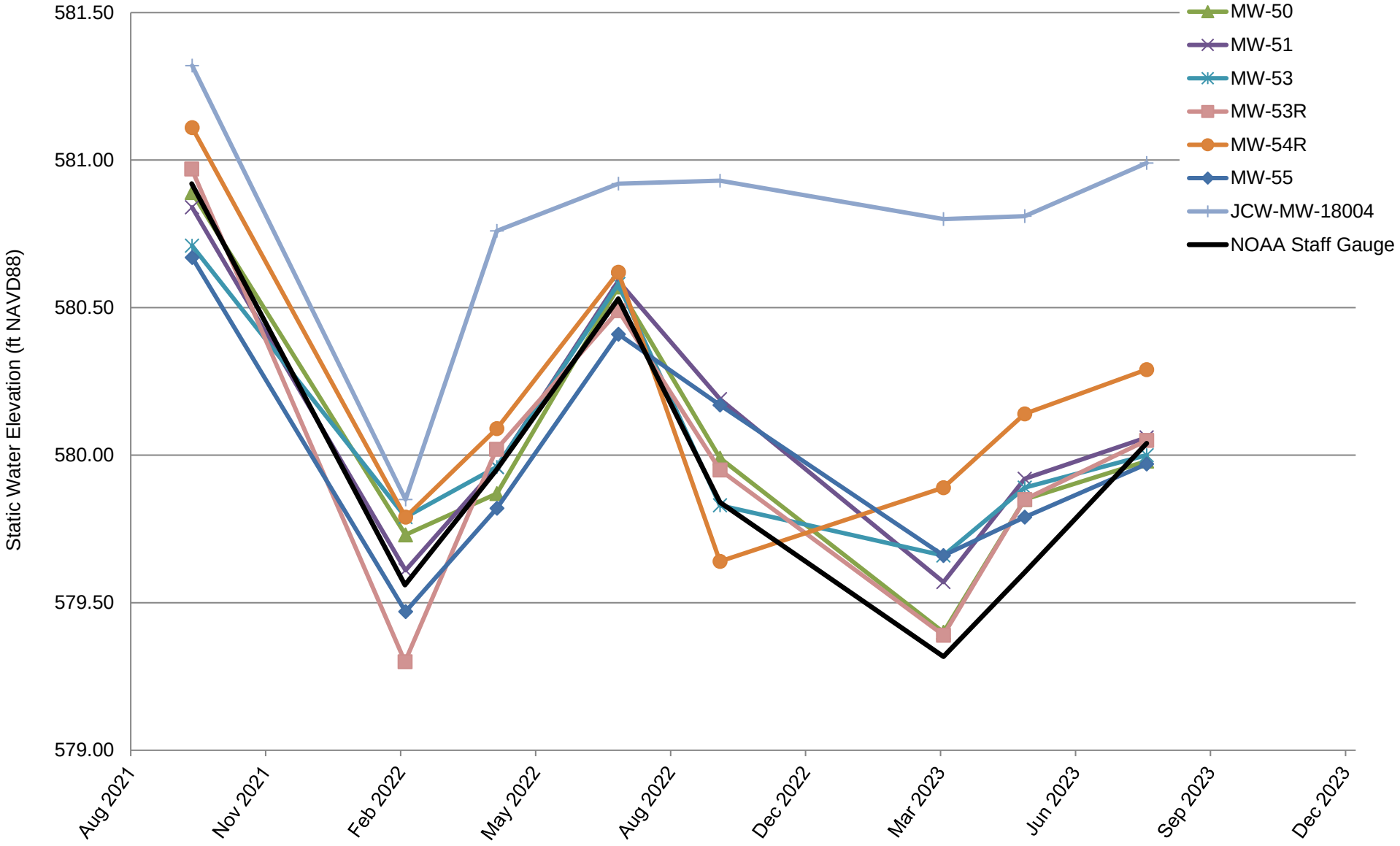
Appendix A
Static Water Level for MW-55 and OW-55



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	Chromium	Field duplicate variability (absolute difference equal to reporting limit); potential uncertainty exists for the listed results.
MW-15008	7/24/2023		
MW-15016	7/26/2023		
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
- 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.

- 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[(1)]	O	O	O	O	O	O
Calcium	↑ ASD	O	O	O	O	↓
Chloride	O	O	O	O	O	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	↑*	O	↓	O	O	O
pH/Corrosivity[(1)]	O	O	O	O	O	O
Sulfate	↑ ASD	O	O	O	O	↓
Total Dissolved Solids	O	O	O	O	O	↓

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 OUT**
Boron[(1)]	O	O	O	↑	↑*	O
Calcium	O	O	O	O	O	O
Chloride	↓	O	O	O	O	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	O	O	O	O	O
pH/Corrosivity[(1)]	O	O	O	O	O	O
Sulfate	O	O	O	O	O	O
Total Dissolved Solids	O	O	O	O	O	O

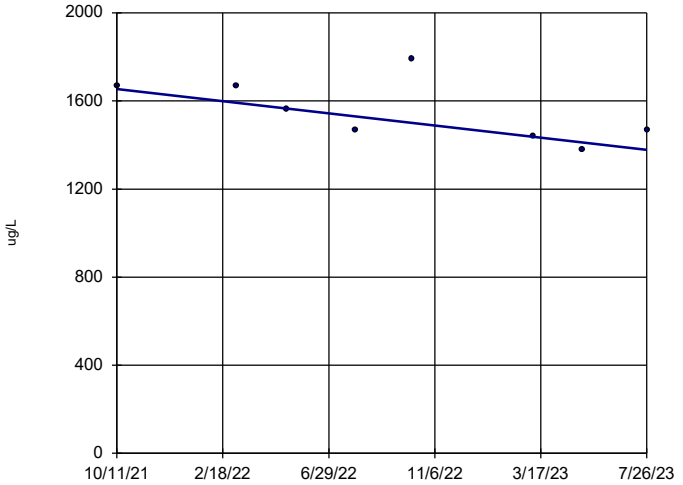
Notes:

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).

Boron, Total

JCW-MW-18001



n = 8

Slope = -154.1 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

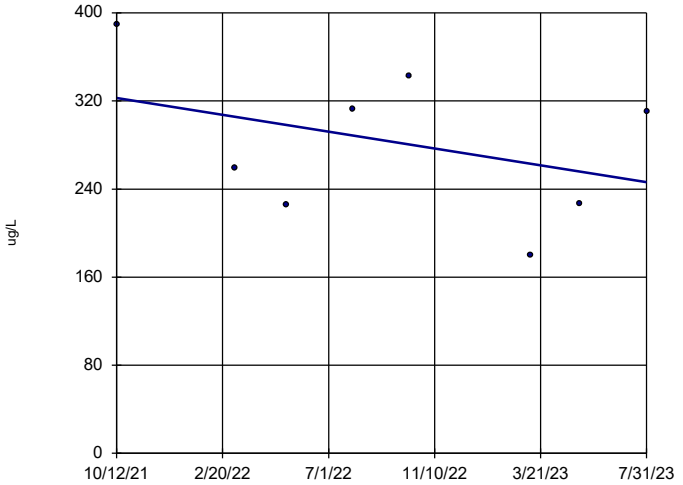
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

JCW-MW-18004



n = 8

Slope = -42.43 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

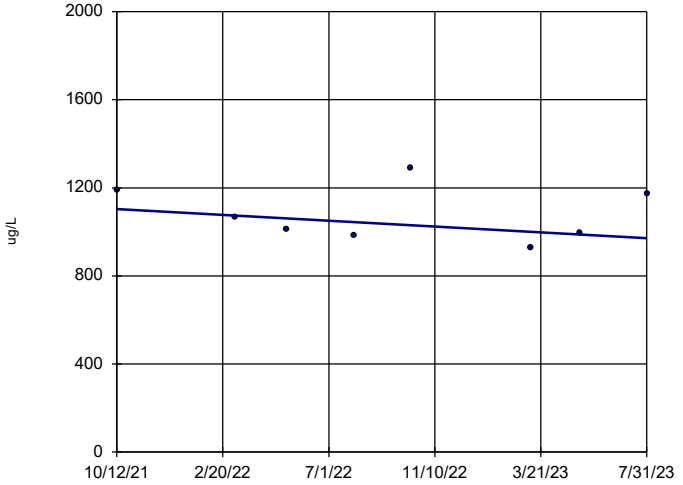
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

JCW-MW-18005



n = 8

Slope = -73.63 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

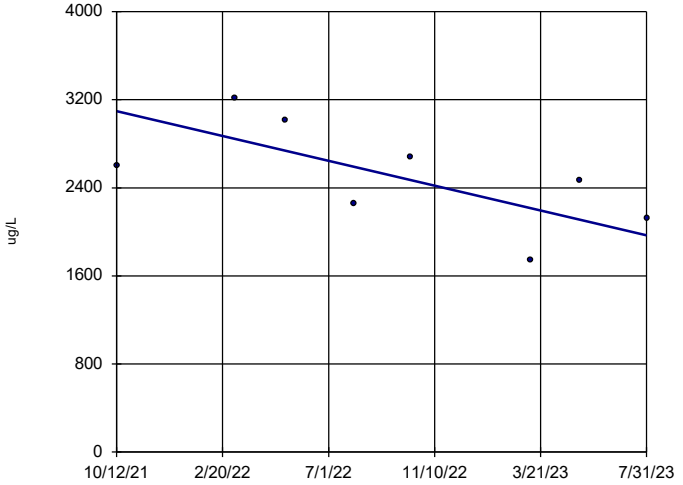
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

JCW-MW-18006



n = 8

Slope = -626.1 units per year.

Mann-Kendall statistic = -14 critical = -17

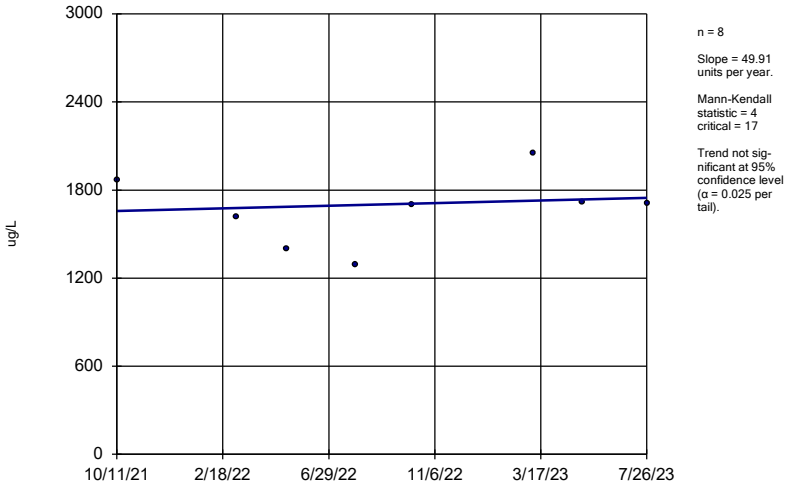
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-50



n = 8

Slope = 49.91 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

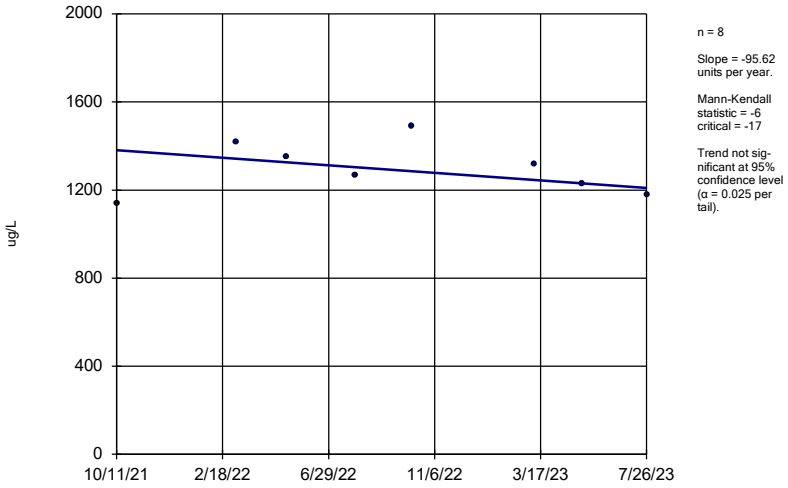
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

MW-51



n = 8

Slope = -95.62 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

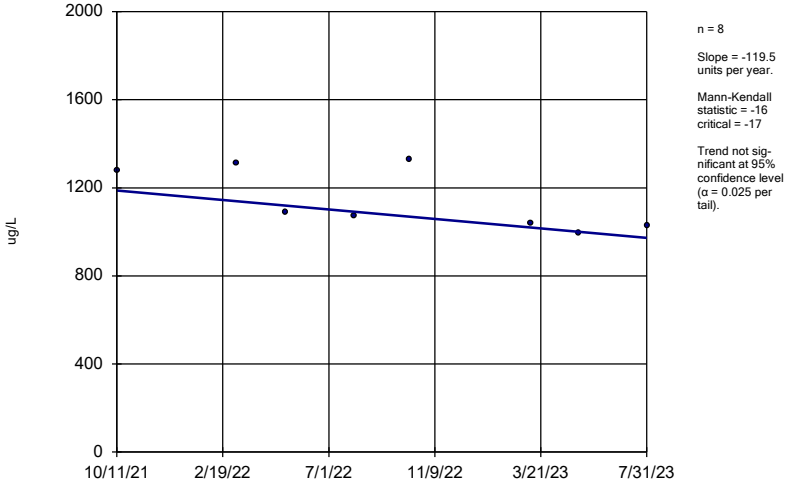
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

MW-52



n = 8

Slope = -119.5 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

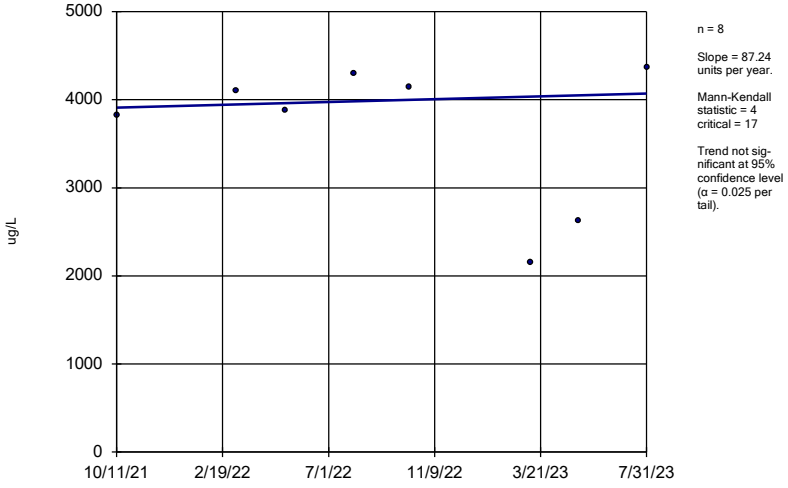
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

MW-53



n = 8

Slope = 87.24 units per year.

Mann-Kendall statistic = 4 critical = 17

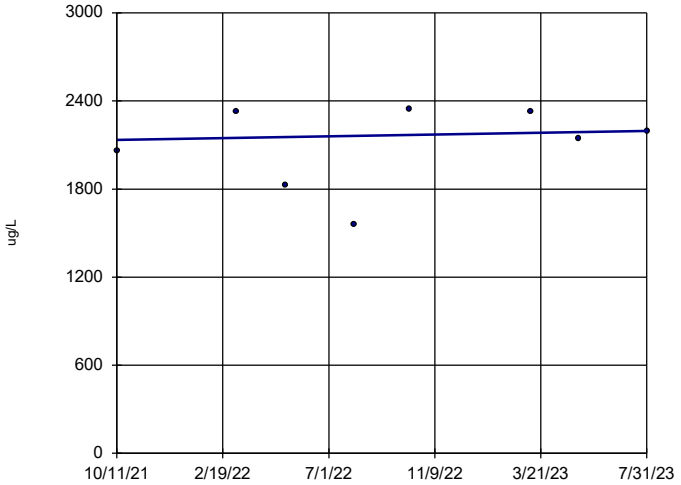
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-53R



n = 8

Slope = 33.88 units per year.

Mann-Kendall statistic = 3 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

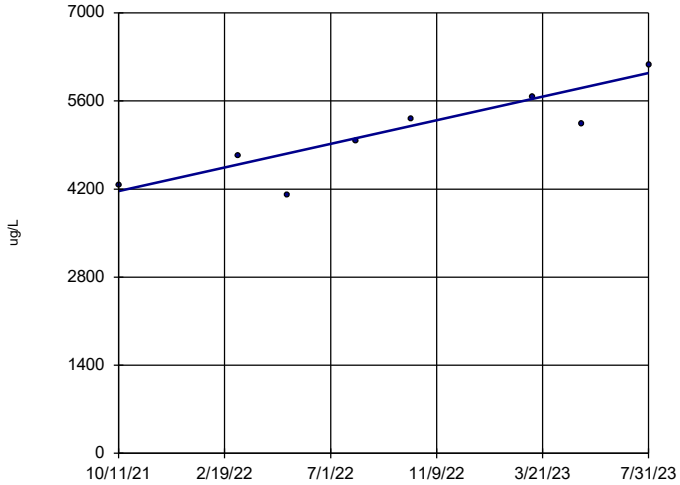
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

MW-54R



n = 8

Slope = 1041 units per year.

Mann-Kendall statistic = 20 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

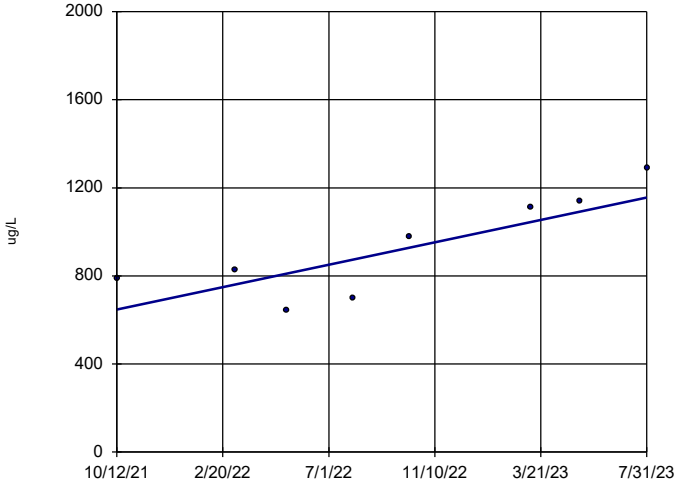
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

MW-55



n = 8

Slope = 283.1 units per year.

Mann-Kendall statistic = 20 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

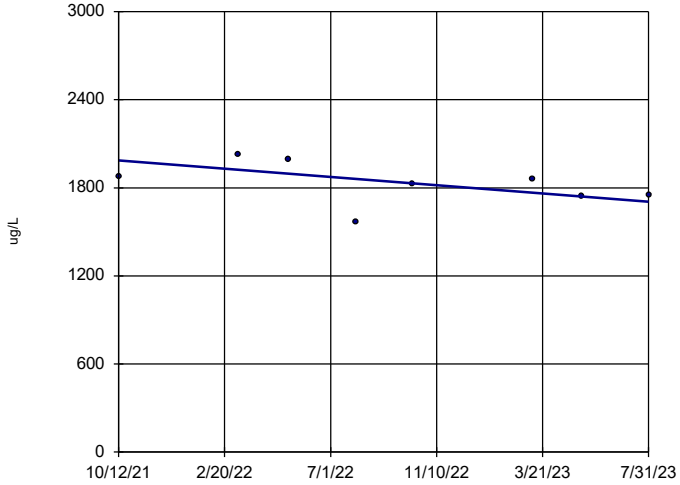
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Boron, Total

OW-57ROUT



n = 8

Slope = -156.5 units per year.

Mann-Kendall statistic = -12 critical = -17

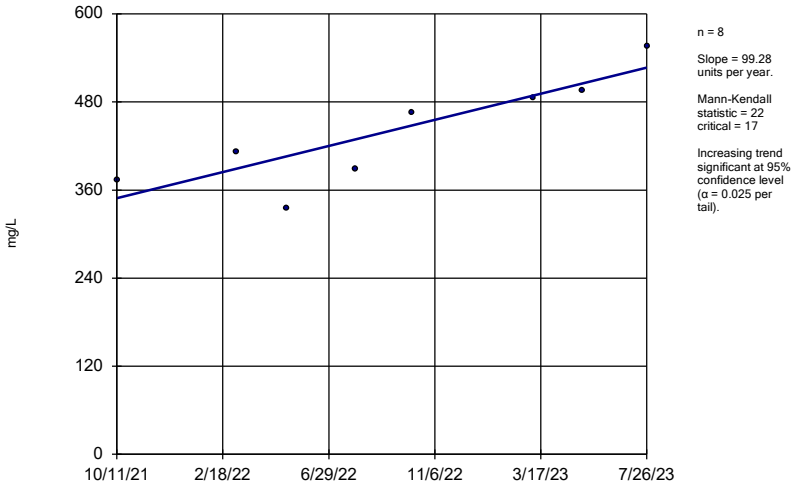
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

JCW-MW-18001



n = 8

Slope = 99.28 units per year.

Mann-Kendall statistic = 22
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

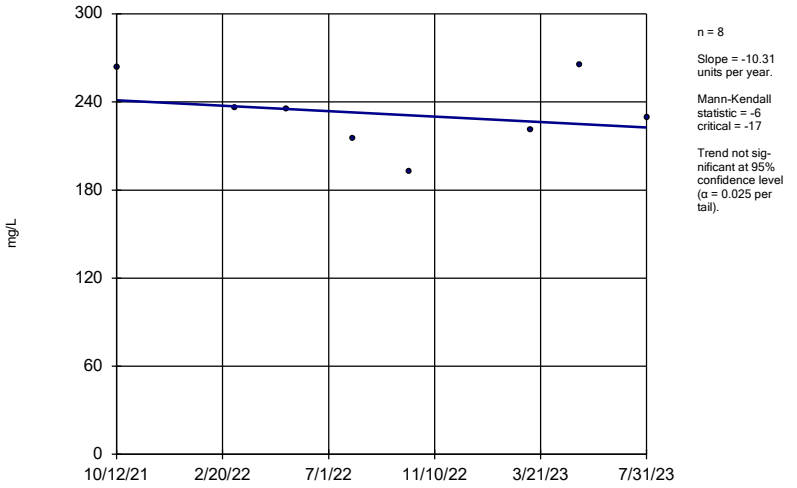
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

JCW-MW-18004



n = 8

Slope = -10.31 units per year.

Mann-Kendall statistic = -6
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

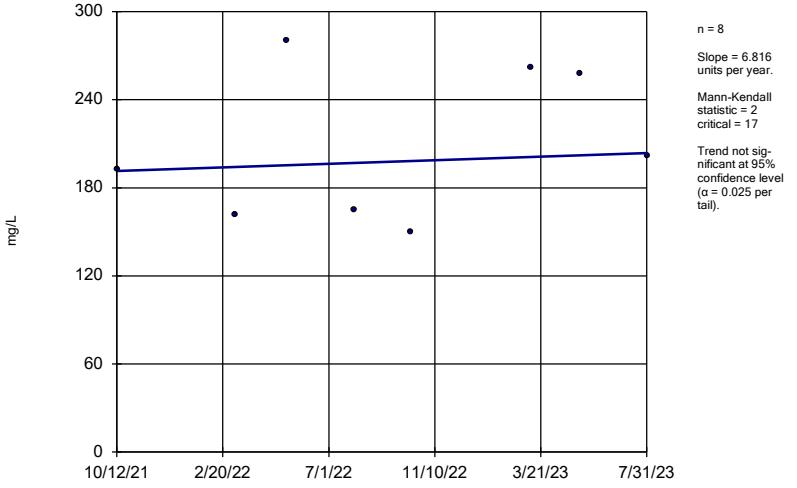
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

JCW-MW-18005



n = 8

Slope = 6.816 units per year.

Mann-Kendall statistic = 2
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

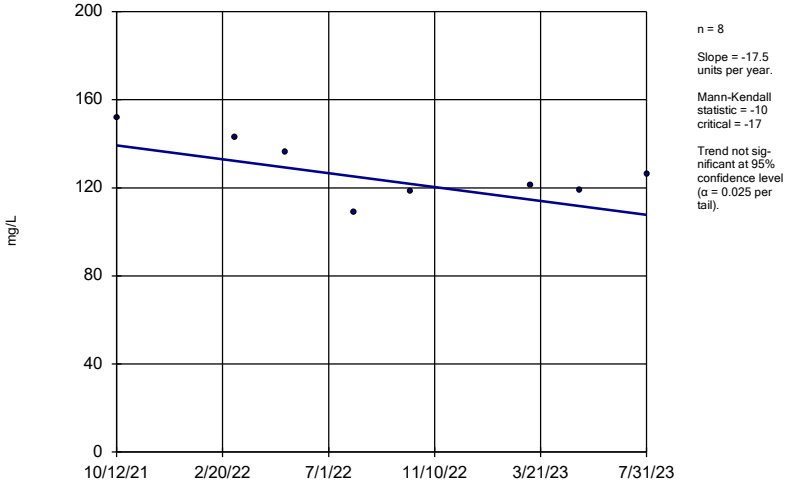
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

JCW-MW-18006



n = 8

Slope = -17.5 units per year.

Mann-Kendall statistic = -10
critical = -17

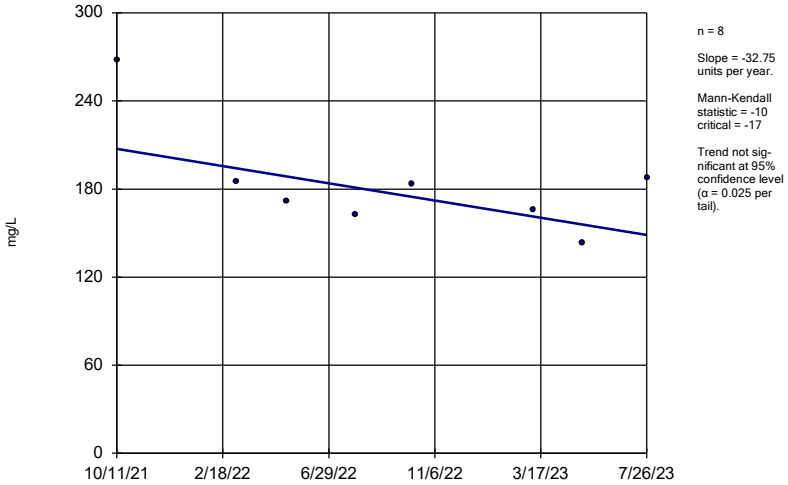
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

MW-50



n = 8

Slope = -32.75 units per year.

Mann-Kendall statistic = -10
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

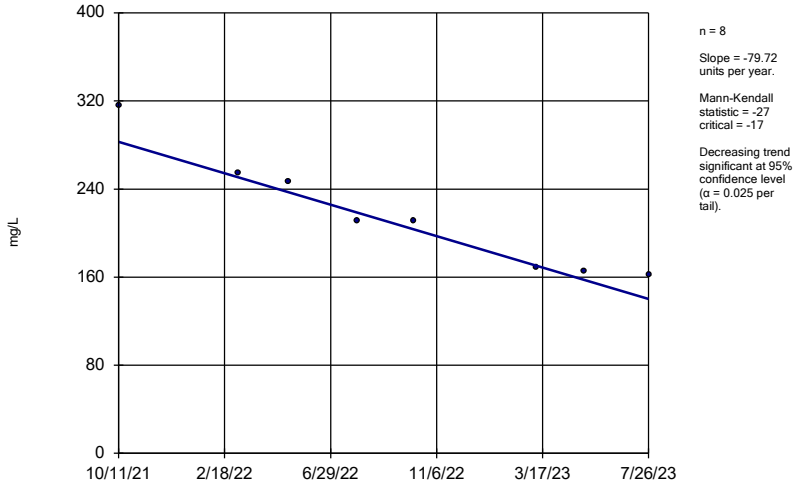
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

MW-51



n = 8

Slope = -79.72 units per year.

Mann-Kendall statistic = -27
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

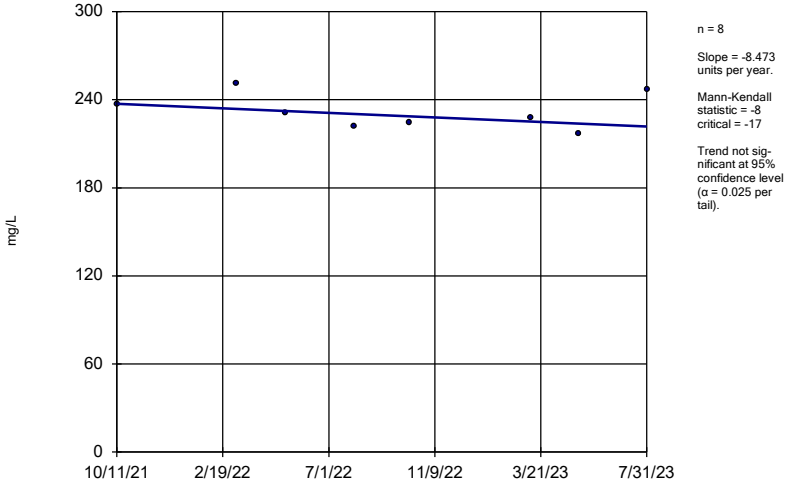
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

MW-52



n = 8

Slope = -8.473 units per year.

Mann-Kendall statistic = -8
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

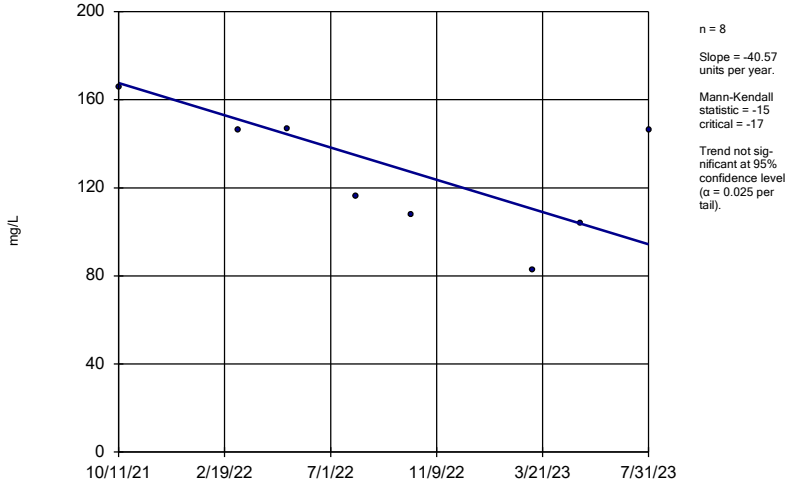
Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Calcium, Total

MW-53



n = 8

Slope = -40.57 units per year.

Mann-Kendall statistic = -15
critical = -17

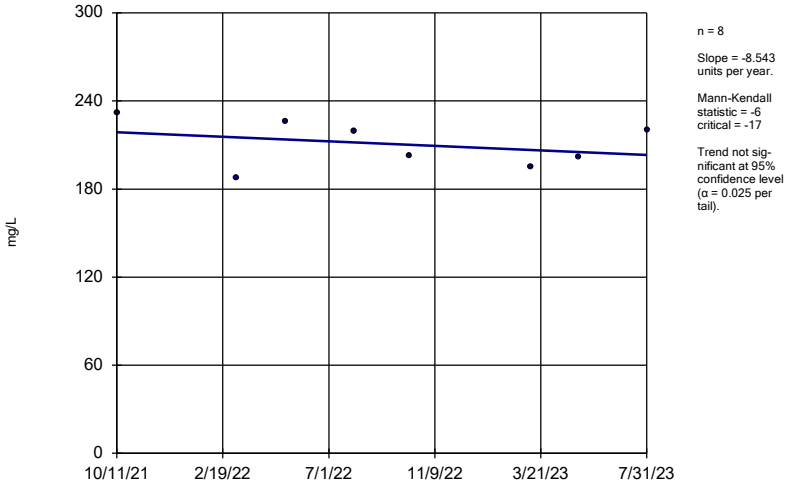
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:14 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

MW-53R



n = 8

Slope = -8.543 units per year.

Mann-Kendall statistic = -6
critical = -17

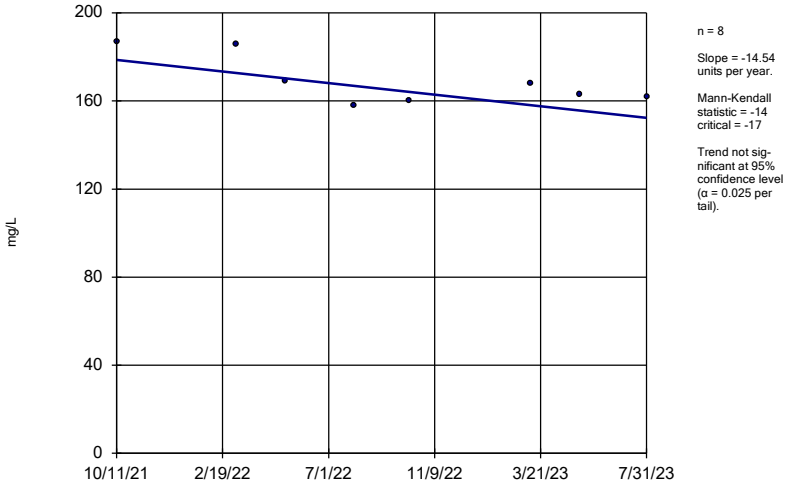
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

MW-54R



n = 8

Slope = -14.54 units per year.

Mann-Kendall statistic = -14
critical = -17

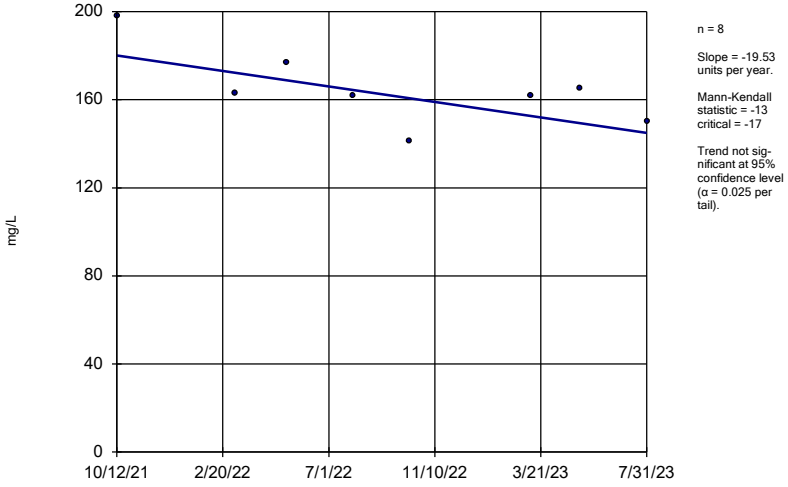
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

MW-55



n = 8

Slope = -19.53 units per year.

Mann-Kendall statistic = -13
critical = -17

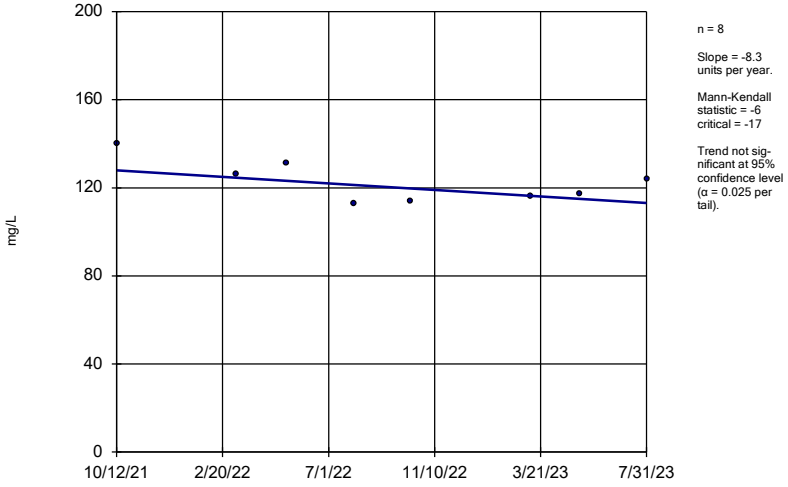
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

OW-57ROUT



n = 8

Slope = -8.3 units per year.

Mann-Kendall statistic = -6
critical = -17

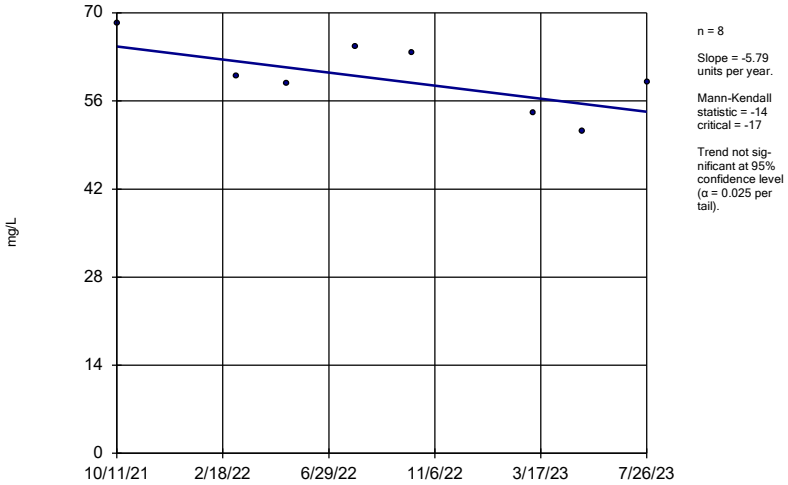
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Chloride

JCW-MW-18001



n = 8

Slope = -5.79 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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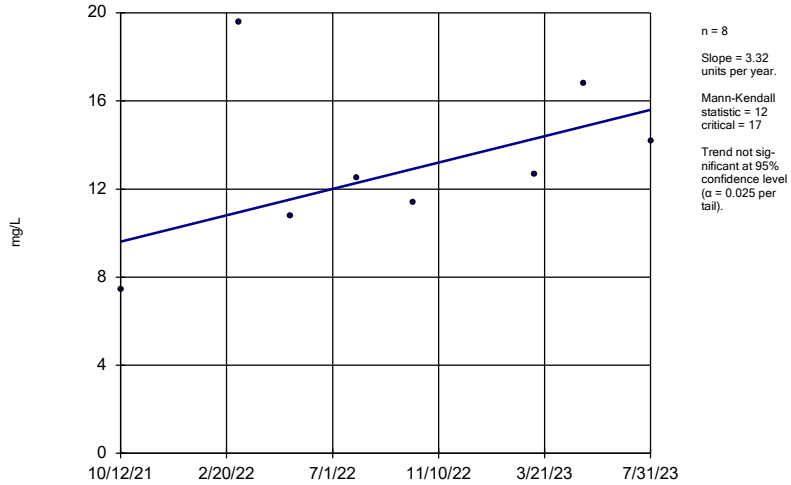
Chloride

JCW-MW-18004



n = 8

Slope = 3.32 units per year.

Mann-Kendall statistic = 12 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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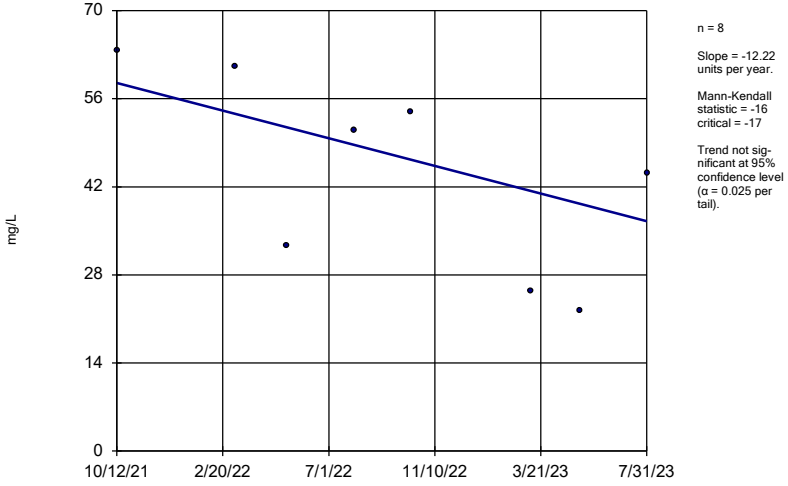
Chloride

JCW-MW-18005



n = 8

Slope = -12.22 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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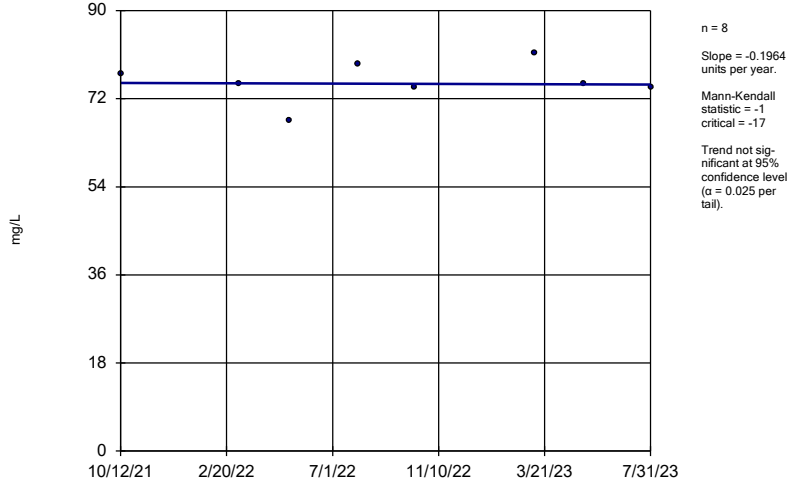
Chloride

JCW-MW-18006



n = 8

Slope = -0.1964 units per year.

Mann-Kendall statistic = -1 critical = -17

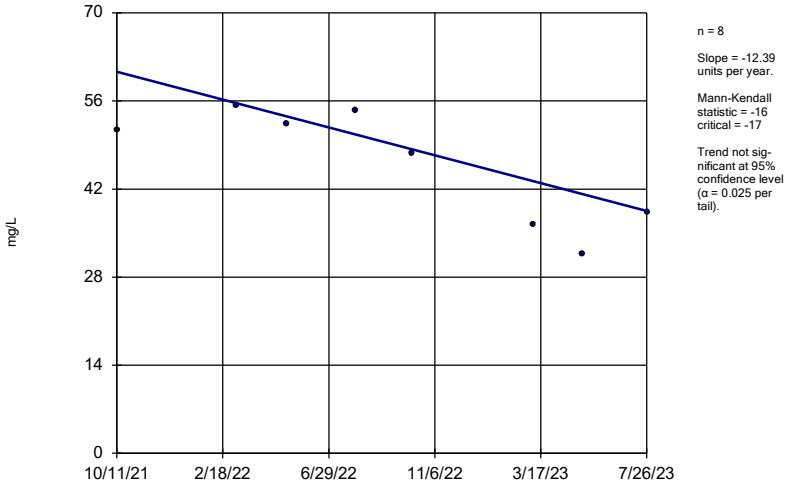
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Chloride

MW-50



n = 8

Slope = -12.39 units per year.

Mann-Kendall statistic = -16
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

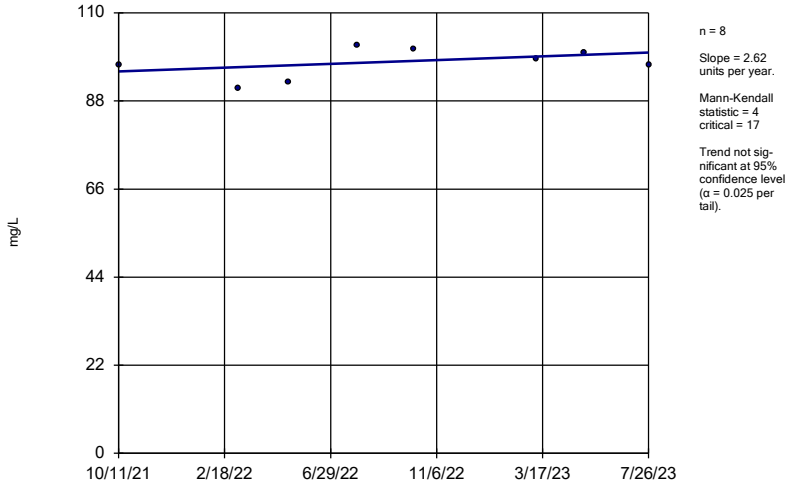
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

MW-51



n = 8

Slope = 2.62 units per year.

Mann-Kendall statistic = 4
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

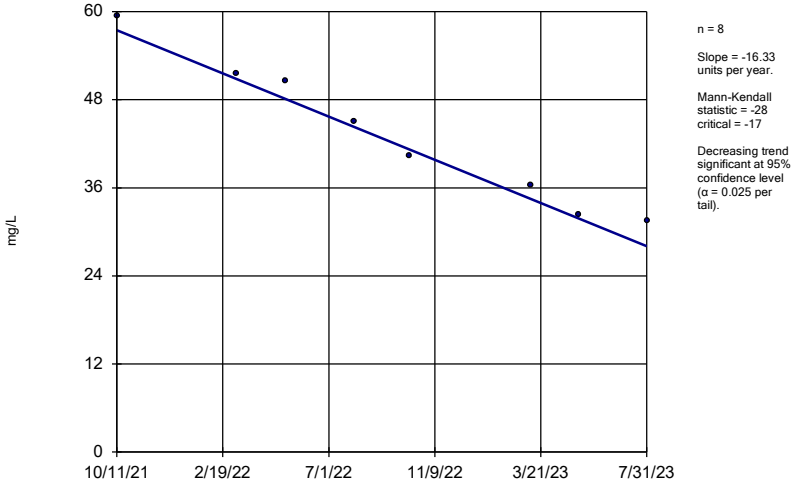
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

MW-52



n = 8

Slope = -16.33 units per year.

Mann-Kendall statistic = -28
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

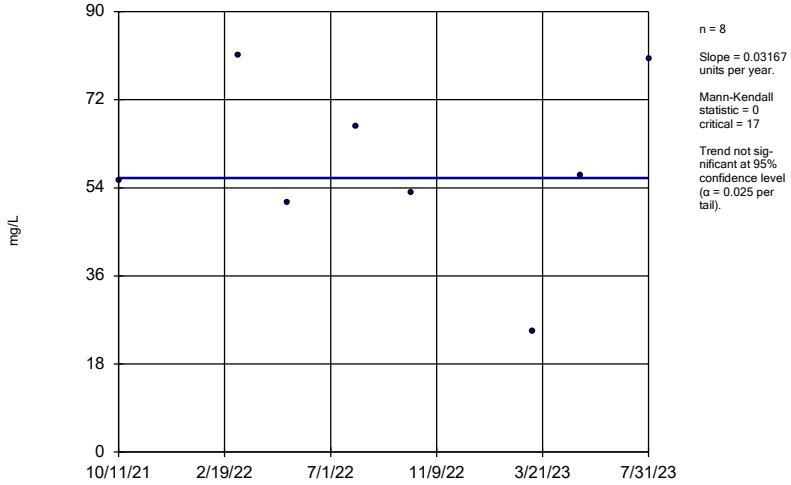
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

MW-53



n = 8

Slope = 0.03167 units per year.

Mann-Kendall statistic = 0
critical = 17

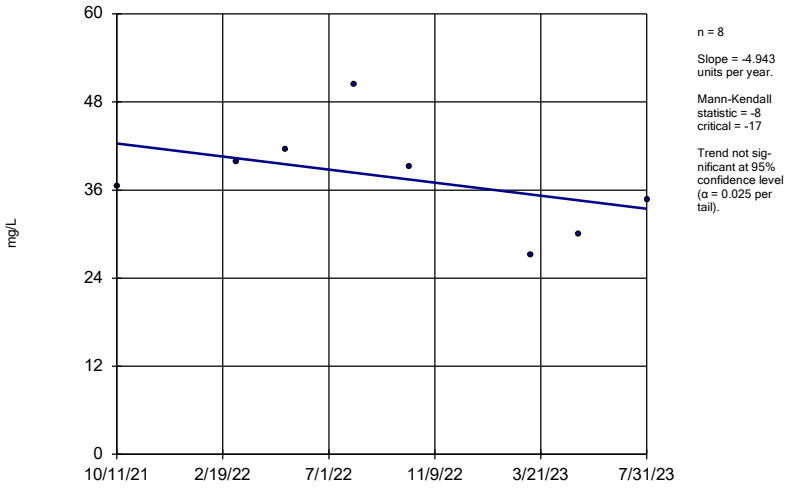
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Chloride

MW-53R



n = 8

Slope = -4.943 units per year.

Mann-Kendall statistic = -8 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

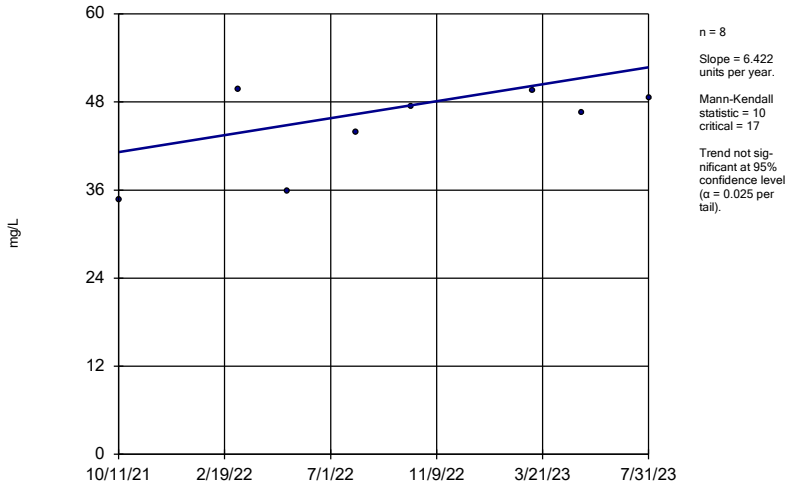
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

MW-54R



n = 8

Slope = 6.422 units per year.

Mann-Kendall statistic = 10 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

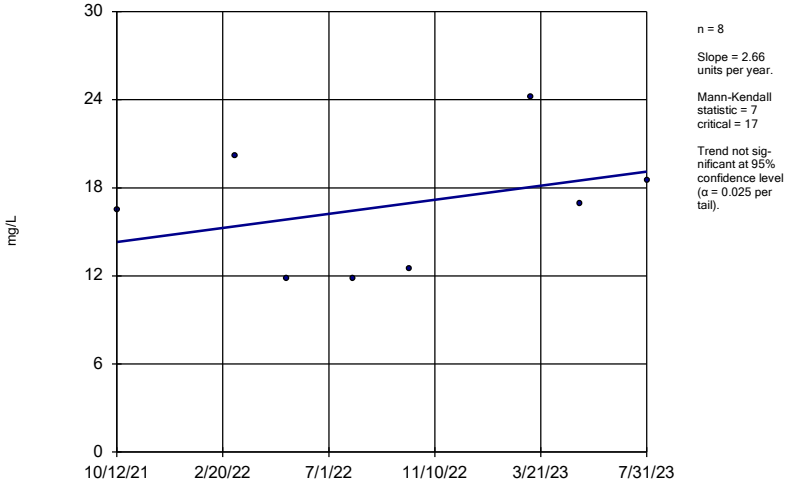
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

MW-55



n = 8

Slope = 2.66 units per year.

Mann-Kendall statistic = 7 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

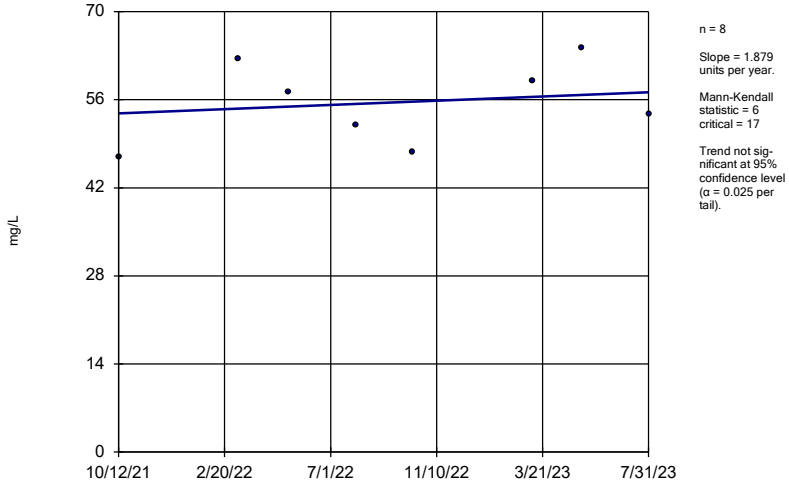
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Chloride

OW-57ROUT



n = 8

Slope = 1.879 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

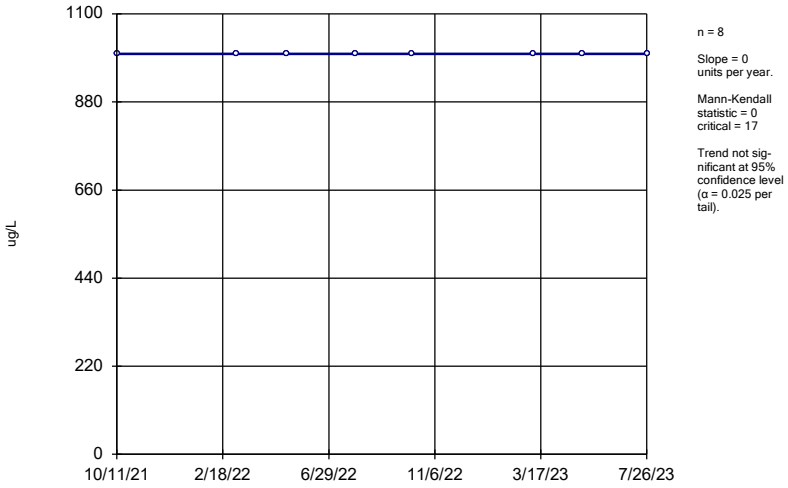
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18001



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

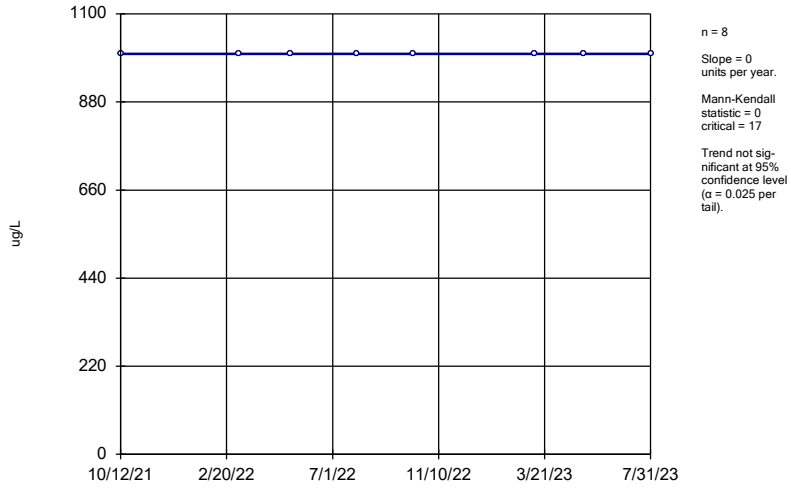
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

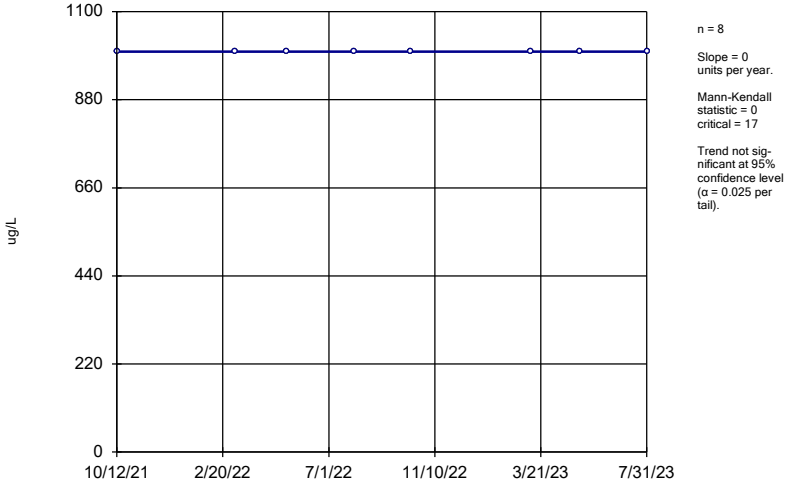
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18005



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

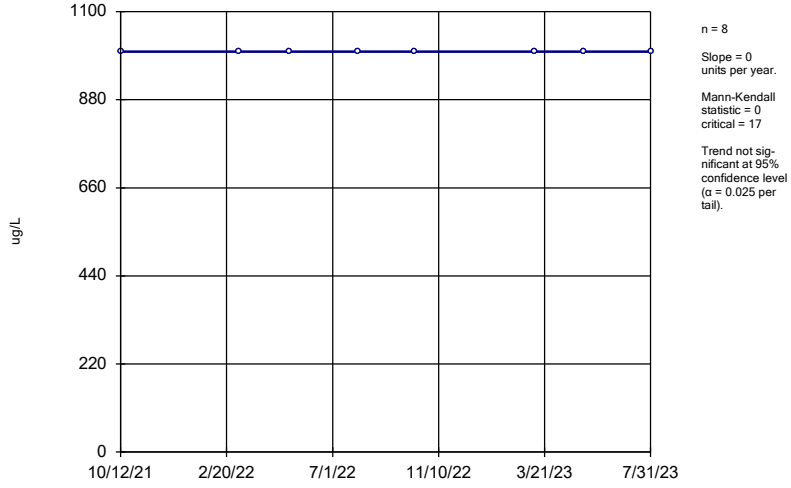
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18006



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

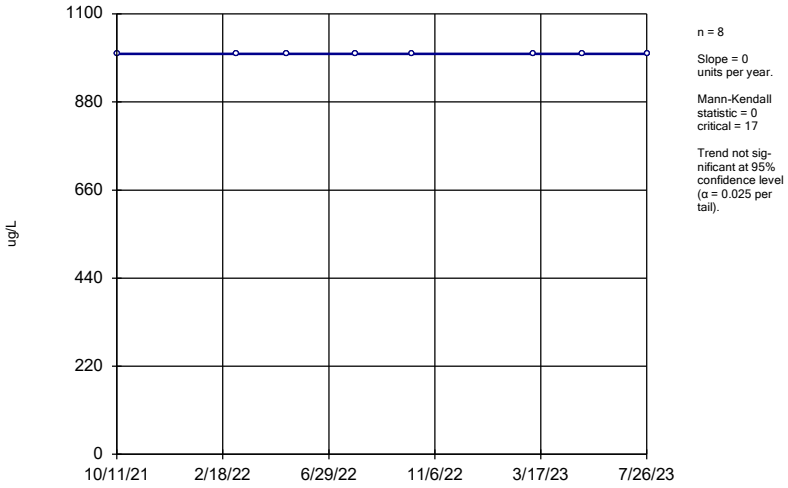
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-50



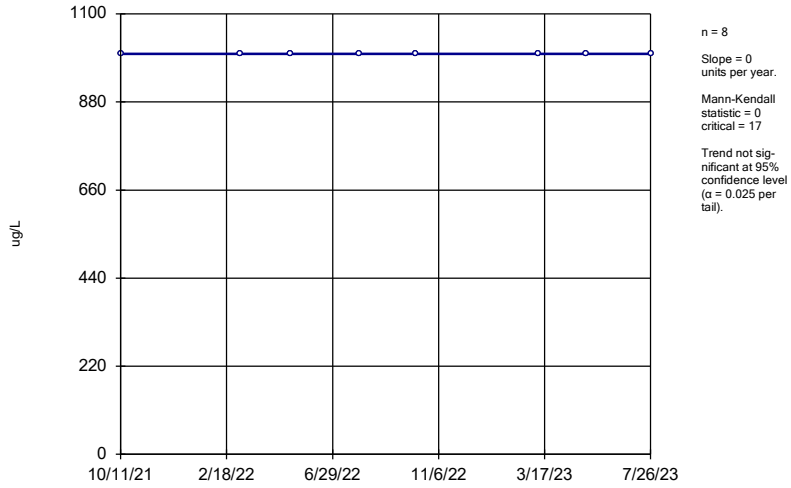
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-51



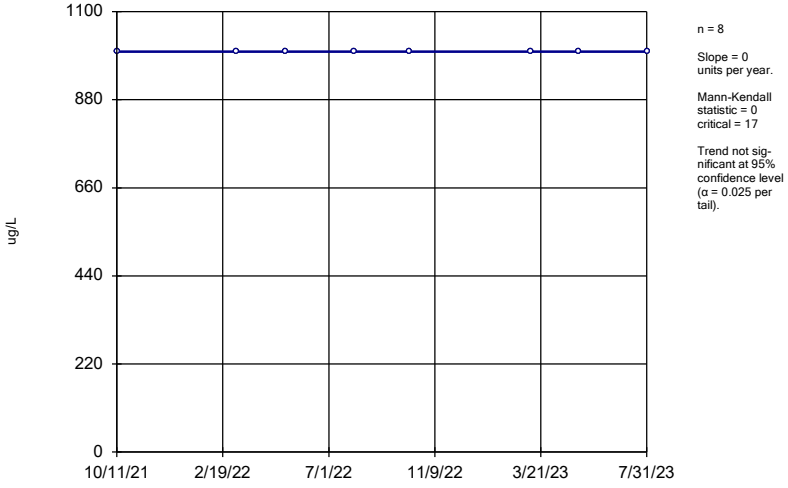
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-52



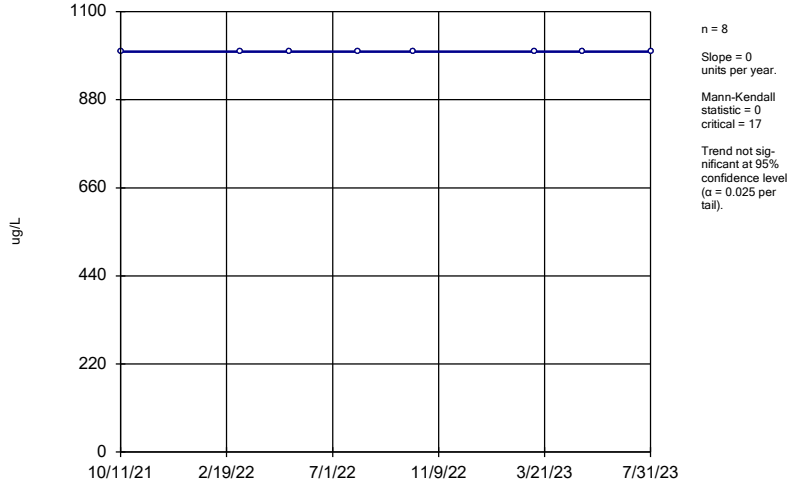
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53



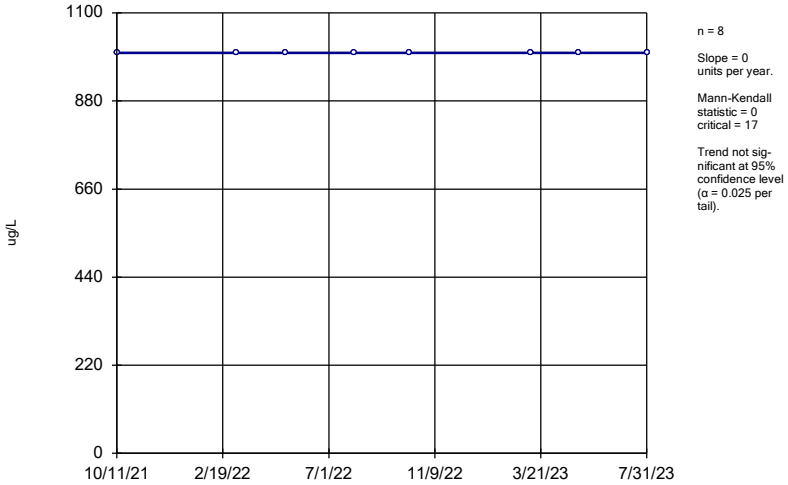
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

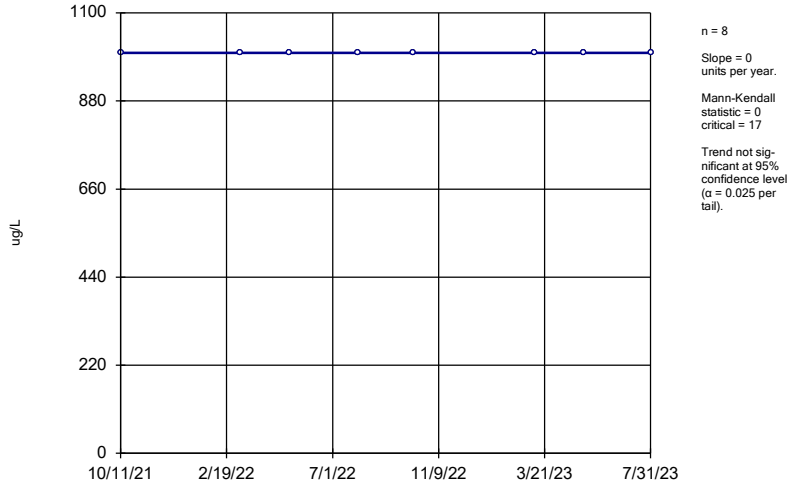
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-54R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

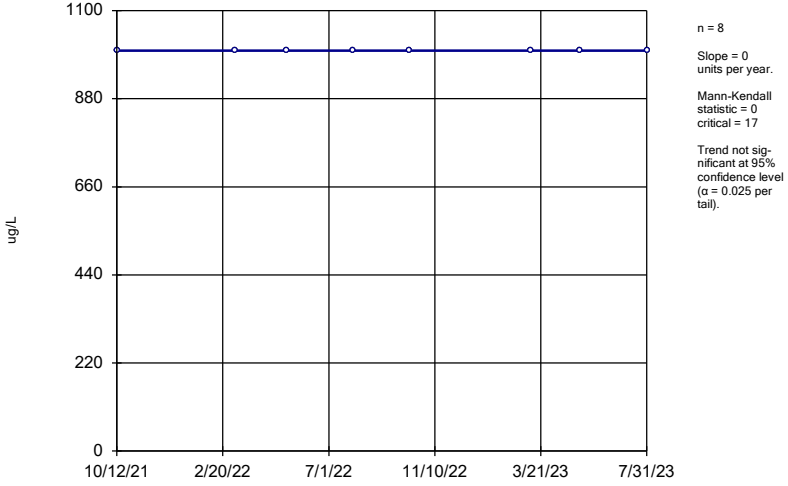
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-55



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

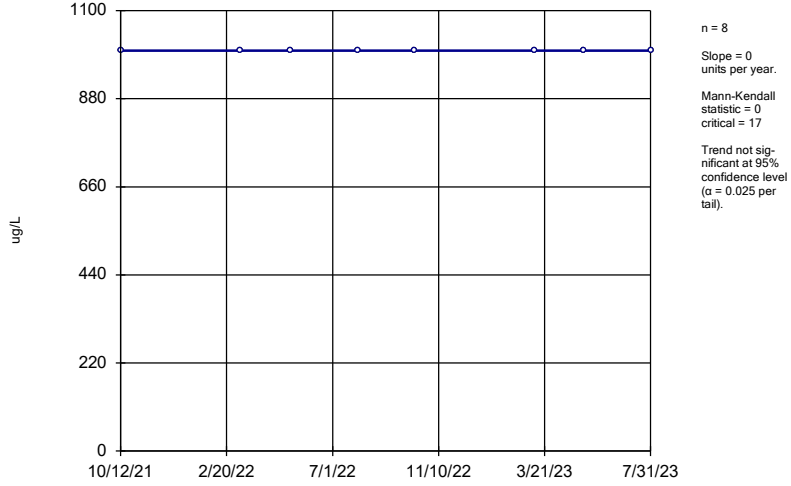
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

OW-57ROUT



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

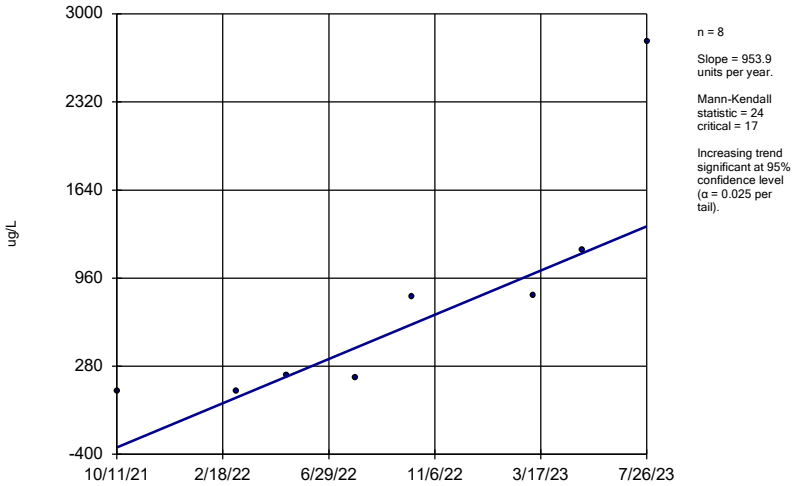
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

JCW-MW-18001



n = 8

Slope = 953.9 units per year.

Mann-Kendall statistic = 24
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

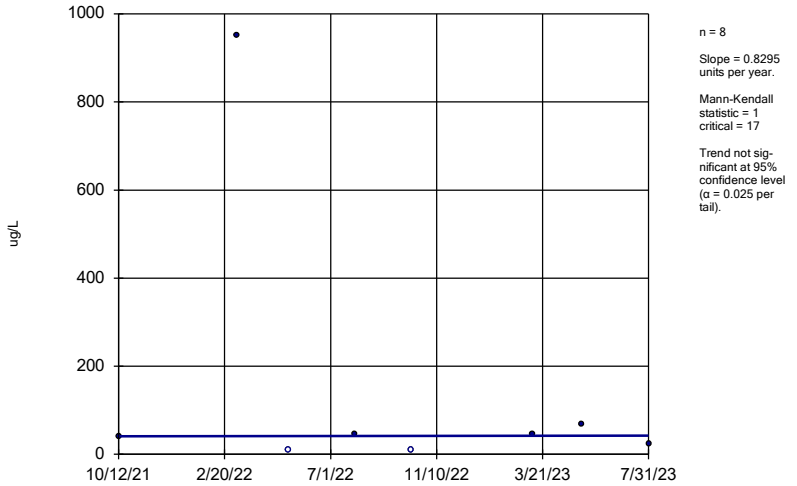
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Hollow symbols indicate censored values.

Iron, Total

JCW-MW-18004



n = 8

Slope = 0.8295 units per year.

Mann-Kendall statistic = 1
critical = 17

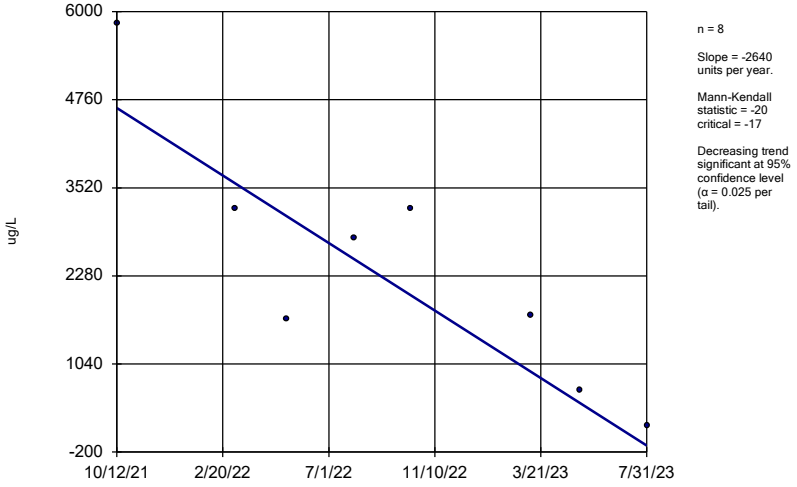
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

JCW-MW-18005



n = 8

Slope = -2640 units per year.

Mann-Kendall statistic = -20
critical = -17

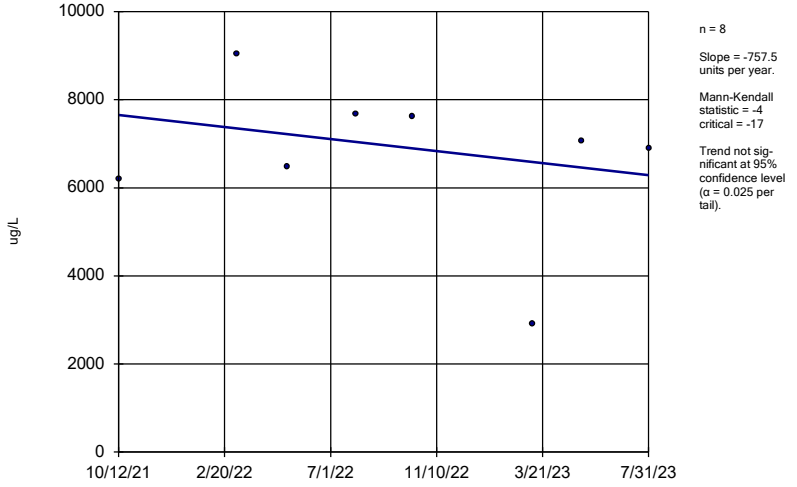
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

JCW-MW-18006



n = 8

Slope = -757.5 units per year.

Mann-Kendall statistic = -4
critical = -17

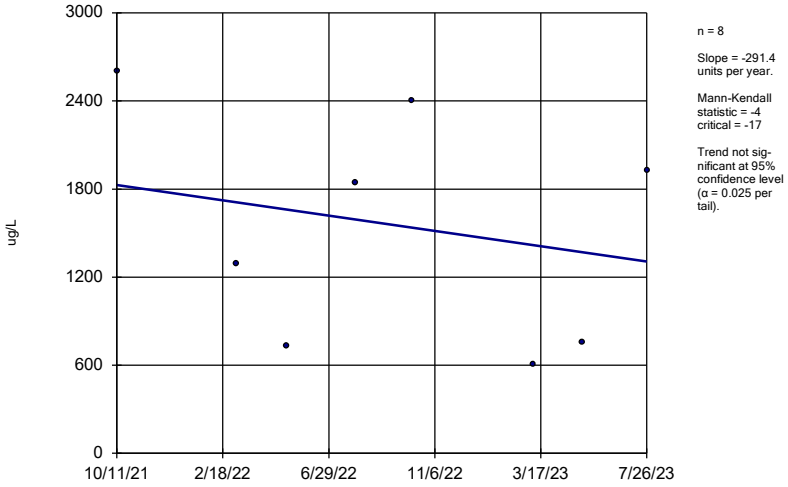
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

MW-50



n = 8

Slope = -291.4 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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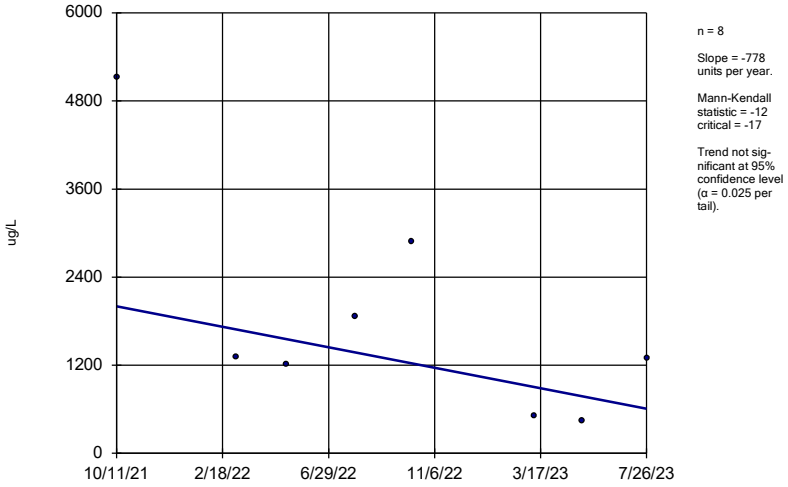
Iron, Total

MW-51



n = 8

Slope = -778 units per year.

Mann-Kendall statistic = -12 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

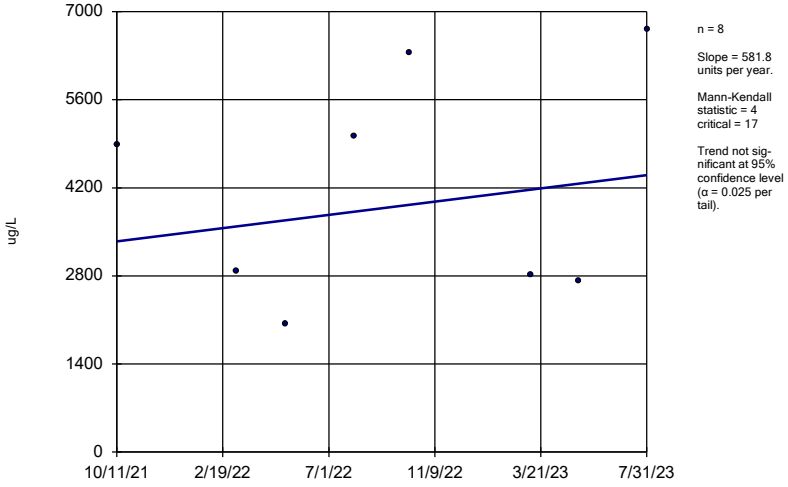
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Iron, Total

MW-52



n = 8

Slope = 581.8 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

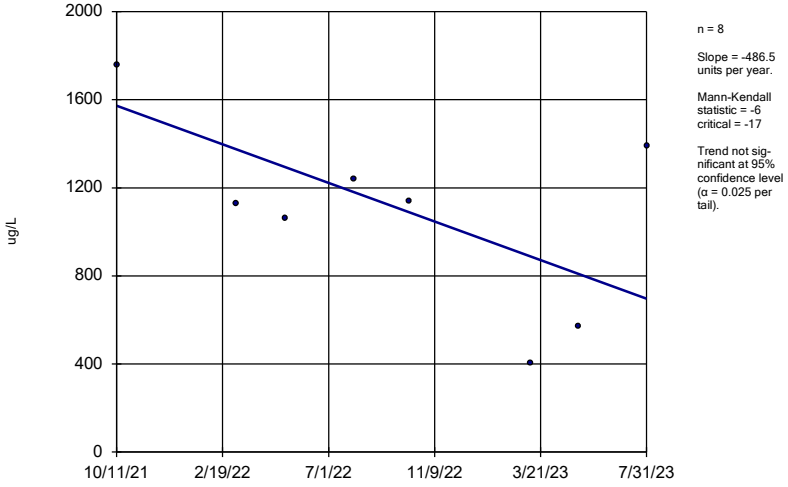
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Iron, Total

MW-53



n = 8

Slope = -486.5 units per year.

Mann-Kendall statistic = -6 critical = -17

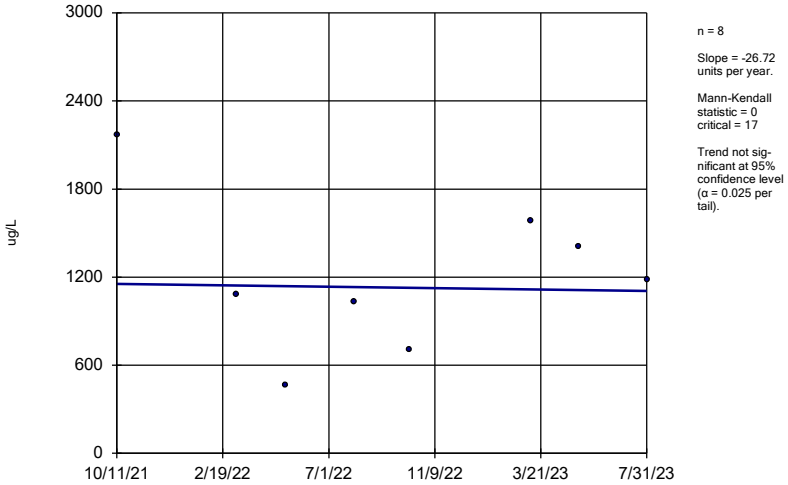
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

MW-53R



n = 8

Slope = -26.72 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

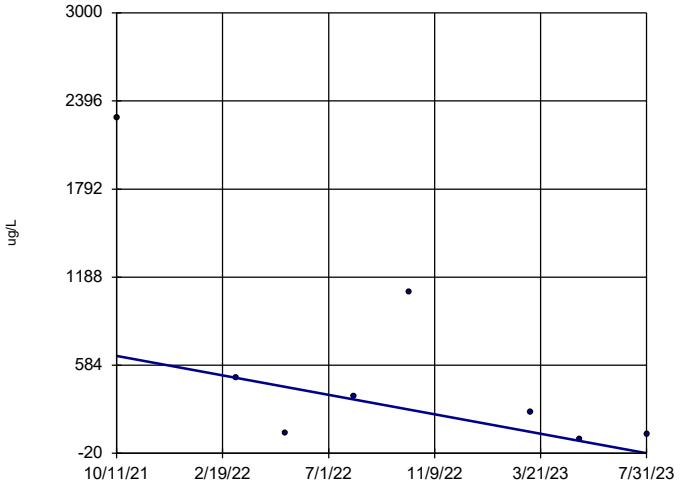
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Iron, Total

MW-54R



n = 8

Slope = -371.1 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

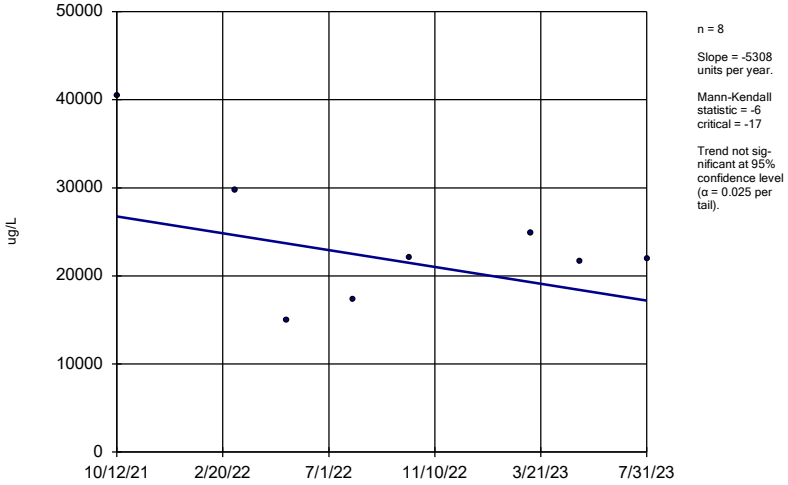
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Iron, Total

MW-55



n = 8

Slope = -5308 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

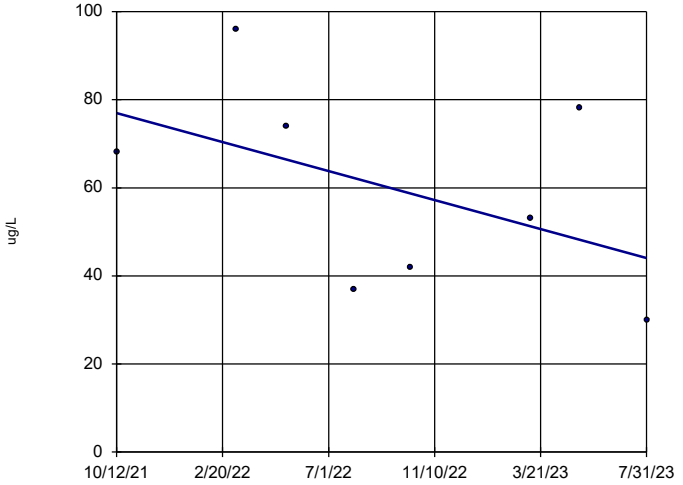
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Iron, Total

OW-57ROUT



n = 8

Slope = -18.27 units per year.

Mann-Kendall statistic = -8 critical = -17

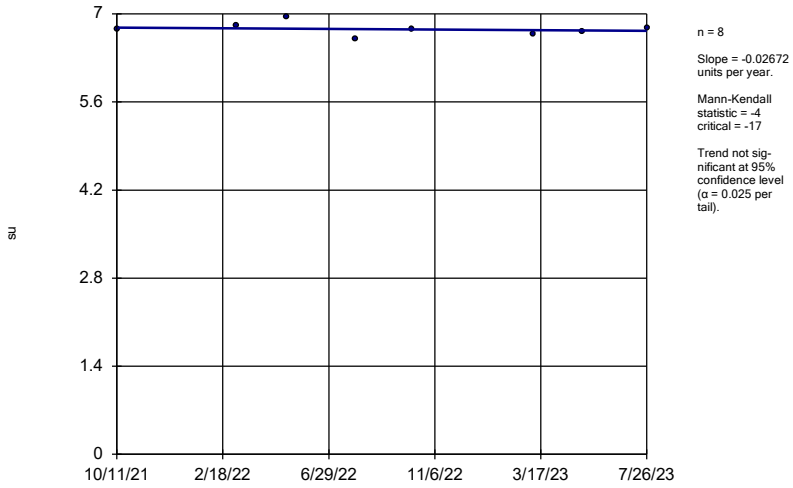
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

JCW-MW-18001



n = 8

Slope = -0.02672 units per year.

Mann-Kendall statistic = -4 critical = -17

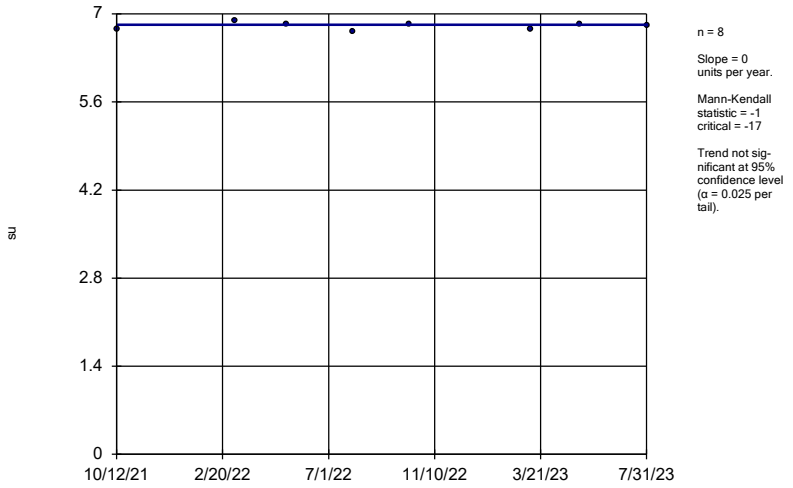
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = -1 critical = -17

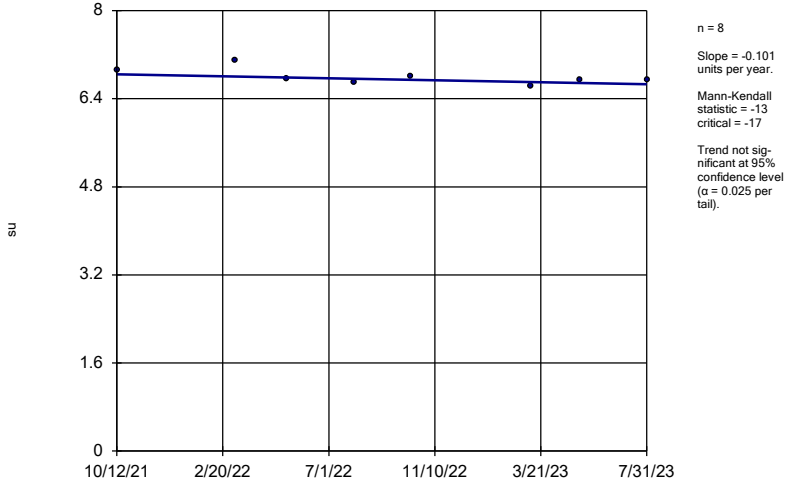
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

JCW-MW-18005



n = 8

Slope = -0.101 units per year.

Mann-Kendall statistic = -13 critical = -17

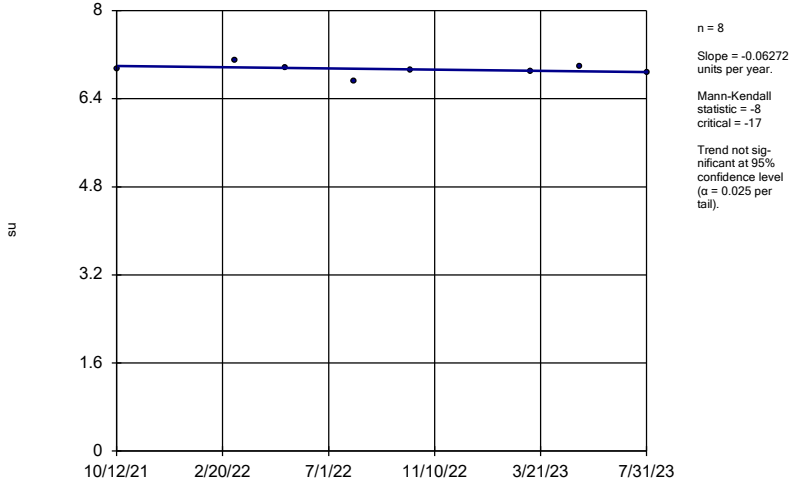
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

JCW-MW-18006



n = 8

Slope = -0.06272 units per year.

Mann-Kendall statistic = -8 critical = -17

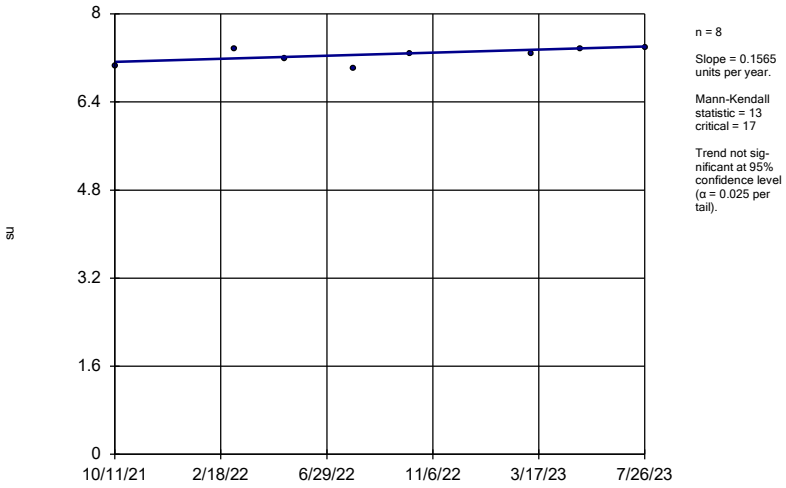
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

MW-50



n = 8

Slope = 0.1565 units per year.

Mann-Kendall statistic = 13 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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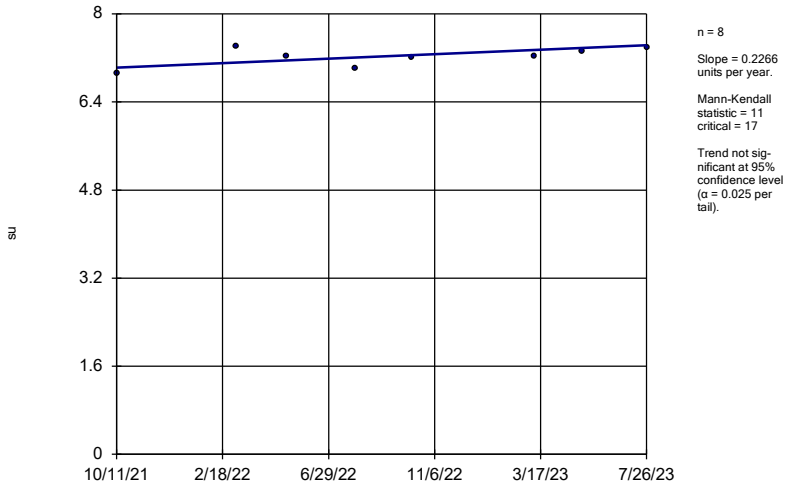
pH, Field

MW-51



n = 8

Slope = 0.2266 units per year.

Mann-Kendall statistic = 11 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

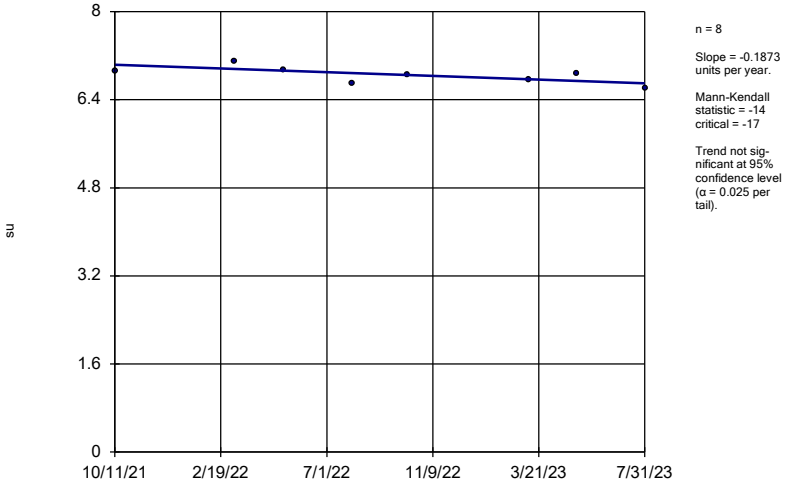
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

pH, Field

MW-52



n = 8

Slope = -0.1873 units per year.

Mann-Kendall statistic = -14 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

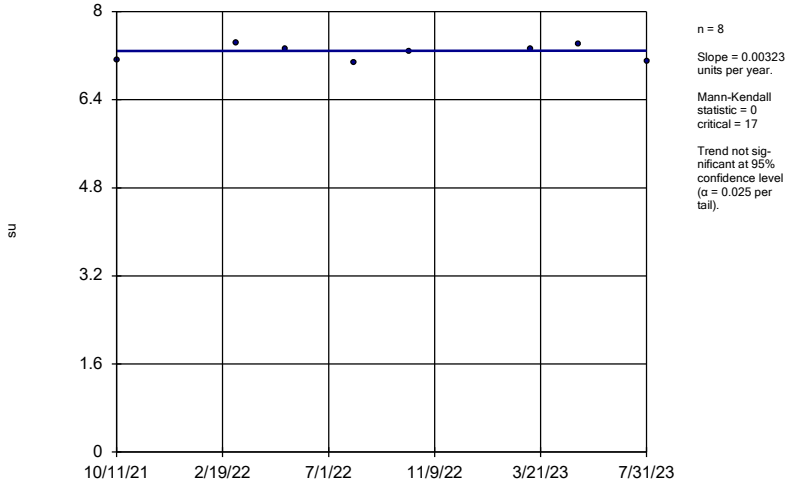
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

pH, Field

MW-53



n = 8

Slope = 0.00323 units per year.

Mann-Kendall statistic = 0 critical = 17

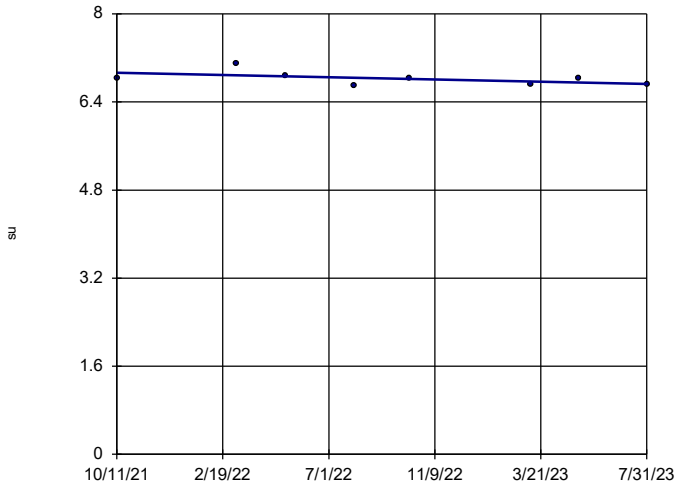
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

pH, Field

MW-53R



n = 8

Slope = -0.1144 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

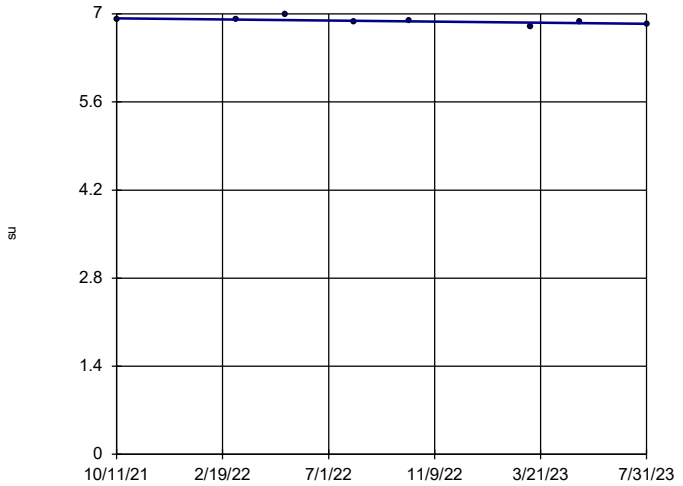
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

pH, Field

MW-54R



n = 8

Slope = -0.04993 units per year.

Mann-Kendall statistic = -16 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

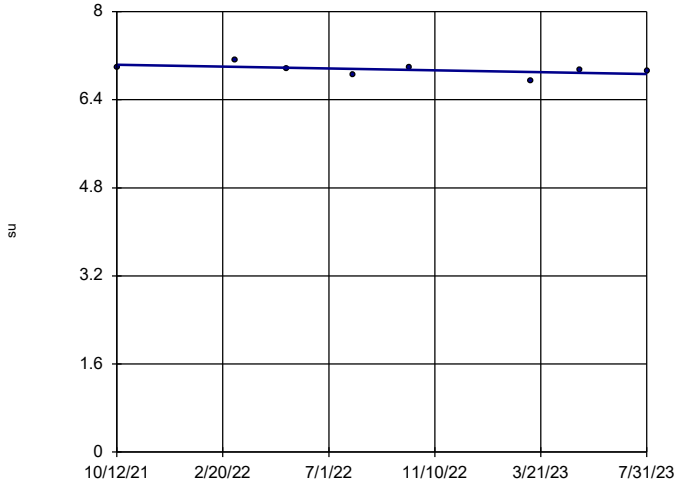
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

pH, Field

MW-55



n = 8

Slope = -0.09291 units per year.

Mann-Kendall statistic = -12 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

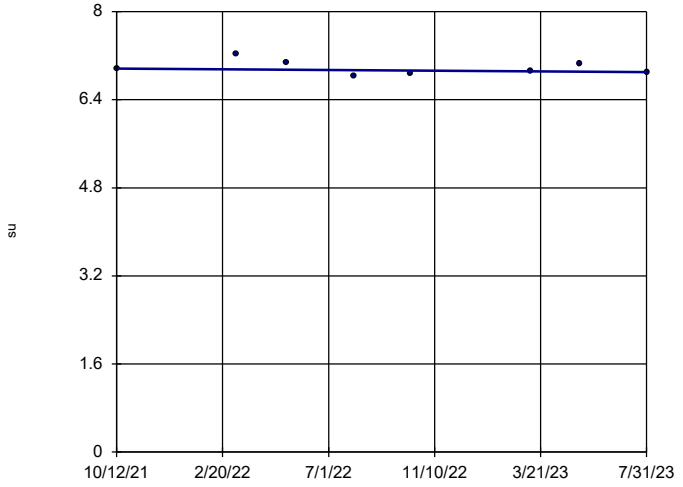
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

pH, Field

OW-57ROUT



n = 8

Slope = -0.03445 units per year.

Mann-Kendall statistic = -6 critical = -17

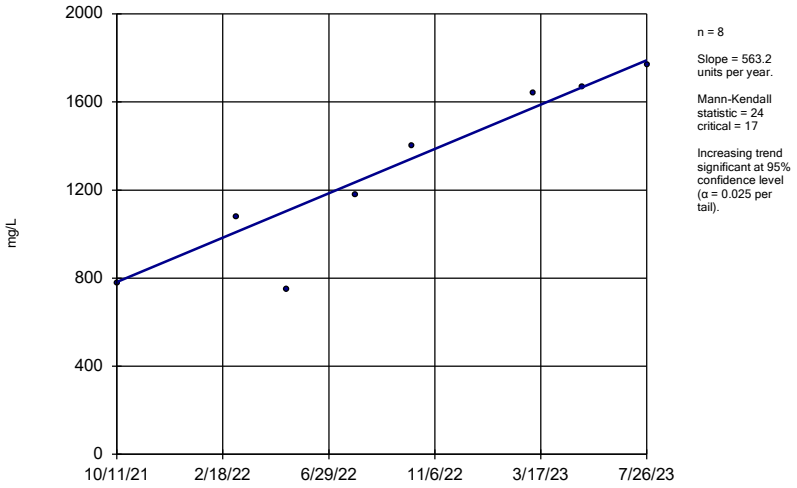
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sulfate

JCW-MW-18001



n = 8

Slope = 563.2 units per year.

Mann-Kendall statistic = 24
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

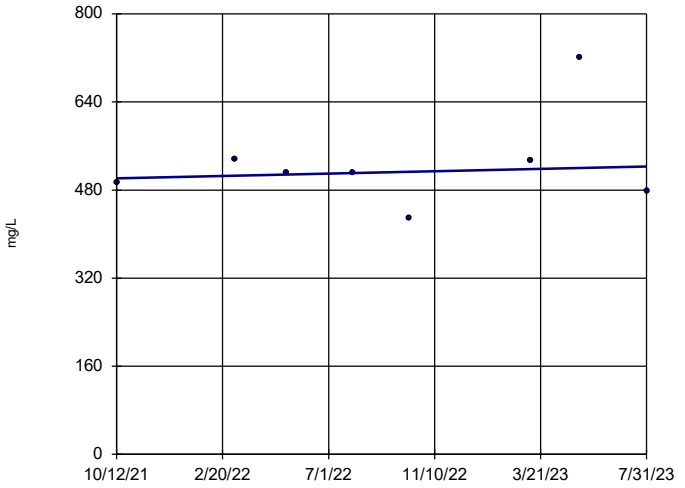
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

JCW-MW-18004



n = 8

Slope = 11.83 units per year.

Mann-Kendall statistic = 1
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

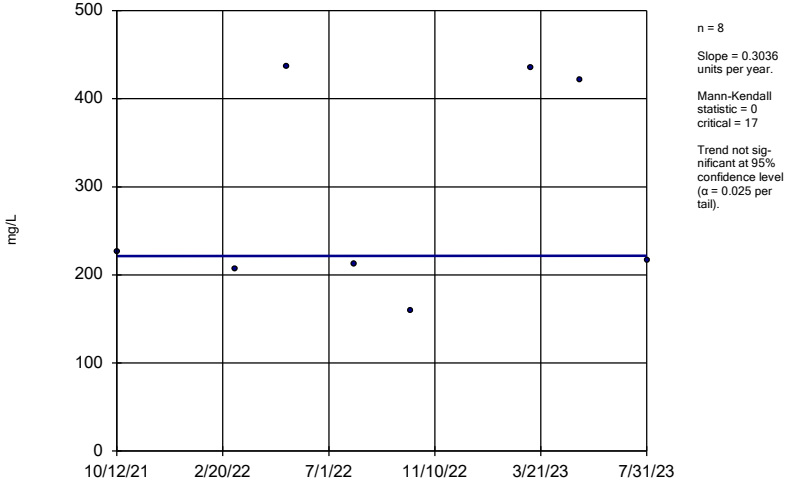
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

JCW-MW-18005



n = 8

Slope = 0.3036 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

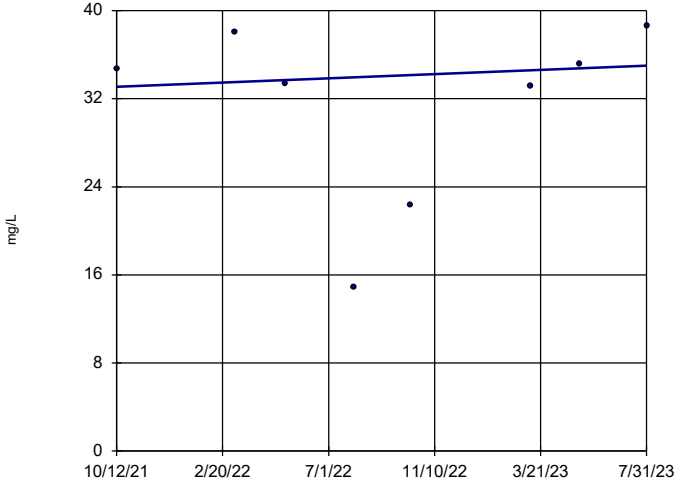
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

JCW-MW-18006



n = 8

Slope = 1.071 units per year.

Mann-Kendall statistic = 4
critical = 17

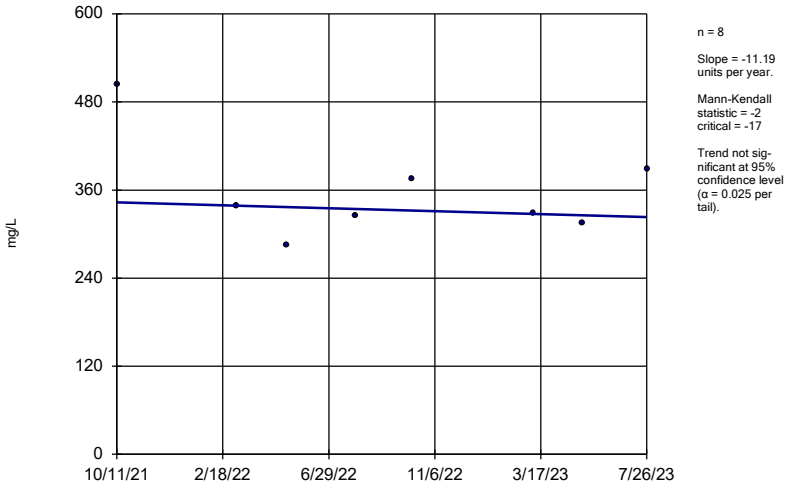
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sulfate

MW-50



n = 8

Slope = -11.19 units per year.

Mann-Kendall statistic = -2
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

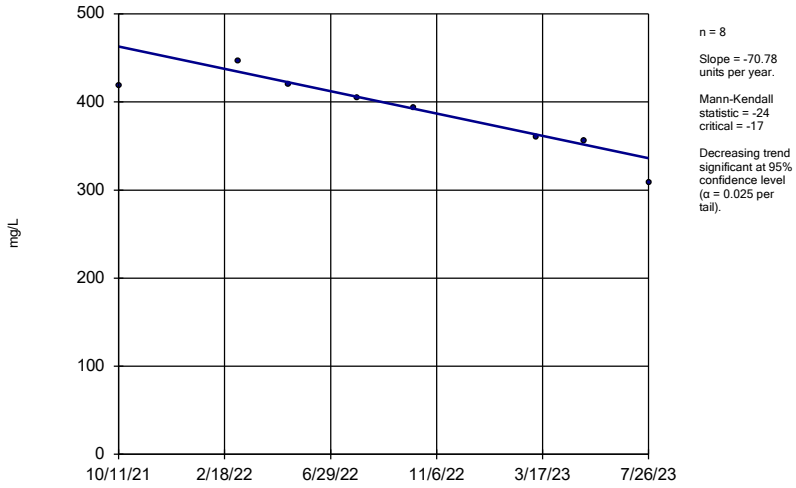
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

MW-51



n = 8

Slope = -70.78 units per year.

Mann-Kendall statistic = -24
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

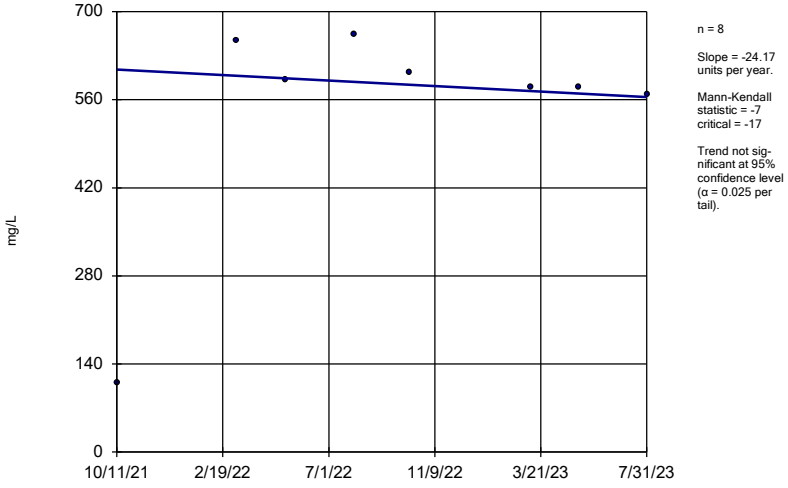
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

MW-52



n = 8

Slope = -24.17 units per year.

Mann-Kendall statistic = -7
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

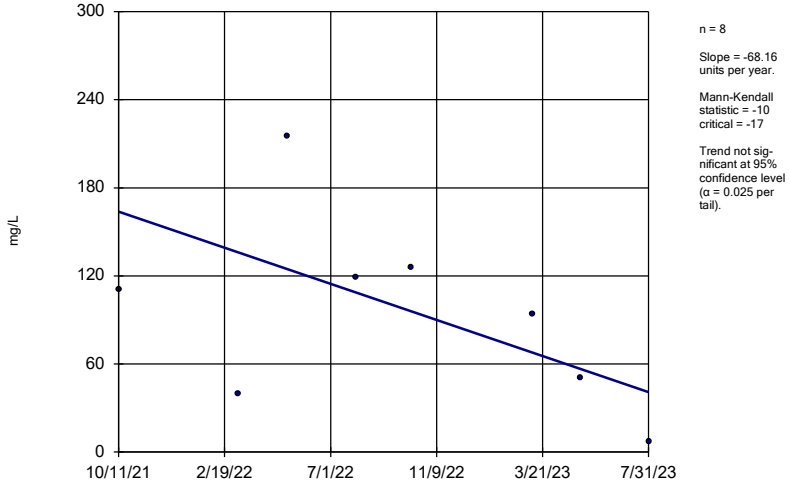
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

MW-53



n = 8

Slope = -68.16 units per year.

Mann-Kendall statistic = -10
critical = -17

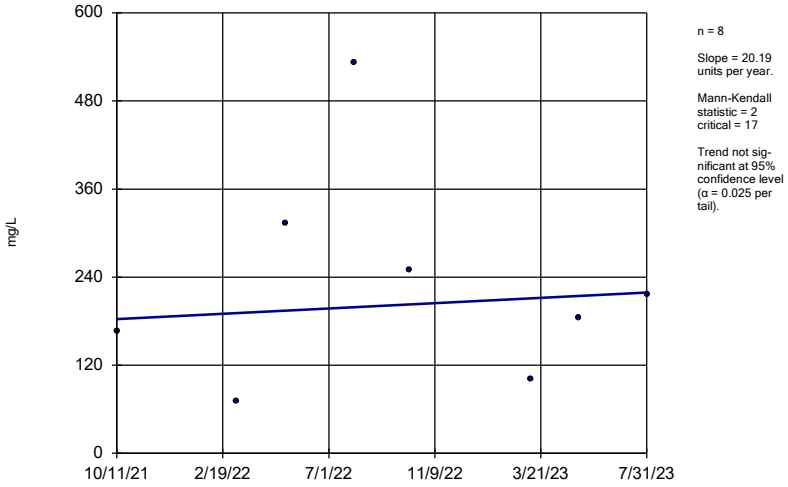
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sulfate

MW-53R



n = 8

Slope = 20.19 units per year.

Mann-Kendall statistic = 2 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

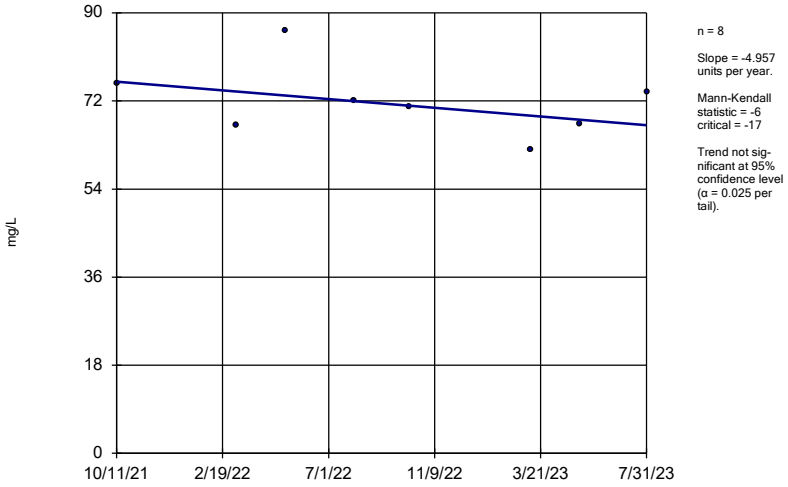
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

MW-54R



n = 8

Slope = -4.957 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

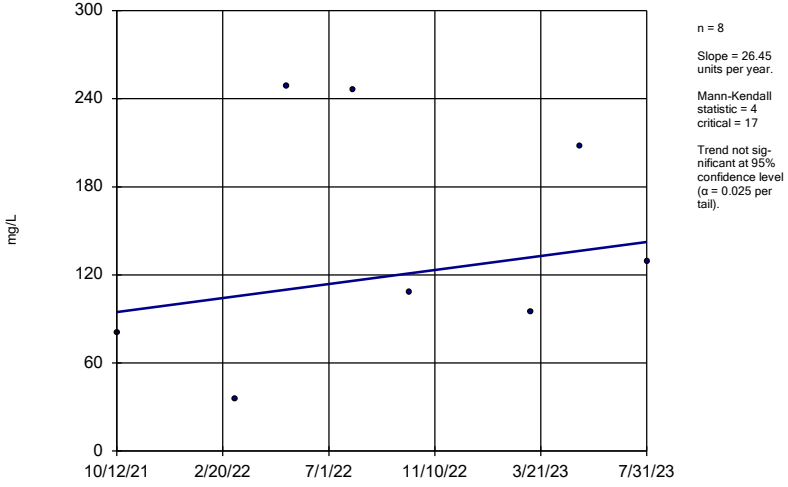
Sen's Slope Estimator Analysis Run 9/5/2023 12:15 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

MW-55



n = 8

Slope = 26.45 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

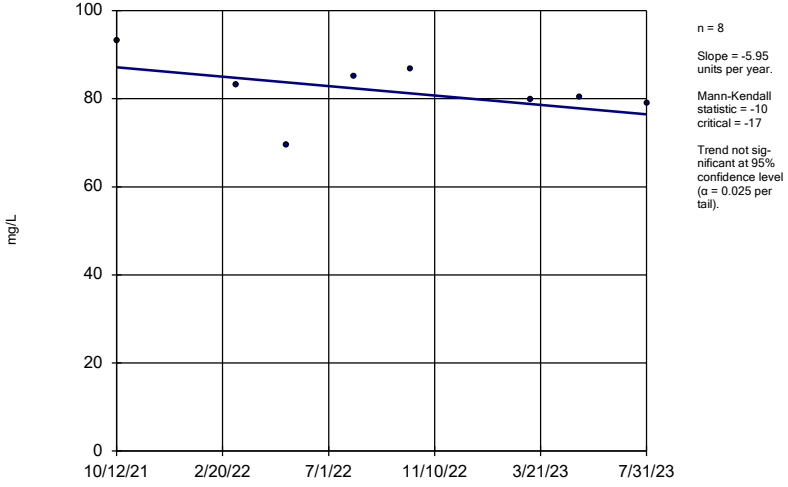
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Sulfate

OW-57ROUT



n = 8

Slope = -5.95 units per year.

Mann-Kendall statistic = -10 critical = -17

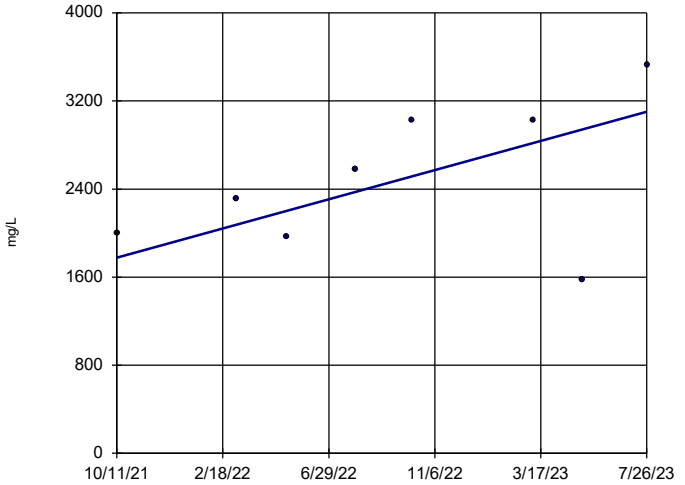
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Total Dissolved Solids

JCW-MW-18001



n = 8

Slope = 741.4 units per year.

Mann-Kendall statistic = 12
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

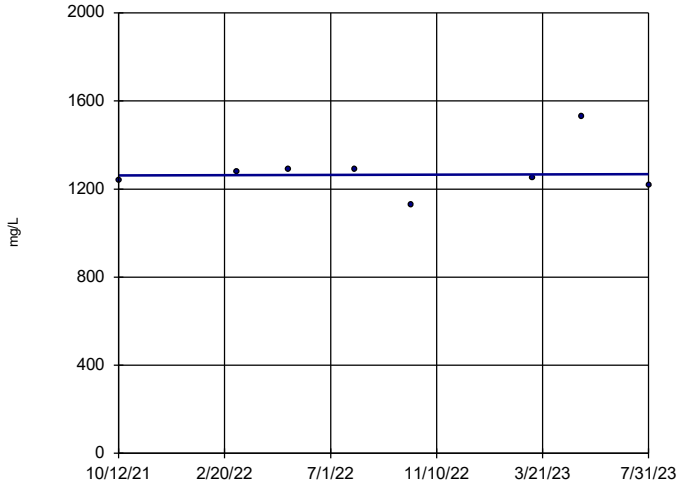
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

JCW-MW-18004



n = 8

Slope = 3.558 units per year.

Mann-Kendall statistic = 1
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

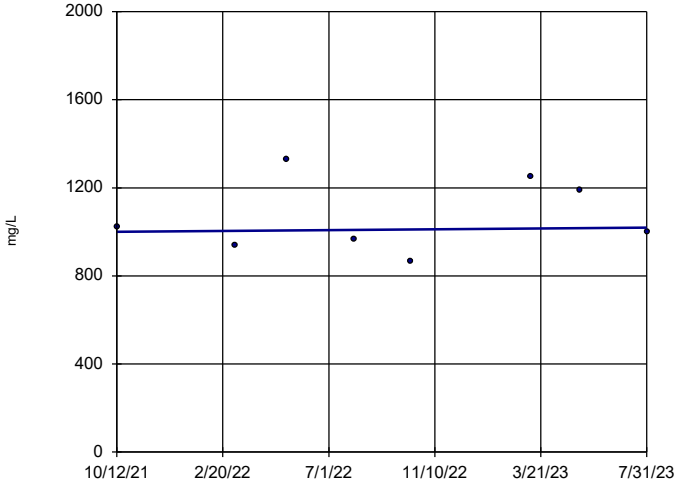
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

JCW-MW-18005



n = 8

Slope = 11.04 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

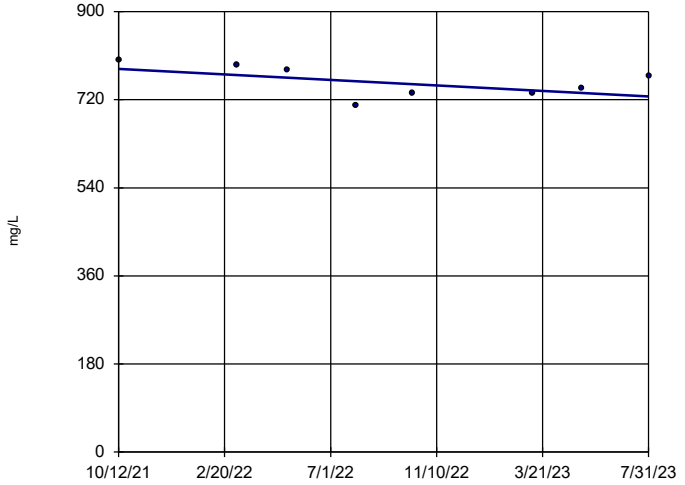
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

JCW-MW-18006



n = 8

Slope = -31.25 units per year.

Mann-Kendall statistic = -8
critical = -17

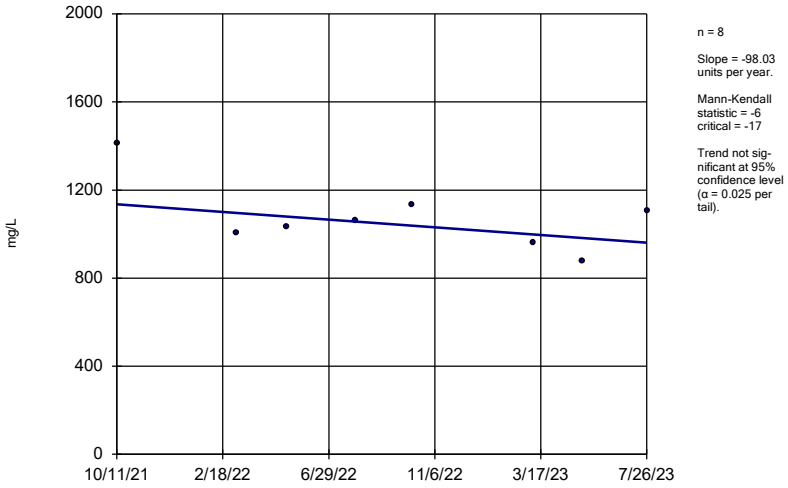
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Total Dissolved Solids

MW-50



n = 8

Slope = -98.03 units per year.

Mann-Kendall statistic = -6
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

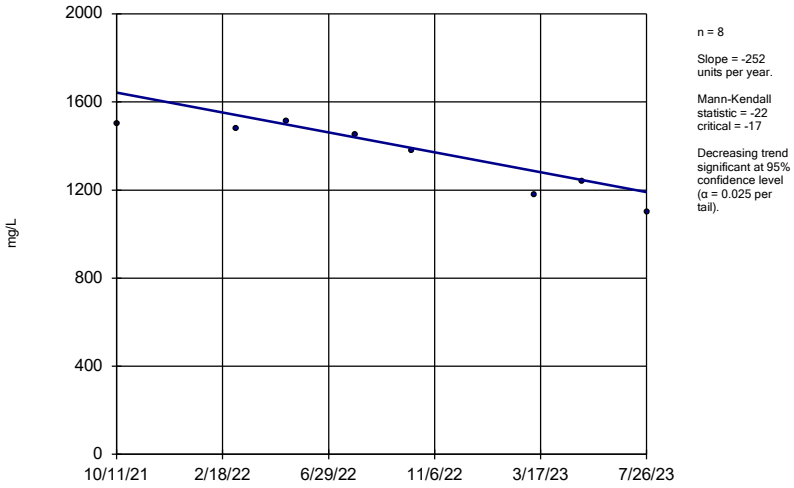
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

MW-51



n = 8

Slope = -252 units per year.

Mann-Kendall statistic = -22
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

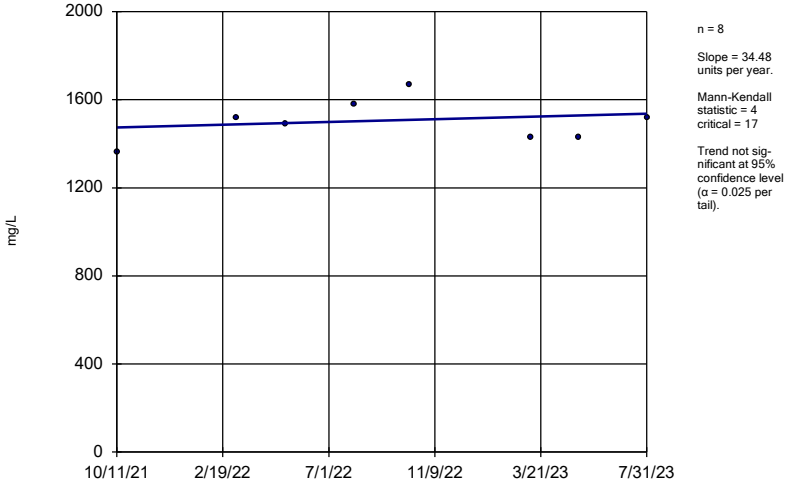
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

MW-52



n = 8

Slope = 34.48 units per year.

Mann-Kendall statistic = 4
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

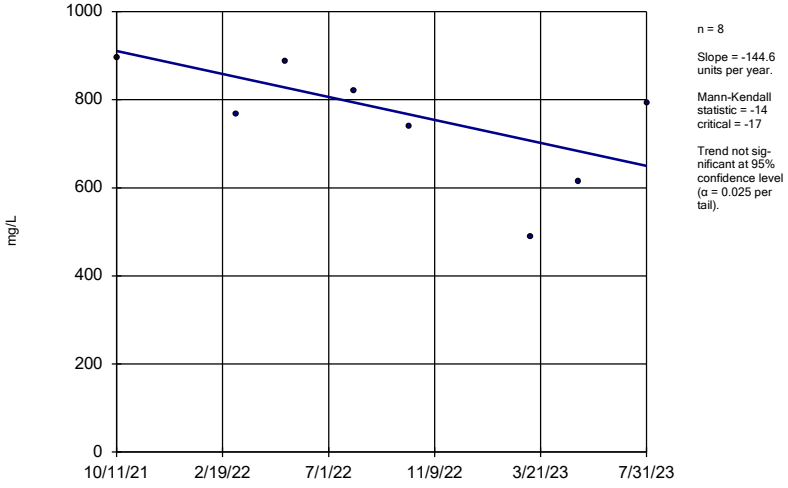
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

MW-53



n = 8

Slope = -144.6 units per year.

Mann-Kendall statistic = -14
critical = -17

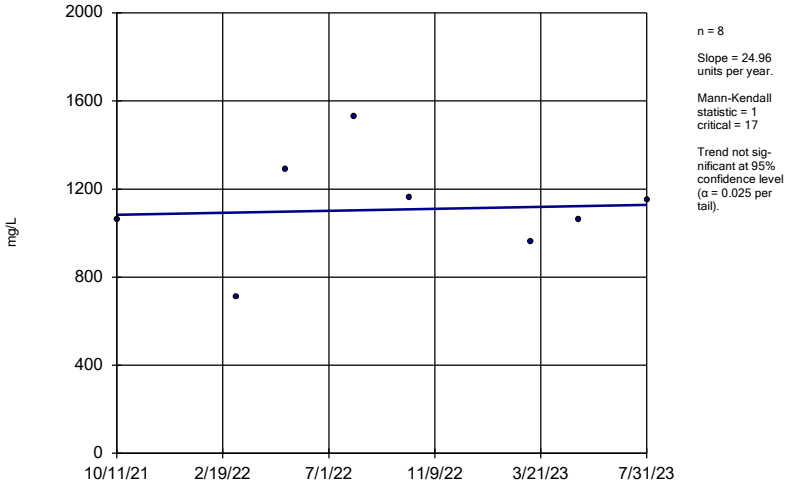
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Total Dissolved Solids

MW-53R



n = 8

Slope = 24.96 units per year.

Mann-Kendall statistic = 1
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

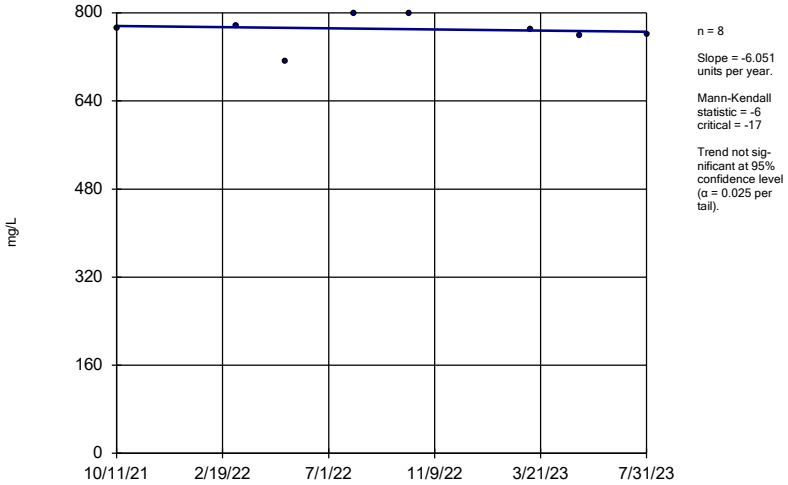
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

MW-54R



n = 8

Slope = -6.051 units per year.

Mann-Kendall statistic = -6
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

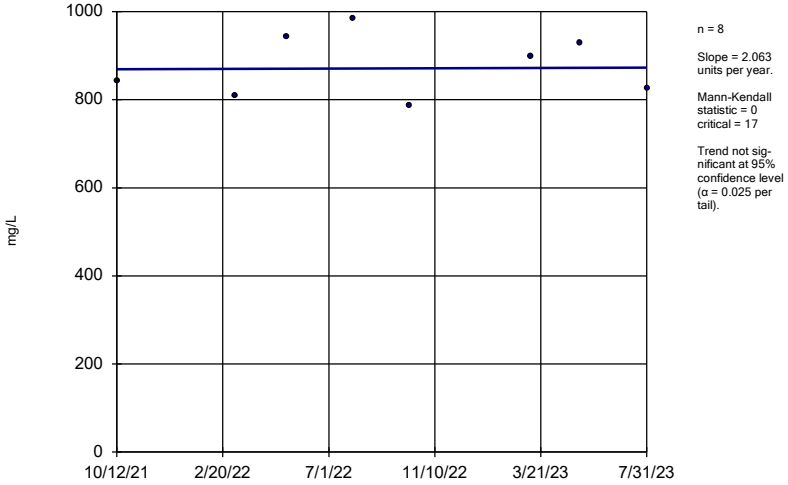
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

MW-55



n = 8

Slope = 2.063 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

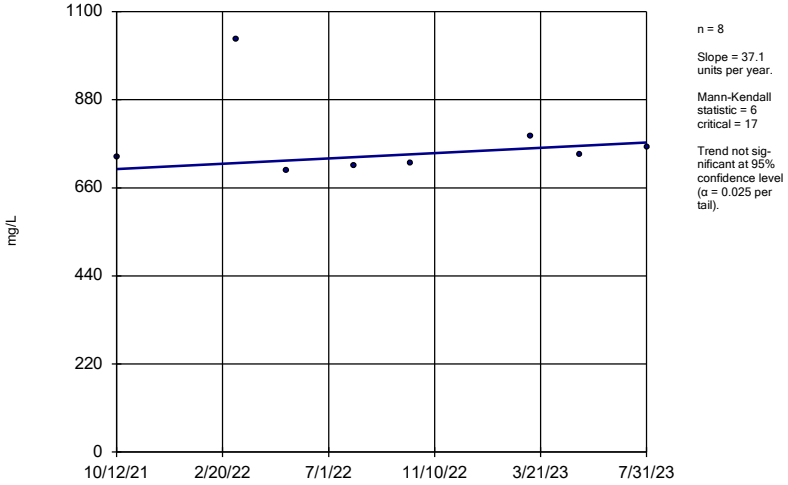
Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Total Dissolved Solids

OW-57ROUT



n = 8

Slope = 37.1 units per year.

Mann-Kendall statistic = 6
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 12:16 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Appendix D
Assessment Monitoring and GSI Statistical Evaluation

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

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 Rule[1] 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 Report[2]. 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

[1] 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).

[2] 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

[3] 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™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each parameter with a direct exceedance using a per test[4] 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™ 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™ 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

[4] Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

per-test significance of α = 0.01. Non-detect data was handled in accordance with the HMP 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 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™ 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™ 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

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		Sample Location:	MW-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[1]				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[1]																		
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[2]																		
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 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:	MW-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	GWPS								
Appendix III[1]										
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[1]										
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	--	< 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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		Sample Location:	MW-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	GWPS								
Appendix III[1]										
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[1]										
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]										
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.

(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:	MW-53							
		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[1]										
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[1]										
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	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**	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

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:	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[1]										
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[1]										
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		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[1]										
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[1]										
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.

(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:	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[1]							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[1]											
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.
(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:	OW-57R 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[1]										
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[1]										
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.
(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-MW-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[1]										
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[1]										
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

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-MW-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	GWPS								
Appendix III[1]										
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[1]										
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

			Sample Location:	JCW-MW-18005							
			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				Field Dup						
Appendix III[(1)]												
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[(1)]												
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.
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-MW-18006												
		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[1]						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	119	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[1]															
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.

(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:	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**		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup		Field Dup
Appendix III[(1)]																					
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[F]	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[(1)]																					
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[H]	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 Parameters[(2)]																					
Iron	ug/L	500,000[EE]	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

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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	20	12	10	15	18	10	8	10
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-53							
					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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	2	1	< 1	1	2	< 1	< 1	1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	25	10	8	17	20	17	14	17
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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(1)													
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[F]	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(1)													
Arsenic	ug/L	10	100	680	**100**	4	1	< 1	2	2	1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters(2)													
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (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-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**					Field Dup				
Appendix III(1)														
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[F]	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(1)														
Arsenic	ug/L	10	100	680	**100**	**198**	88	48	80	78	**126**	68	44	75
Chromium	ug/L	11[H]	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 Parameters(2)														
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

					Sample Location:	JCW-MW-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[(1)]													
Boron	ug/L	4,000	44,000	69,000	44,000	389	259	226	313	343	180	227	310
Sulfate	mg/L	1,200[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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) .

[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.

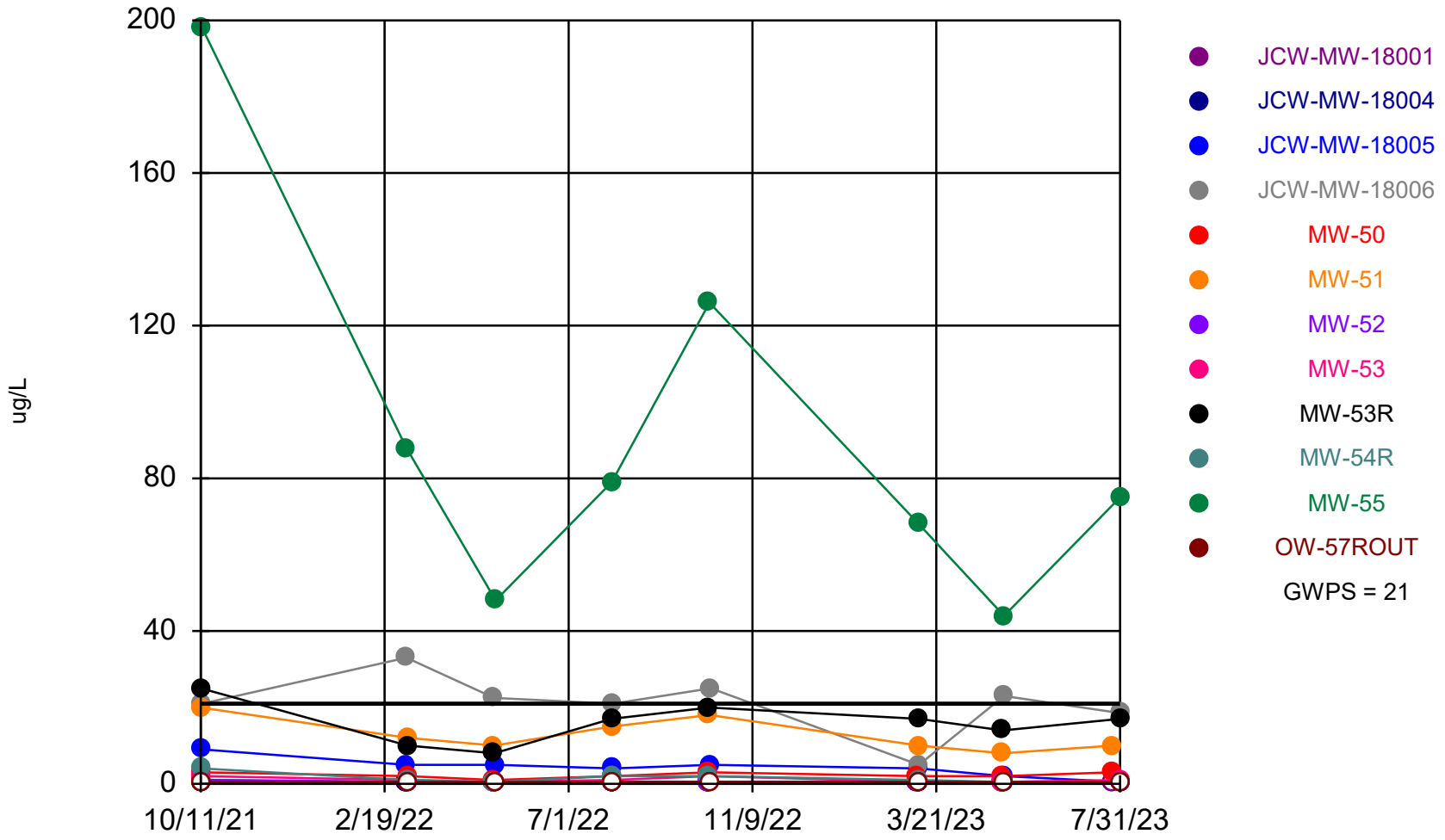
(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Attachment 1
Assessment Monitoring Sanitas™ Output Files

Hollow symbols indicate censored values.

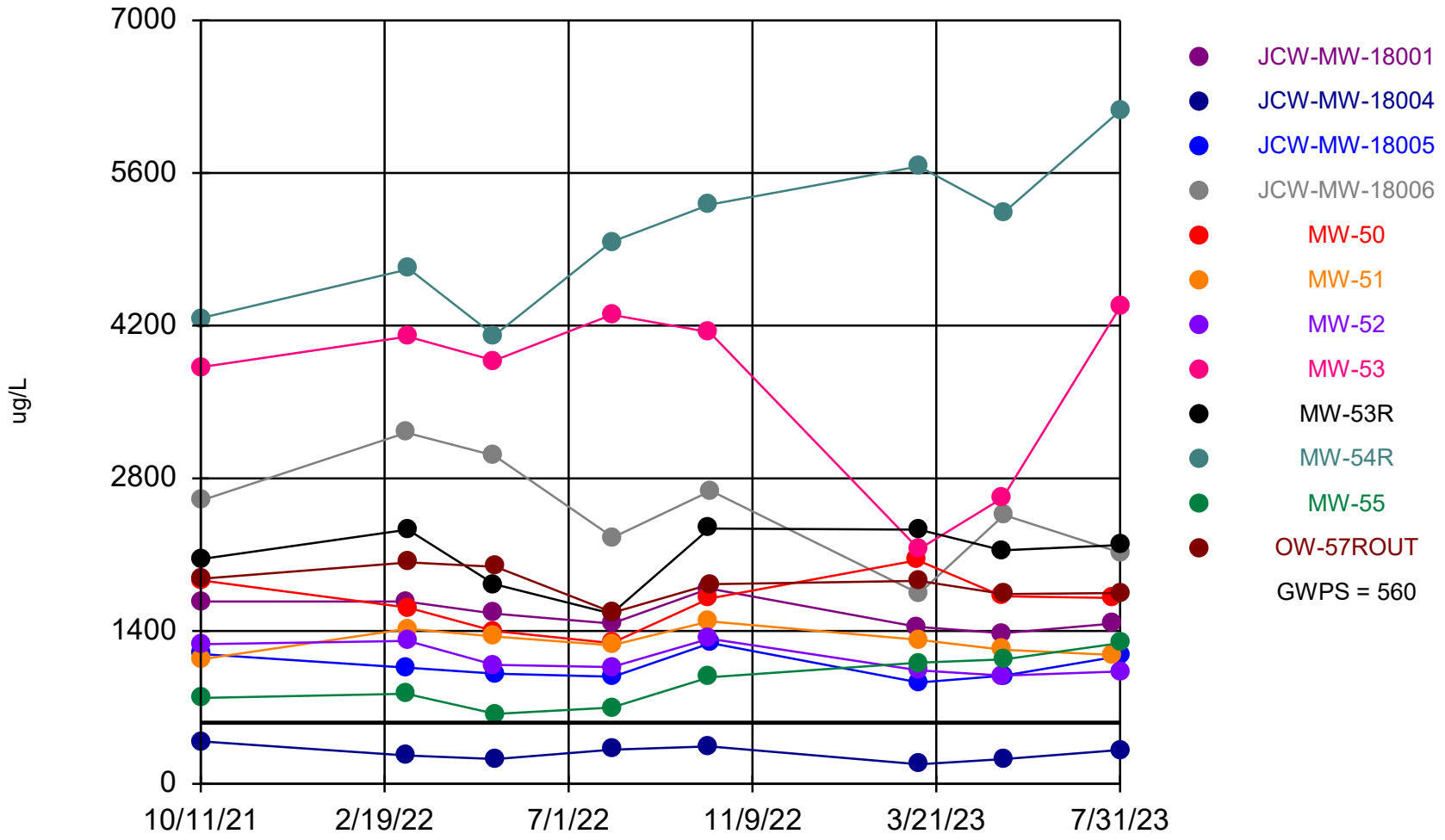
Arsenic Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:49 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

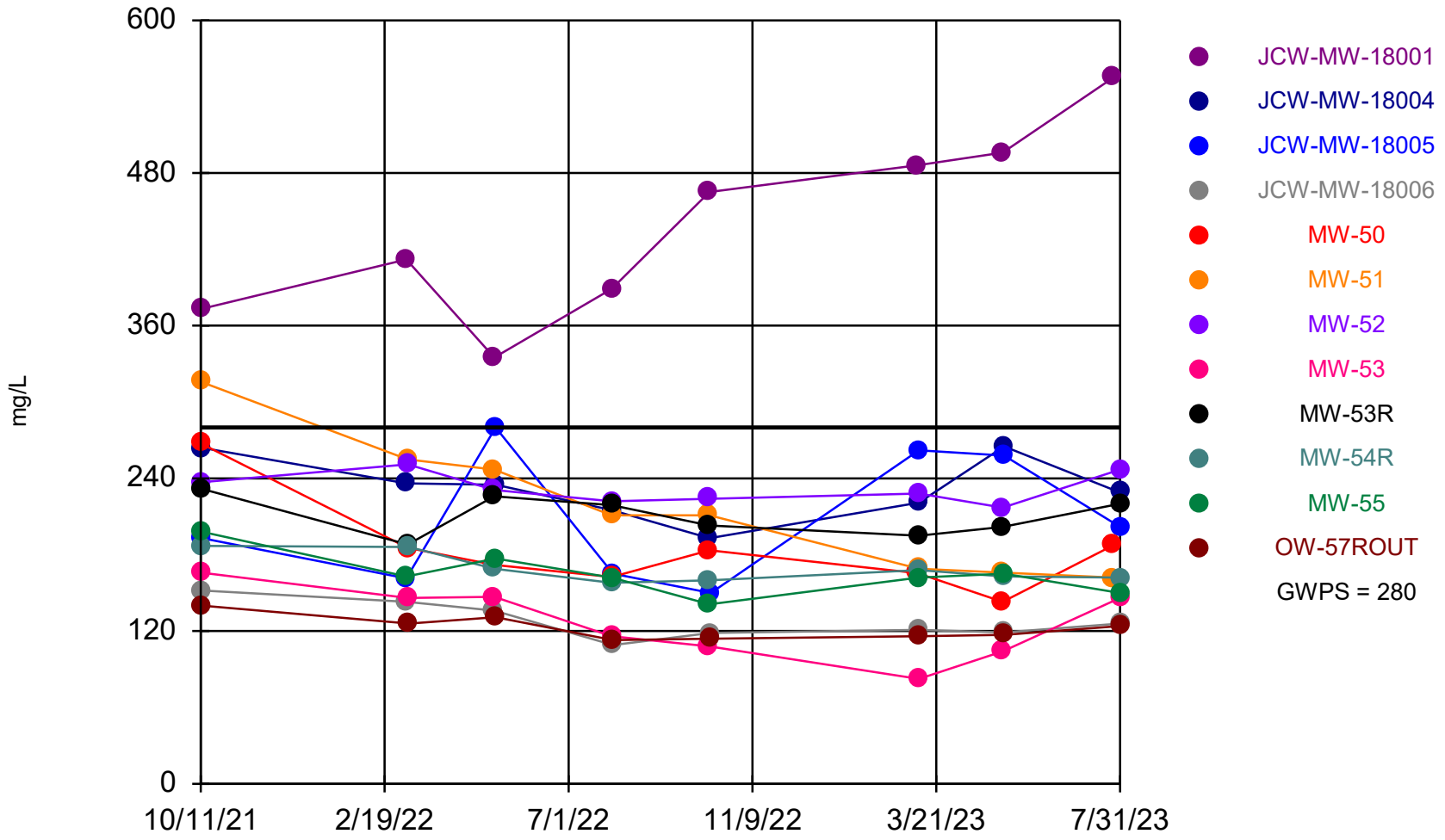
Boron Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:50 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium Comparison to GWPS

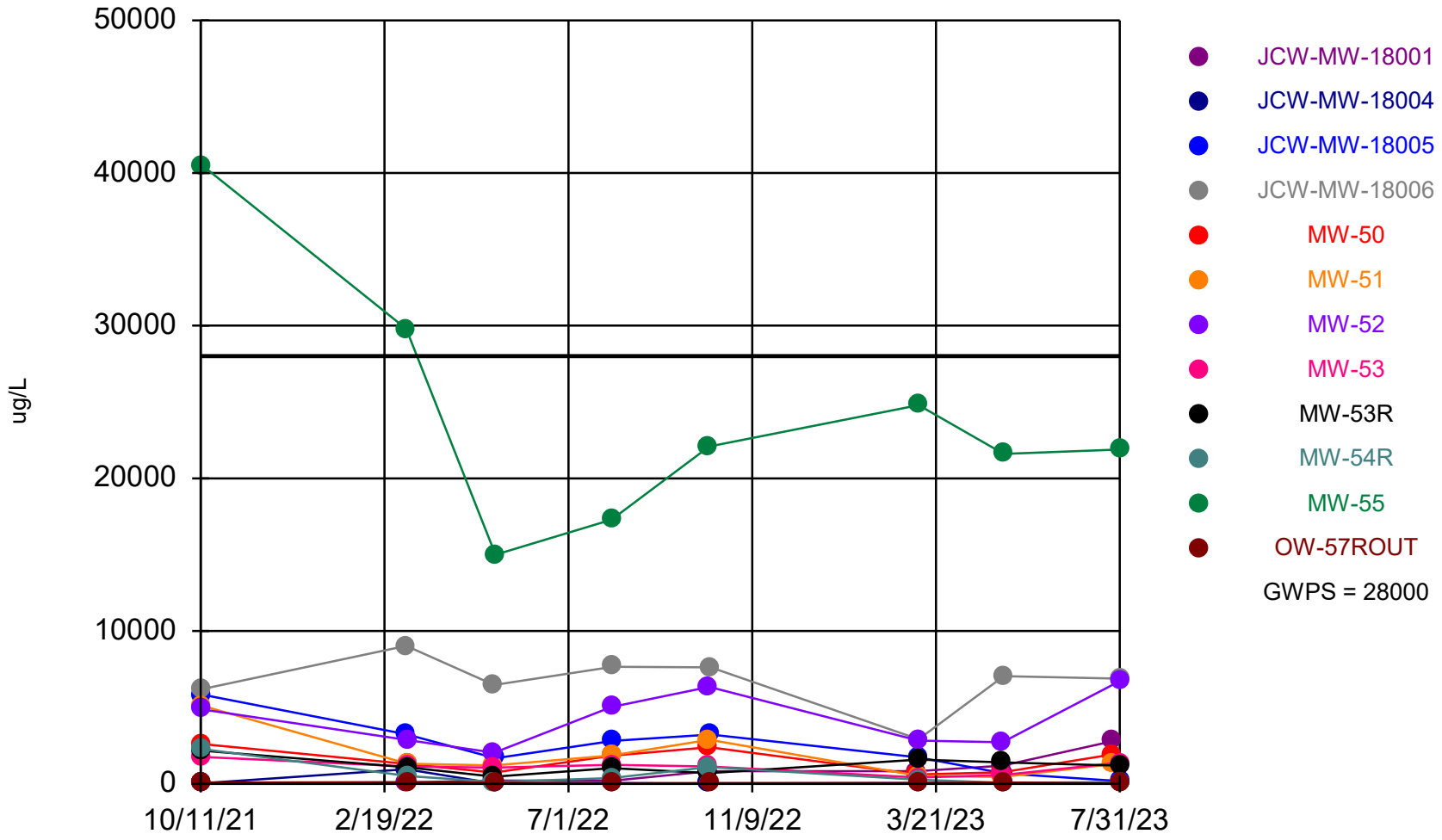


Time Series Analysis Run 9/5/2023 12:51 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Hollow symbols indicate censored values.

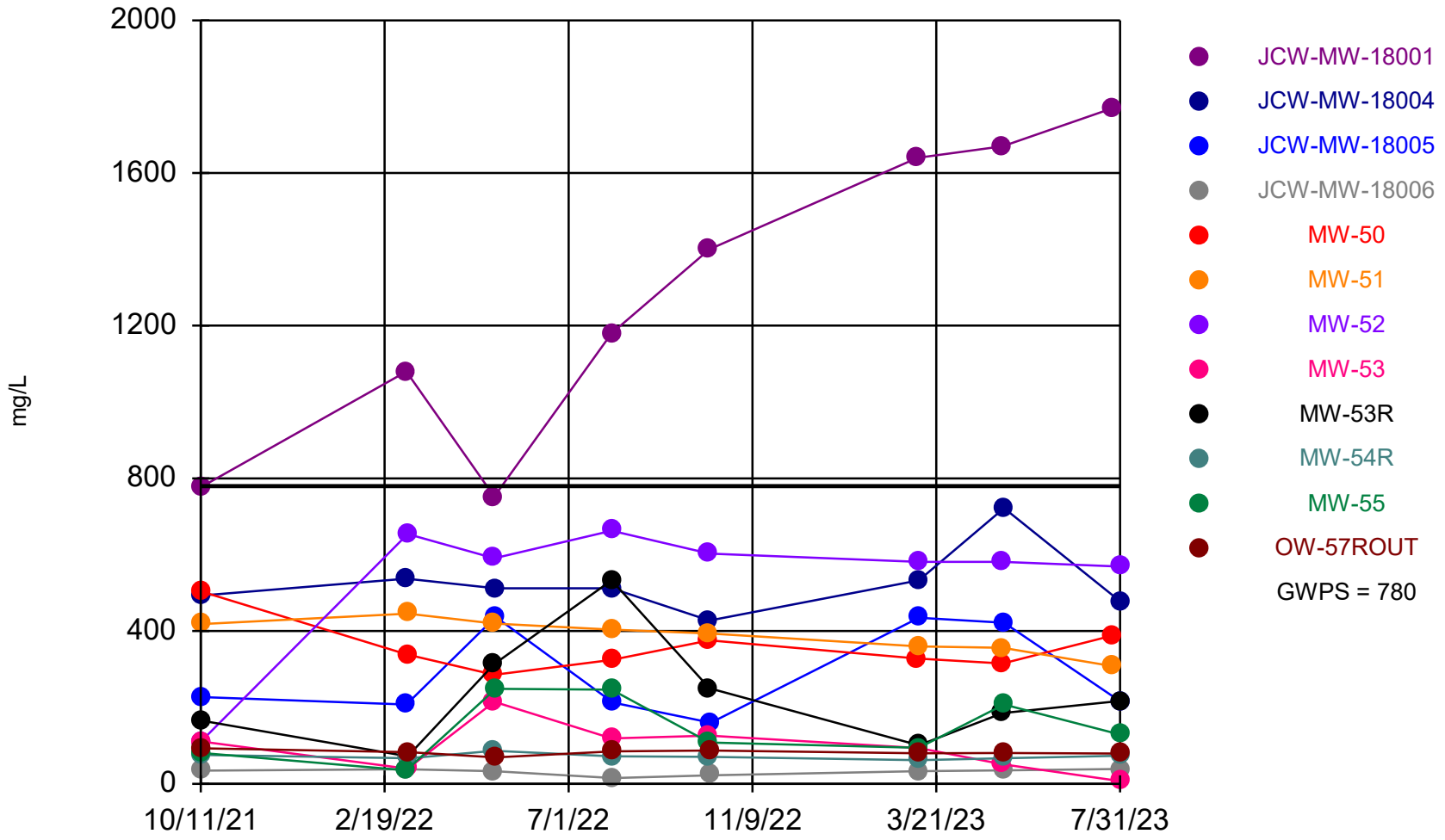
Iron Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:52 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sulfate Comparison to GWPS



Time Series Analysis Run 9/5/2023 12:53 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

Constituent: Sulfate Analysis Run 9/5/2023 12:54 PM
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

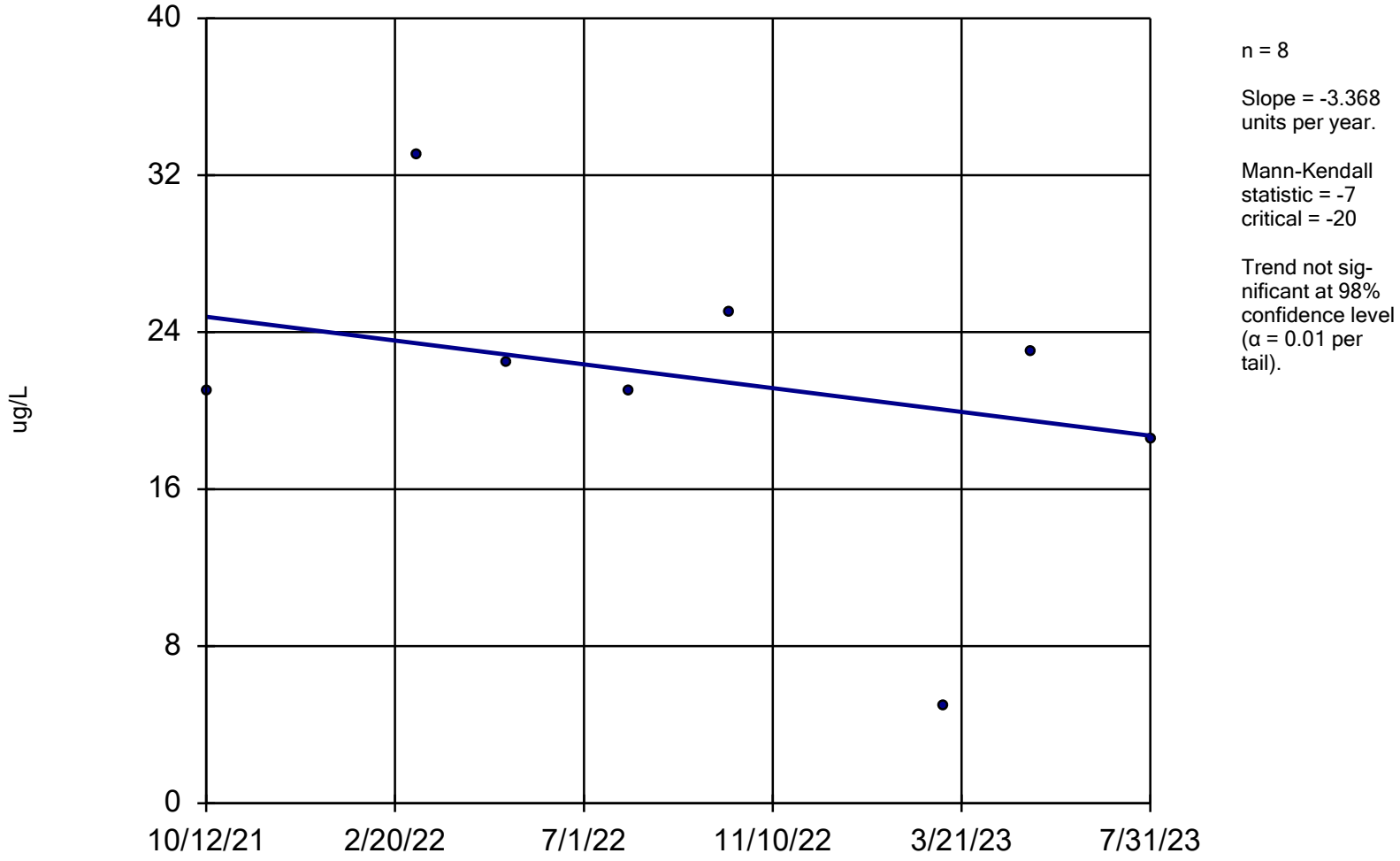
For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

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	Min	Max	Mean	Median	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

Arsenic, Total

JCW-MW-18006



n = 8

Slope = -3.368 units per year.

Mann-Kendall statistic = -7
critical = -20

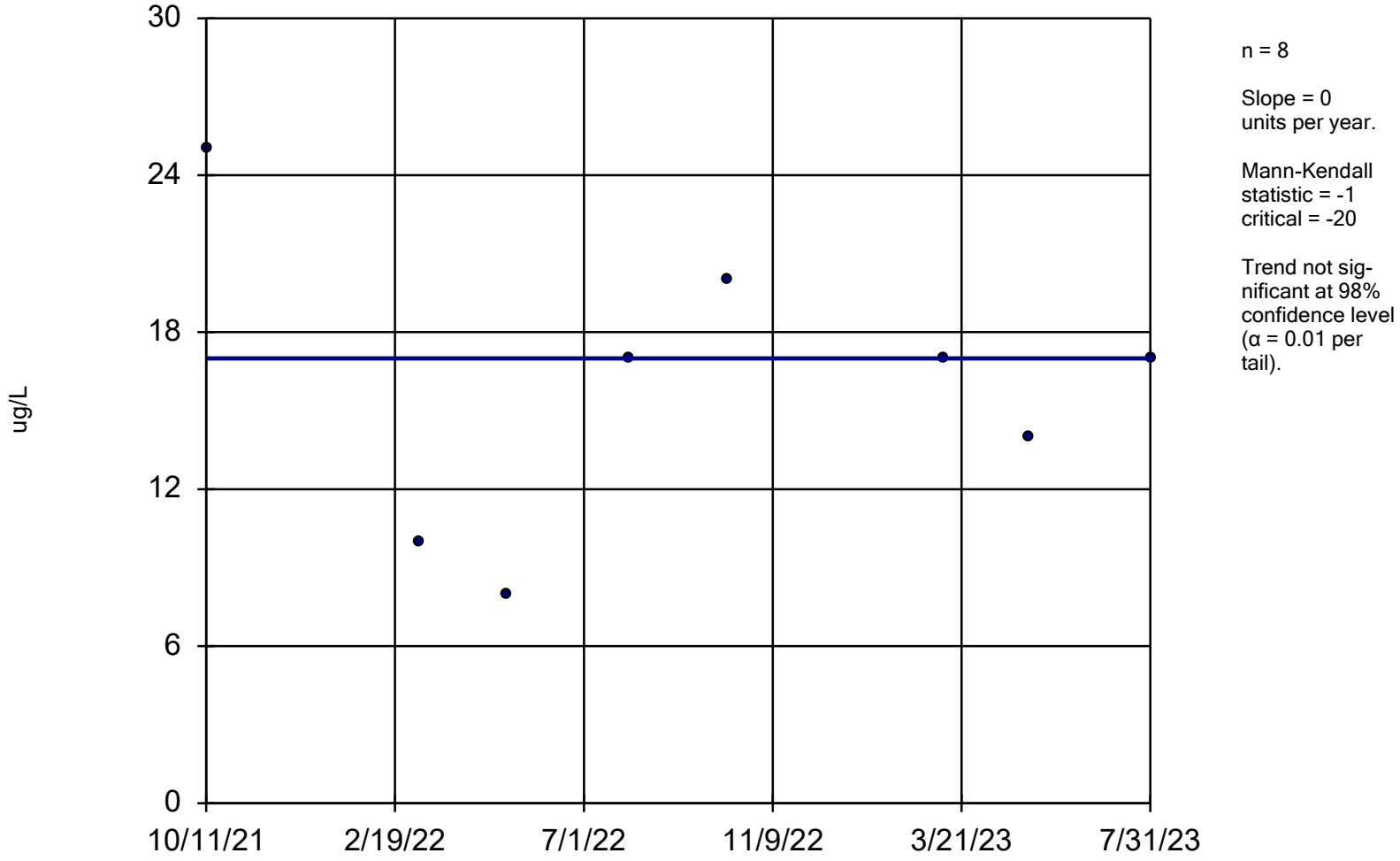
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Arsenic, Total

MW-53R



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = -1
critical = -20

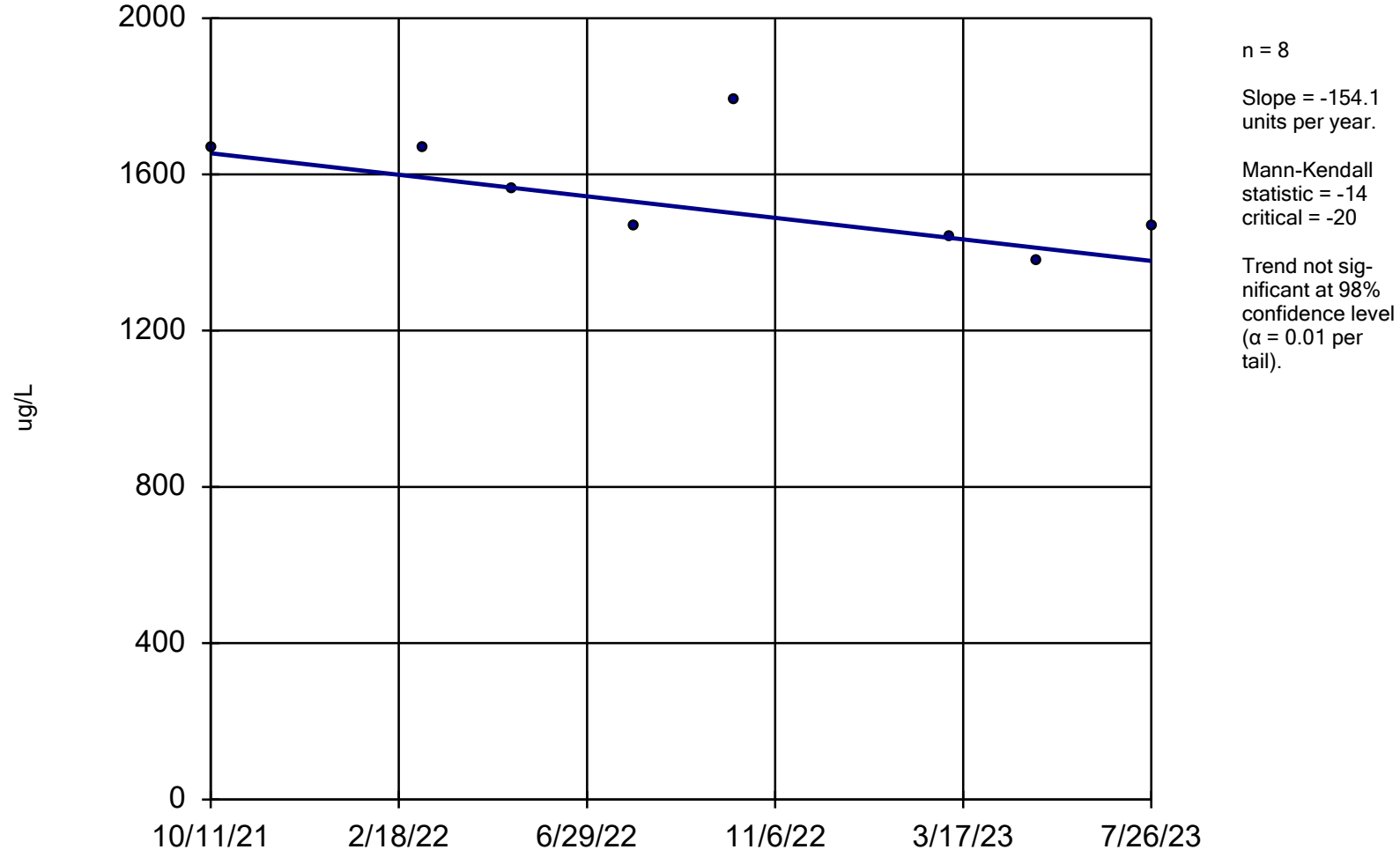
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

JCW-MW-18001



n = 8

Slope = -154.1 units per year.

Mann-Kendall statistic = -14
critical = -20

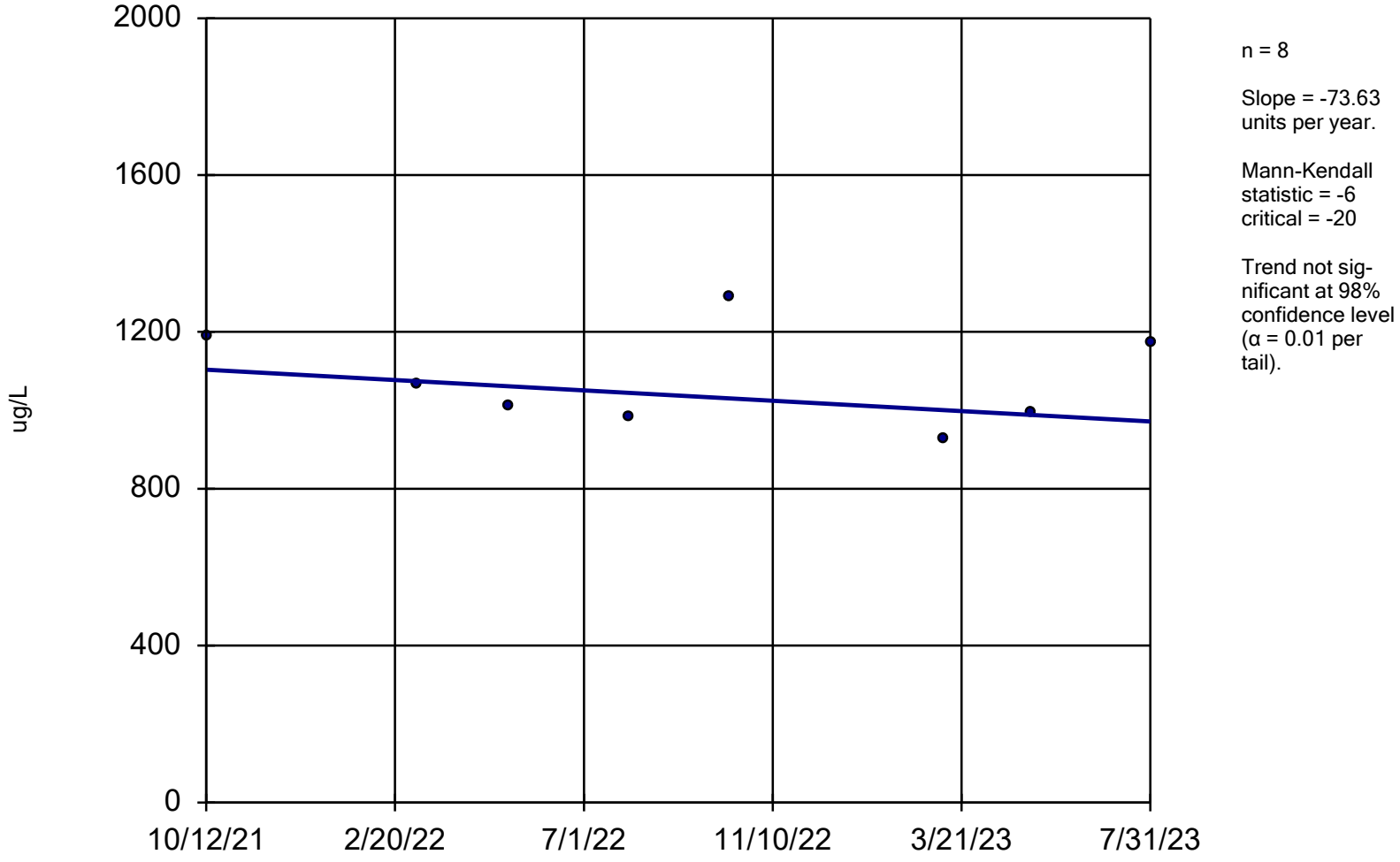
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

JCW-MW-18005



n = 8

Slope = -73.63 units per year.

Mann-Kendall statistic = -6
critical = -20

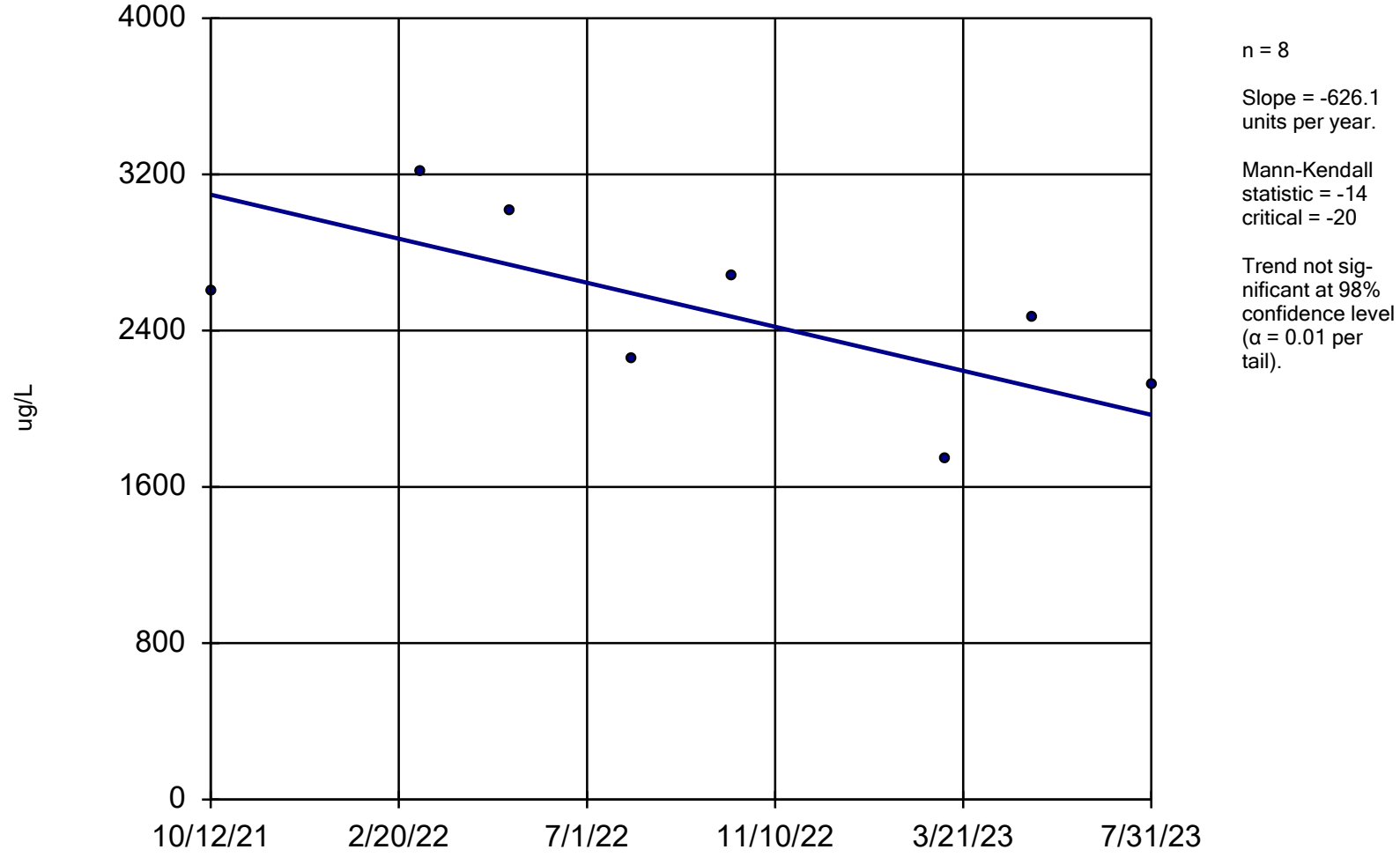
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

JCW-MW-18006



n = 8

Slope = -626.1 units per year.

Mann-Kendall statistic = -14
critical = -20

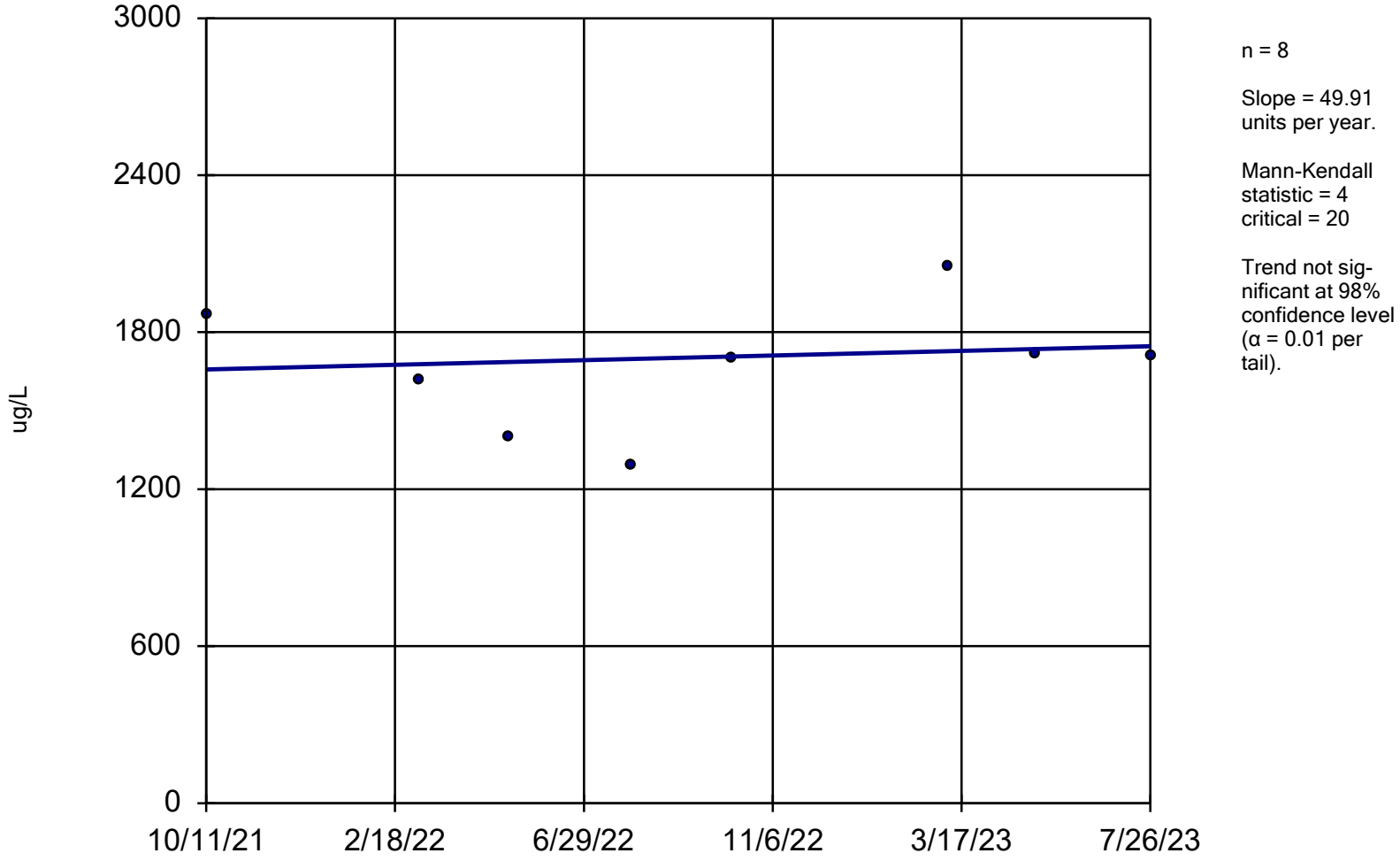
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-50



n = 8

Slope = 49.91 units per year.

Mann-Kendall statistic = 4
critical = 20

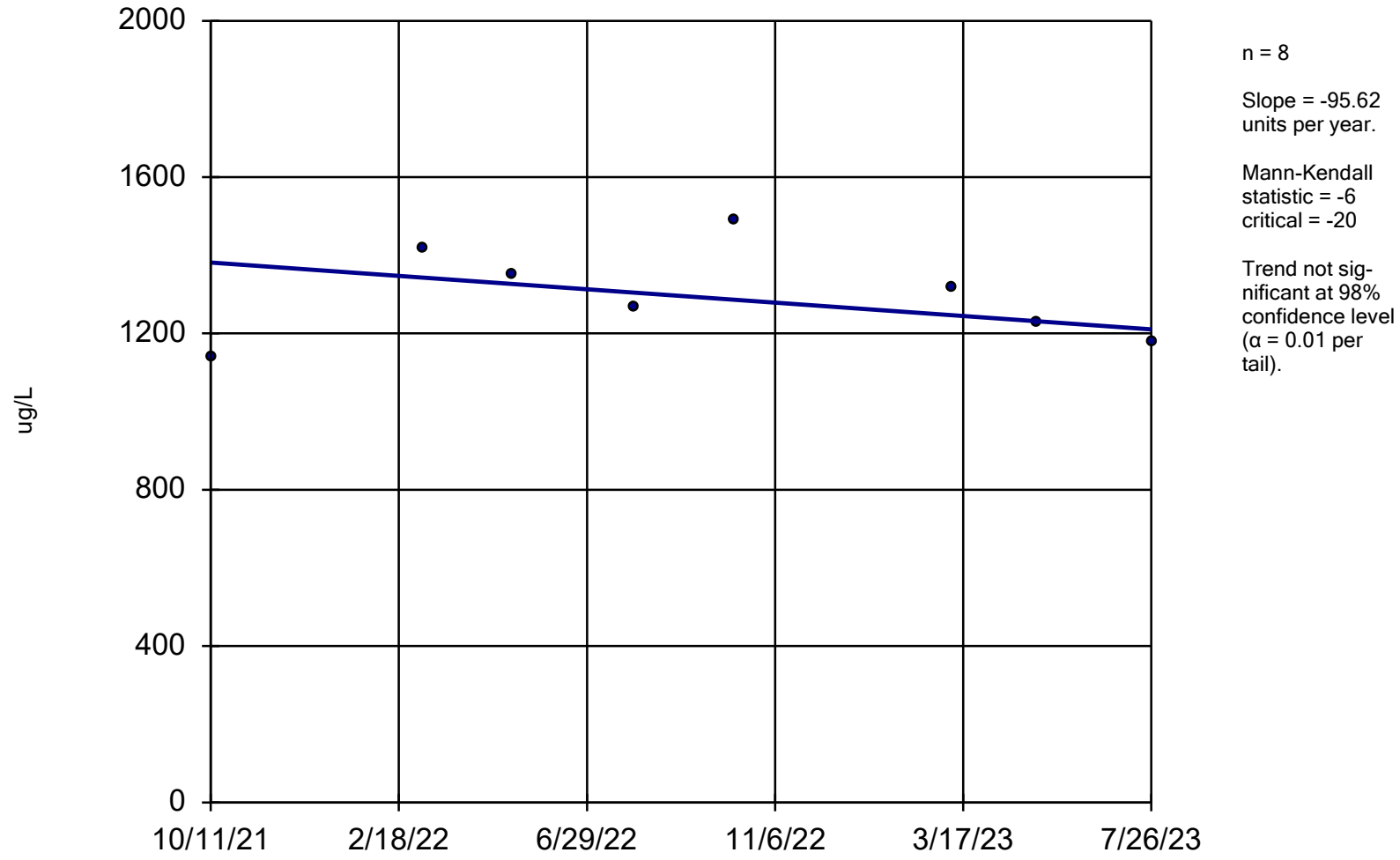
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-51



n = 8

Slope = -95.62 units per year.

Mann-Kendall statistic = -6
critical = -20

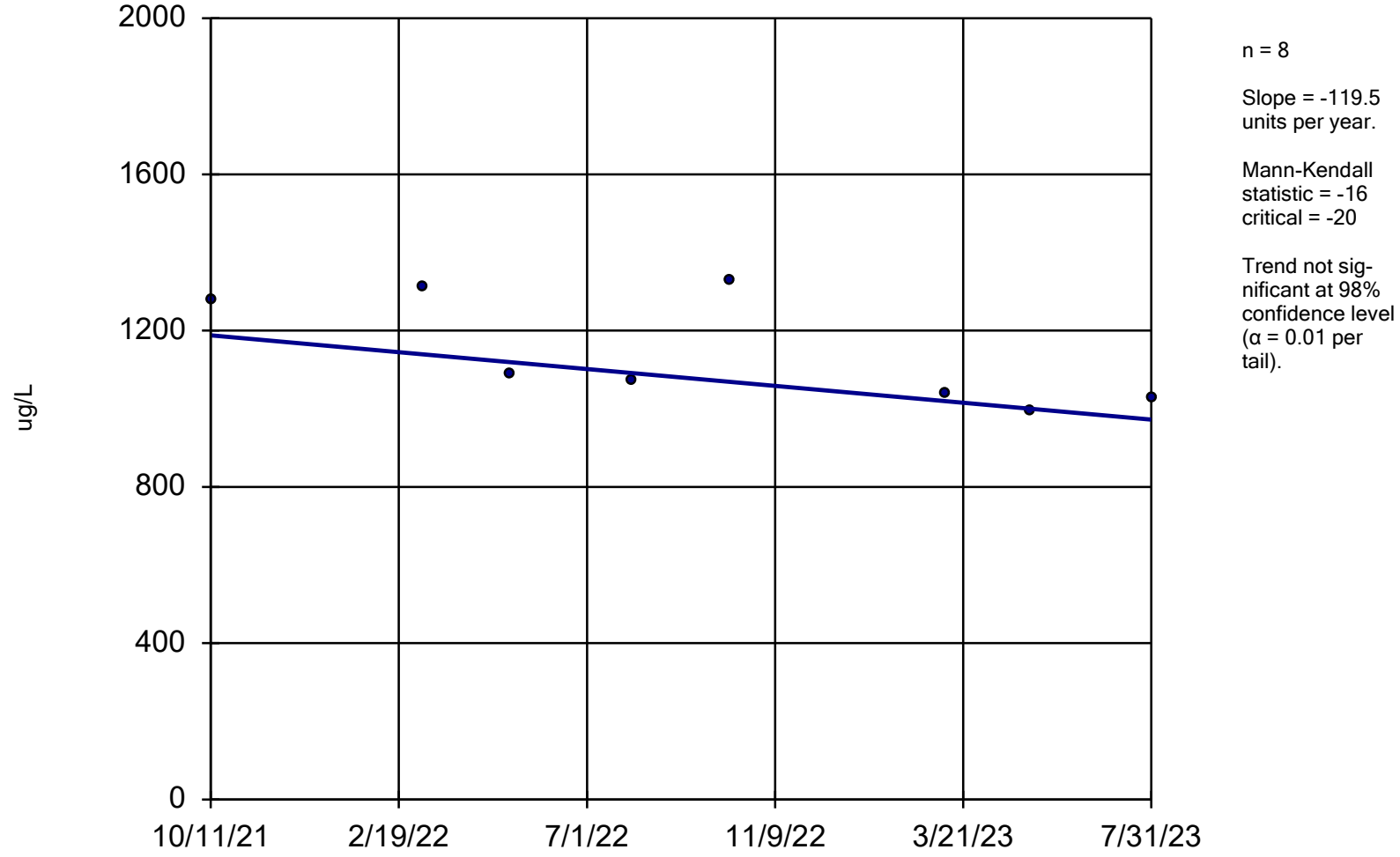
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-52



n = 8

Slope = -119.5 units per year.

Mann-Kendall statistic = -16
critical = -20

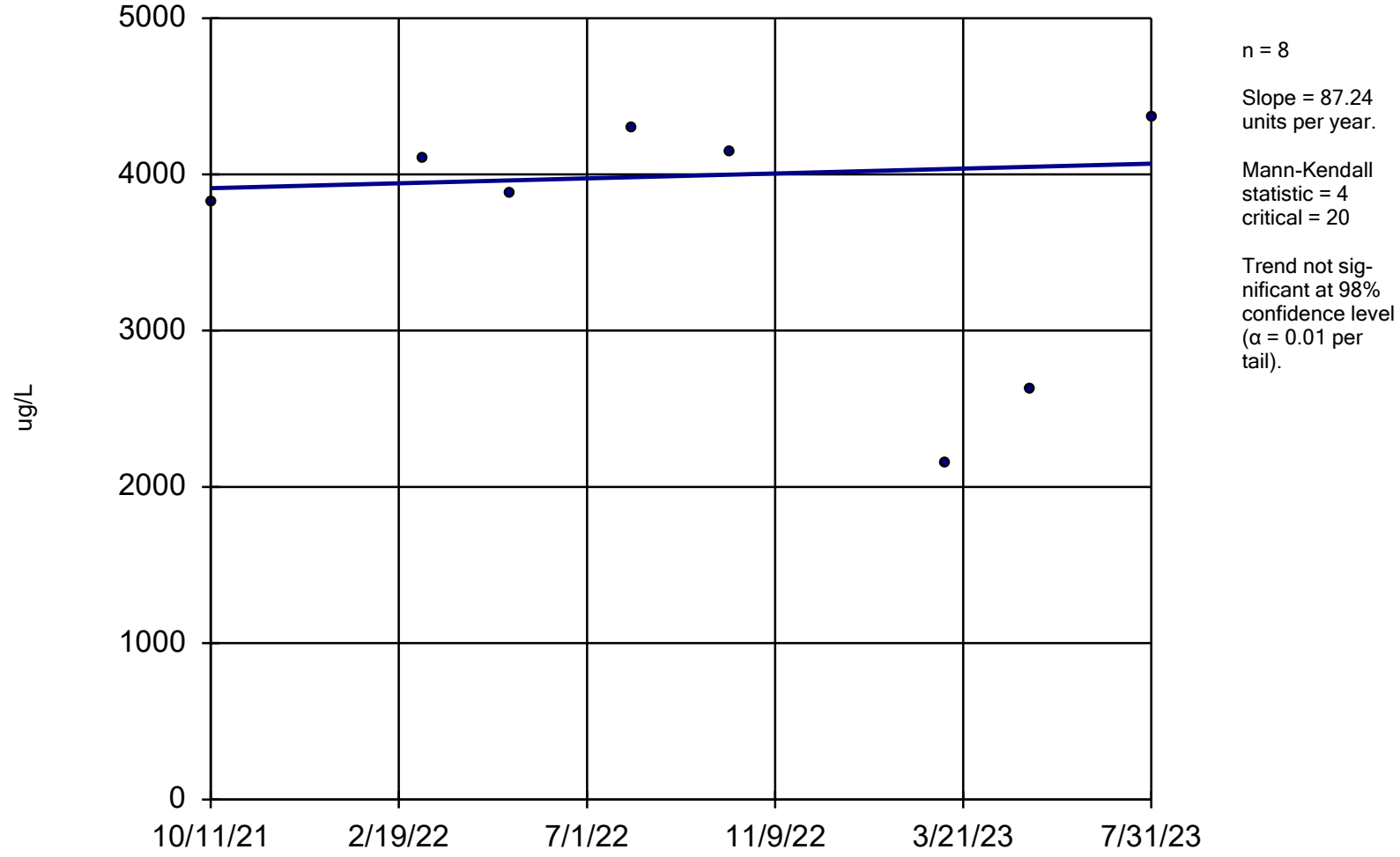
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-53



n = 8

Slope = 87.24 units per year.

Mann-Kendall statistic = 4
critical = 20

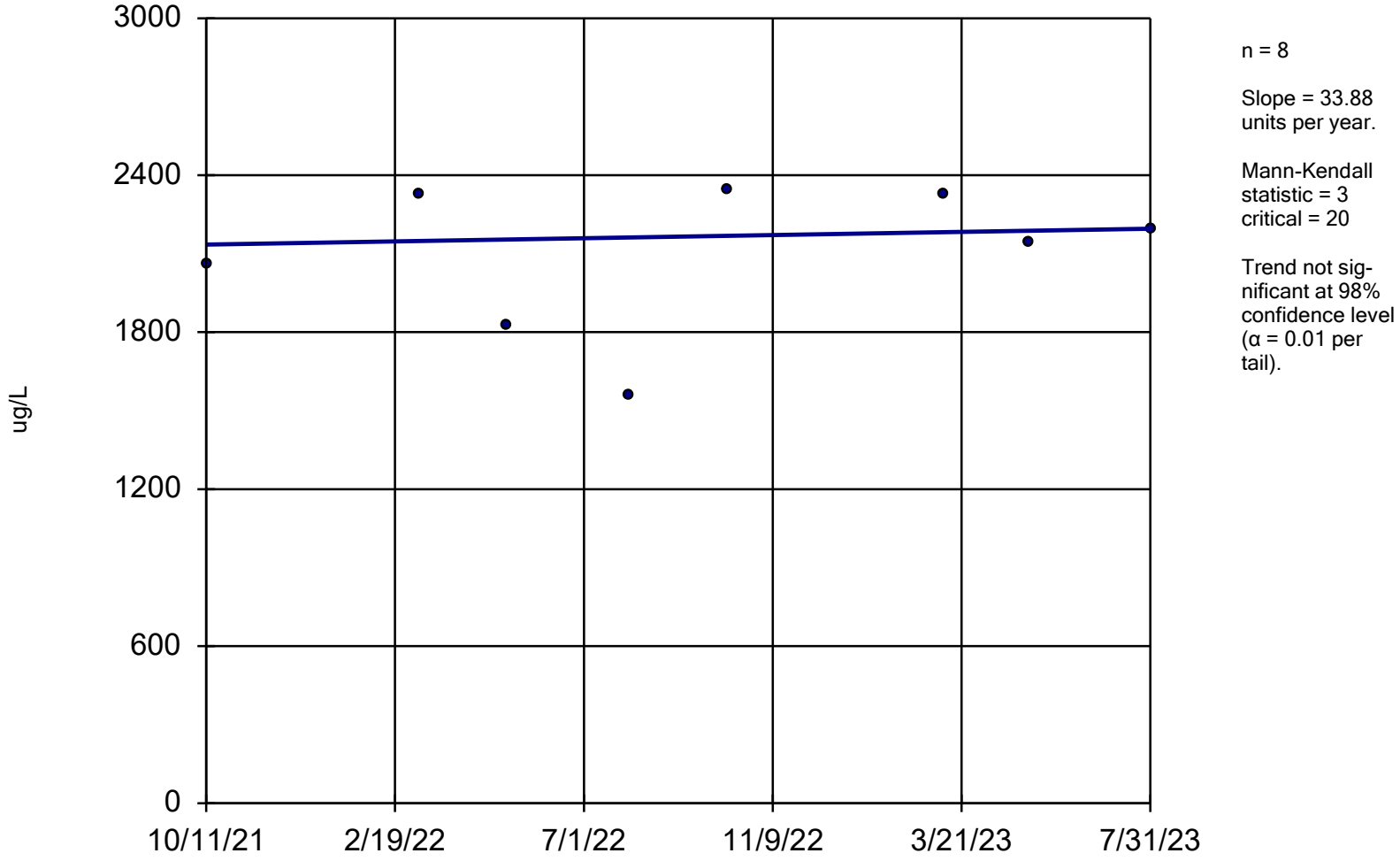
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-53R



n = 8

Slope = 33.88 units per year.

Mann-Kendall statistic = 3
critical = 20

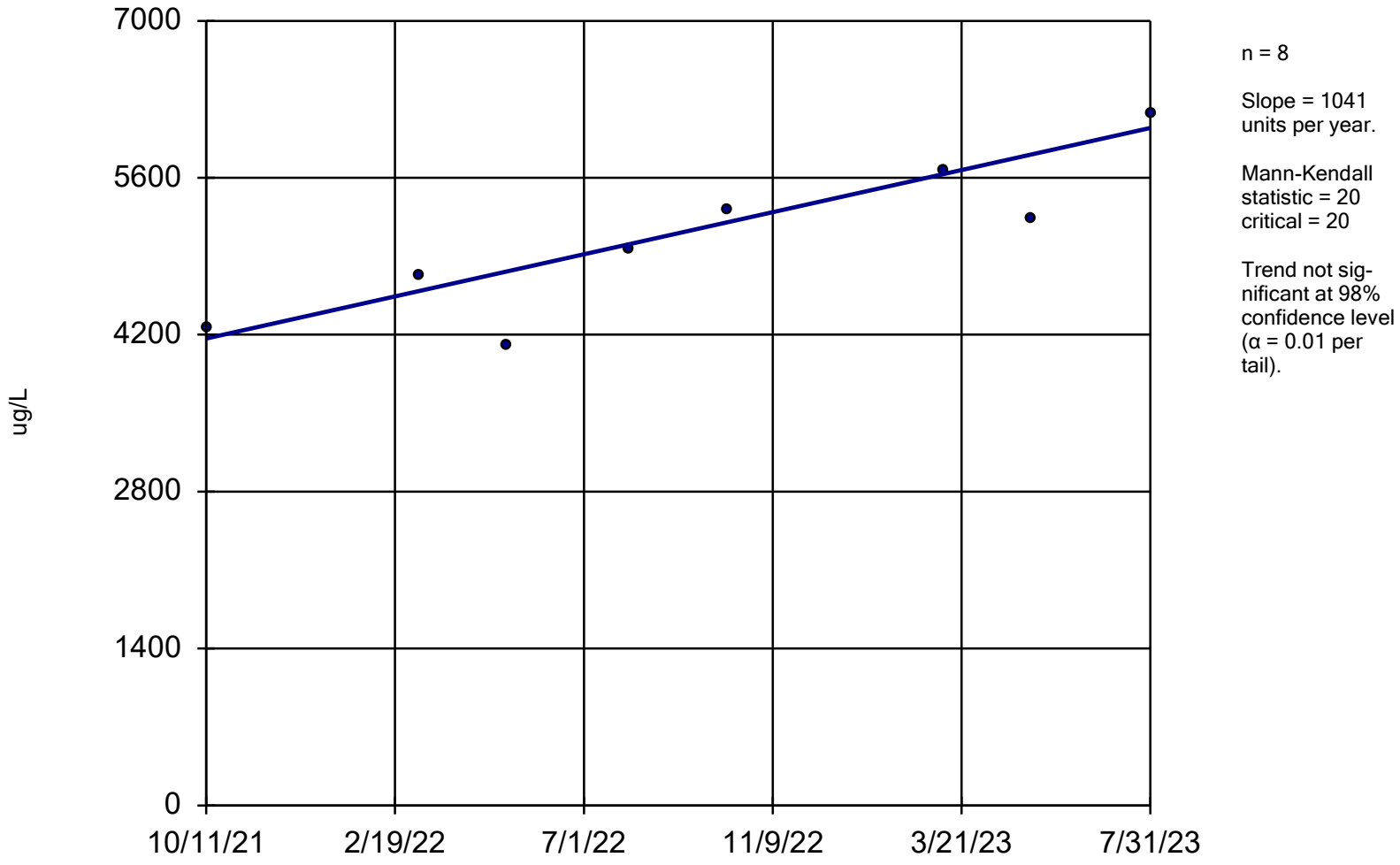
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-54R



n = 8

Slope = 1041 units per year.

Mann-Kendall statistic = 20
critical = 20

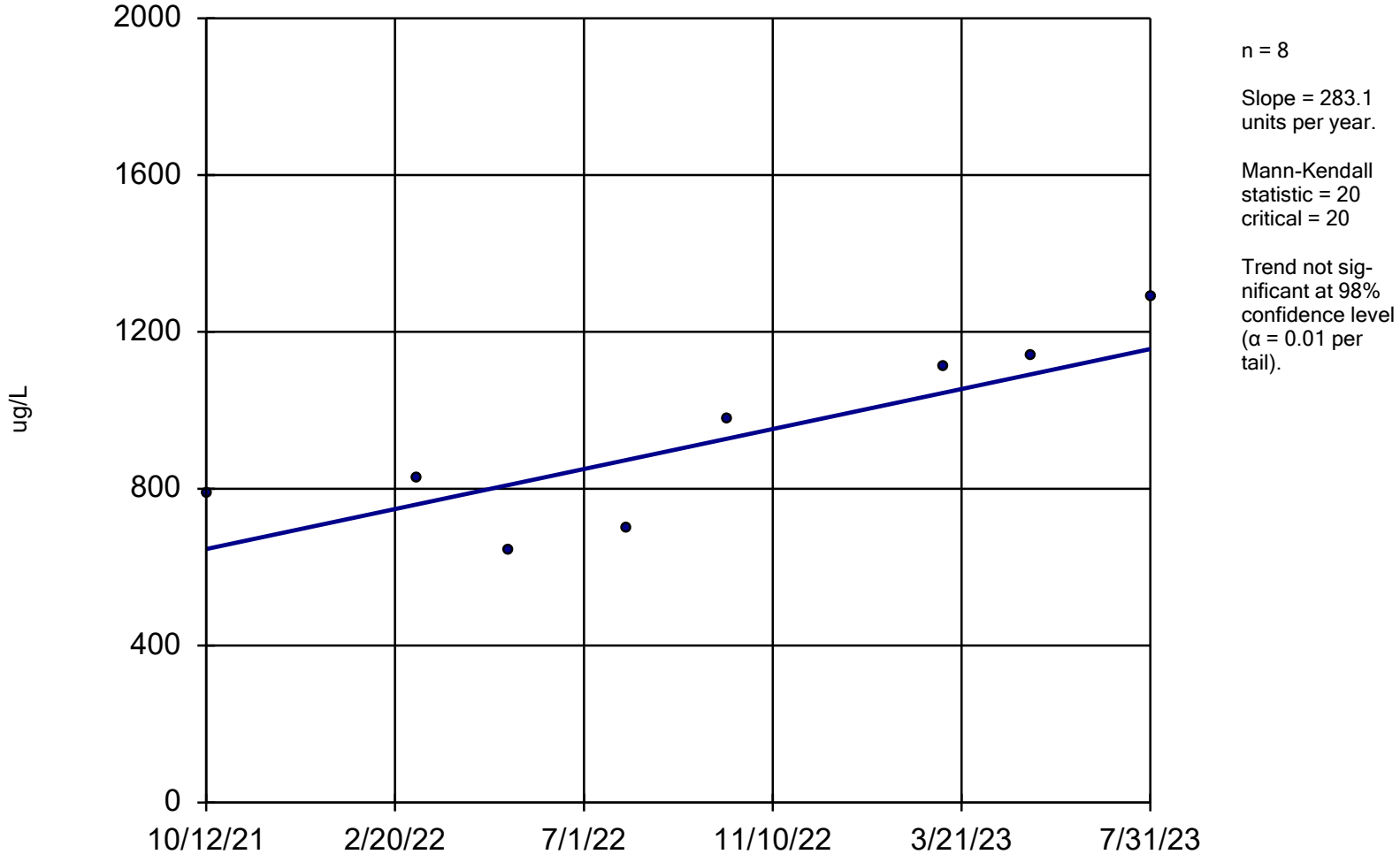
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

MW-55



n = 8

Slope = 283.1 units per year.

Mann-Kendall statistic = 20
critical = 20

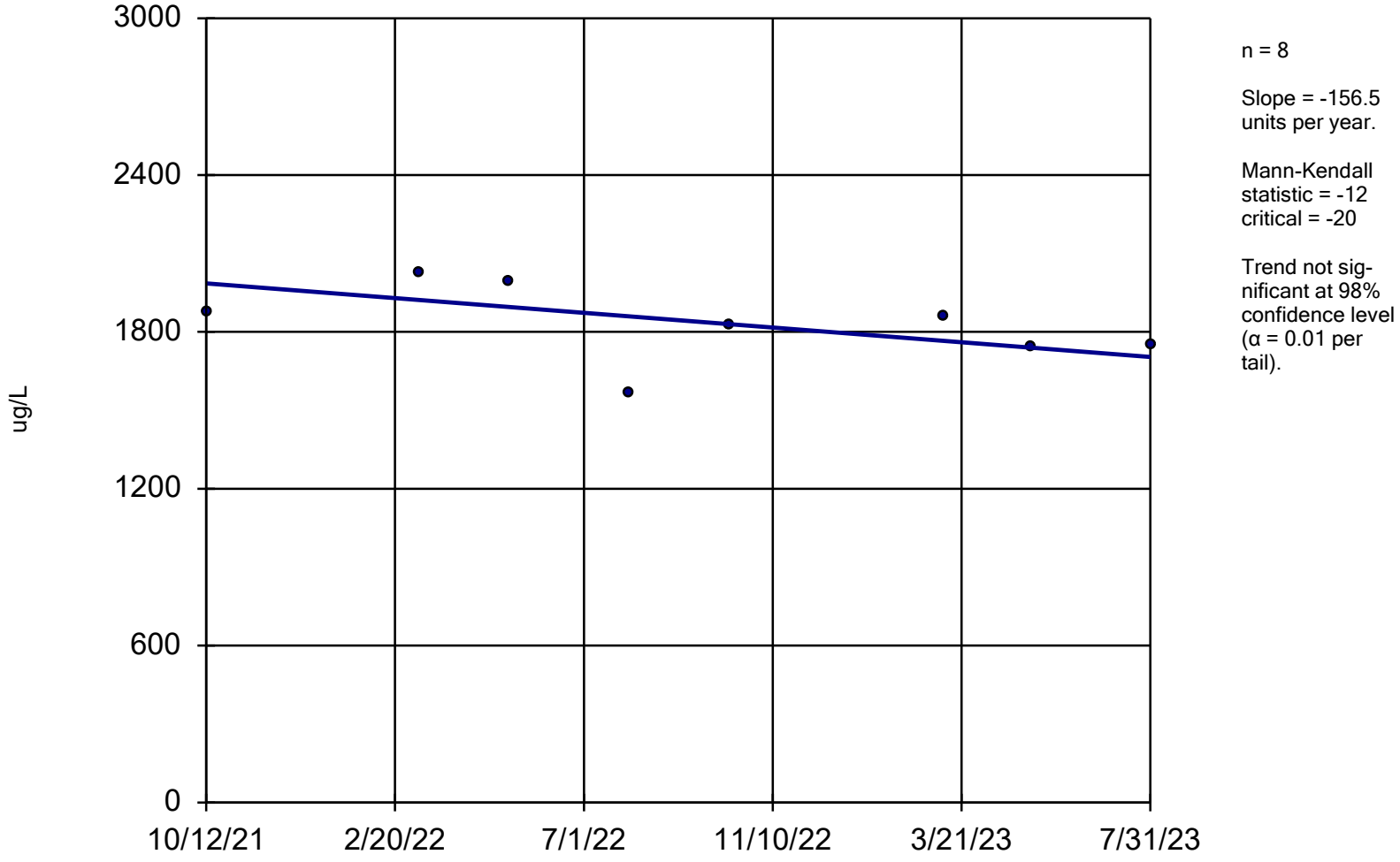
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Boron, Total

OW-57ROUT



n = 8

Slope = -156.5 units per year.

Mann-Kendall statistic = -12 critical = -20

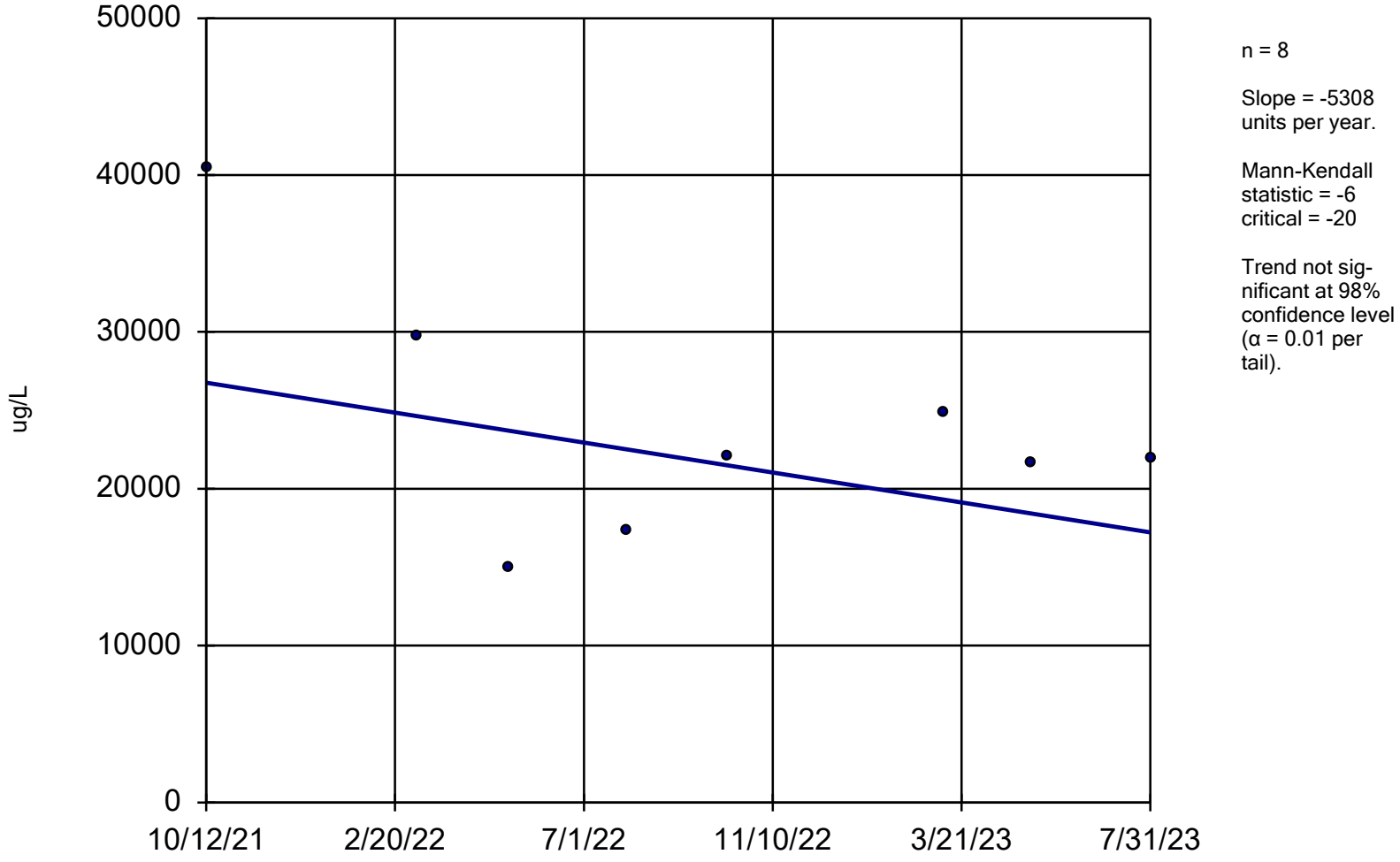
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Iron, Total

MW-55



n = 8

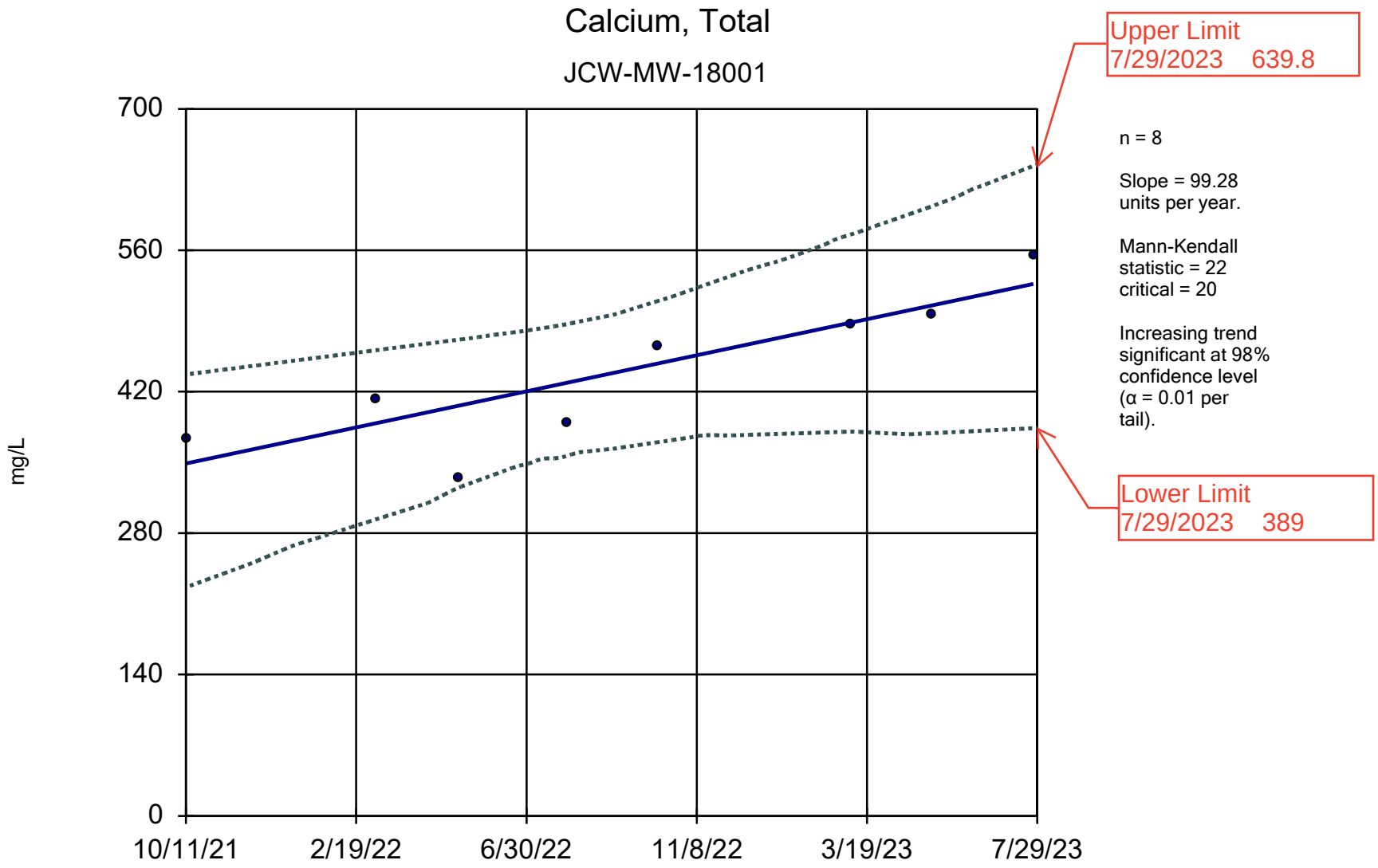
Slope = -5308 units per year.

Mann-Kendall statistic = -6
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:05 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

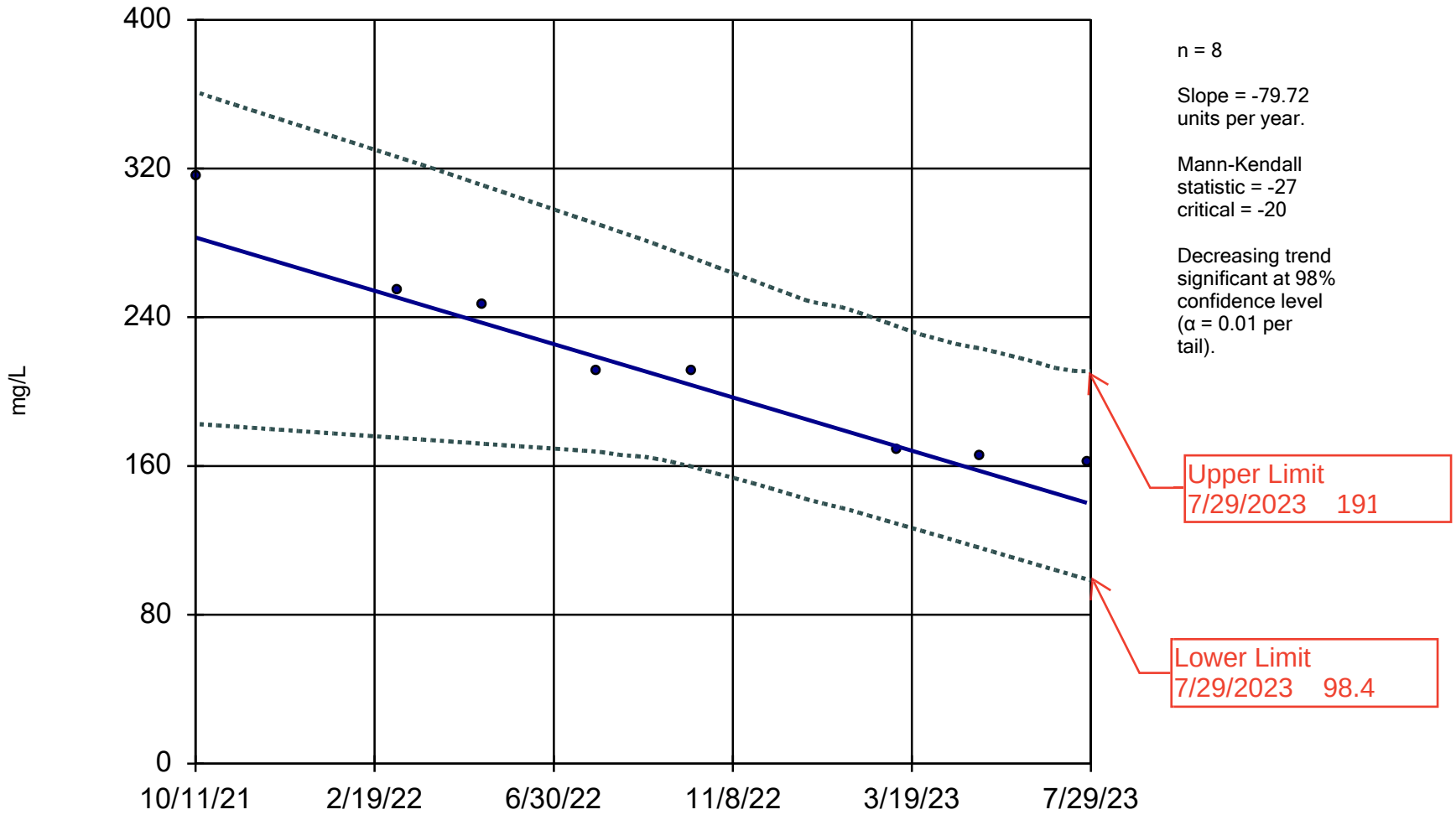


Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Calcium, Total

MW-51

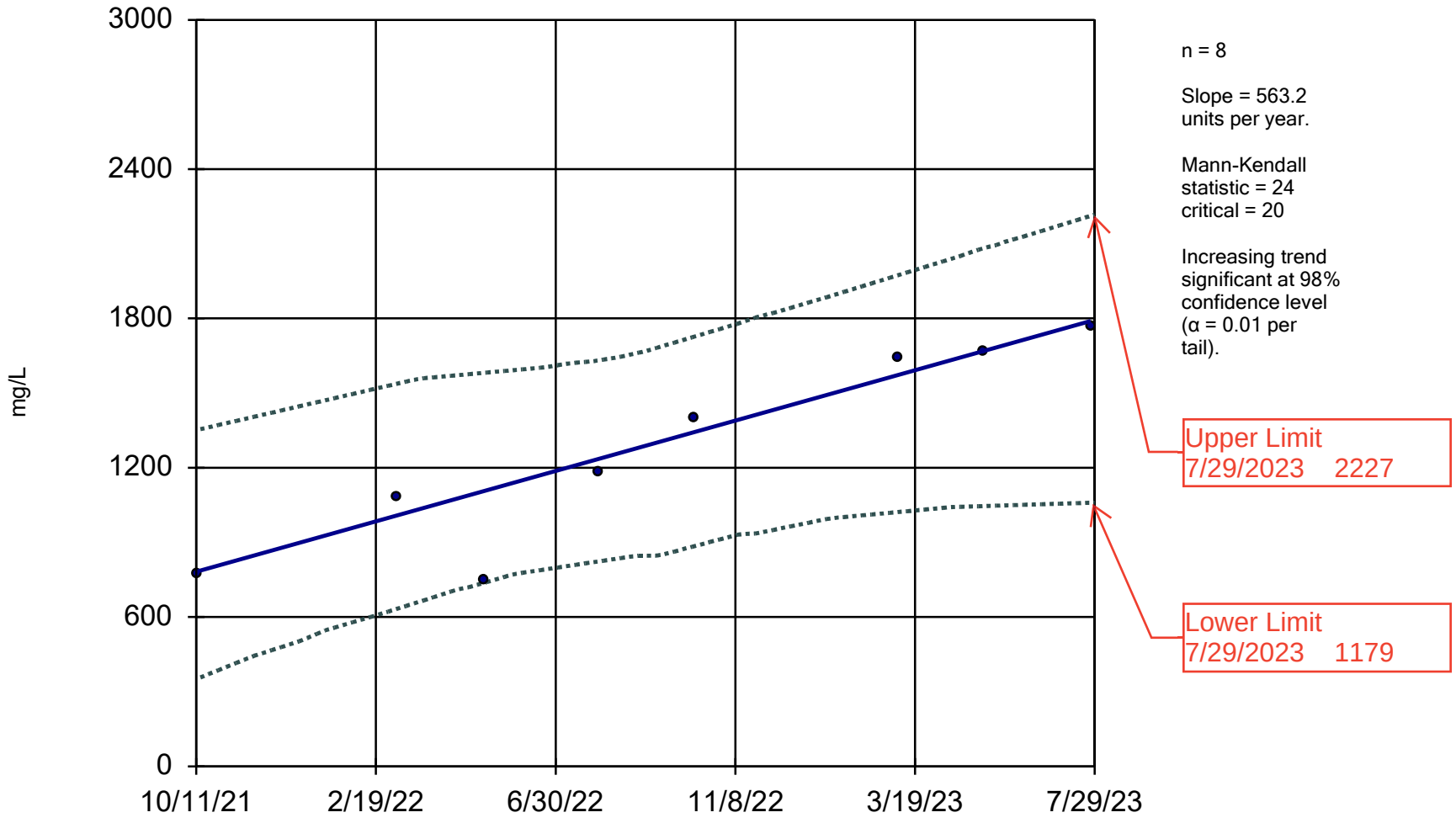


Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Sulfate

JCW-MW-18001

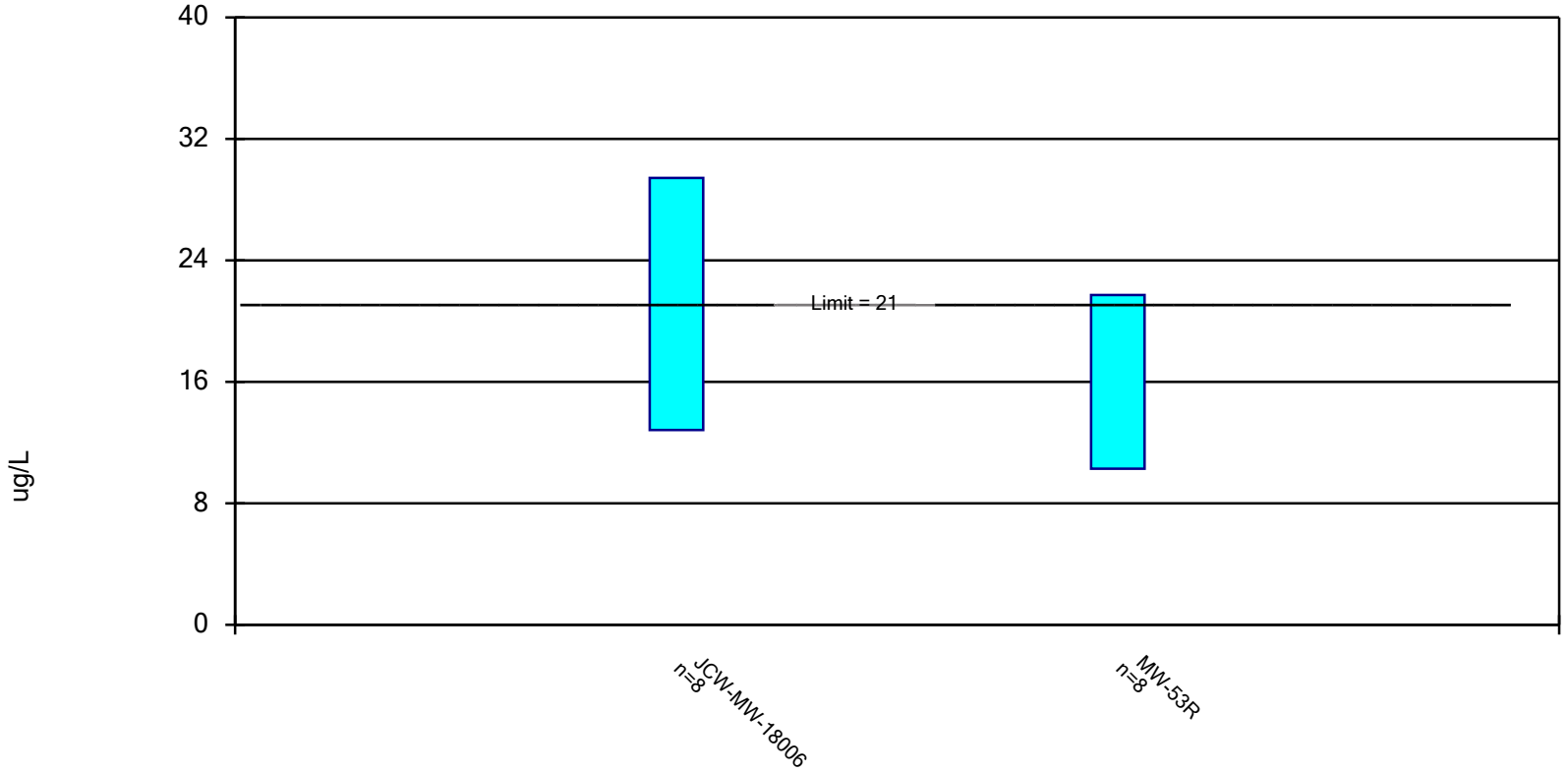


Sen's Slope and 98% Confidence Band Analysis Run 9/5/2023 12:57 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

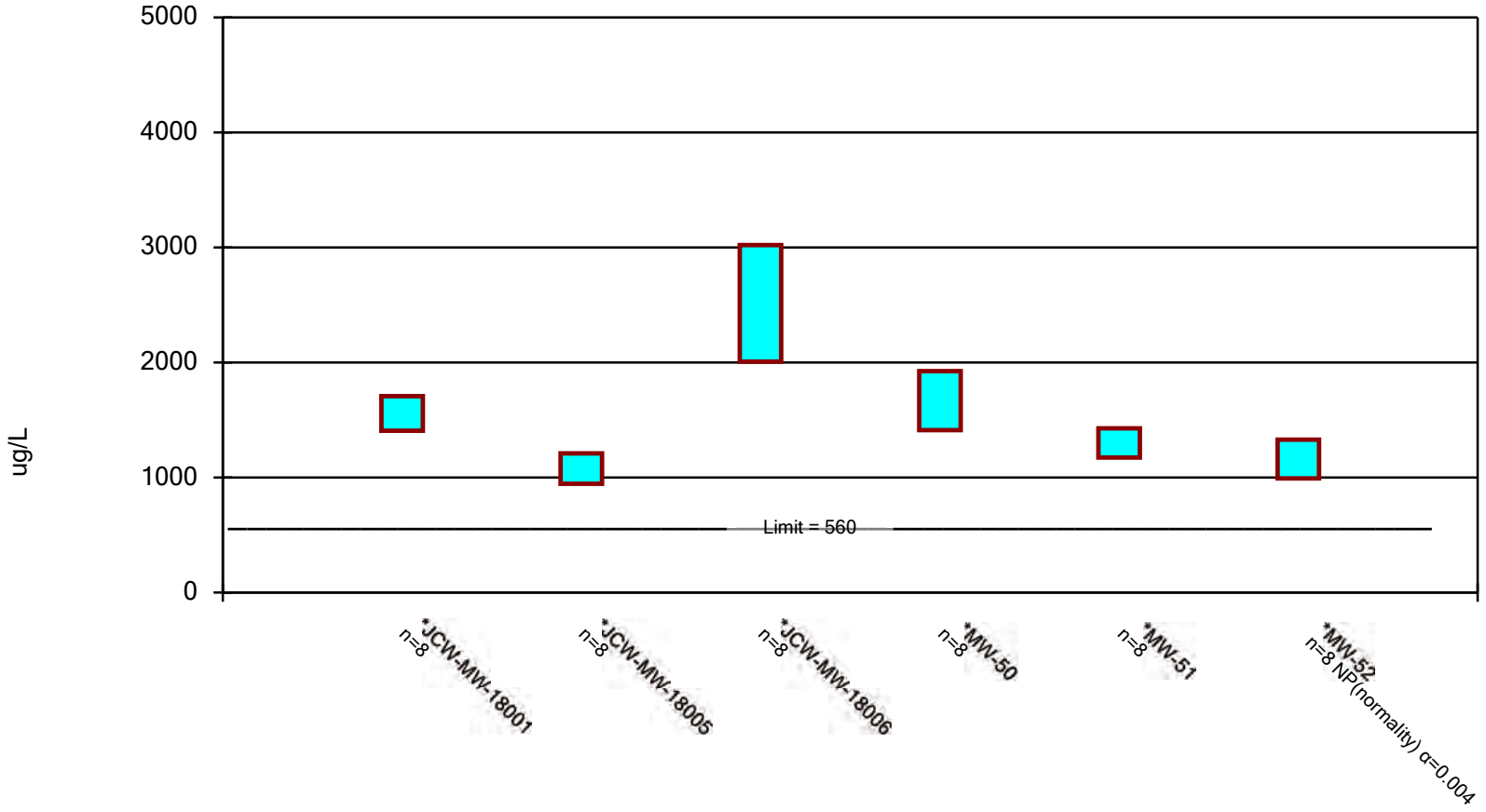
Constituent: Arsenic, Total (ug/L) Analysis Run 9/5/2023 1:08 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

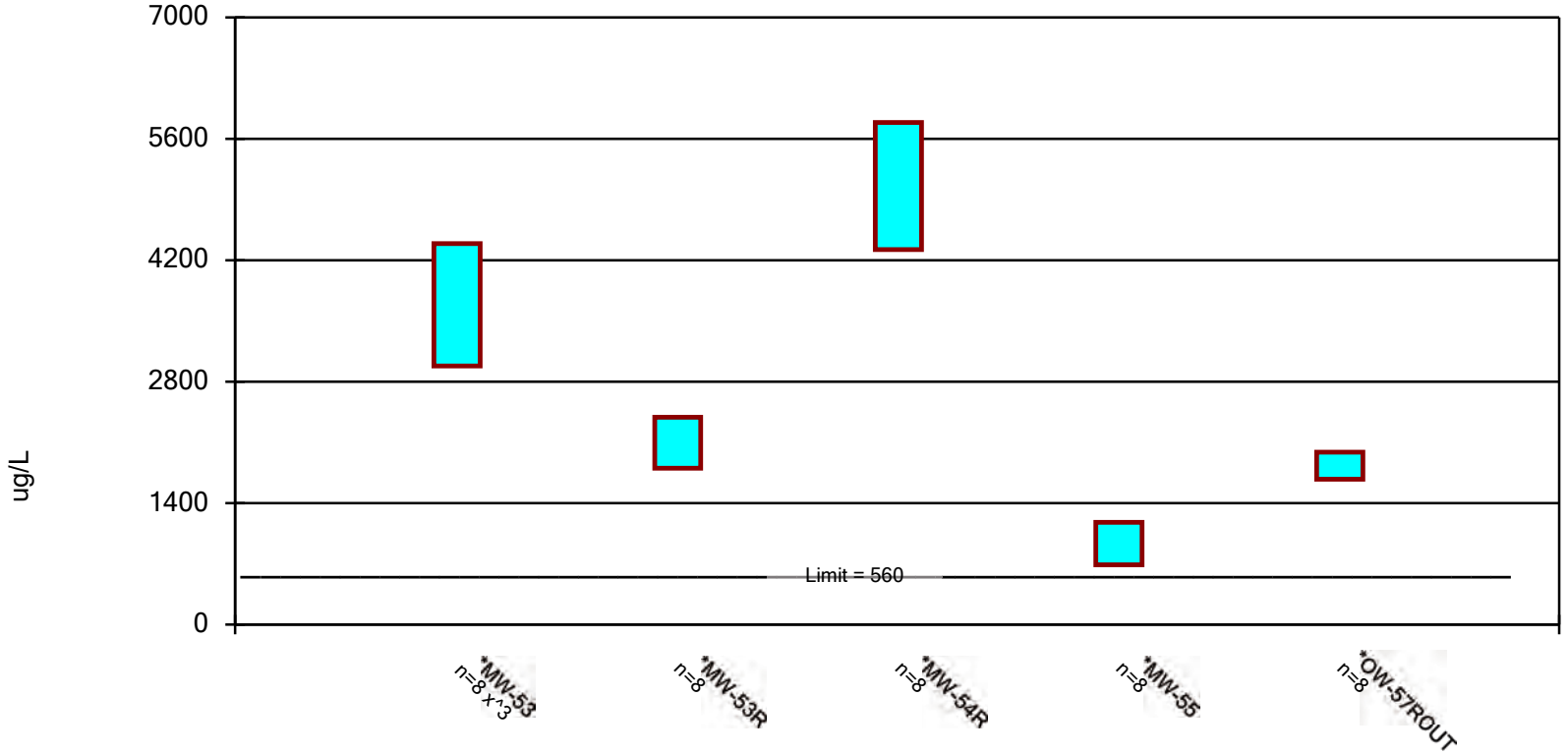
Constituent: Boron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM

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

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

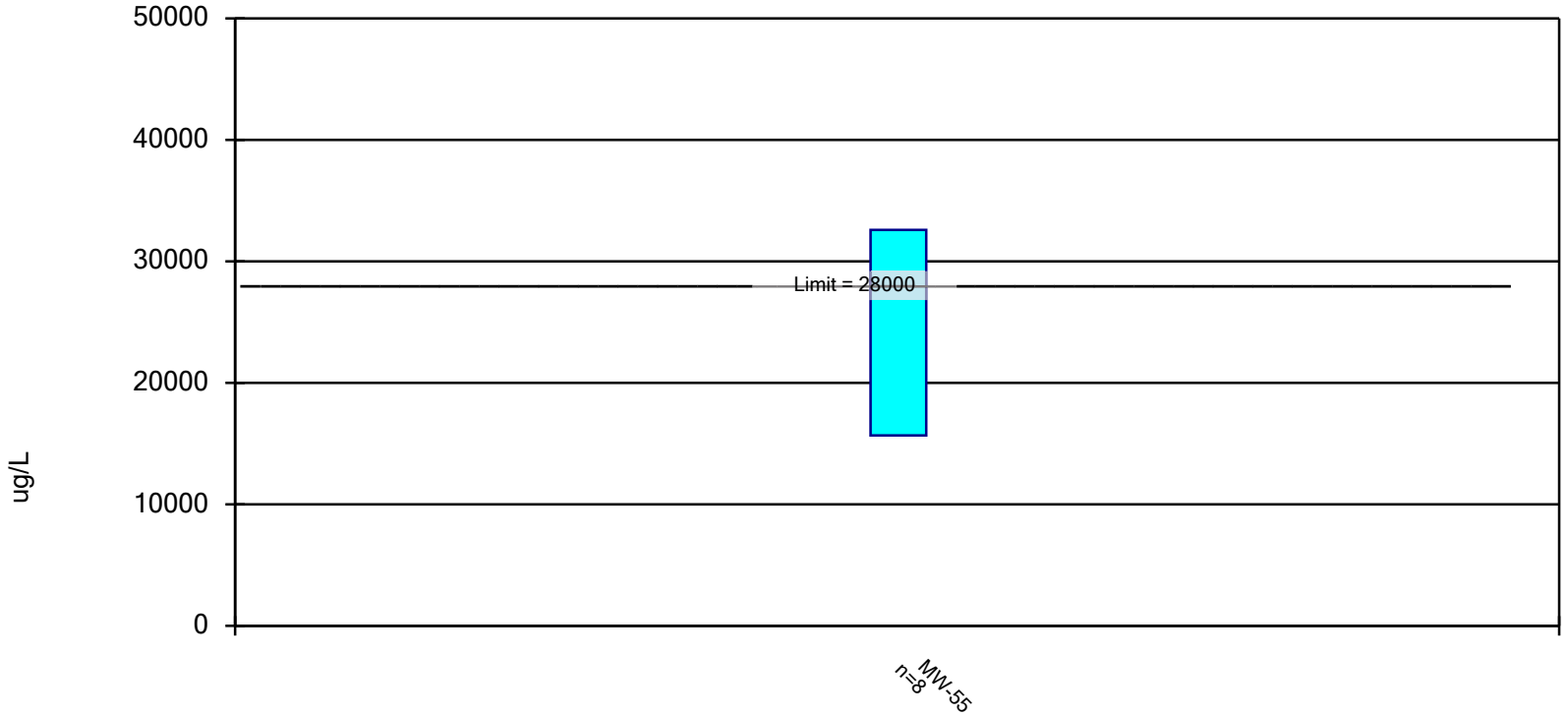
Constituent: Boron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

Constituent: Iron, Total (ug/L) Analysis Run 9/5/2023 1:08 PM

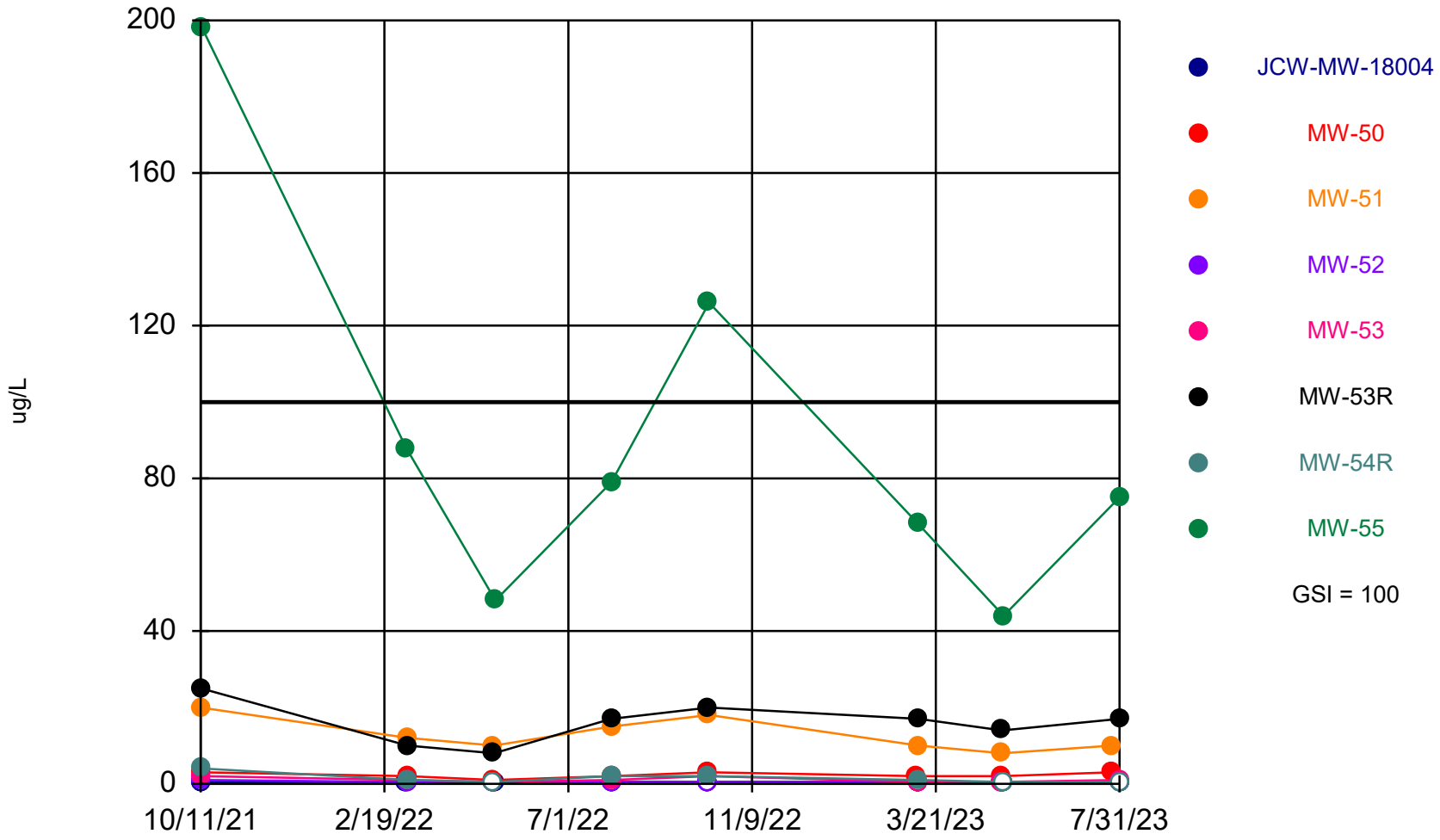
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

	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

Hollow symbols indicate censored values.

Arsenic Comparison to GSI

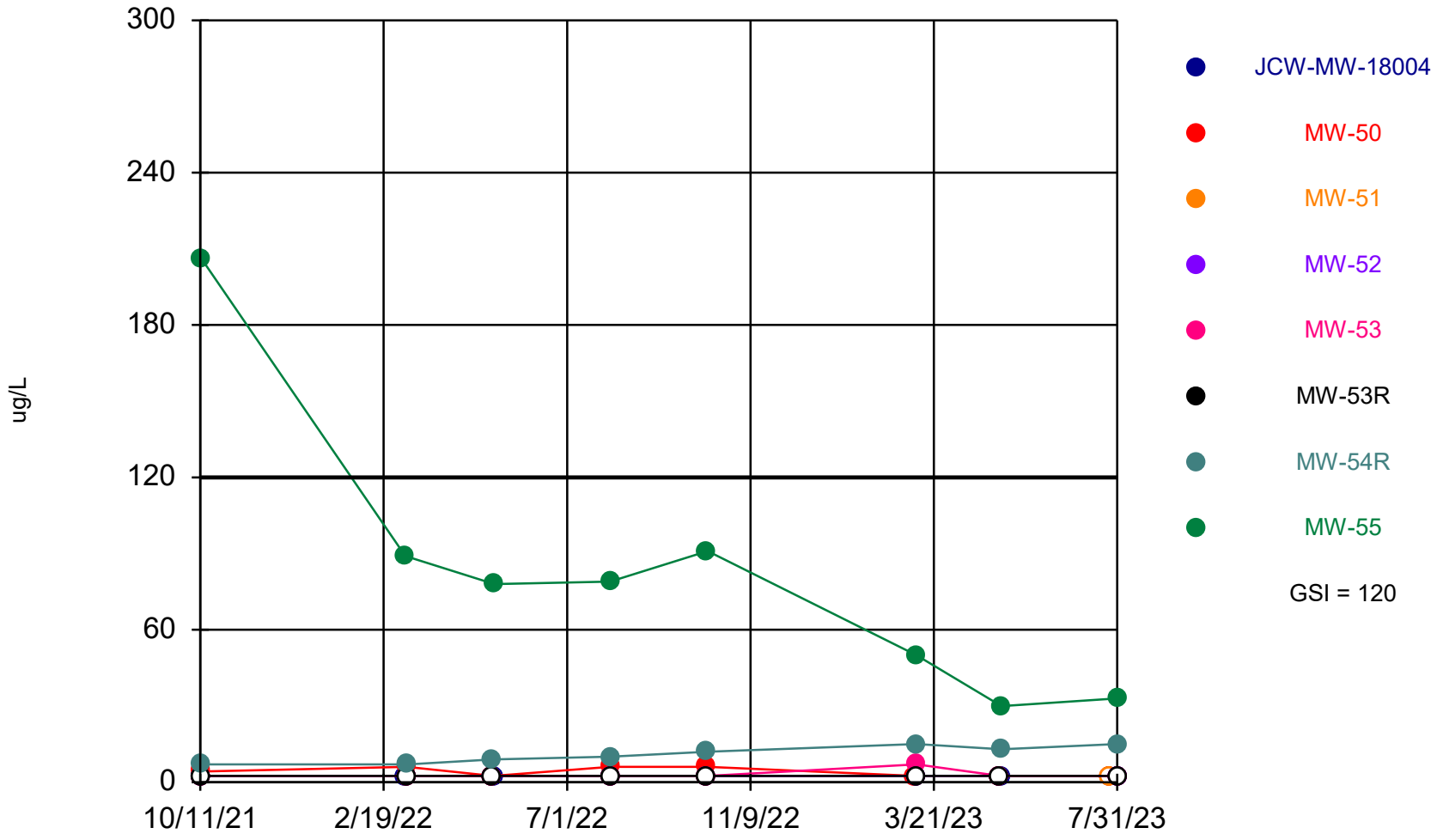


Time Series Analysis Run 9/5/2023 1:35 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Hollow symbols indicate censored values.

Molybdenum Comparison to GSI



Time Series Analysis Run 9/5/2023 1:35 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

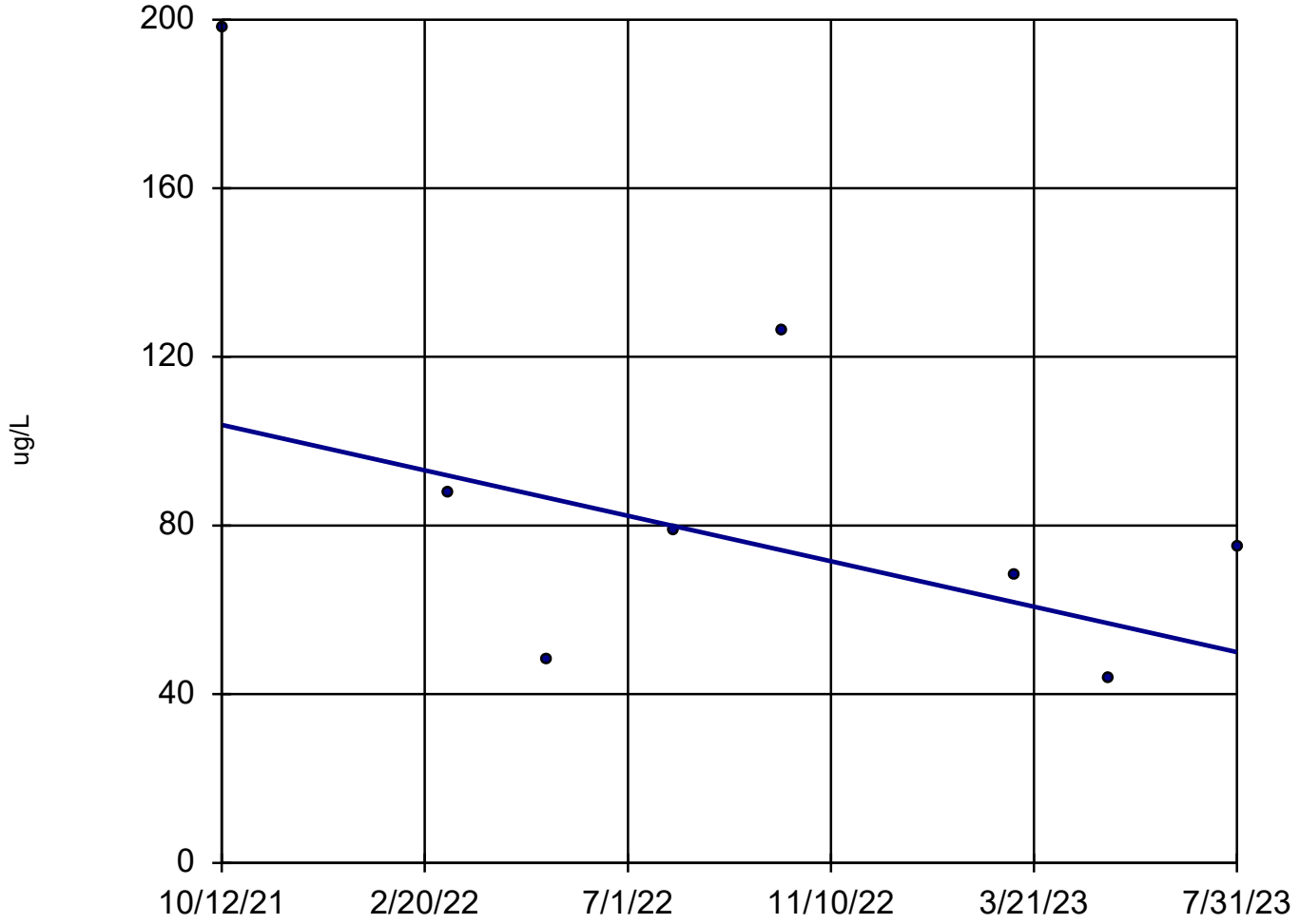
For observations made between 10/11/2021 and 7/31/2023, a summary of the selected data set:

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

Well	#Obs.	ND/Trace	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Arsenic, Total

MW-55



n = 8

Slope = -29.94 units per year.

Mann-Kendall statistic = -12
critical = -20

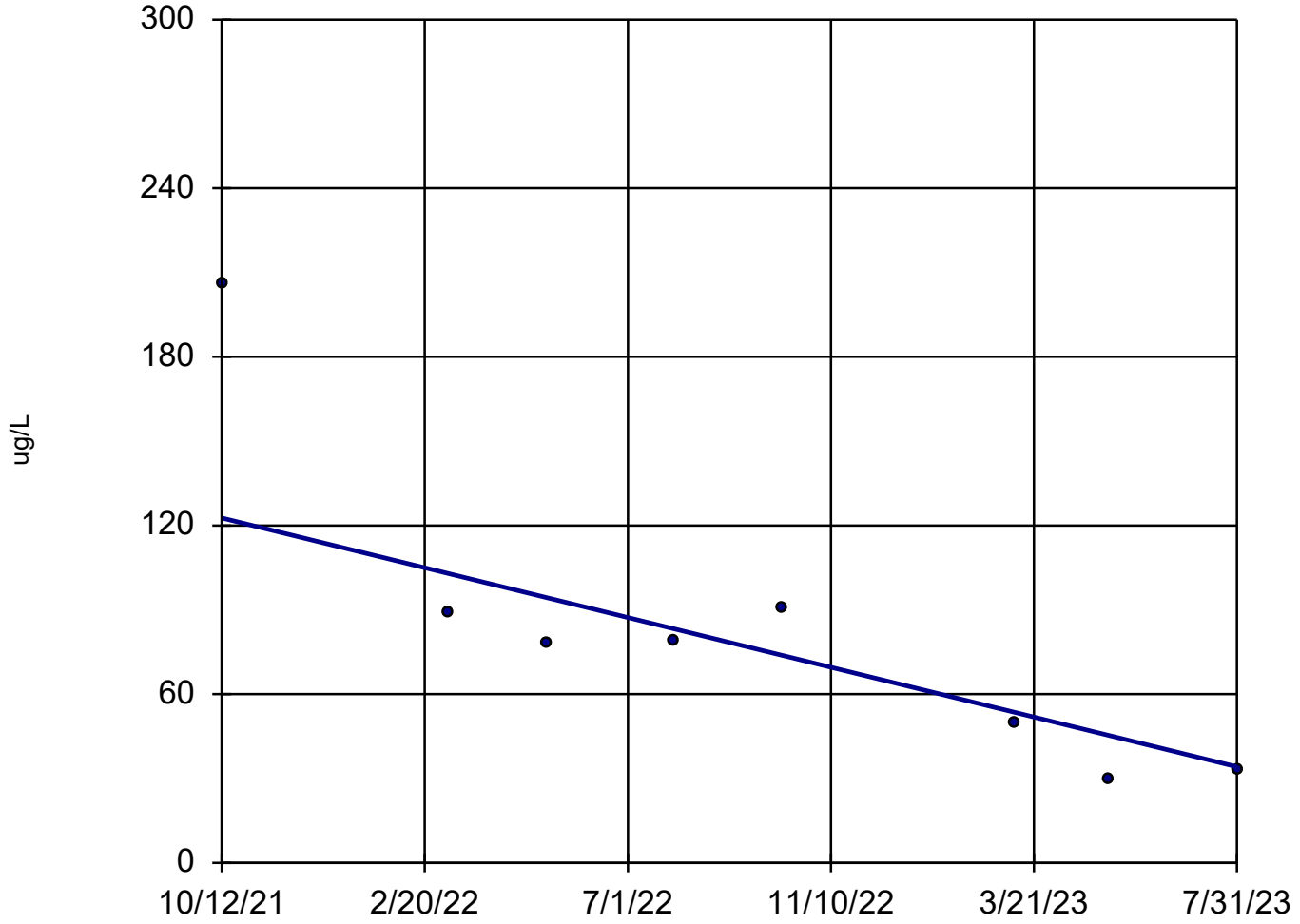
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:38 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Molybdenum, Total

MW-55



n = 8

Slope = -49.22 units per year.

Mann-Kendall statistic = -18
critical = -20

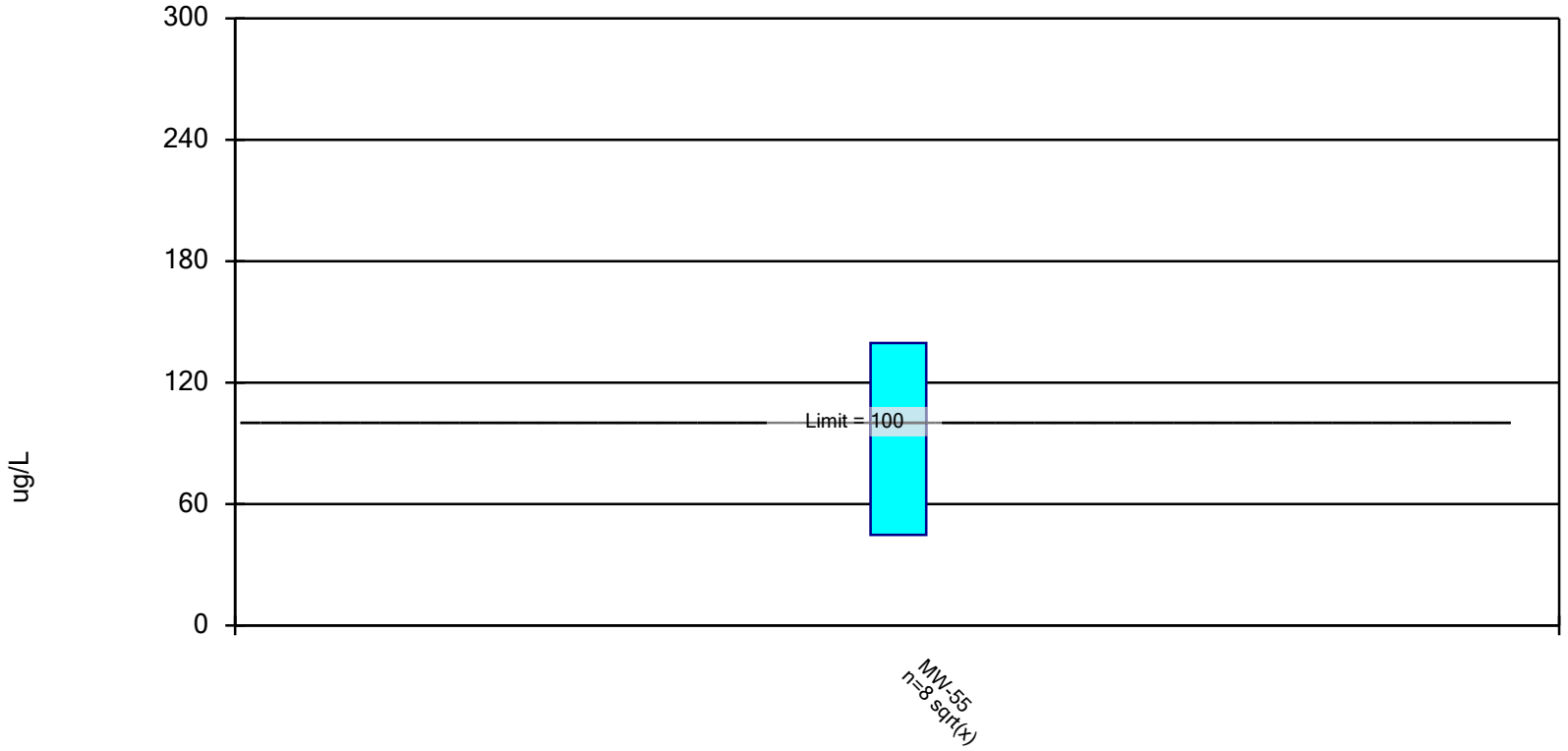
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 9/5/2023 1:38 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 1:39 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

Confidence Interval

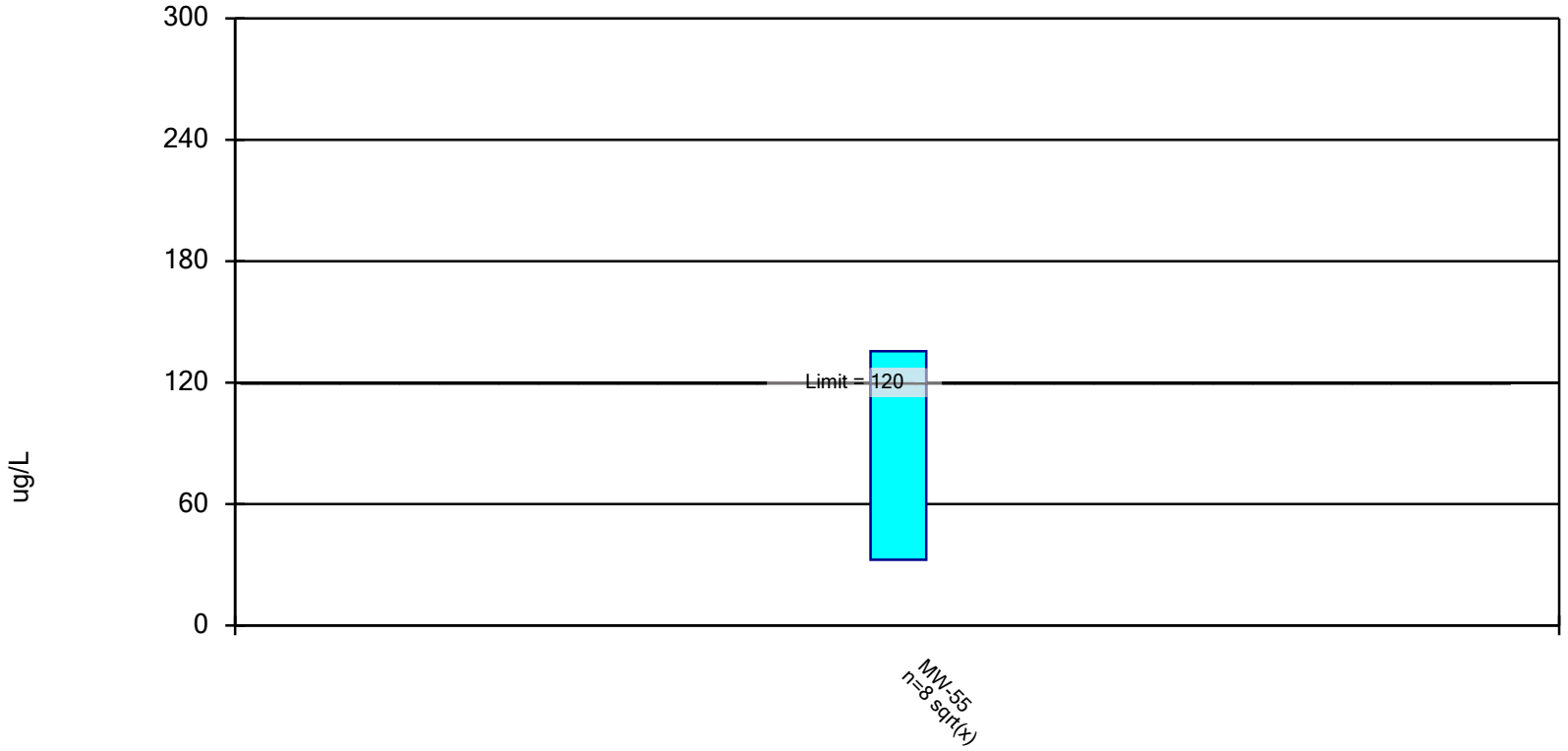
Constituent: Arsenic, Total (ug/L) Analysis Run 9/5/2023 1:39 PM

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

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q3

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

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

135 W. Trail St.
Jackson, MI 49201

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

To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 12, 2023

Subject: HMP GROUNDWATER MONITORING – JCW POREWATER – 2023 Q3

CC: HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

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

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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001**
Lab Sample ID: 23-0723-01
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/26/2023
Collect Time: 12:12 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-01-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	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

Aliquot #: 23-0723-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-01-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 #: 23-0723-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3530		mg/L	10.0	08/01/2023	AB23-0801-05

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Analytical Report

Report Date: 08/12/23

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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0723-01-C04-A01 **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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18004**
Lab Sample ID: 23-0723-02
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 08:17 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-02-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, Aqueous

Aliquot #: 23-0723-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-02-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 #: 23-0723-02-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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18005**
Lab Sample ID: 23-0723-03
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 09:34 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-03-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	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

Aliquot #: 23-0723-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-03-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 #: 23-0723-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1000		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18006**
Lab Sample ID: 23-0723-04
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 10:35 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-04-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	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, Aqueous

Aliquot #: 23-0723-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-04-C02-A01 **Analyst: KDR**

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 #: 23-0723-04-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	765		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-50**
Lab Sample ID: 23-0723-05
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/26/2023
Collect Time: 01:40 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-05-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	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

Aliquot #: 23-0723-05-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-05-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 #: 23-0723-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1100		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-51**
Lab Sample ID: 23-0723-06
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/26/2023
Collect Time: 02:13 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-06-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	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, Aqueous

Aliquot #: 23-0723-06-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-06-C02-A01 **Analyst: KDR**

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 #: 23-0723-06-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1100		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-52**
Lab Sample ID: 23-0723-07
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 06:07 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-07-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, Aqueous

Aliquot #: 23-0723-07-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-07-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 #: 23-0723-07-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1520		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53**
Lab Sample ID: 23-0723-08
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 06:40 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-08-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	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, Aqueous

Aliquot #: 23-0723-08-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-08-C02-A01 **Analyst: KDR**

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 #: 23-0723-08-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	792		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53R**
Lab Sample ID: 23-0723-09
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 07:30 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-09-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	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

Aliquot #: 23-0723-09-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-09-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 #: 23-0723-09-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1150		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-54R**
Lab Sample ID: 23-0723-10
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 07:47 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-10-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	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, Aqueous

Aliquot #: 23-0723-10-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-10-C02-A01 **Analyst: KDR**

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 2540C

Aliquot #: 23-0723-10-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	761		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-55**
Lab Sample ID: 23-0723-11
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 08:55 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-11-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

Aliquot #: 23-0723-11-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-11-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 #: 23-0723-11-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	827		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **OW-57ROUT**
Lab Sample ID: 23-0723-12
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 10:07 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-12-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, Aqueous

Aliquot #: 23-0723-12-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-12-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 #: 23-0723-12-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	762		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-58**
Lab Sample ID: 23-0723-13
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 11:05 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-13-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	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, Aqueous

Aliquot #: 23-0723-13-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-13-C02-A01 **Analyst: KDR**

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 #: 23-0723-13-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1420		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-01**
Lab Sample ID: 23-0723-14
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/26/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-14-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	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, Aqueous

Aliquot #: 23-0723-14-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-14-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 #: 23-0723-14-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1110		mg/L	10.0	08/01/2023	AB23-0801-05

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-02**
Lab Sample ID: 23-0723-15
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-15-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, Aqueous

Aliquot #: 23-0723-15-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-15-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 #: 23-0723-15-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

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Analytical Report

Report Date: 08/12/23

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
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-16-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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, Total, Aqueous

Aliquot #: 23-0723-16-C01-A02 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	100.0		%	0.2	08/08/2023	AB23-0808-01

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

Aliquot #: 23-0723-16-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001 MSD**
Lab Sample ID: 23-0723-17
Matrix: Groundwater

Laboratory Project: **23-0723**
Collect Date: 07/26/2023
Collect Time: 12:12 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-17-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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, Total, Aqueous

Aliquot #: 23-0723-17-C01-A02 **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, Aqueous

Aliquot #: 23-0723-17-C02-A01 **Analyst: KDR**

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

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **FB-01**
Lab Sample ID: 23-0723-18
Matrix: Water

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 11:10 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-18-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	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	2		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 #: 23-0723-18-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-18-C02-A01 **Analyst: KDR**

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
Sulfate	ND		ug/L	1000.0	08/01/2023	AB23-0801-04

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Analytical Report

Report Date: 08/12/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **EB-01**
Lab Sample ID: 23-0723-19
Matrix: Water

Laboratory Project: **23-0723**
Collect Date: 07/31/2023
Collect Time: 11:13 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0723-19-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	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 #: 23-0723-19-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0723-19-C02-A01 **Analyst: KDR**

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
Sulfate	ND		ug/L	1000.0	08/01/2023	AB23-0801-04

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0723

Inspection Date: 7-27-23 **Inspection By:** TWR

Sample Origin/Project Name: Q3-2023 Weadock Porewater Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler 1 Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.4-1.8°C Samples Received on Ice: Yes ✓ No _____

M&TE # and Expiration 015402 5-29-24

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

pH paper
Lot # 205522
Exp 2.15.25

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
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 mL Plastic	4				

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Page 1 of 2

SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-01	7/26/23	1213	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	x		
-04			GW	JCW-MW-18006	3	2	1						x	x	x		
-05	7/26/23	1316	GW	MW-50	3	2	1						x	x	x		
-06	"	1613	GW	MW-51	3	2	1						x	x	x		
-07			GW	MW-52	3	2	1						x	x	x		
-08			GW	MW-53	3	2	1						x	x	x		
-09			GW	MW-53R	3	2	1						x	x	x		
-10			GW	MW-54R	3	2	1						x	x	x		
-11			GW	MW-55	3	2	1						x	x	x		
-12			GW	OW-57ROUT	3	2	1						x	x	x		

RELINQUISHED BY: _____ DATE/TIME: 7/27/23 0930 RECEIVED BY: _____

RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 1.4 - 1.8 °C Cal. Due Date: 5-23-24

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SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-13			GW	MW-58	3	2	1						x	x	x		
-14	7/26/23	—	GW	DUP-JCW-LF-01	3	2	1						x	x	x		
-15			GW	DUP-JCW-LF-02	3	2	1						x	x	x		
-16	7/26/23	1212	GW	JCW-MW-18001 MS	2	1	1						x	x			
-17	" "	1213	GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18			W	FB-01	2	1	1						x	x			
-19			W	EB-01	2	1	1						x	x			

RELINQUISHED BY: DATE/TIME: 7/29/23 0930 RECEIVED BY:

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: 015402

Temperature: 1.4-1.8 °C Cal. Due Date: 5-23-24

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0723

Inspection Date: 7.31.23 **Inspection By:** CLE

Sample Origin/Project Name: Q3 2023 Meadock Porewater

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler (1) Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 7.4-9.8°C Samples Received on Ice: Yes ✓ No _____

M&TE # and Expiration 015402 5.23.24

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	6				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	20				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	11				
Other _____					

PH FSP 0-14
Exp: 2055 22
Exp: 2-15-25

Pg. 2 not needed

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

SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-01			GW	JCW-MW-18001	5	4	1						x	x	x	x	
-02	7/31/23	0807	GW	JCW-MW-18004	3	2	1						x	x	x		
-03	" "	0934	GW	JCW-MW-18005	3	2	1						x	x	x		
-04	7/31/23	1035	GW	JCW-MW-18006	3	2	1						x	x	x		
-05			GW	MW-50	3	2	1						x	x	x		
-06			GW	MW-51	3	2	1						x	x	x		
-07	7/31/23	0807	GW	MW-52	3	2	1						x	x	x		
-08	" "	0940	GW	MW-53	3	2	1						x	x	x		
-09	" "	0730	GW	MW-53R	3	2	1						x	x	x		
-10	" "	0747	GW	MW-54R	3	2	1						x	x	x		
-11	" "	0855	GW	MW-55	3	2	1						x	x	x		
-12	" "	1007	GW	OW-57ROUT	3	2	1						x	x	x		

EB 07-31-23

RELINQUISHED BY: 7/31/23 — DATE/TIME: 1321 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: 015402

Temperature: 7.4 -9.8 °C — Cal. Due Date: 5-23-24

CHAIN OF CUSTODY

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

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MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

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23-0723-13	7/31/23	1101	GW	MW-58 EB 07-31-23	3	2	1						x	x	x		
-14			GW	DUP-JCW-LF-01	3	2	1						x	x	x		
-15	7/31/23	—	GW	DUP-JCW-LF-02	3	2	1						x	x	x		
-16			GW	JCW-MW-18001 MS EB 07-31-23	2	1	1						x	x			
-17			GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18	7/31/23	1110	W	FB-01	2	1	1						x	x			
-19	7/31/23	1113	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: [signature] DATE/TIME: 7/31/23 1341 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 7.4-9.8 °C Cal. Due Date: 5-23-24

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0721-01
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 08:52 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-01-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 Total Metals Exp

Aliquot #: 23-0721-01-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	1940000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	2160		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2100		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0721-02
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 01:23 PM

Mercury 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 Appendix III-IV Total Metals Exp

Aliquot #: 23-0721-02-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, Aqueous

Aliquot #: 23-0721-02-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

Aliquot #: 23-0721-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	526		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0721-03
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 09:33 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-03-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 Total Metals Exp

Aliquot #: 23-0721-03-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	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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	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 2540C

Aliquot #: 23-0721-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	660		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0721-04
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 02:05 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-04-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 Total Metals Exp

Aliquot #: 23-0721-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	339000		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

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-04-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

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0721-05
Matrix: Groundwater

Laboratory Project: **23-0721**
Collect Date: 07/24/2023
Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-05-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 Total Metals Exp

Aliquot #: 23-0721-05-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	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, Cl, F, SO4, Aqueous

Aliquot #: 23-0721-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	336000		ug/L	1000.0	07/31/2023	AB23-0731-01
Fluoride	ND		ug/L	1000.0	07/31/2023	AB23-0731-01
Sulfate	18800		ug/L	1000.0	07/31/2023	AB23-0731-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0721-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	559		mg/L	10.0	07/28/2023	AB23-0728-09

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Analytical Report

Report Date: 08/11/23

Sample Site: **DEK JCW Background**
Field Sample ID: **FB- Background**
Lab Sample ID: 23-0721-06
Matrix: Water

Laboratory Project: **23-0721**
Collect Date: 07/26/2023
Collect Time: 09:33 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0721-06-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 Total Metals Exp

Aliquot #: 23-0721-06-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	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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0721

Inspection Date: 07.27.23 **Inspection By:** CLE

Sample Origin/Project Name: 03.2023 ICW-DEK Background

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler (1) Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 2.8-3.6°C Samples Received on Ice: Yes X No ____

M&TE # and Expiration 015402 5-23-24

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
500 mL (plastic)	5				
Other					

pH FSP 0-3
13.640.511
124-205522
EXP: 2.15.25

250

PG. 2&2 not needed

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

SAMPLING SITE / CUSTOMER: Q3-2023 JCW-DEK Background Wells

PROJECT NUMBER: 23-0721

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER ____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other ____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER ____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0721-01	7-26-23	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	x	
-04	7-24-23	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			

RELINQUISHED BY: [signature] DATE/TIME: 7/27/23 0800 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 2.8-3.6 °C Cal. Due Date: 5-23-24

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 3rd 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: 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

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Analytical Report

Report Date: 08/11/23

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0724-01
Matrix: Groundwater

Laboratory Project: **23-0724**
Collect Date: 07/26/2023
Collect Time: 01:02 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0724-01-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, Aqueous

Aliquot #: 23-0724-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0724-01-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 #: 23-0724-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	08/01/2023	AB23-0801-05

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Analytical Report

Report Date: 08/11/23

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0724-01
Matrix: Groundwater

Laboratory Project: **23-0724**
Collect Date: 07/26/2023
Collect Time: 01:02 PM

Alkalinity by SM 2320B

Aliquot #: 23-0724-01-C04-A01 **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

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0724

Inspection Date: 7.27.23 **Inspection By:** TMR

Sample Origin/Project Name: Q3-2023 Weadock ASD

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TJC

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

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

Cooler 1 Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed ✓

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC ✓ Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.4-1.8°C Samples Received on Ice: Yes ✓ No ____

M&TE # and Expiration 015402 5-23-24

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	2				
24 mL vial (glass)					
500 mL (plastic)					
Other 250 mL plastic	1				

pH Paper
Lot # 205522
Exp 2-15-25

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SAMPLING SITE / CUSTOMER: Q3-2023 Weadock ASD

PROJECT NUMBER: 23-0724

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES:
GW = Groundwater, WW = Wastewater, W = Water / Aqueous Liquid, S = Soil / General Solid, O = Oil, OX = Other _____, SL = Sludge, A = Air, WP = Wipe, WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0724-01	7/26/23	1302	GW	JCW-OW-18001	5	4	1						x	x	x	x	

RELINQUISHED BY: — DATE/TIME: 7/27/23 0930 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: 015402

Temperature: 1.4 -1.8 °C — Cal. Due 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 ~~8/1/23~~ 7-31-23
PURPOSE OF FIELDWORK:	Third Quarter HMP Sampling Event
WORK PERFORMED BY:	Javier Jasso

SIGNED 8/1/23 DATE

CHECKED BY 8-1-23 DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 7/26/23	TIME ARRIVED: 1130
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1430

WEATHER

TEMPERATURE: 82 °F WIND: 15 MPH VISIBILITY: Over Cast

WORK / SAMPLING PERFORMED

~~JCW-MW-18001-MS,MSD~~ JCW-DW-18001, MW-90 Dup-01, MW-51,

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
~~Caleb Batts~~ → P. Madzar	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

8/1/23
SIGNED DATE

8-1-23
CHECKED BY DATE

REVISED 04/2019

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 7/28/23	TIME ARRIVED: 0930
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1116

WEATHER		
TEMPERATURE: 60 °F	WIND: 15-12 MPH	VISIBILITY: Overcast

WORK / SAMPLING PERFORMED

MW-52, 53, 53R, 54R, 55, 57Rout, 58 FB#01
New mw- 18004, 18005, 18004, Dup#02, EB#01

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
~~Caleb Batte~~	Consumers	Site Contact
P. Mudzinski		

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

SIGNED 8/1/23 DATE

CHECKED BY 8-1-23 DATE

TRC

EQUIPMENT SUMMARY

PROJECT NAME:	CEC Weadock LF: 2023 GW Co	SAMPLER NAME:	Javier Jasso
PROJECT NO.:	514403.0000.0000		

WATER LEVEL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PURGING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

SAMPLING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTERATION DEVICE	FILTER TYPE AND SIZE
DEDICATED POLY TUBING	☑ LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

☑ GROUND ☐ DRUM ☐ POTW ☐ POLYTANK ☐ OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
8/1/23	8-1-23
SIGNED / DATE	CHECKED BY / DATE

REVISED 04/2019

TRC

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: 7/26/23

PH CALIBRATION CHECK

pH 7 (LOT #): 36C914 (EXP. DATE): 3/27 — POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 3611436 (EXP. DATE): 1/27 — POST-CAL. READING / STANDARD	CAL. RANGE	TIME
700 / 700	400 / 400	☑ WITHIN RANGE	1137
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 36C483 (EXP. DATE): 3/24 — POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1413 / 1413	26.0	☑ WITHIN RANGE	1137
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 22K1801 (EXP. DATE): 10/27 — POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
220 / 220	25.0	☑ WITHIN RANGE	1137
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING — POST-CAL. READING / SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
7.89 / 7.89	26.0	☑ WITHIN RANGE	1141
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A30917 (EXP. DATE): 4/25 — POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): — POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 /	/	☐ WITHIN RANGE	1137
100 /	/	☐ WITHIN RANGE	1137
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):

☑ STANDARD SOLUTION (S) — LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK

CALIBRATED PARAMETERS		CALIBRATION RANGES (1)	
☐	pH	pH:	+/- 0.2 S.U.
☐	COND	COND:	+/- 1% OF CAL. STANDARD
☐	ORP	ORP:	+/- 25 mV
☐	D.O.	D.O.:	VARIES
☐	TURB	TURB:	+/- 5% OF CAL. STANDARD
☐	_____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER	
☐	_____		

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

8/1/23
SIGNED — DATE

8-1-23
CHECKED BY — DATE

TRC

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: 7/31/23

PH CALIBRATION CHECK

pH 7 (LOT #): 30C 914 (EXP. DATE): 3/25 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 30A 1136 (EXP. DATE): 1/25 POST-CAL. READING / STANDARD	CAL. RANGE	TIME
700 / 700	400 / 400	☑ WITHIN RANGE	0527
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 30C 493 (EXP. DATE): 3/24 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1309 / 1309	20.8	☑ WITHIN RANGE	0527
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 22K 10C180 (EXP. DATE): 10/27 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
233 / 233	19.6	☐ WITHIN RANGE	0531
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL. READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
8.65 / 8.61	20	☑ WITHIN RANGE	0537
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A Mo't (EXP. DATE): POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 / 0	/	☑ WITHIN RANGE	0526
10 / 10	/	☑ WITHIN RANGE	0530
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION
(LOT #):
(EXP. DATE):

☑ STANDARD SOLUTION (S)
LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK

CALIBRATED PARAMETERS		CALIBRATION RANGES (1)	
☐	pH	pH:	+/- 0.2 S.U.
☐	COND	COND:	+/- 1% OF CAL. STANDARD
☐	ORP	ORP:	+/- 25 mV
☐	D.O.	D.O.:	VARIES
☐	TURB	TURB:	+/- 5% OF CAL. STANDARD
☐	_____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER	
☐	_____		

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED _____ 8/1/23 DATE

CHECKED BY _____ 8-1-23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 7/24/23
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
JCW-MW-18001	0620	TOC	14.69	23.25	NA	NM
JCW-MW-18004	0700	TOC	12.05	14.72	NA	NM
JCW-MW-18005	0723	TOC	8.43	16.20	NA	NM
JCW-MW-18006	0743	TOC	13.13	23.68	NA	NM
JCW-OW-18001	0627	TOC	6.80	20.25	NA	NM
JCW-OW-18002	0638	TOC	10.60	19.41	NA	NM
JCW-OW-18003	0637	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	TOC	9.00	1400	NA	NM
~~JCW~~-MW-20	0734	TOC	6.44	1400	NA	NM
MW-50	0624	TOC	13.38	19.40	NA	NM
MW-51	0631	TOC	1423	20.00	NA	NM
MW-52	0636	TOC	1487	19.74	NA	NM
MW-53	0642	TOC	13.68	18.18	NA	NM
MW-53R	0654	TOC	14.20	18.80	NA	NM
MW-54R	0700	TOC	13.60	17.22	NA	NM
MW-55	0716	TOC	13.85	18.42	NA	NM
MW-58	0839	TOC	5.56	18.28	NA	NM
OW-51	0633	TOC	9.34	17.28	NA	NM
OW-53	0643	TOC	7.78	18.00	NA	NM
OW-54	0701	TOC	7.88	16.48	NA	NM
OW-55	0719	TOC	6.76	18.42	NA	NM
OW-56	0729	TOC	6.00	19.27	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 8/1/23 DATE

CHECKED 8-1-23 DATE

REVISED 04/2019

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE: 7/24/23
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	0730	TOC	6.05	20.38	NA	NM
OW-57 IN	0738	TOC	5.76	19.66	NA	NM
OW-57R IN	0739	TOC	5.91	20.18	NA	NM
OW-57 OUT	0740	TOC	10.38	20.20	NA	NM
OW-57R OUT	0737	TOC	9.68	19.88	NA	NM
JCW-MW-15007	0815	TOC	3.79	8.95	NA	NM
JCW-MW-15009	0824	TOC	8.65	13.00	NA	NM
JCW-MW-15010	0810	TOC	17.03	19.57	NA	NM
JCW-MW-15028	0818	TOC	7.60	25.10	NA	NM
MW-15002	0851	TOC	7.15	16.80	NA	NM
MW-15008	0830	TOC	4.63	17.46	NA	NM
MW-15016	0854	TOC	4.60	8.10	NA	NM
MW-15019	0846	TOC	5.56	16.87	NA	NM
OW-1	0811		8.35	37.07		
JCW-MW-15003	0835		15.45	100 plus		
JCW-MW-15026	0815		14.95	100 plus		
MW-16B	0802		14.12	19.87		
JCW-MW-15001	0711		15.58	100 plus		
MW-19	0750		8.85	20.28		
MW-106B	0819		7.60	41.20 100 plus		
JCW-MW-15004	0815		9.40	100 plus		
MW-150X	0835		5.32	17.17		
MW-106B	0841		5.05	32.76		
MW-15024	0843		5.56	17.17		
MW-15018	0840		5.73	9.94		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 8/1/23 DATE

CHECKED 8-1-23 DATE

REVISED 04/2019

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514404.0001.0000	BY: AW, JK, JJ	DATE: 7-26-23	BY: AW	DATE: 8/4/23

SAMPLE ID: MW-15002 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0730	DATE: 7-26-23	SAMPLE	TIME: 0852	DATE: 7-26-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 7.17 T/ PVC

DEPTH TO BOTTOM 16.80 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 16 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY: ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.61 SU CONDUCTIVITY: 5346 umhos/cm

ORP: -56.8 mV DO: 0.8 mg/L

TURBIDITY: 5.37 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.5 °C OTHER: ———

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: ——— FILTRATE ODOR: ———

QC SAMPLE: ☐ MS/MSD ☐ DUP- ———

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0732	200	6.56	1799	88.1	2.7	9.31	15.9	7.35	INITIAL
0737	200	6.75	1707	34.3	1.2	6.51	15.9	7.45	1
0742	200	6.82	1776	5.8	1.0	6.41	16.0	7.50	2
0747	200	6.88	1723	-18.3	1.0	5.41	15.8	7.55	3
0752	200	6.92	1679	-36.8	0.9	5.43	15.5	7.55	4
0757	200	6.71	2975	-38.5	0.9	5.16	15.5	7.55	5
0802	200	6.65	3591	-42.3	0.9	5.33	15.5	7.55	6
0807	200	6.64	4030	-47.1	0.9	5.47	15.5	7.55	7
0812	200	6.62	4356	-49.5	0.9	5.51	15.4	7.55	8
0817	200	6.62	4521	-52.4	0.9	5.61	15.3	7.55	9

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	500mL	Plastic	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Dropoff DATE SHIPPED: 7-27-23 AIRBILL NUMBER: ———

COC NUMBER: ——— SIGNATURE: [signature] DATE SIGNED: 8-1-23

TRC

WATER SAMPLE LOG

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514404.0001.0000	BY: AW (JK) JJ	DATE: 7-26-23	BY: AG	DATE: 8/1/23

SAMPLE ID: MW-15002

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0822	200	6.62	4701	-53.8	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
0832	200	6.60	4985	-55.1	0.8	5.53	15.3	7.55	12
0837	200	6.61	5052	-55.5	0.8	5.66	15.3	7.55	13
0842	200	6.60	5222	-55.5	0.8	5.59	15.6	7.55	14
0847	200	6.60	5302	-56.4	0.8	5.43	15.6	7.55	15
0852	200	6.61	5346	-56.8	0.8	5.37	15.5	7.55	16

SIGNATURE: 

DATE SIGNED: 8-1-23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER:	514404.0001.0000	BY: AW (JK) JJ DATE: 7-24-23	BY: AW DATE: 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: 1257	DATE: 7-24-23	SAMPLE	TIME: 1323	DATE: 7.24-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 4.64 T/ PVC

DEPTH TO BOTTOM 17.42 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 5 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.47 SU CONDUCTIVITY: 1340 umhos/cm

ORP: -55.5 mV DO: 0.9 mg/L

TURBIDITY: 0.63 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 14.9 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☒ DUP- Background

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1258	200	6.20	1902	35.8	4.1	0.87	18.0	4.66	INITIAL
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
1323	200	6.47	1340	-55.5	0.9	0.63	14.9	4.66	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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
2	500mL	plastic	A	☐ Y ☒ N					☐ Y ☐ N
2	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
2	125mL		A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Lab Drop off DATE SHIPPED: 7-27-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 8-1-23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER:	514404.0001.0000	BY: AW, (JK) JJ DATE: 7-26-23	BY: AW DATE: 8/1/23

SAMPLE ID: MW-15016 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0916	DATE: 7-26-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 4.63 T/ PVC

DEPTH TO BOTTOM 7.75 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 3 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0933	DATE: 7-26-23

PH: 6.83 SU CONDUCTIVITY: 1559 umhos/cm

ORP: -83.9 mV DO: 0.9 mg/L

TURBIDITY: 6.04 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 19.3 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☐ DUP- _____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0918	200	7.00	1554	-63.9	2.0	7.63	20.2	4.95	INITIAL
0923	200	6.85	1551	-75.9	1.2	6.14	19.5	5.02	1
0928	200	6.83	1562	-81.8	0.9	5.87	19.4	5.02	2
0933	200	6.83	1559	-83.9	0.9	6.04	19.3	5.02	3

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	~~500mL~~ 250mL	Plastic	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off DATE SHIPPED: 7-27-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 8-1-23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514404.0001.0000	BY: AW, (K) JJ	DATE: 7-24-23	BY: ACW	DATE: 8/4/23

SAMPLE ID: MW-15019 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1343	DATE: 7-24-23	SAMPLE	TIME: 1405	DATE: 7-24-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 5.55 T/ PVC

DEPTH TO BOTTOM 16.86, T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY: ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.55 SU CONDUCTIVITY: 1636 umhos/cm

ORP: -61.4 mV DO: 0.9 mg/L

TURBIDITY: 4.90 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 14.7 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☐ DUP- _____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1345	200	6.60	1606	-37.3	2.3	4.39	14.0	5.66	INITIAL
1350	200	6.54	1608	-43.9	1.2	4.06	14.1	5.66	1
1355	200	6.54	1639	-51.9	1.1	3.75	14.8	5.66	2
1400	200	6.55	1638	-57.9	1.0	4.25	14.7	5.66	3
1405	200	6.55	1636	-61.4	0.9	4.90	14.7	5.66	4

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	500mL	plastic	A	☐ Y ☒ N					☐ Y ☐ N
2	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
3	125mL		A	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off DATE SHIPPED: 7-27-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 8-1-23

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER: 514403.0000.0000	BY: JJ	DATE: 6/11/23	BY: JK	DATE: 8-1-23

SAMPLE ID: JCW-MW-18001 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1143	DATE: 7/26/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 16.66 T/ PVC

DEPTH TO BOTTOM 23.71 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 6 ☒ LITERS ☐ GALLONS

COLOR: GRAYISH ODOR: NONE

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1213	DATE: 7/26/23

PH: 6.78 SU CONDUCTIVITY: 4130 umhos/cm

ORP: -60.0 mV DO: 0.38 mg/L

TURBIDITY: 10.0 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 16.7 °C OTHER:

COLOR: CLEAR ODOR: NONE

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☑ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1143	209	Ua	1880	32.0	7.8	556	23.0	16.71	INITIAL
1147		6.87	4331	-55.7	1.5	120	16.5	1683	1
1153		6.78	4633	-51.6	0.41	12.0	16.4	1683	2
1157		6.78	4067	-55.0	0.37	10.0	16.3	1685	3
1203		6.78	4099	-60.8	0.31	10.0	16.3	1685	4
1207		6.78	4110	-60.9	0.29	10.0	16.3	1685	5
1213		6.78	4120	-61.0	0.28	10.0	16.2	1681	6
									7

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
2	125	glass	A	☐ Y ☒ N					☐ Y ☐ N
1	250	pl	A	☐ Y ☒ N					☐ Y ☐ N
3	125	pl	A	☐ Y ☒ N					☐ Y ☐ N
3	125	pl	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off	DATE SHIPPED: 7-28-23	AIRBILL NUMBER:
COC NUMBER:	SIGNATURE:	DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED			CHECKED		
PROJECT NUMBER:	514403.0000.0000	BY:	JJ	DATE: 6/16/23	BY: SK	DATE: 9-1-23	

SAMPLE ID: MW-OW-18001 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1237	DATE: 7/26/23	SAMPLE	TIME: 1302	DATE: 7/26/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.71 SU	CONDUCTIVITY: 1977 umhos/cm	
			ORP: -72.0 mV	DO: 0.02 mg/L	
DEPTH TO WATER: 6.82 T/ PVC			TURBIDITY: 9.90 NTU		
DEPTH TO BOTTOM 20.7x T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 16.5 °C	OTHER:	
VOLUME REMOVED 7 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: clear	ODOR: non		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1227	200	7.04	1017	-11.3	7.4	140	24.9	7.05	INITIAL
1232		6.90	1863	-67.0	0.83	13.5	17.3	7.15	1
1237		6.85	1924	-70.0	0.49	13.0	16.7	7.15	2
1242		6.80	1970	-71.0	0.32	11.5	16.5	7.15	3
1247		6.80	1979	-71.5	0.89	11.0	16.5	7.15	4
1252		6.79	1977	-71.9	0.28	10.0	16.5	7.15	5
1257		6.79	1976	-72.0	0.24	10.0	16.5	7.15	6
1302		6.79	1977	-72.0	0.22	9.90	16.5	7.15	7

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
2	125	glass	A	☐ Y ☑ N					☐ Y ☐ N
1	250	p	A	☐ Y ☑ N					☐ Y ☐ N
1	125	p	A	☐ Y ☑ N					☐ Y ☐ N
1	125	p	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	7-27-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 7/26/23	BY: JK	DATE: 8-1-23

SAMPLE ID: MW-50 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1315	DATE: 7/26/23	SAMPLE	TIME: 1340	DATE: 7/26/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 13.36 T/ PVC

DEPTH TO BOTTOM 14.40 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 3 ☐ LITERS ☐ GALLONS

COLOR: clear ODOR: NOR

TURBIDITY

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 7.38 SU CONDUCTIVITY: 1620 umhos/cm

ORP: -80.5 mV DO: 023 mg/L

TURBIDITY: 10.0 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 17.2 °C OTHER:

COLOR: clear ODOR: NOR

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☑ DUP- #01

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1315	200	7.14	1821	44.4	7.85	15.0	23.9	13.30	INITIAL
1320		7.40	1690	-46	075	11.5	17.2	1345	1
1325		7.39	1600	-70.5	041	11.0	17.2	1345	2
1330		7.38	1609	-80.0	029	10.0	17.2	1345	3
1335		7.38	1616	-80.3	025	10.0	17.2	1345	4
1340		7.38	1620	-80.5	023	10.0	17.3	1345	5
									6

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
2	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off DATE SHIPPED: 7-27-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: MW-51 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1353	DATE: 7/26/23	SAMPLE	TIME: 1413	DATE: 7/26/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.38 SU	CONDUCTIVITY: 1761	umhos/cm
			ORP: -26.3 mV	DO: 0.40	mg/L
DEPTH TO WATER: 14.23 T/ PVC			TURBIDITY: 9.95 NTU		
DEPTH TO BOTTOM 20.00 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 15.3 °C	OTHER:	
VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: None	
COLOR: Cloudy	ODOR: None		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☑ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1353	200	7.63	1814	30.2	7.75	51.6	20.6	14.21	INITIAL
1358		7.41	1803	-11.5	1.00	13.0	15.6	1430	1
1403		7.37	1770	-25.7	0.54	10.0	15.4	1430	2
1408		7.37	1765	-26.0	0.45	10.0	15.4	1430	3
1413		7.38	1761	-26.3	0.40	9.95	15.3	1430	4
~~1418~~								~~1430~~	←

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	250	P	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	7-27-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: MW 52 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0547	DATE: 7/31/23	SAMPLE	TIME: 0607	DATE: 7/31/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.60 SU	CONDUCTIVITY: 1548 umhos/cm	
			ORP: 13.5 mV	DO: 1.31 mg/L	
DEPTH TO WATER: 14.87 T/ PVC			TURBIDITY: 4.9 NTU		
DEPTH TO BOTTOM 19.76 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 13.4 °C	OTHER:	
VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY ☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0547	200	4.66	1607	22.0	8.82	12.0	16.16	14.82	INITIAL
0552		6.47	1573	23.8	1.60	5.0	13.4	14.61	1
0557		6.40	1533	13.0	1.40	5.0	13.40	14.61	2
0602		6.60	1540	13.5	1.35	4.9	13.40	14.61	3
0607		6.60	1548	13.5	1.35	4.9	13.40	14.61	4
~~0612~~									~~5~~

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☐ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off DATE SHIPPED: ~~7-27-23~~ 7-31-23 AIRBILL NUMBER:

COC NUMBER: SIGNATURE: DATE SIGNED: 8/1/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: MW 53 — WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0611	DATE: 7/31/23	SAMPLE	TIME: 0646	DATE: 7/31/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.10 SU	CONDUCTIVITY: 1049 umhos/cm	
DEPTH TO WATER: 13.68 T/ PVC			ORP: -60.5 mV	DO: 1.25 mg/L	
DEPTH TO BOTTOM 18.14 T/ PVC			TURBIDITY: 2.8 NTU		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
VOLUME REMOVED 5 ☒ LITERS ☐ GALLONS			TEMPERATURE: 13.8 °C	OTHER:	
COLOR: Clear	ODOR: NON		COLOR: Clear	ODOR: NON	
TURBIDITY ☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE (0.45 um) ☐ YES ☑ NO		
			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0611	200	7.14	1074	30.8	7.0	7.3	16.0	13.5	INITIAL
0630		7.08	1019	-49.5	1.76	4.5	13.7	13.5	1
0637		7.10	1038	-60.5	1.40	3.0	13.7	13.5	2
0670		7.10	1043	-60.5	1.30	2.9	13.8	13.5	3
0637		7.10	1047	-60.0	1.30	2.8	13.8	13.5	4
0646		7.10	1049	-60.5	1.25	2.8	13.8	13.5	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Lab Drop off DATE SHIPPED: ~~7-27-23~~ 7-31-23 AIRBILL NUMBER: ———

COC NUMBER: ——— SIGNATURE: [signature] DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: MW-53R | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0641	DATE: 7/31/23	SAMPLE	TIME: 0730	DATE: 7/31/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.71 SU	CONDUCTIVITY: 1350 umhos/cm	
			ORP: 23.2 mV	DO: 1.32 mg/L	
DEPTH TO WATER: 14.20 T/ PVC			TURBIDITY: 4.1 NTU		
DEPTH TO BOTTOM 18.80 T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 13.3 °C	OTHER:	
VOLUME REMOVED 7 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: non	
COLOR: grayish	ODOR: non		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0641	200	6.97	1686	29.7	9.6	1000	15.3	13.6	INITIAL
0652		6.72	1606	23	1.75	900	13.4	1416	1
0657		6.71	1530	23	1.40	500	13.6	1416	2
0700		6.71	1475	24.3	1.35	38	13.5	1410	3
0705		6.71	1413	24.3	1.35	13	13.5	1416	4
0710		6.71	1382	23.8	1.34	5.0	13.4	1416	5
0715		6.71	1360	23.2	1.33	4.5	13.3	1416	6
0720		6.71	1350	23.2	1.32	4.1	13.3	1416	7

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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: MW 54C | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0727	DATE: 7/31/23	SAMPLE	TIME: 0747	DATE: 7/31/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 13.66 T/ PVC

DEPTH TO BOTTOM 17.22 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS

COLOR: Cloudy ODOR: none

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.84 SU CONDUCTIVITY: 1017 umhos/cm

ORP: 220 mV DO: 2.0 mg/L

TURBIDITY: 3.1 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 14.0 °C OTHER:

COLOR: Clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0727	200	7.22	1080	32.0	9.8	200	15.1	1341	INITIAL
0732		6.84	1052	19.7	2.0	22	13.9	1366	1
0737		6.84	1033	22.0	2.0	3.9	14.0	1366	2
0742		6.84	1021	22.0	2.0	3.5	14.0	1366	3
0747		6.84	1017	22.0	2.0	3.5	14.0	1366	4
~~0752~~								~~1366~~	~~5~~

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Lab Drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: Dcw-mw7E004 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0757	DATE: 7/31/23	SAMPLE	TIME: 0817	DATE: 7/31/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 12.01 T/ PVC

DEPTH TO BOTTOM 14.73 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 2 ☒ LITERS ☐ GALLONS

COLOR: cloudy ODOR: none

TURBIDITY

☐ NONE ☐ SLIGHT ☑ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.81 SU CONDUCTIVITY: 1364 umhos/cm

ORP: 50.3 mV DO: 6.4 mg/L

TURBIDITY: 3.0 NTU

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 16.9 °C OTHER:

COLOR: clear ODOR: non

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0757	140	7.00	774	44.6	9.1	34	17.1	11.98	INITIAL
0803		6.81	1387	44.0	6.7	4.0	16.7	12.01	.5
0807		6.81	1375	49.5	6.7	3.5	16.8	12.01	1
0813		6.81	1363	50.2	6.7	3.0	16.9	12.01	1.5
0817		6.81	1364	50.3	6.6	3.0	16.9	12.01	2
									3 L

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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	N	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off DATE SHIPPED: 7-31-23 AIRBILL NUMBER:

COC NUMBER: SIGNATURE: DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: MW 55 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0830	DATE: 7/31/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 13.81 T/ PVC

DEPTH TO BOTTOM 18.45 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 5 ☒ LITERS ☐ GALLONS

COLOR: Brown ODOR: None

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0837	DATE: 7/31/23

PH: 6.91 SU CONDUCTIVITY: 1136 umhos/cm

ORP: -81.0 mV DO: 1.2 mg/L

TURBIDITY: 33 NTU

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.5 °C OTHER:

COLOR: Clear ODOR: None

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0830	240	6.73	1254	36.5	8.6	78.0	18.8	13.5	INITIAL
0833		6.90	1143	-49.5	1.6	14	15.3	13.51	1
0836		6.90	1135	-66	1.3	5.0	15.3	13.51	2
0839		6.90	1133	-80.5	1.2	4.0	15.4	13.51	3
0842		6.90	1135	-81.0	1.2	3.5	15.5	13.51	4
0845		6.91	1136	-81.0	1.2	3.3	15.5	13.51	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	2x	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Lab Drop off DATE SHIPPED: 7-31-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: JCW-MW1800T | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0909	DATE: 7/31/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 8.43 T/ PVC

DEPTH TO BOTTOM 16.23 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 2.5 ☒ LITERS ☐ GALLONS

COLOR: Brown ODOR: none

TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0934	DATE: 7/31/23

PH: 6.75 SU CONDUCTIVITY: 1245 umhos/cm

ORP: 28.3 mV DO: 1.3 mg/L

TURBIDITY: 4.5 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.4 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0909	100	7.05	1453	14.6	7.8	100	20.3	8.69	INITIAL
0914		6.74	1317	28.5	2.0	30	15.2	9.85	1
0919		6.74	1281	29.0	1.5	80	15.1	9.85	1
0924		6.75	1268	29.0	1.4	5.0	15.3	9.85	1.5
0929		6.75	1254	28.5	1.3	4.5	15.3	9.85	2
0934		6.75	1245	28.3	1.3	4.5	15.4	9.85	2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	1L	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	1L	P1	A	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: KB Drop off DATE SHIPPED: 7-31-23 AIRBILL NUMBER: _____

COC NUMBER: _____ SIGNATURE: [signature] DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: OW-56R OUT | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0947	DATE: 7/31/23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 9.66 T/ PVC

DEPTH TO BOTTOM 19.48 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED 1.5 ~~2~~ ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1007	DATE: 7/31/23

PH: 6.90 SU CONDUCTIVITY: 1133 umhos/cm

ORP: 39.5 mV DO: 1.4 mg/L

TURBIDITY: 2.8 NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.8 °C OTHER:

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: FILTRATE ODOR:

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0947	100	7.19	1212	62.7	8.7	12.0	21.3	9.84	INITIAL
0952		6.92	1163	53.5	1.8	3.0	16.6	10.20	.5
0957		6.90	1149	40	1.5	2.5	15.9	11.26	1
1002		6.90	1133	39.5	1.4	2.8	15.8	11.88	1.5
~~1007~~									~~2~~
~~1012~~									2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☐ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 7/31/23	BY: JK	DATE: 8-1-23

SAMPLE ID: JCW-MW 18006 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1015	DATE: 7/31/23	SAMPLE	TIME: 1035	DATE: 7/31/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.87 SU	CONDUCTIVITY: 1049 umhos/cm	
			ORP: -25.0 mV	DO: 1.3 mg/L	
DEPTH TO WATER: 7.90 T/ PVC			TURBIDITY: 4.1 NTU		
DEPTH TO BOTTOM: 23.45 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 15.1 °C	OTHER:	
VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: non	
COLOR: clear	ODOR: non		FILTRATE (0.45 um) ☐ YES ☐ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD	☑ DUP- 04)	
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1015	200	7.11	1153	40.5	8.7	15.0	20.3	1346	INITIAL
1020		6.87	1053	-10.5	1.7	4.3	15.0	1360	1
1025		6.89	1046	-25.0	1.4	4.2	15.1	1360	2
1030		6.87	1049	-25.3	1.3	4.1	15.1	1360	3
1035		6.87	1049	-25.0	1.3	4.1	15.1	1360	4
								~~1360~~	

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
2	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
3	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: MW-5E | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1045	DATE: 7/31/23	SAMPLE	TIME: 1105	DATE: 7/31/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.80 SU	CONDUCTIVITY: 2128 umhos/cm	
DEPTH TO WATER: 5.58 T/ PVC			ORP: -43.3 mV	DO: 1.3 mg/L	
DEPTH TO BOTTOM 18.50 T/ PVC			TURBIDITY: 3.0 NTU		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
VOLUME REMOVED 4 ☒ LITERS ☐ GALLONS			TEMPERATURE: 16.1 °C	OTHER:	
COLOR: Brownish	ODOR: non		COLOR: Clear	ODOR: non	
TURBIDITY ☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE (0.45 um) ☐ YES ☒ NO		
			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1045	200	6.97	931	47.5	9.0	20	20.1	5.55	INITIAL
1050		6.76	2145	-26.0	1.6	3.7	16.2	5.51	1
1055		6.79	2130	-45.0	1.3	3.5	16.1	5.51	2
1100		6.80	2129	-43.1	1.3	3.3	16.2	5.51	3
1105		6.80	2128	-43.3	1.3	3.0	16.1	5.51	4

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	250	DI	A	☐ Y ☒ N					☐ Y ☐ N
1	125	DI	A	☐ Y ☒ N					☐ Y ☐ N
1	125	DI	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	
COC NUMBER:		SIGNATURE:		DATE SIGNED:	8/1/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: JK	DATE: 8-1-23

SAMPLE ID: FB#01 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: ____ T/ PVC

DEPTH TO BOTTOM ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED ____ ☐ LITERS ☐ GALLONS

COLOR: ____ ODOR: ____

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1110	DATE: 7/31/23

PH: NR SU CONDUCTIVITY: NR umhos/cm

ORP: NR mV DO: NR mg/L

TURBIDITY: NR NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NR °C OTHER: ____

COLOR: Clear ODOR: non

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: ____ FILTRATE ODOR: ____

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	1L	PL	B	☐ Y ☑ N					☐ Y ☐ N
1	1L	PL	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab Drop off DATE SHIPPED: 7-31-23 AIRBILL NUMBER: ____

COC NUMBER: ____ SIGNATURE: ____ DATE SIGNED: 8/1/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 8/1/23	BY: SK	DATE: 8-1-23

SAMPLE ID: EB #C

WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: ____ T/ PVC

DEPTH TO BOTTOM ____ T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED ____ ☐ LITERS ☐ GALLONS

COLOR: ____ ODOR: ____

TURBIDITY

☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1113	DATE: 7/31/23

PH: NR SU CONDUCTIVITY: NR umhos/cm

ORP: NR mV DO: NR mg/L

TURBIDITY: NR NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NR °C OTHER: ____

COLOR: CL ODOR: non

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: ____ FILTRATE ODOR: ____

QC SAMPLE: ☐ MS/MSD ☐ DUP- ____

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	1L	AG	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	7-31-23	AIRBILL NUMBER:	____
COC NUMBER:	____	SIGNATURE:		DATE SIGNED:	8/1/23

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CHAIN OF CUSTODY

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SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-01	7/26/23	1213	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	x		
-04			GW	JCW-MW-18006	3	2	1						x	x	x		
-05	7/26/23	1215	GW	MW-50	3	2	1						x	x	x		
-06	"	1613	GW	MW-51	3	2	1						x	x	x		
-07			GW	MW-52	3	2	1						x	x	x		
-08			GW	MW-53	3	2	1						x	x	x		
-09			GW	MW-53R	3	2	1						x	x	x		
-10			GW	MW-54R	3	2	1						x	x	x		
-11			GW	MW-55	3	2	1						x	x	x		
-12			GW	OW-57ROUT	3	2	1						x	x	x		

RELINQUISHED BY: DATE/TIME: 7/27/23 0930 RECEIVED BY:

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 1.4 - 1.8 °C Cal. Due Date: 5-23-24

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Page 2 of 2

SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells	PROJECT NUMBER: 23-0723	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)
SAMPLING TEAM:	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER	REQUESTER: Harold Register	QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER
SEND REPORT TO: Caleb Batts	email:	phone:	
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other; SL = Sludge; A = Air; WP = Wipe; WT = General Waste		

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-13			GW	MW-58	3	2	1						x	x	x		
-14	7/26/23	—	GW	DUP-JCW-LF-01	3	2	1						x	x	x		
-15			GW	DUP-JCW-LF-02	3	2	1						x	x	x		
-16	7/26/23	1212	GW	JCW-MW-18001 MS	2	1	1						x	x			
-17	" "	1217	GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18			W	FB-01	2	1	1						x	x			
-19			W	EB-01	2	1	1						x	x			

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	COMMENTS:
[signature]	7/29/23 0830	[signature]	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	Received on Ice? ☑ Yes ☐ No M&TE #: 015402
			Temperature: 1.4-1.8 °C Cal. Due Date: 5-23-24

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SAMPLING SITE / CUSTOMER: Q3-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0723

SAP CC or WO#:

REQUESTER: Harold Register

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT:

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Caleb Batts — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-01			GW	JCW-MW-18001	5	4	1						x	x	x	x	
-02	7/31/23	0807	GW	JCW-MW-18004	3	2	1						x	x	x		
-03	"	0934	GW	JCW-MW-18005	3	2	1						x	x	x		
-04	7/31/23	1035	GW	JCW-MW-18006	3	2	1						x	x	x		
-05			GW	MW-50	3	2	1						x	x	x		
-06			GW	MW-51	3	2	1						x	x	x		
-07	7/31/23	0907	GW	MW-52	3	2	1						x	x	x		
-08	"	0940	GW	MW-53	3	2	1						x	x	x		
-09	"	0930	GW	MW-53R	3	2	1						x	x	x		
-10	"	0947	GW	MW-54R	3	2	1						x	x	x		
-11	"	0955	GW	MW-55	3	2	1						x	x	x		
-12	"	1007	GW	OW-57ROUT	3	2	1						x	x	x		

EB 07-31-23

RELINQUISHED BY: 7/31/23 — DATE/TIME: 1341 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: 015402

Temperature: 7.4-9.8°C — Cal. Due Date: 5-23-24

CHAIN OF CUSTODY

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SAMPLING SITE / CUSTOMER: 23-2023 Weadock Porewater Wells	PROJECT NUMBER: 23-0723	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)
SAMPLING TEAM:	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER	REQUESTER: Harold Register	QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER
SEND REPORT TO: Caleb Batts	email:	phone:	
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater, WW = Wastewater, W = Water / Aqueous Liquid, S = Soil / General Solid, O = Oil, OX = Other, SL = Sludge, A = Air, WP = Wipe, WT = General Waste		

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0723-13	7/31/23	1101	GW	MW-58 EB 07-31-23	3	2	1						x	x	x		
-14			GW	DUP-JCW-LF-01	3	2	1						x	x	x		
-15	7/31/23	—	GW	DUP-JCW-LF-02	3	2	1						x	x	x		
-16			GW	JCW-MW-18001 MS EB 07-31-23	2	1	1						x	x			
-17			GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18	7/31/23	1110	W	FB-01	2	1	1						x	x			
-19	7/31/23	1113	W	EB-01	2	1	1						x	x			

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:
	7/31/23 1301	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: 015402

Temperature: 7.4-9.8 °C Cal. Due Date: 5-23-24

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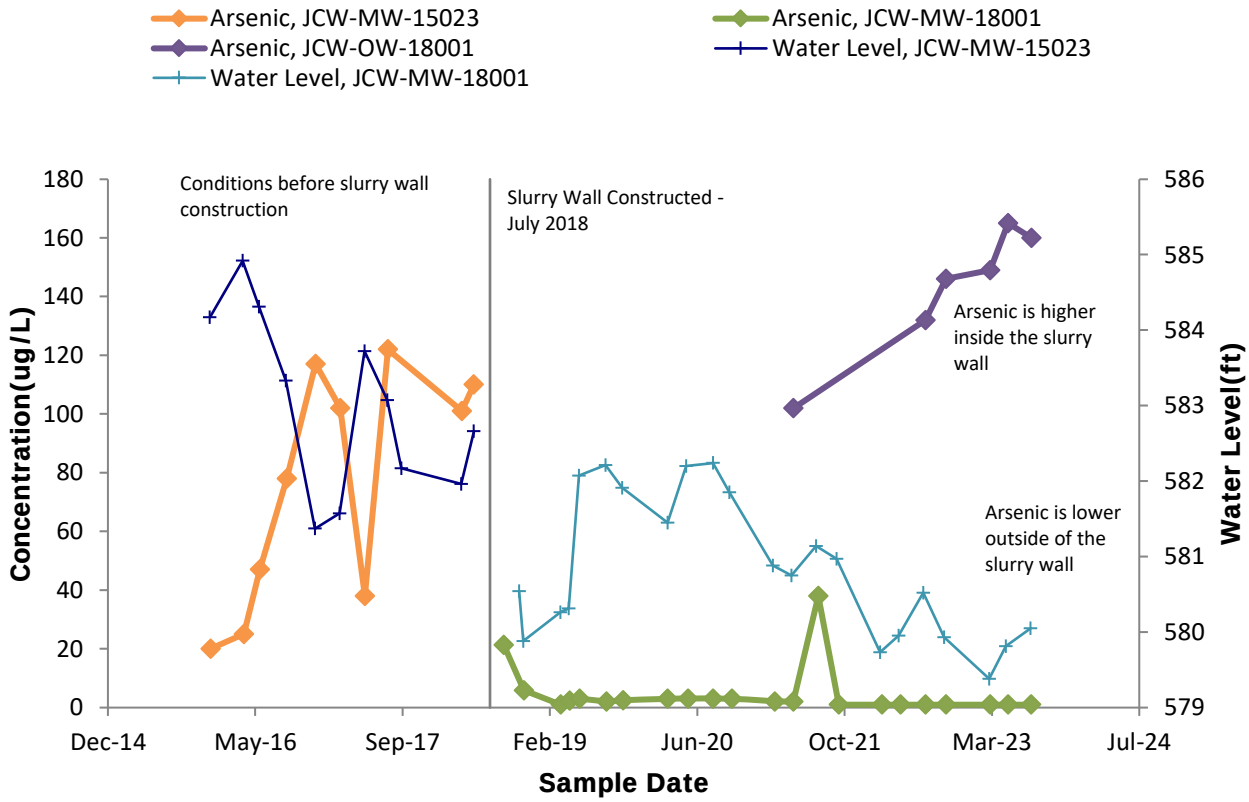
SAMPLING SITE / CUSTOMER:	PROJECT NUMBER:	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)	QA REQUIREMENT:
Q3-2023 JCW-DEK Background Wells	23-0721	REQUESTER: Harold Register		☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER
SAMPLING TEAM:	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER			
SEND REPORT TO: Caleb Batts	email:	phone:		
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater, WW = Wastewater, W = Water / Aqueous Liquid, S = Soil / General Solid, O = Oil, OX = Other, SL = Sludge, A = Air, WP = Wipe, WT = General Waste			

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	REMARKS
23-0721-01	7-26-23	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	x	
-04	7-24-23	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			

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	COMMENTS:
[signature]	7/27/23 0800	[signature]	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	Received on Ice? ☑ Yes ☐ No M&TE #: 015402
			Temperature: 2.8-3.6 °C Cal. Due Date: 5-23-24

Appendix G
Alternate Source Demonstration Supporting Information

Figure G1: Time Series Plots for JCW-MW-18001 ASD



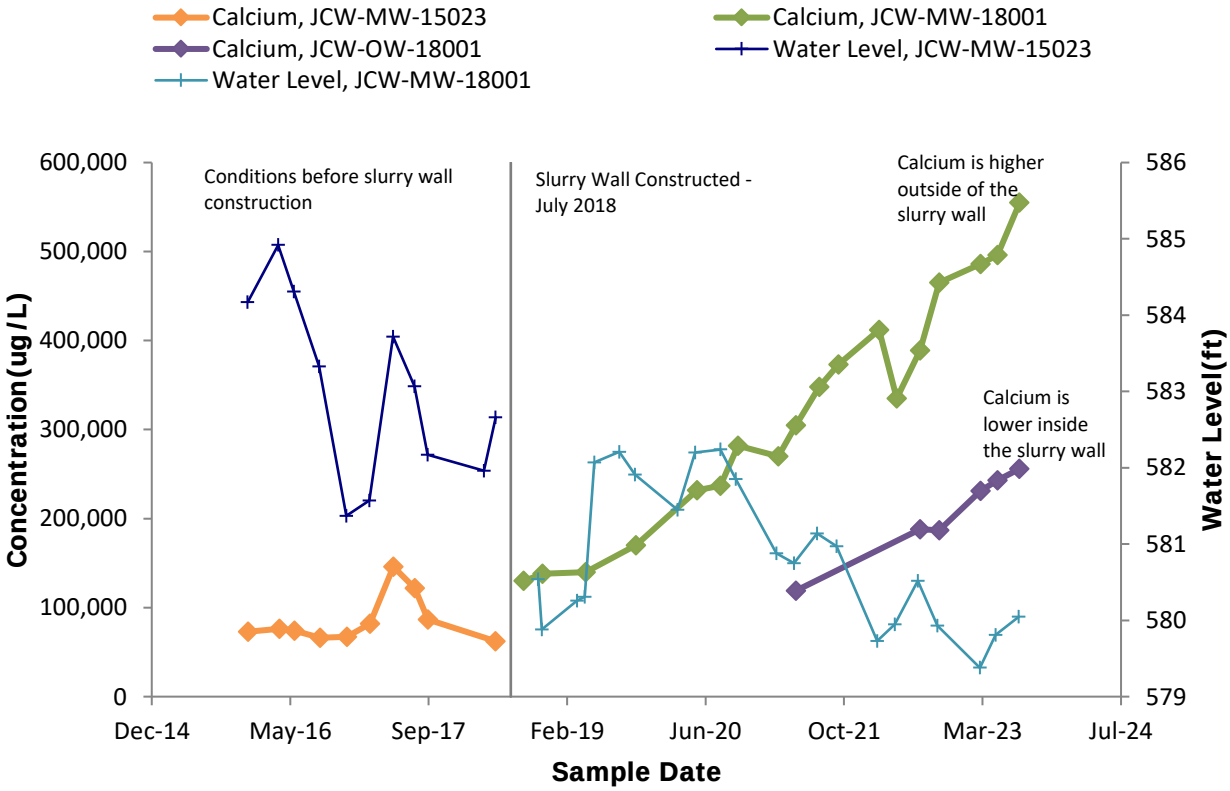
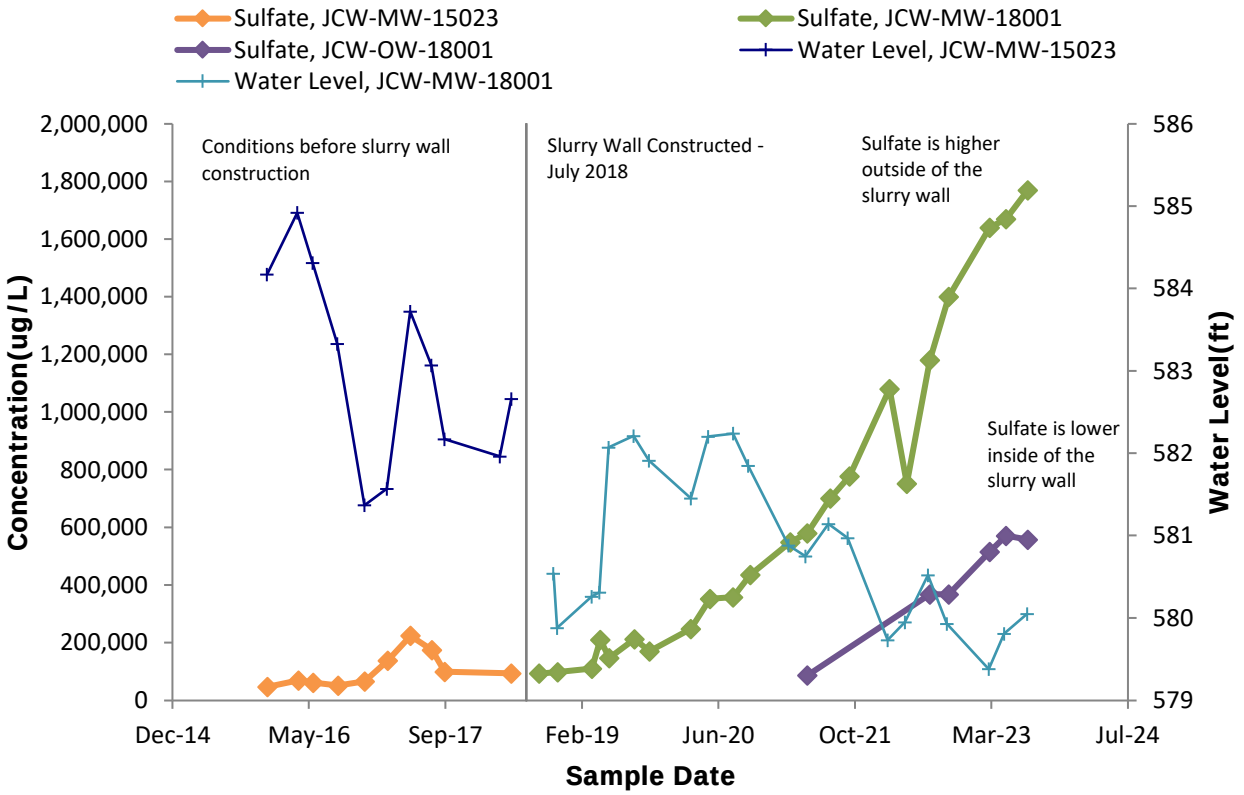


Figure G1: Time Series Plots for JCW-MW-18001 ASD



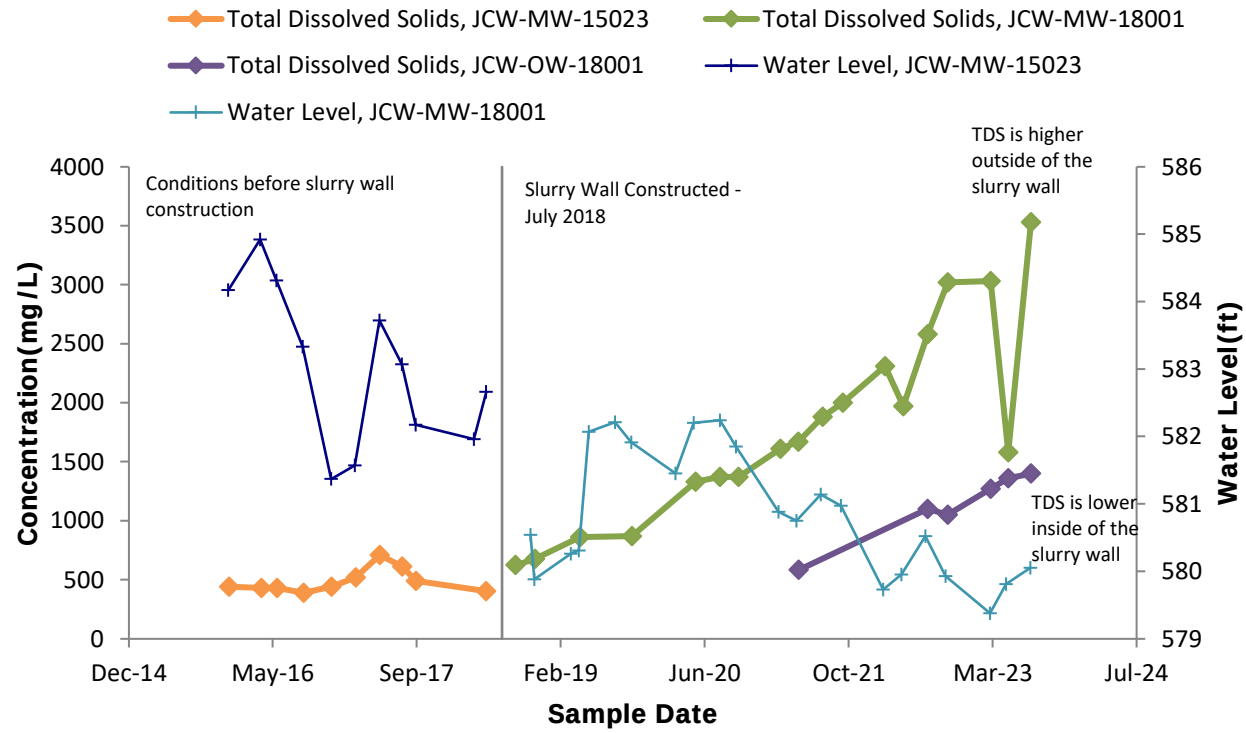
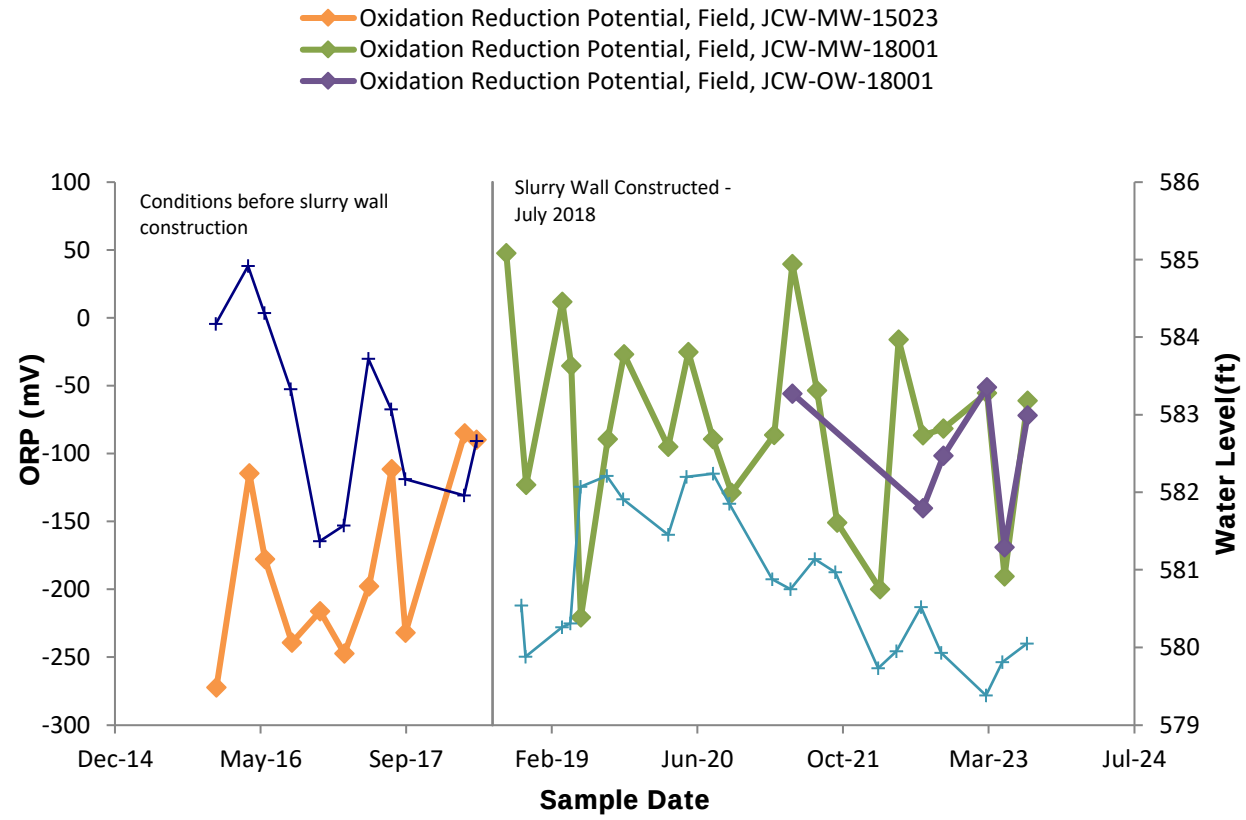


Figure G1: Time Series Plots for JCW-MW-18001 ASD



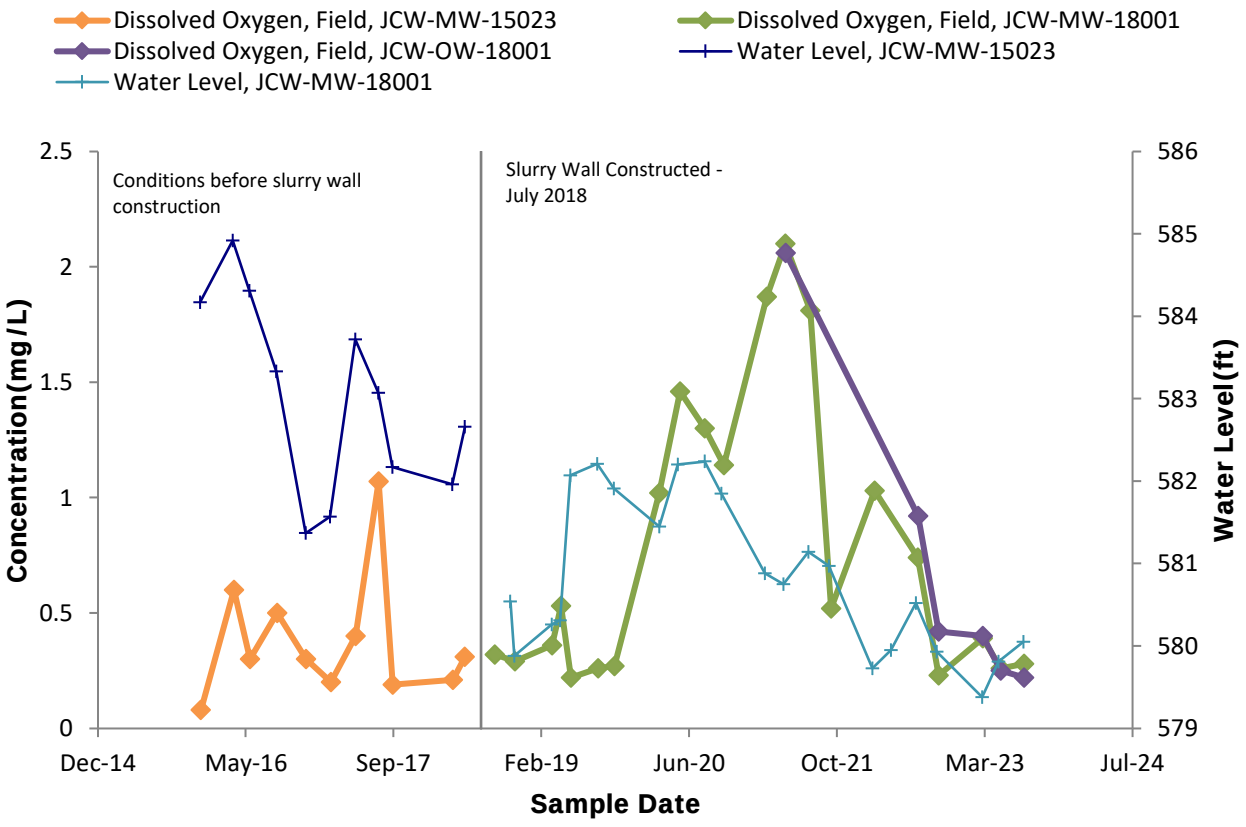
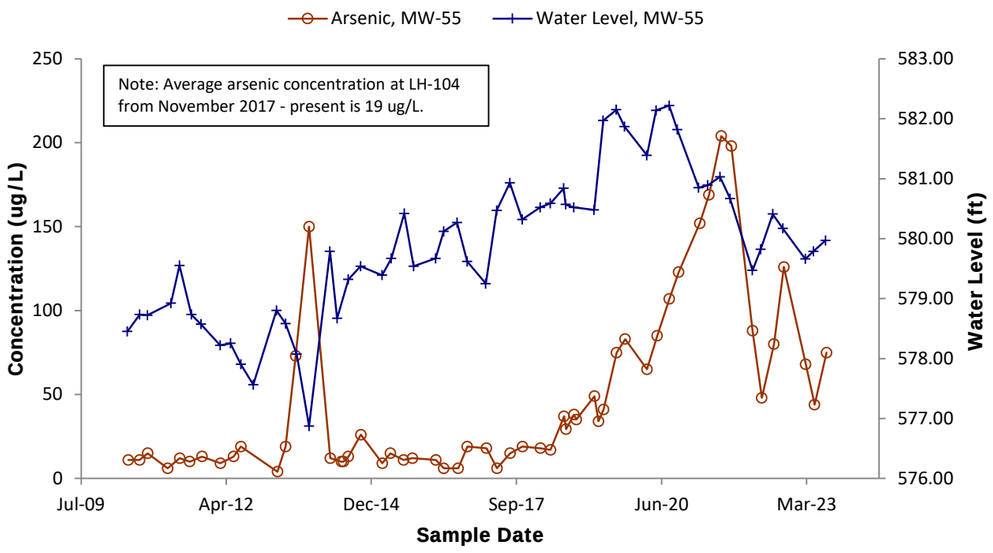
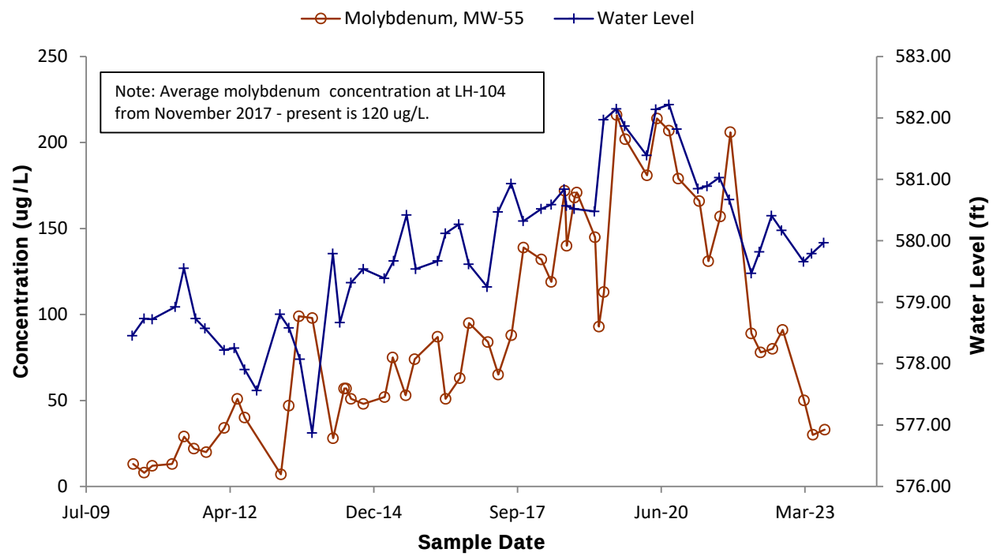
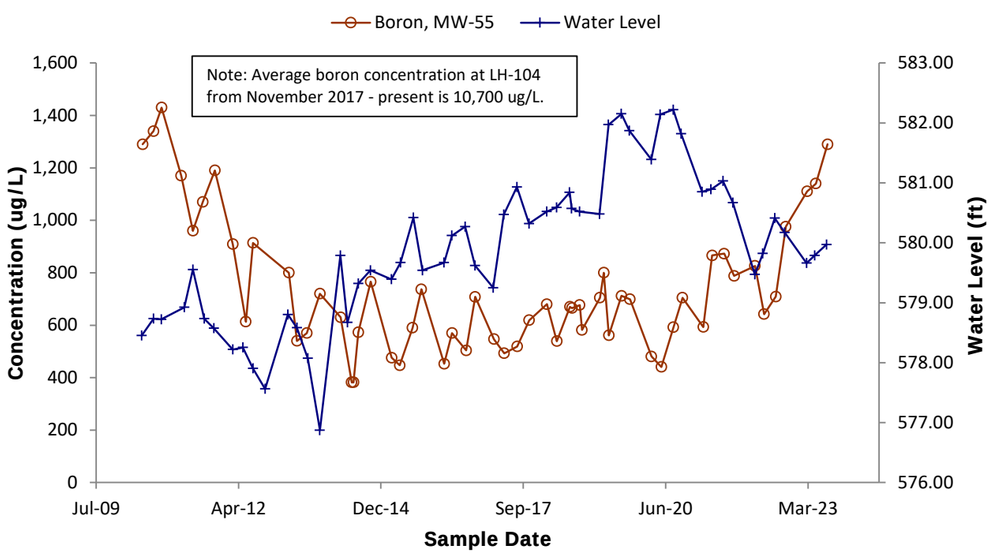
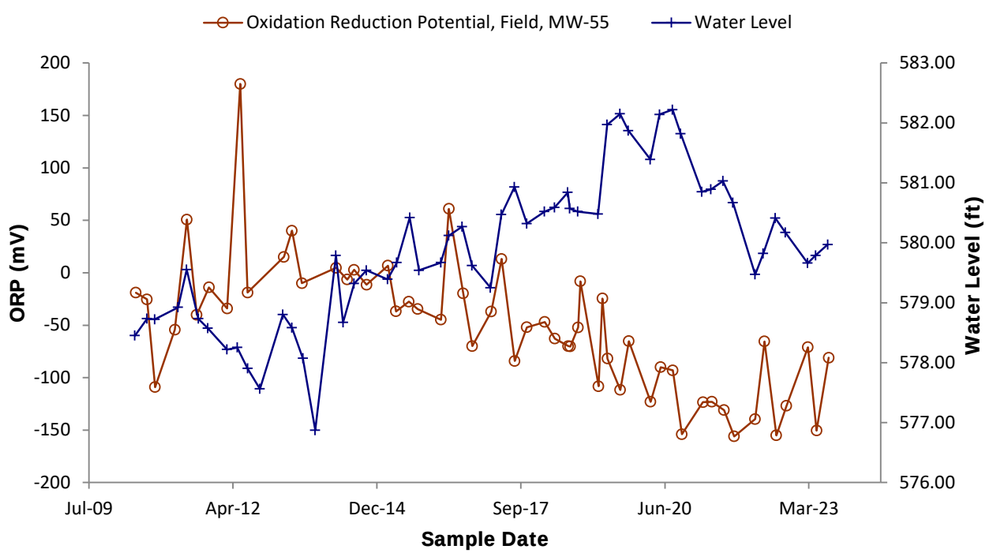


Figure G2: Time Series Plots for MW-55 ASD









2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2023 Hydrogeological Monitoring Report

JC Weadock Solid Waste Disposal Area

Essexville, Michigan

January 2024

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Darby Litz
Project Manager/Hydrogeologist

Kristin Lowery, P.E.
Project Engineer

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APPENDICES

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-53R – MW-54R – MW-55 – JCW-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) – Assessment Monitoring Constituents	
Boron	Antimony	Lithium
Calcium	Arsenic	Mercury
Chloride	Barium	Molybdenum
Fluoride	Beryllium	Nickel
Iron	Cadmium	Selenium
pH	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™ 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
- 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 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 on-site. 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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Tables

Table 1

Summary of Groundwater Elevation Data

JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program

Essexville, Michigan

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)			October 2, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background Monitoring Wells							
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: Downgradient Monitoring Wells							
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
Landfill: Downgradient Monitoring Wells (outside slurry wall)							
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 slurry wall)							
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 Headwells							
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.

Table 2
Summary of Field Parameters
JC Weadock Solid Waste Disposal Area – Hydrogeological 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	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.

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
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background			
Appendix III[(1)]									
Boron	ug/L	NC	**500**	**500**	4,000	205	157	**533**	275
Calcium	mg/L	NC	NC	NC	500[EE]	245	126	244	162
Chloride	mg/L	**250****	**250[E]**	**250[E]**	**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[E]	250[E]	500[EE]	< 1	89	149	101
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	**5,430**	**1,160**	**1,340**	**1,400**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	6.7	6.5	6.9	6.6
Appendix IV[(1)]									
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 115[(2)]									
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	**30,400**	**22,500**	**22,500**	**21,800**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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}.

[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) addtional 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 Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

								JCW-MW-18001	JCW-MW-18004	JCW-MW-18005	JCW-MW-18006	MW-50	MW-51
							Sample Location:						
							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[(1)]													
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	**500[EE]**	NC	NC	**562**	218	159	117	205	132
Chloride	mg/L	250**	250[E]	250[E]	**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[E]**	**250[E]**	**500[EE]**	NC	NC	**1,890**	**466**	154	46.9	**470**	**267**
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**3,430**	**1,160**	**884**	**738**	**1,170**	**952**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.5	7.0	6.9	7.0	7.0	7.2
Appendix IV[(1)]													
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 115[(2)]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**3,840**	36	**948**	**5,660**	**2,300**	**1,660**
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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[E]	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 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) addtional 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 Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

								MW-52	MW-53	MW-53R	MW-54R	MW-55	OW-57ROUT
							Sample Location:						
							Sample Date:	10/9/2023	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/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient/ GSI	Downgradient
Appendix III[(1)]													
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	**500[EE]**	NC	NC	234	136	206	165	163	120
Chloride	mg/L	250**	250[E]	250[E]	**50**	NC	NC	30.2	**77.4**	35.5	45	16.7	**50.6**
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[E]**	**250[E]**	**500[EE]**	NC	NC	**572**	2.28	221	67.4	156	94.8
Total Dissolved Solids	mg/L	**500****	**500[E]**	**500[E]**	**500**	NC	NC	**1,440**	**722**	**1,090**	**756**	**846**	**758**
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5[E]	6.5 - 8.5[E]	6.5 - 9.0	NC	NC	6.8	7.3	7.0	7.0	7.0	7.0
Appendix IV[(1)]													
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	**16**	1	**75**	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	108	719	110	113	248	77
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	42	61	70	26	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	17	56	7
Radium-226	pCi/L	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	1.64	1.72	0.968	1.38	1.26	0.586
Radium-226/228	pCi/L	5	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	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 115[(2)]													
Iron	ug/L	**300****	**300[E]**	**300[E]**	500,000[EE]	NC	NC	**7,560**	**1,080**	**834**	**829**	**16,800**	40
Copper	ug/L	1,000**	1,000[E]	1,000[E]	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	5,000[E]	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 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) addtional 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 5
Summary of Confidence Interval Evaluation: October 2023
JC Weadock Solid Waste Disposal Area – Hydrogeological Monitoring Program
Essexville, Michigan

Assessment Monitoring Statistical Evaluation

Constituent	Units	GWPS	MW-50		MW-51		MW-52		MW-53		MW-53R		MW-54R		MW-55		OW-57R OUT		JCW-MW-18001		JCW-MW-18005		JCW-MW-18006	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron[1]	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]	--[2]	--	--	--	--	--	--	12	29
Molybdenum	ug/L	73	--	--	--	--	--	--	--	--	--	--	--	--	--[2]	--[2]	--	--	--	--	--	--	--	--
Iron	ug/L	28,000	--	--	--	--	--	--	--	--	--	--	--	--	16,000	26,000	--	--	--	--	--	--	--	--

GSI Statistical Evaluation

Constituent	Units	GSI	MW-55	
			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 (α = 0.01) of the downgradient data set.

LCL - Lower Confidence Limit (α = 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.

Table 6

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)	4 Qtr. 2023 (**bold** >201)	3 Qtr. 2023 (**bold** >201)	2 Qtr. 2023 (**bold** >201)	1 Qtr. 2023 (**bold** >201)

No Exceedances at Compliance Locations

Table 7
Leachate Headwell Results
Fourth Quarter 2023 Quarterly Report
JC Weadock Solid Waste Disposal Area, Essexville, Michigan

Parameter	Reporting Limit	Units	2023 Field Leachate		2022 Field Leachate			2021 Field Leachate	2020 Field Leachate	
			LH-103R	LH-104	LH-103R	LH-104	LH-103R[(1)]	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

0 1,500 3,000

FEET

1:36,000 1" = 3,000'

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

PROJECT:
CONSUMERS ENERGY COMPANY
DE KARN AND JC WEADOCK POWER PLANTS
ESSEXVILLE, MICHIGAN

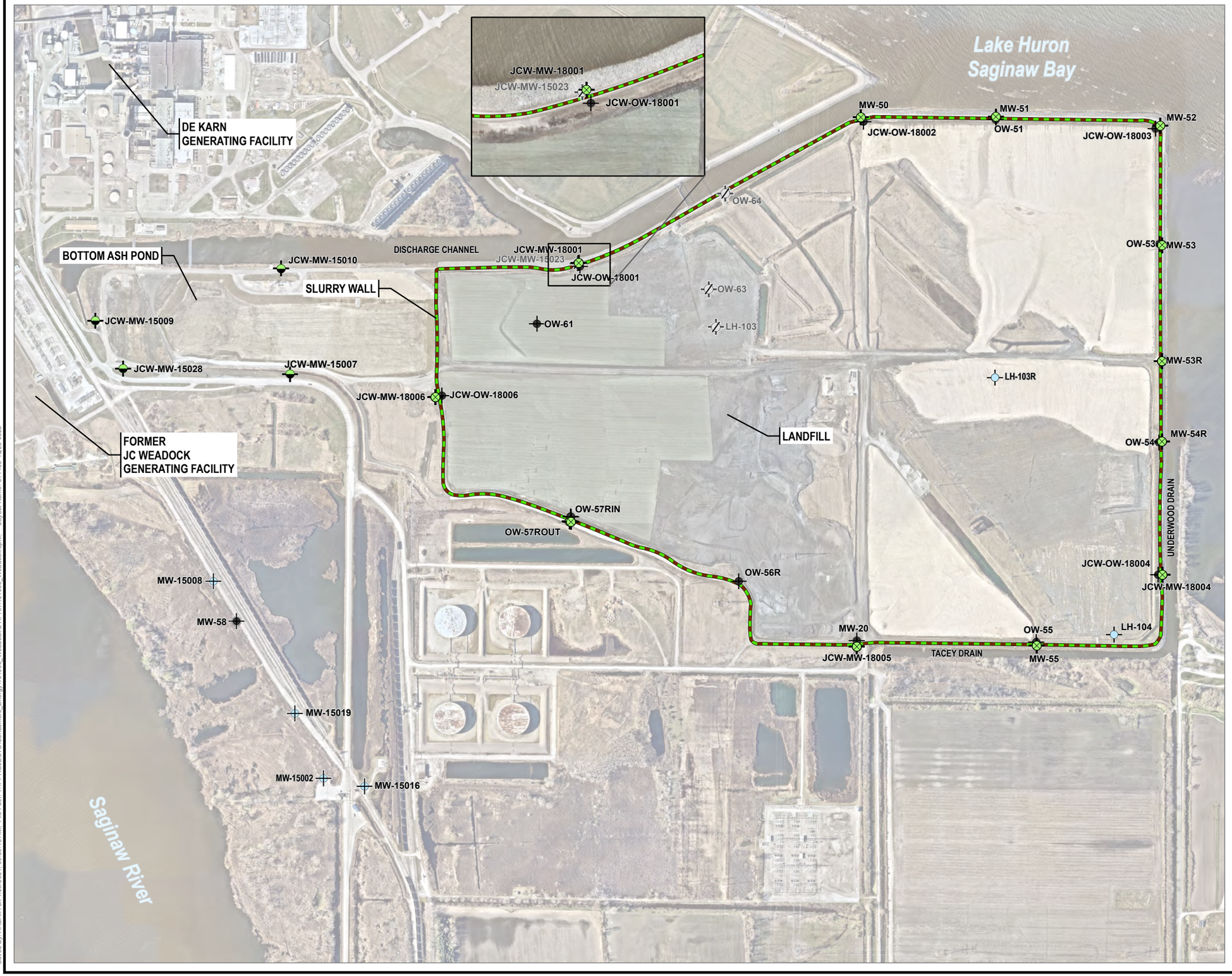
TITLE:
SITE LOCATION MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0000
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	JANUARY 2024		

TRC
999 FOURIER DRIVE
SUITE 101
MADISON, WI 53717
PHONE: 608.826.3663

FILE: 464096_WEADOCK

COORDINATE SYSTEM: NAD 1983 STATEPLANE MICHIGAN SOUTH FIPS 2113 FEET; MAP ROTATION: 0
-- SAVED BY: AADAIR ON 11/22/2023, 09:06:07 AM; FILE PATH: T:\1-PROJECTS\CONSUMERS_ENERGY\464096_WEADOCK\2-APRX\464096_WEADOCK.APRX; LAYOUT NAME: 514403-4Q23-001



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
SITE MAP

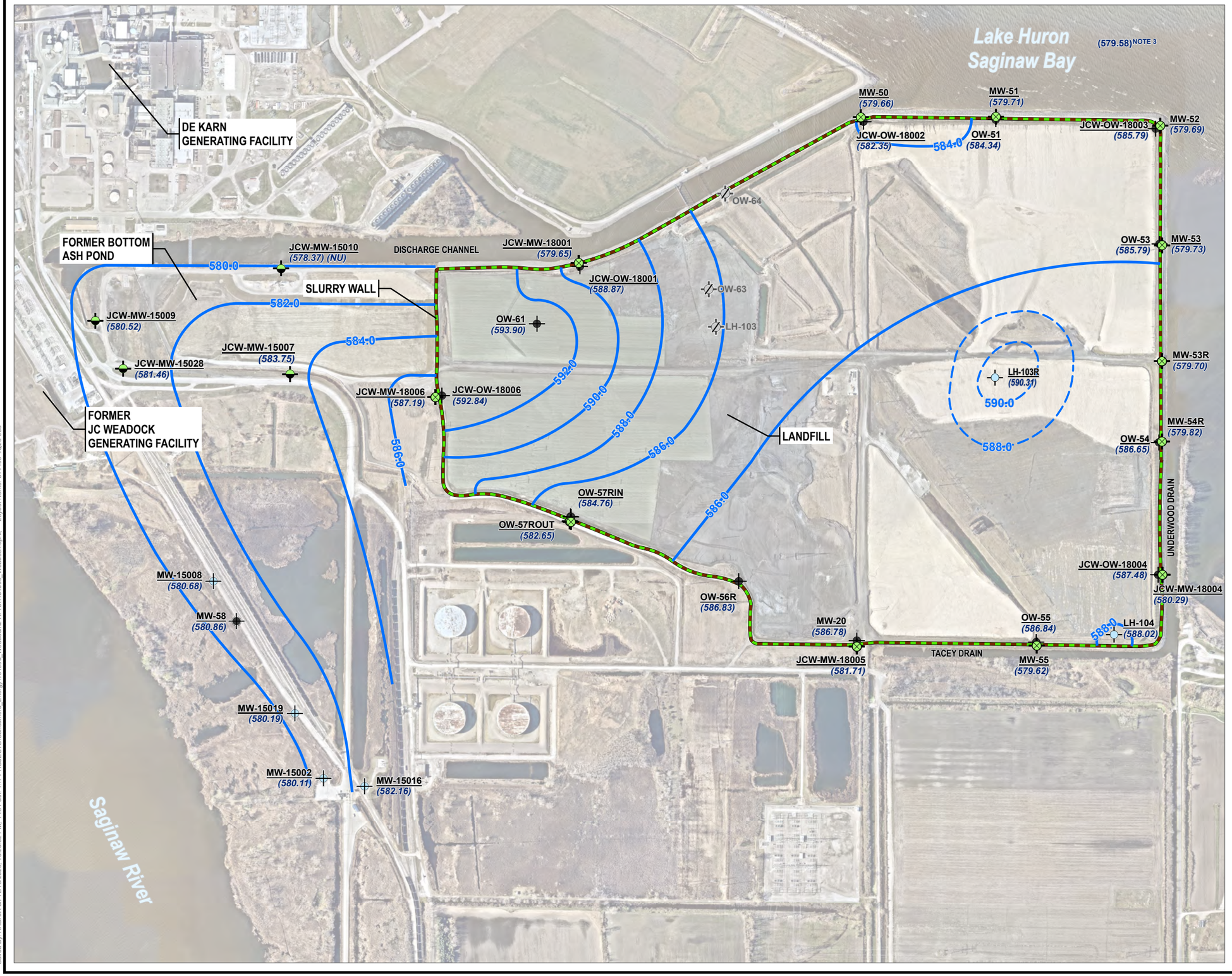
DRAWN BY:	A. ADAIR	PROJ. NO.:	514403.0001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2024		

FIGURE 2

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By: AADAIR on 1/29/2024, 09:39:43 AM; File Path: T:\1_PROJECTS\Consumers_Energy\464096_Weadock\2-APRX\464096_Weadock.aprx; Layout Name: 514403-4Q23-002a



LEGEND

- BACKGROUND MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL HMP WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- DECOMMISSIONED WELL
- SLURRY WALL (APPROXIMATE)
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (590.51) GROUNDWATER ELEVATION (FEET)
- (NU) NOT USED TO DEVELOP CONTOURS

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

N

1:7,200
1" = 600'

0 600 1,200 FEET

PROJECT: CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE: POTENTIOMETRIC SURFACE MAP
OCTOBER 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	514403
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ		FIGURE 3
DATE:	JANUARY 2024		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: 464096_Weadock.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
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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)[1]
MW-50	10/2/2023	579.66	579.58	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		0.15
MW-53R	10/2/2023	579.70		0.12
MW-54R	10/2/2023	579.82		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 **Discharge Channel**	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
JCW-OW-18001	588.87		22.37	4.12E-01	2.00	2.88	1,010	2.30E-08	0.41	2,904	7.80E-02	0.58	213
JCW-MW-18001		579.65			3.75								
JCW-OW-18002	582.35		28.87	9.32E-02	4.00	4.25	970		0.09	4,123	2.50E-02	0.19	68
MW-50		579.66			4.50								

Monitoring Well Pair **Adjacent Zone**	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-51	584.34		14.38	3.22E-01	4.00	4.21	1,850	2.30E-08	0.32	7,779	1.63E-01	1.22	446
MW-51		579.71			4.41								
JCW-OW-18003	585.79		33.85	1.80E-01	3.50	3.70	740		0.18	2,738	3.22E-02	0.24	88
MW-52		579.69			3.90								
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 **Non-Adjacent Zone**	SWL Obs Well (ft NAVD 88)	SWL MW (ft NAVD 88)	x_{wells} (ft)	i (ft/ft)	Saturated Thickness (ft)	Mean Thickness (ft)	Section Length (ft)	K (cm/sec)	i (ft/ft)	Area (ft^2)	Flow ft^3/day	Flow Gal/day	Flow Gal/yr
OW-54	586.65		21.23	3.22E-01	2.00	2.25	510	2.30E-08	0.32	1,148	2.41E-02	0.18	66
MW-54R		579.82			2.50								
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								
OW-55	586.84		23.95	3.01E-01	2.00	1.81	1,220		0.30	2,208	4.34E-02	0.32	118
MW-55		579.62			1.62								
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								

Calculated Groundwater Discharge from JC Weadock (gal per day)	**=**	**3.45**
(cubic ft per day)	**=**	**0.46**
(cubic ft per min)		**3.2E-04**
Calculated Groundwater Discharge from JC Weadock (gal per yr)	**=**	**1,260**
(cubic ft per yr)	**=**	**168**
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)	**=**	**1.88E-02**

Notes:

Water level data collected on October 2, 2023 are shown by yellow cells: **579.578**

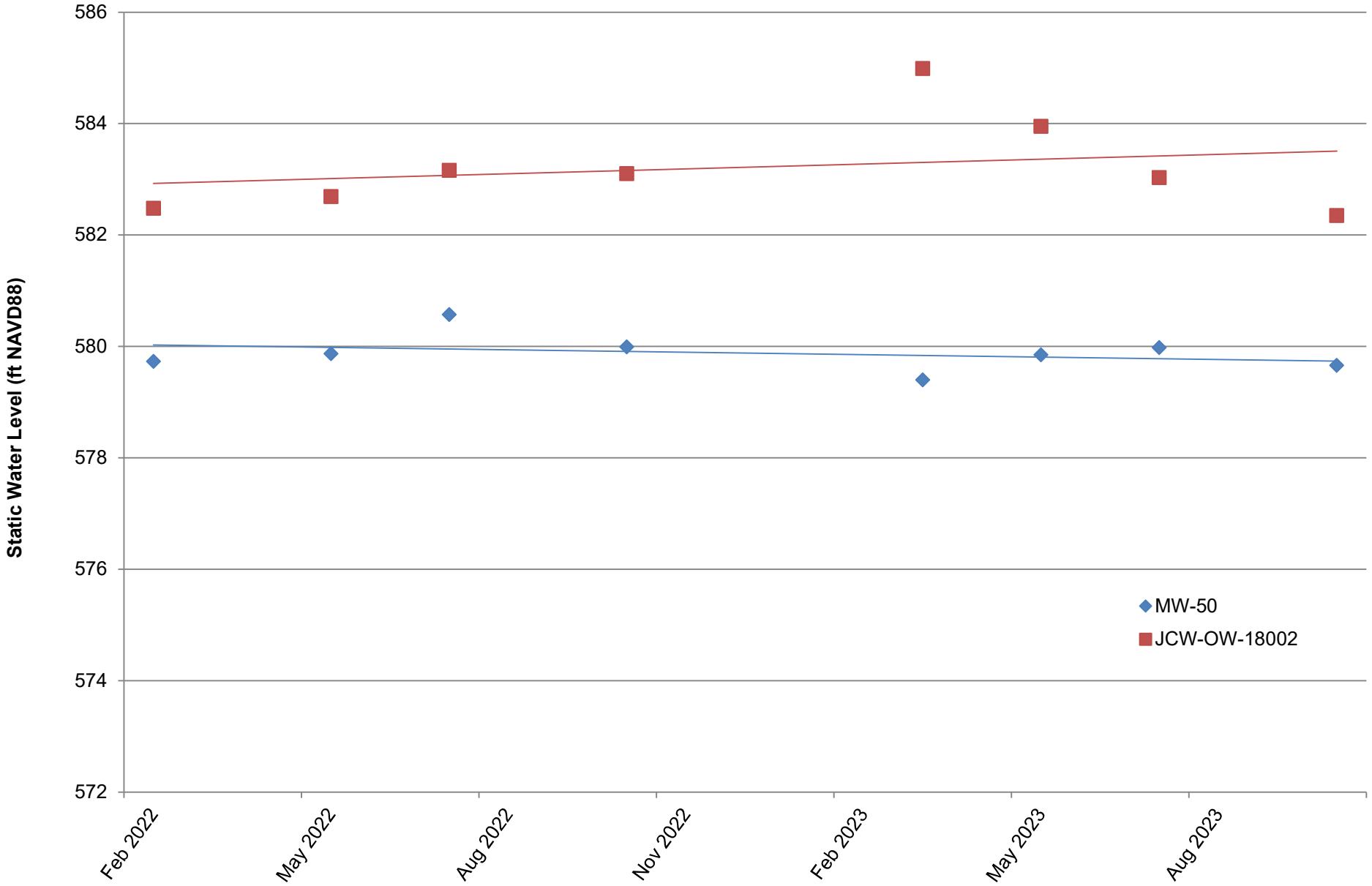
1. Monitoring Well Zones based on Phase II Evaluation, Appendix K Groundwater Discharge Calculations, September 30, 2005. Representative wells based on the Landfill Hydrogeological Monitoring Plan, February 2021.
2. Saturated thickness will be the thickness of the sand unit when the observed SWL is above 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

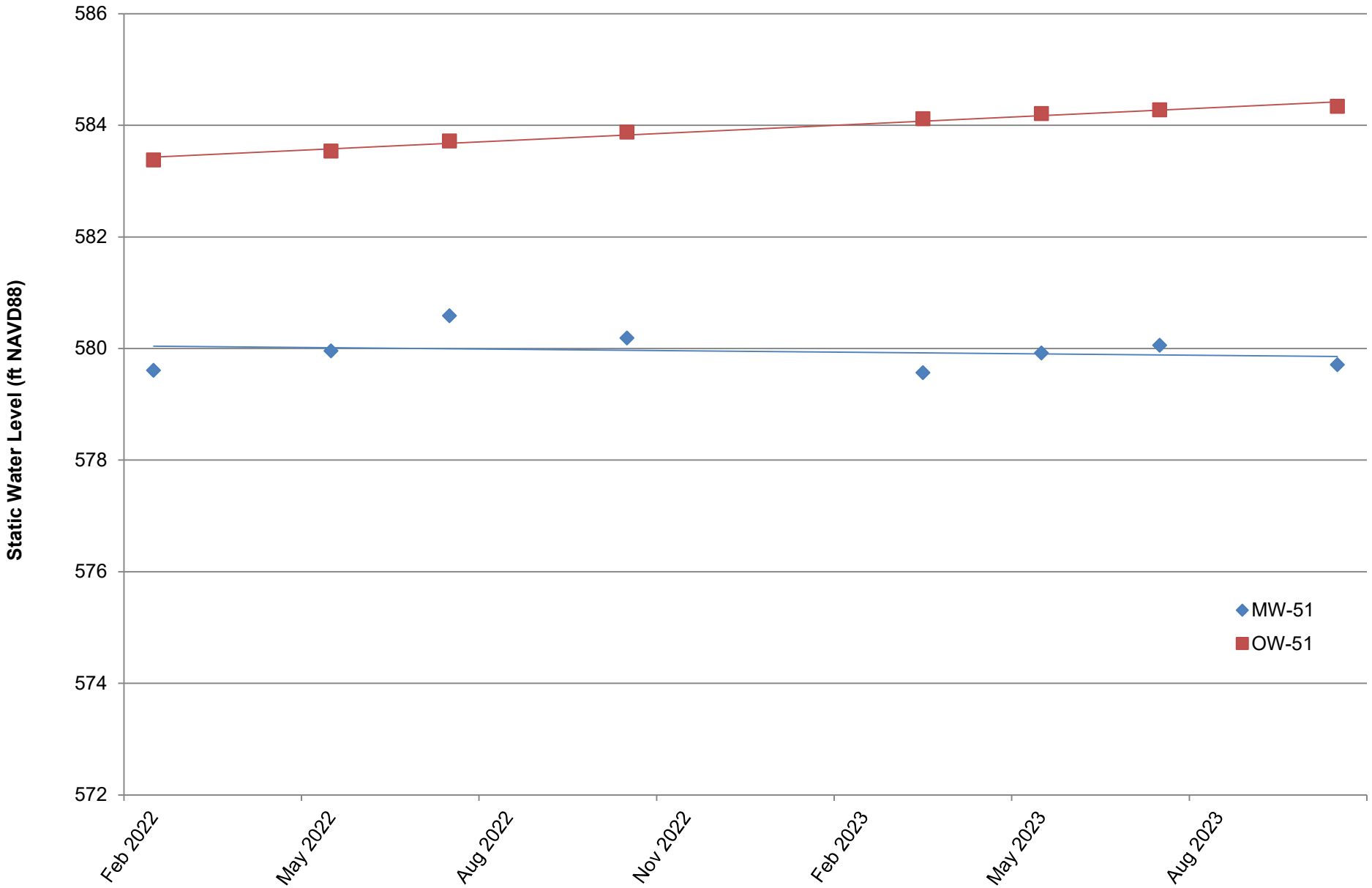
ft/ft = feet per foot; cm/sec = centimeters per second; ft^2 = square feet; ft^3/day = cubic feet per day; Gal/day = gallons per day; Gal/yr = gallons per year

i = hydraulic gradient; K = hydraulic conductivity; x_{wells} = distance between well pairs

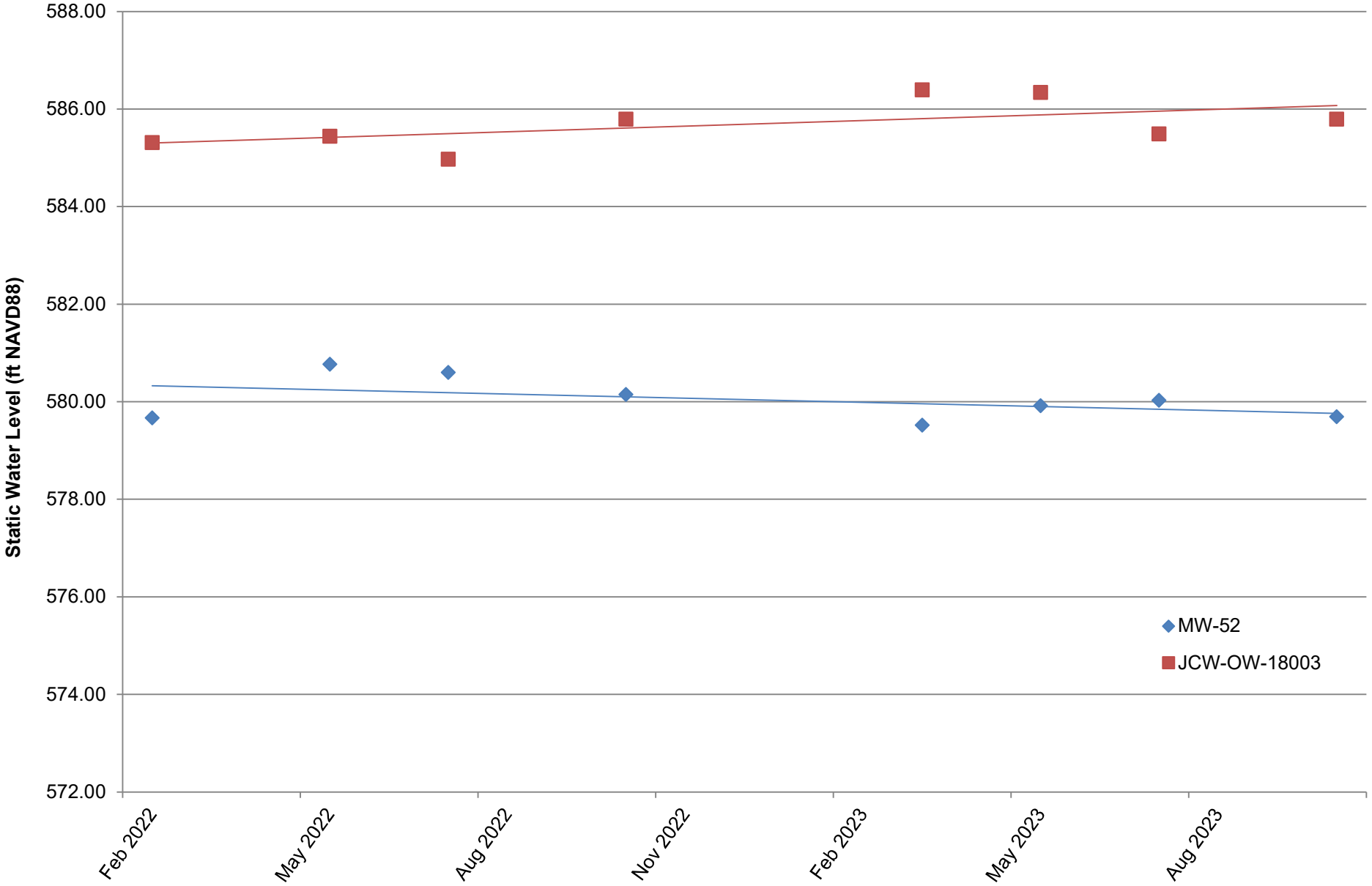
Appendix A
Static Water Level for MW-50 and JCW-OW-18002



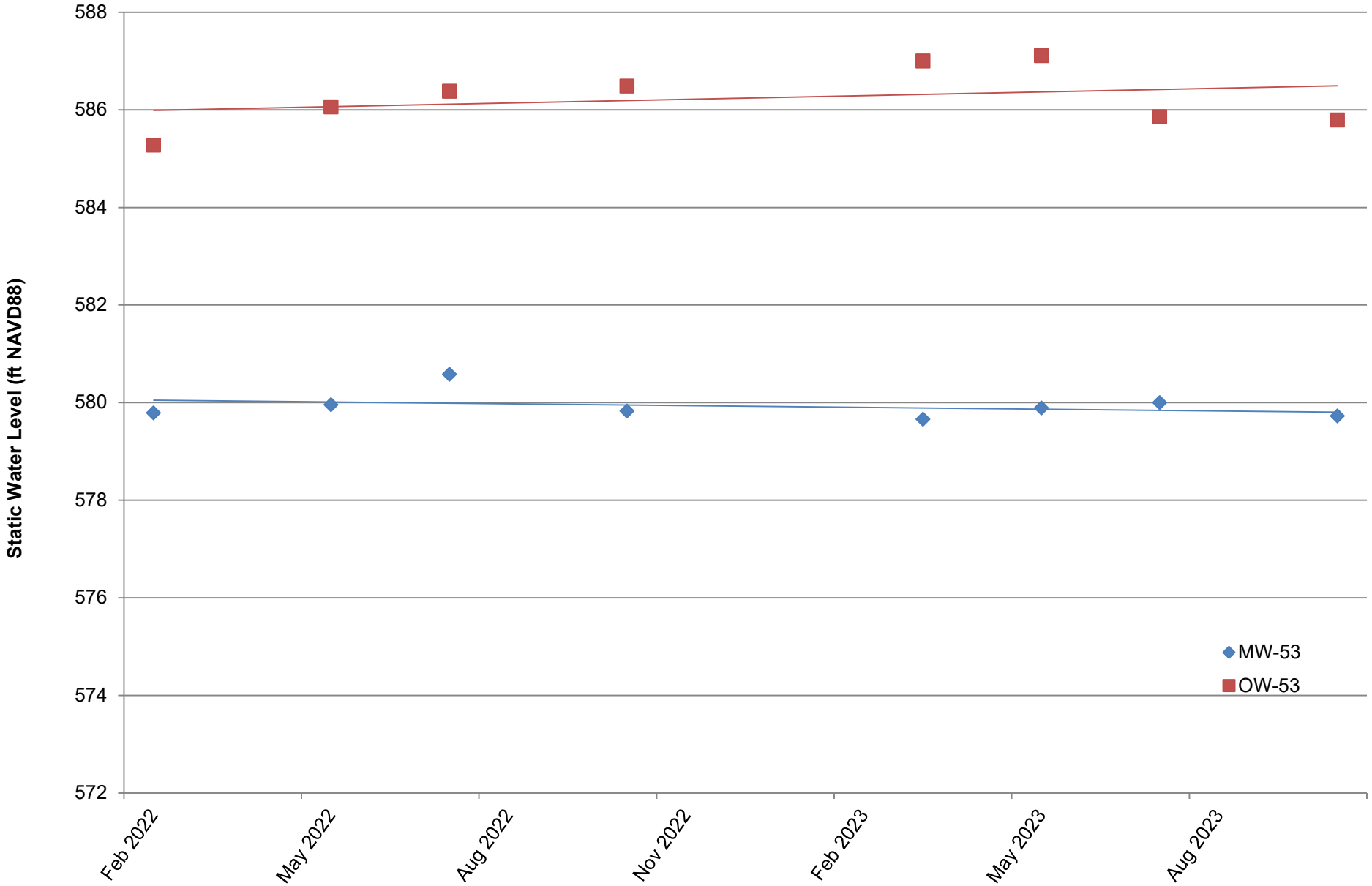
Appendix A
Static Water Level for MW-51 and OW-51



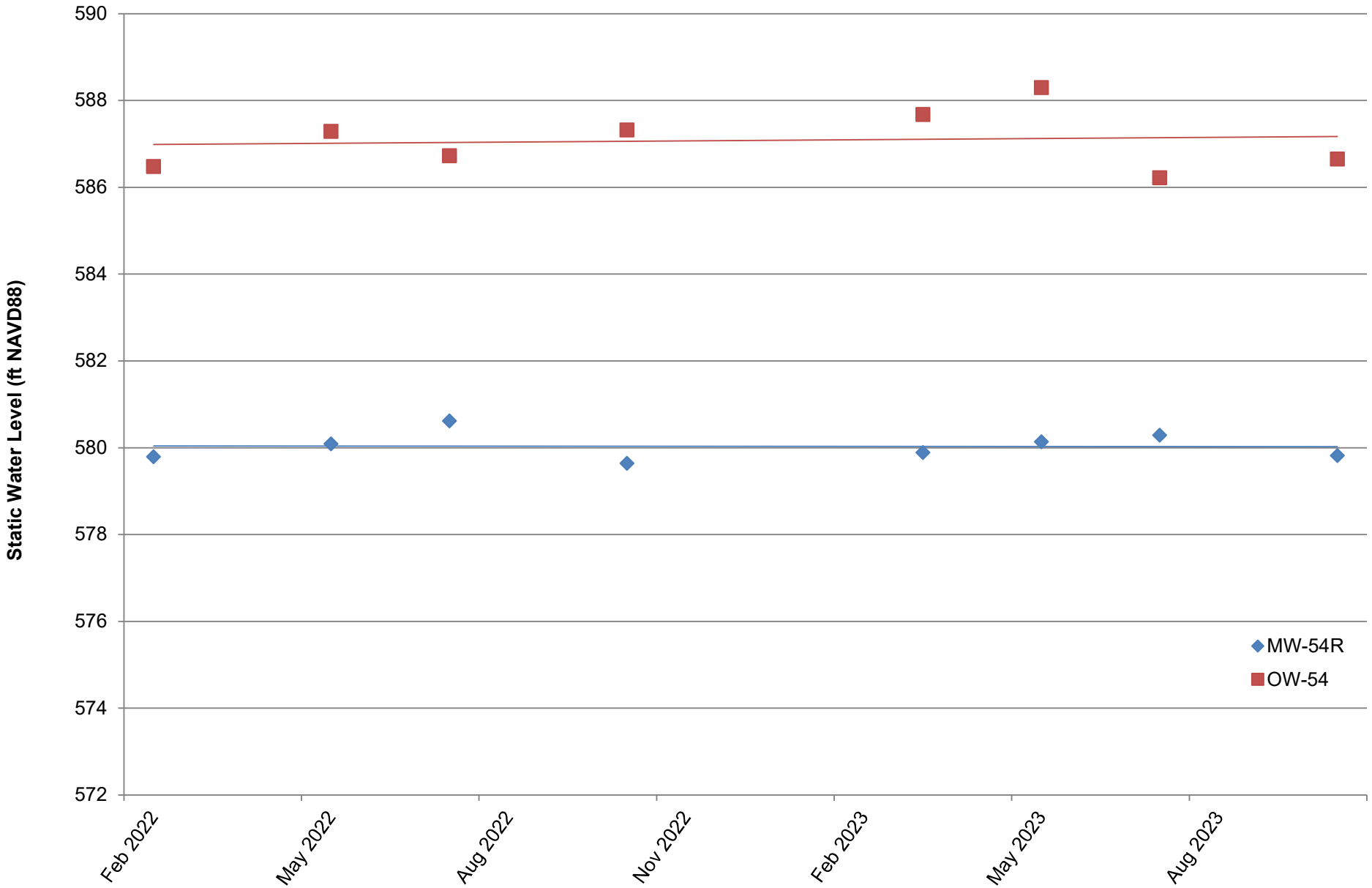
Appendix A
Static Water Level for MW-52 and JCW-OW-18003



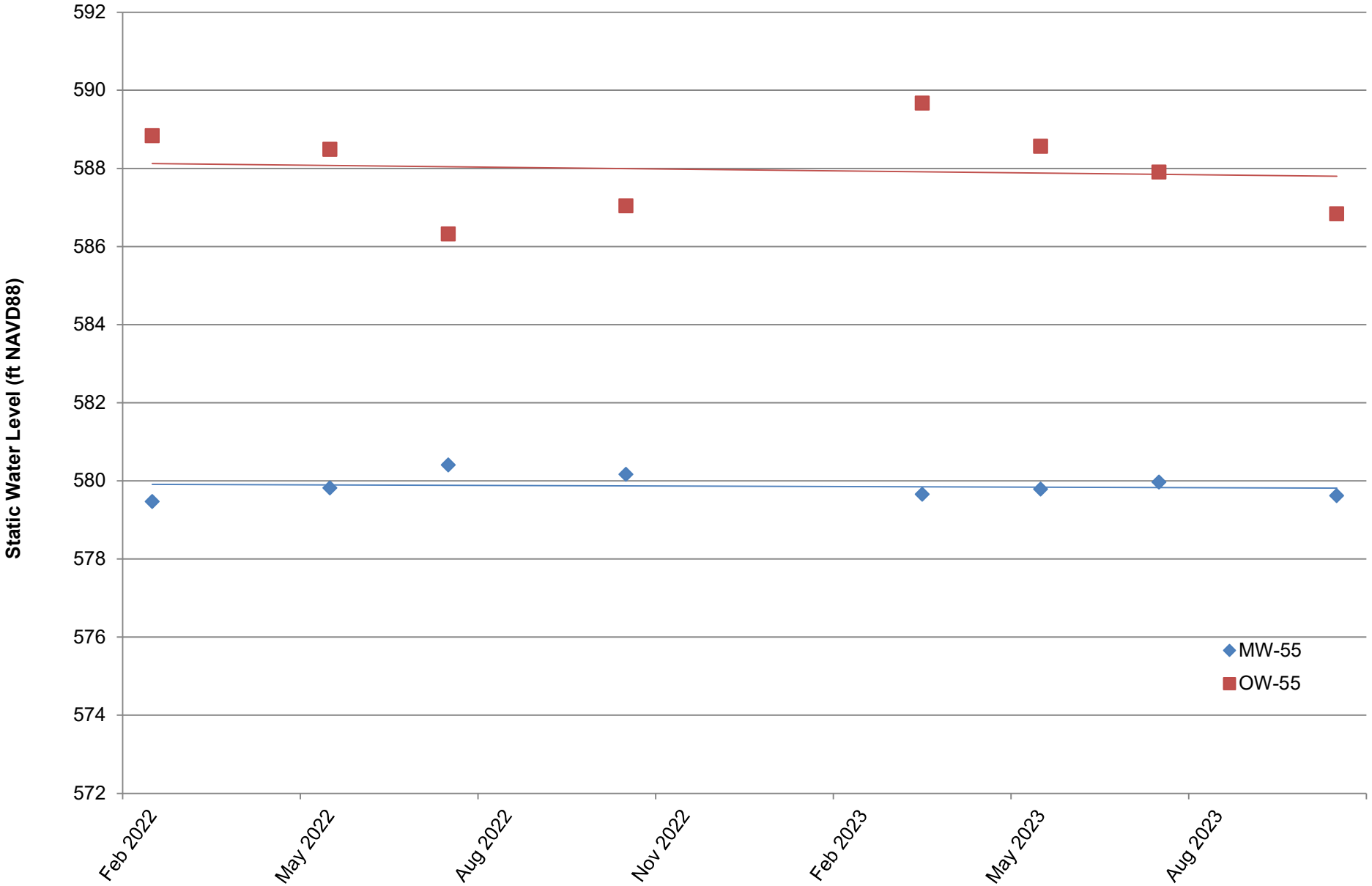
Appendix A
Static Water Level for MW-53 and OW-53



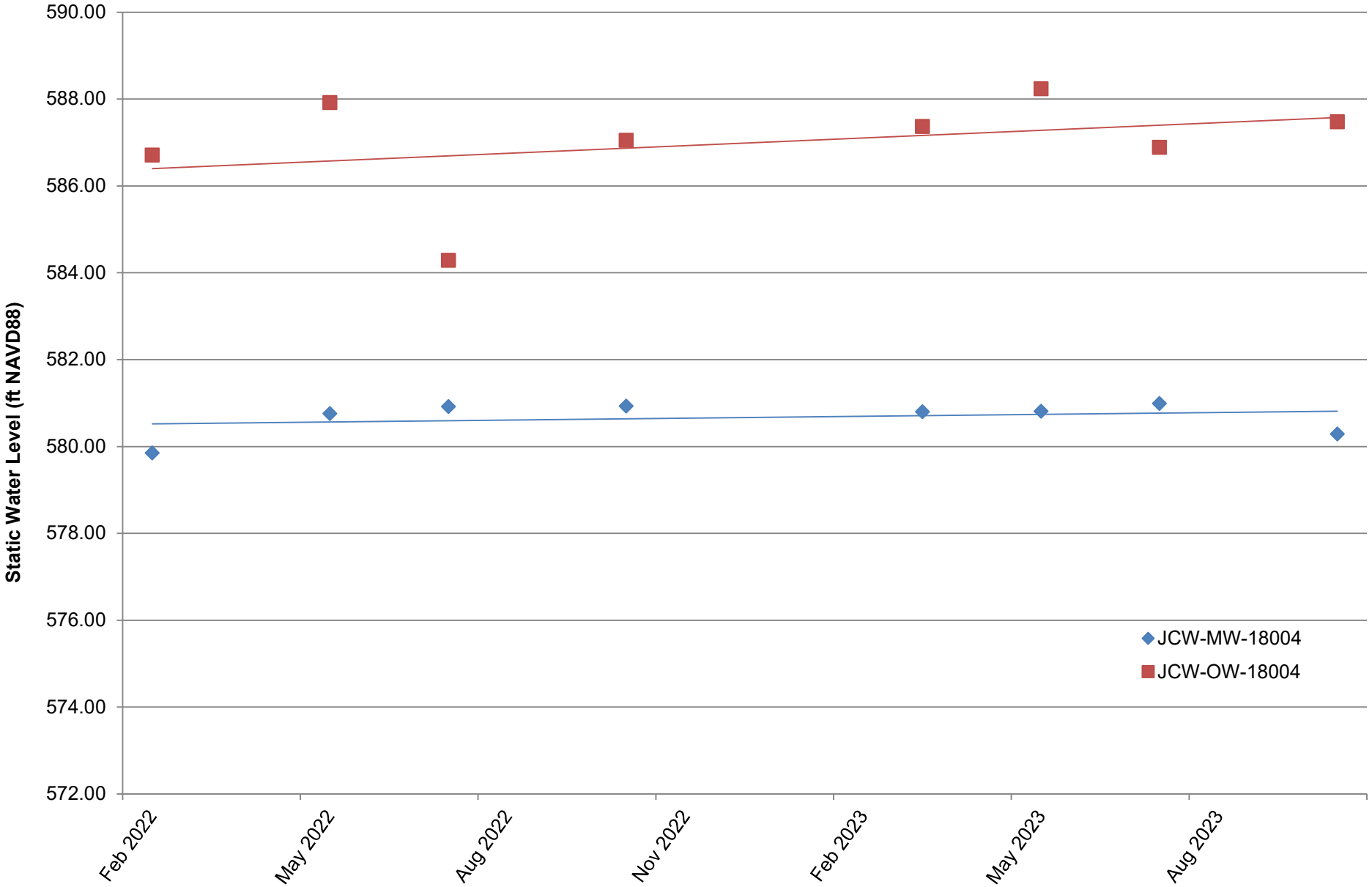
Appendix A
Static Water Level for MW-54R and OW-54



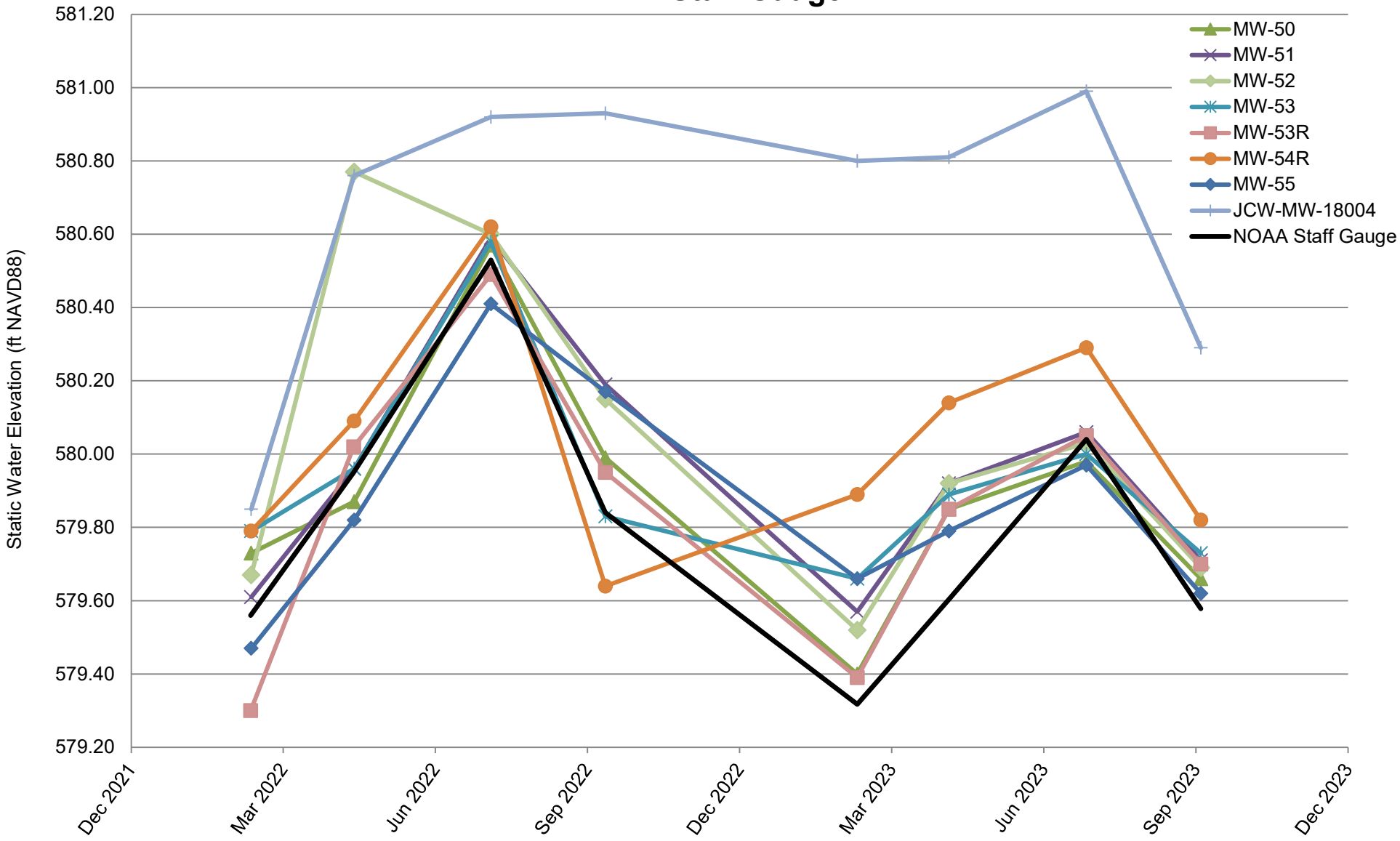
Appendix A
Static Water Level for MW-55 and OW-55



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.

- 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 spike recovery; potential high-bias exists for the listed sample results.
LH-103R Dup	10/4/2023		

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.
- 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

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	Radium-226	Results are potentially biased high due to not undergoing 21-day waiting period prior to analysis. The results are well below the applicable screening criteria and are therefore deemed usable as reported.
JCW-MW-18006	10/9/2023		
MW-50	10/9/2023		
MW-51	10/9/2023		
MW-52	10/9/2023		
MW-53	10/9/2023		
MW-53R	10/9/2023		
MW-54R	10/9/2023		
MW-55	10/9/2023		
MW-58	10/9/2023		
DUP-01	10/9/2023		
DUP #02	10/9/2023		
JCW-MW-18001	10/5/2023	Radium-228	Method blank contamination; potential false positive.
JCW-MW-18004	10/9/2023		
JCW-MW-18005	10/9/2023		
JCW-MW-18006	10/9/2023		
MW-50	10/9/2023		
MW-51	10/9/2023		
MW-52	10/9/2023		
MW-53	10/9/2023		
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		
DUP-01	10/9/2023		
DUP #02	10/9/2023		
EB-01	10/9/2023		
JCW-MW-18001	10/5/2023	Combined radium-226+228	Equipment blank contamination; potential false positive.
JCW-MW-18004	10/9/2023		
JCW-MW-18005	10/9/2023		
JCW-MW-18006	10/9/2023		
MW-50	10/9/2023		
MW-51	10/9/2023		
MW-52	10/9/2023		
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 radium-226+228	Equipment blank contamination; potential false positive.
DUP #02	10/9/2023		
MW-53	10/9/2023		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	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-15016	10/4/2023		
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(1)	O	O	O	O	O	↓*
Calcium	↑ ASD	O	O	O	O	↓
Chloride	O	O	O	O	↓*	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	↑	O	O	O	O	O
pH/Corrosivity(1)	O	O	O	O	O	O
Sulfate	↑ ASD	O	O	O	O	↓
Total Dissolved Solids	O	O	O	O	O	↓

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(1)	O	O	O	↑	↑	O
Calcium	O	O	O	O	O	O
Chloride	↓	O	O	O	O	O
Fluoride	O*	O*	O*	O*	O*	O*
Iron	O	O	O	O	O	O
pH/Corrosivity(1)	O	O	O	O	O	O
Sulfate	↓*	O	O	O	O	O
Total Dissolved Solids	O	O	O	O	O	O

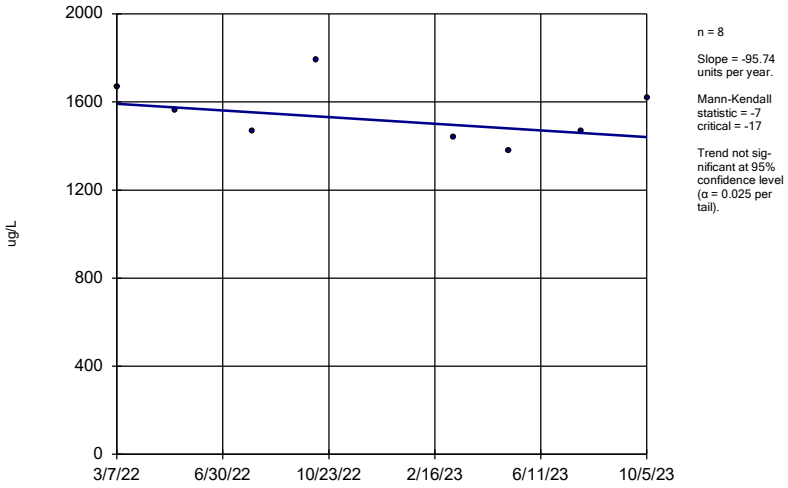
Notes:

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).

Boron, Total

JCW-MW-18001



n = 8

Slope = -95.74 units per year.

Mann-Kendall statistic = -7 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

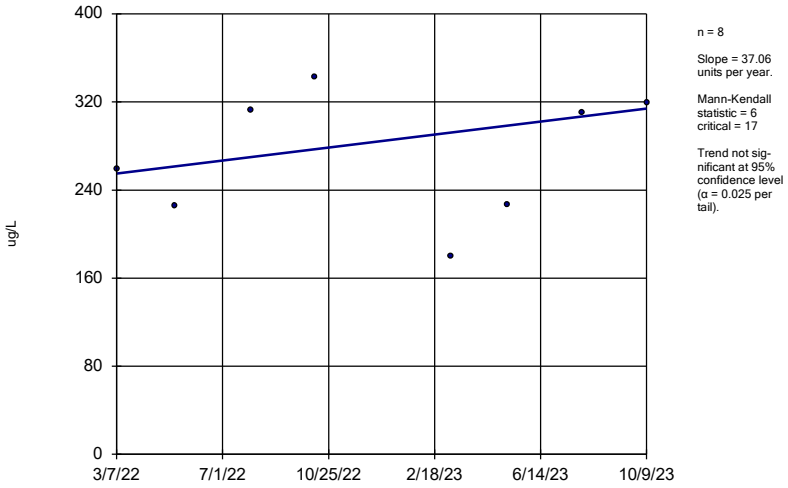
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

JCW-MW-18004



n = 8

Slope = 37.06 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

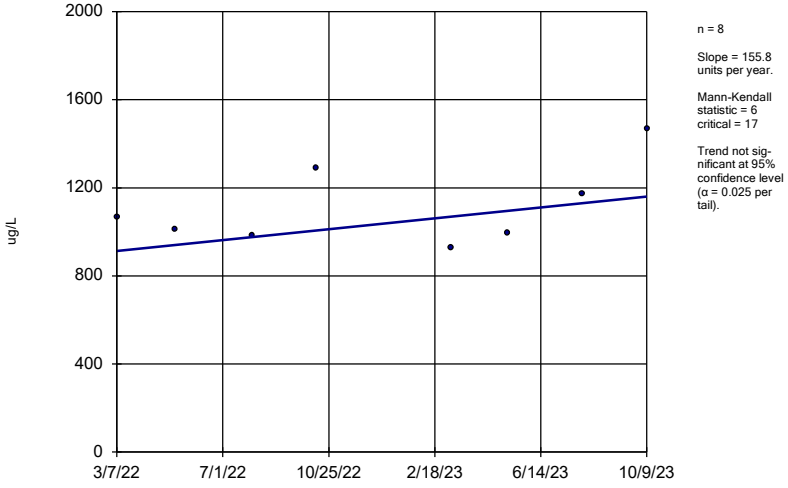
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

JCW-MW-18005



n = 8

Slope = 155.8 units per year.

Mann-Kendall statistic = 6 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

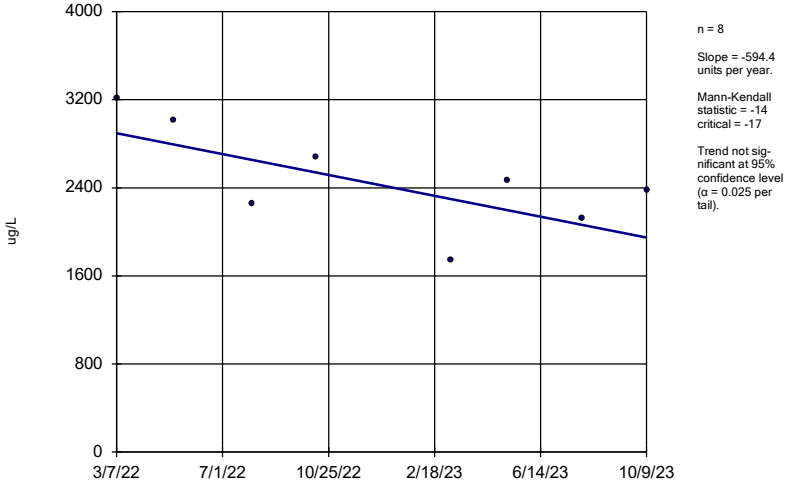
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

JCW-MW-18006



n = 8

Slope = -594.4 units per year.

Mann-Kendall statistic = -14 critical = -17

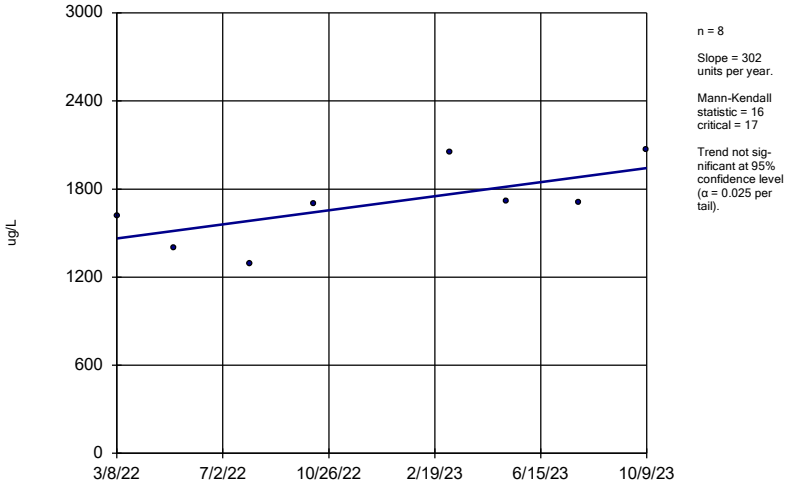
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-50



n = 8

Slope = 302 units per year.

Mann-Kendall statistic = 16 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

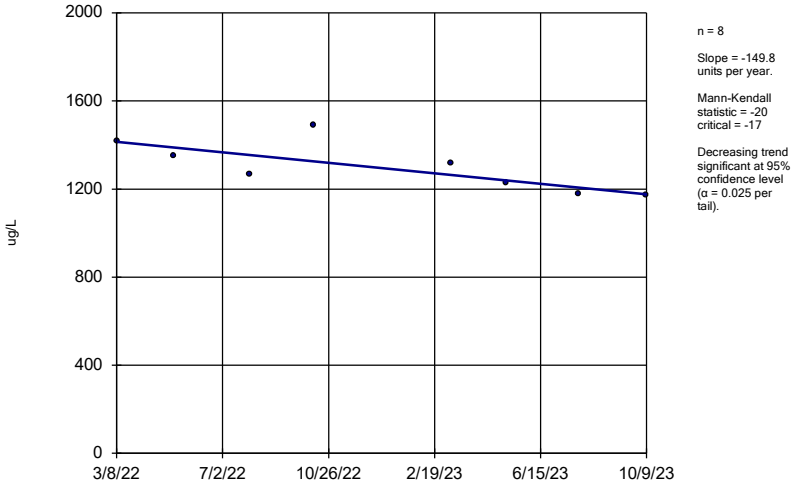
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

MW-51



n = 8

Slope = -149.8 units per year.

Mann-Kendall statistic = -20 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

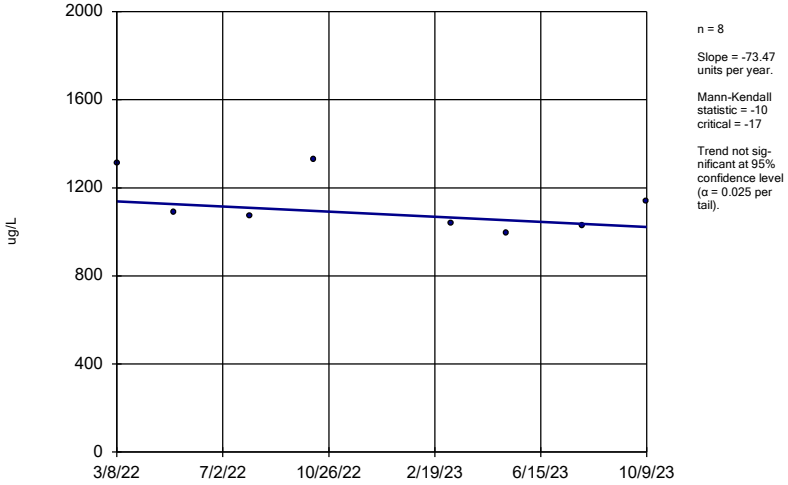
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

MW-52



n = 8

Slope = -73.47 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

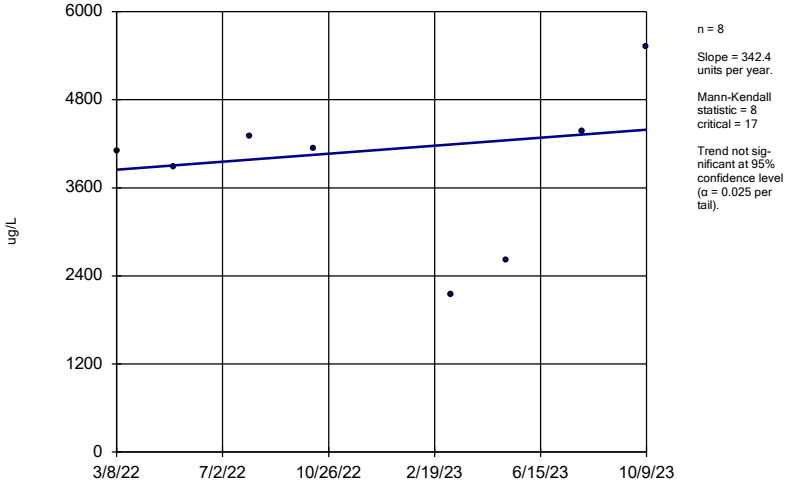
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Boron, Total

MW-53



n = 8

Slope = 342.4 units per year.

Mann-Kendall statistic = 8 critical = 17

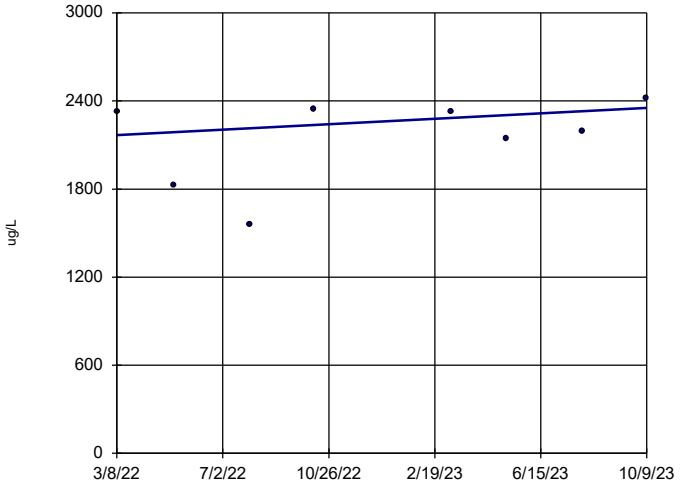
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-53R



n = 8

Slope = 116.9 units per year.

Mann-Kendall statistic = 7 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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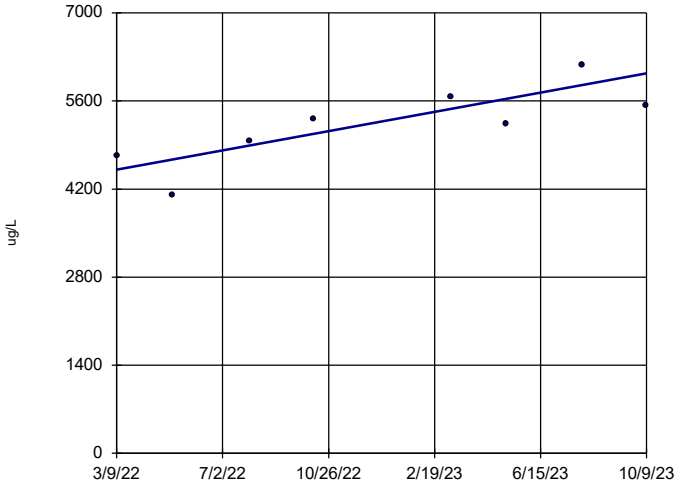
Boron, Total

MW-54R



n = 8

Slope = 966.8 units per year.

Mann-Kendall statistic = 18 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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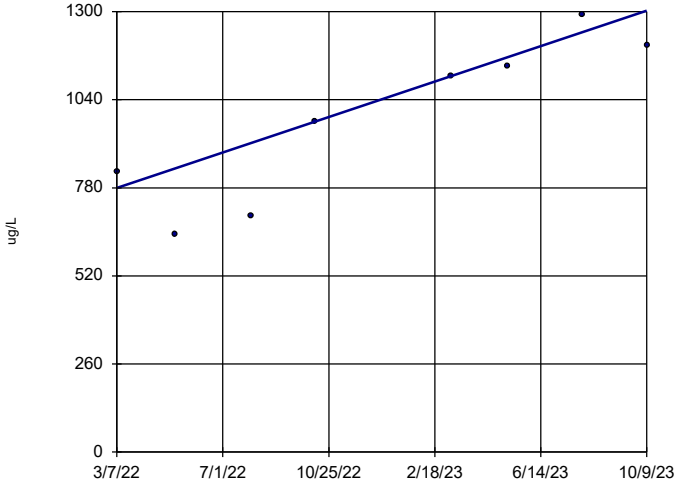
Boron, Total

MW-55



n = 8

Slope = 328.7 units per year.

Mann-Kendall statistic = 22 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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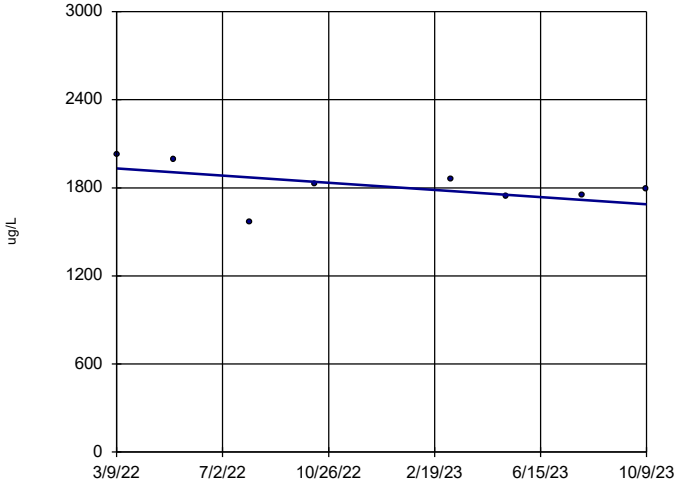
Boron, Total

OW-57ROUT



n = 8

Slope = -153.9 units per year.

Mann-Kendall statistic = -10 critical = -17

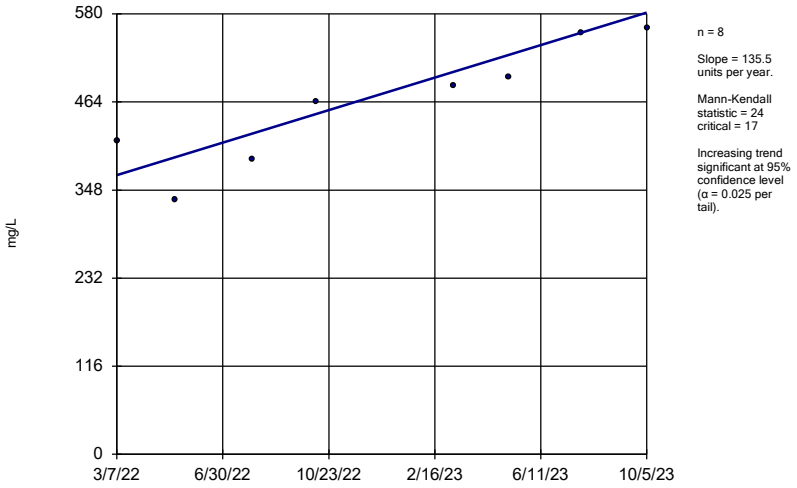
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Calcium, Total

JCW-MW-18001



n = 8

Slope = 135.5 units per year.

Mann-Kendall statistic = 24
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

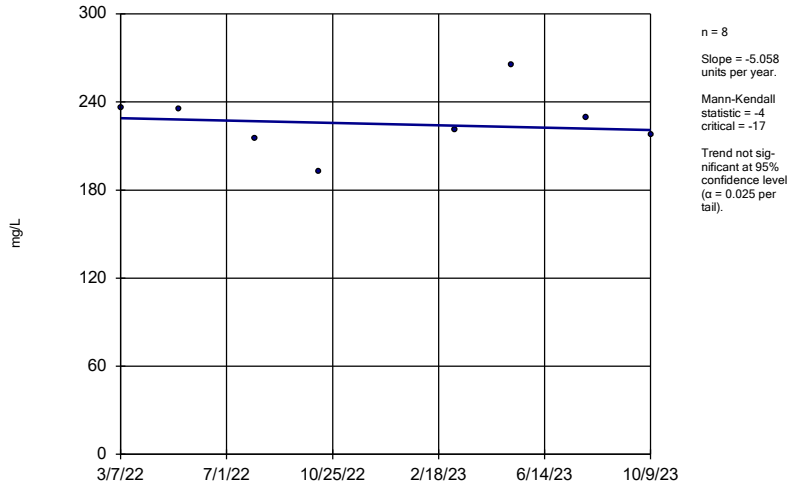
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

JCW-MW-18004



n = 8

Slope = -5.058 units per year.

Mann-Kendall statistic = -4
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

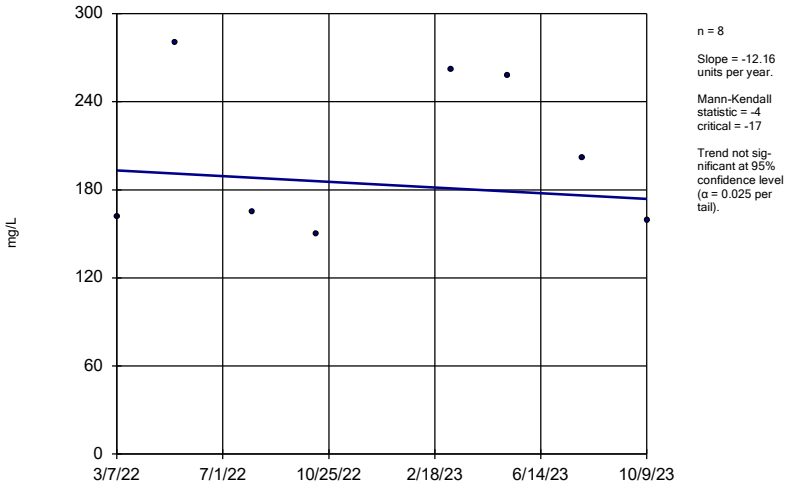
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

JCW-MW-18005



n = 8

Slope = -12.16 units per year.

Mann-Kendall statistic = -4
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

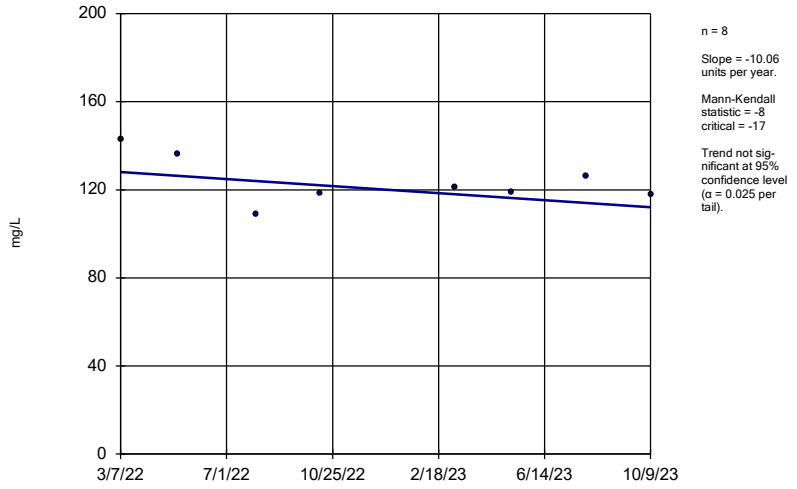
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

JCW-MW-18006



n = 8

Slope = -10.06 units per year.

Mann-Kendall statistic = -8
critical = -17

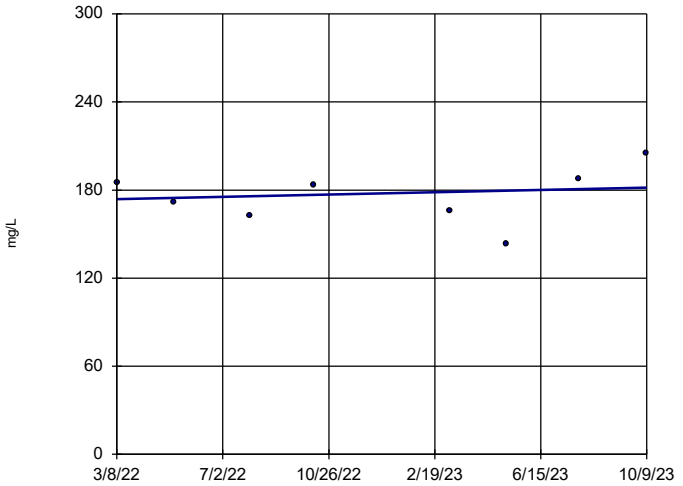
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Calcium, Total

MW-50



n = 8

Slope = 5.026 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

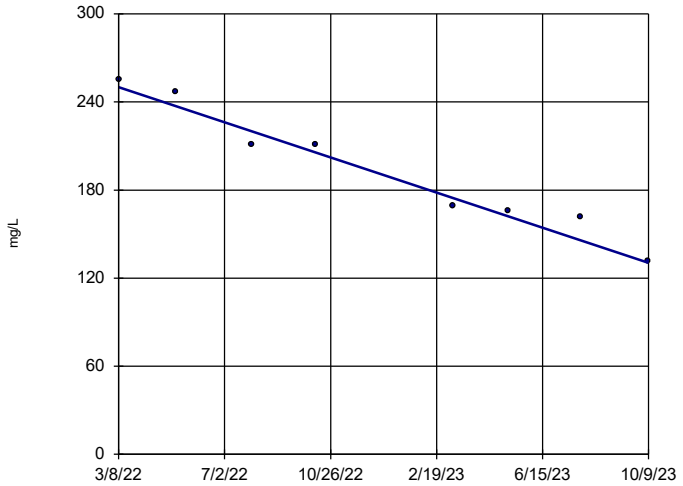
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

MW-51



n = 8

Slope = -75.3 units per year.

Mann-Kendall statistic = -27 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

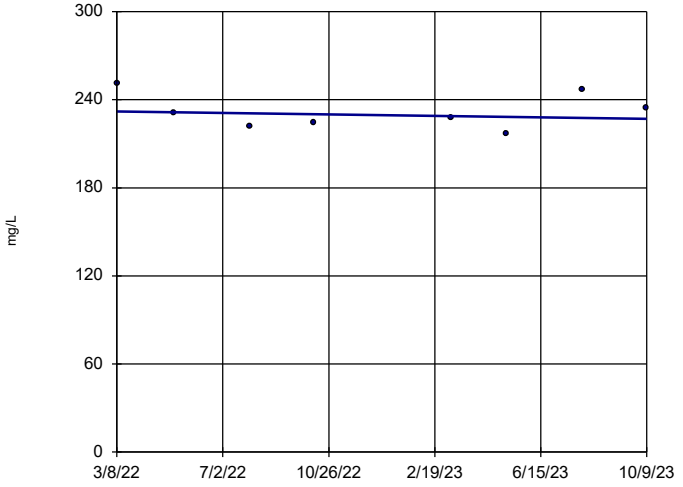
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

MW-52



n = 8

Slope = -3.232 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

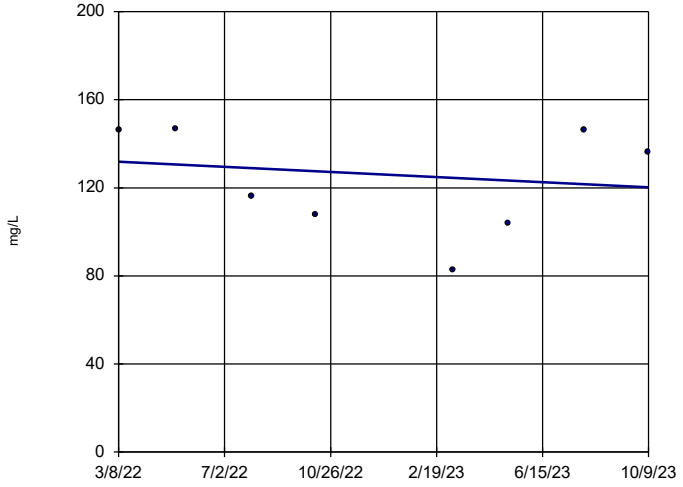
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

MW-53



n = 8

Slope = -7.352 units per year.

Mann-Kendall statistic = -7 critical = -17

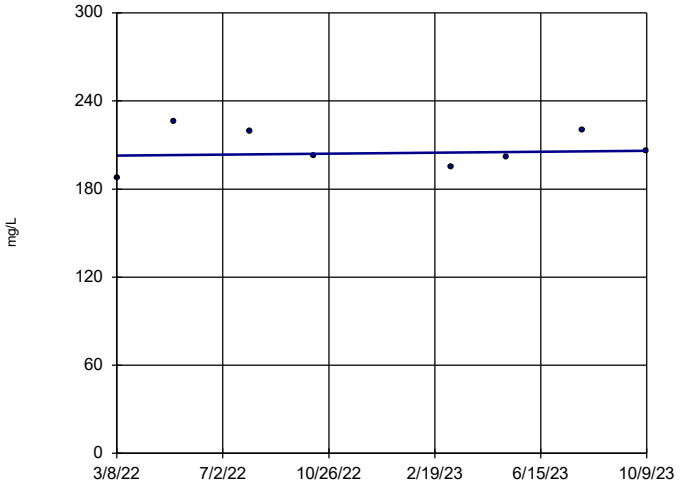
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Calcium, Total

MW-53R



n = 8

Slope = 2.005 units per year.

Mann-Kendall statistic = 2 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

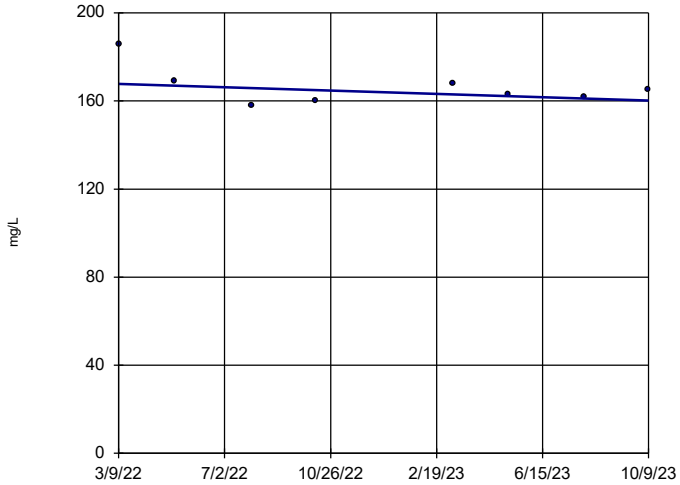
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

MW-54R



n = 8

Slope = -4.757 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

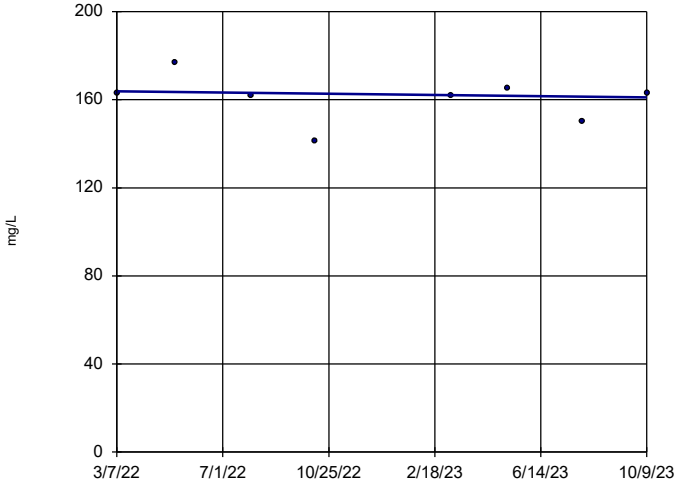
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

MW-55



n = 8

Slope = -1.739 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

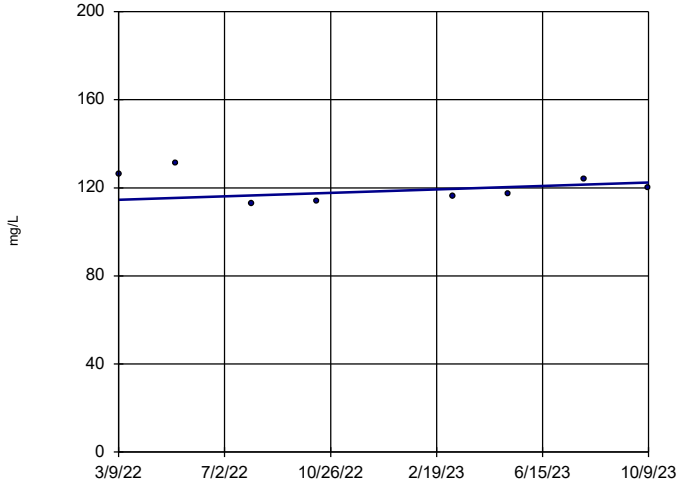
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Calcium, Total

OW-57ROUT



n = 8

Slope = 4.95 units per year.

Mann-Kendall statistic = 2 critical = 17

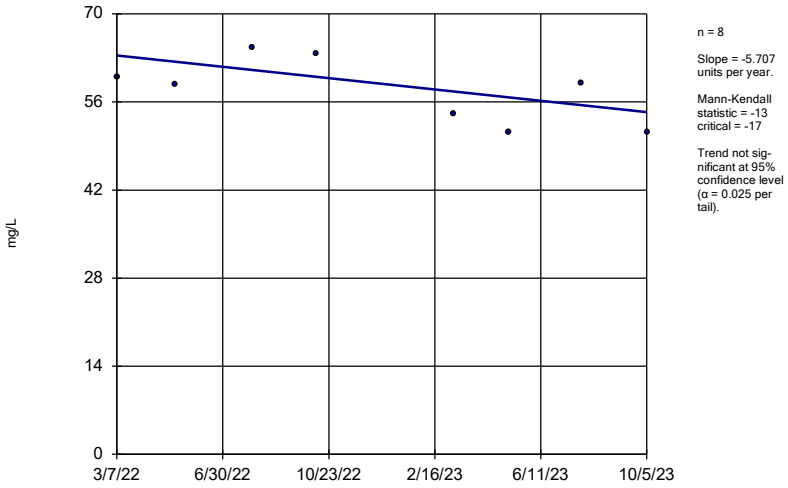
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Chloride

JCW-MW-18001



n = 8

Slope = -5.707 units per year.

Mann-Kendall statistic = -13
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

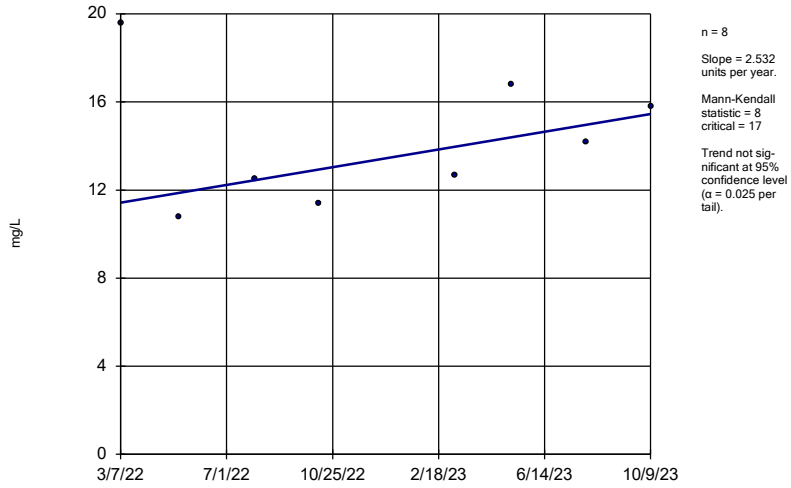
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

JCW-MW-18004



n = 8

Slope = 2.532 units per year.

Mann-Kendall statistic = 8
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

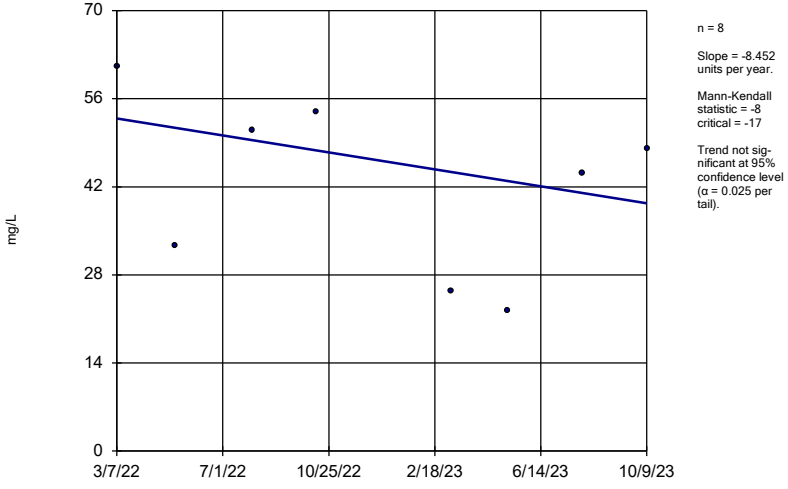
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

JCW-MW-18005



n = 8

Slope = -8.452 units per year.

Mann-Kendall statistic = -8
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

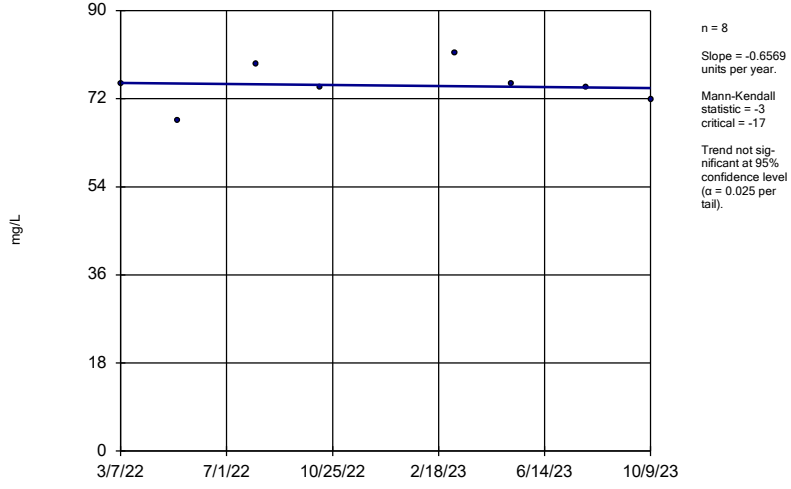
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

JCW-MW-18006



n = 8

Slope = -0.6569 units per year.

Mann-Kendall statistic = -3
critical = -17

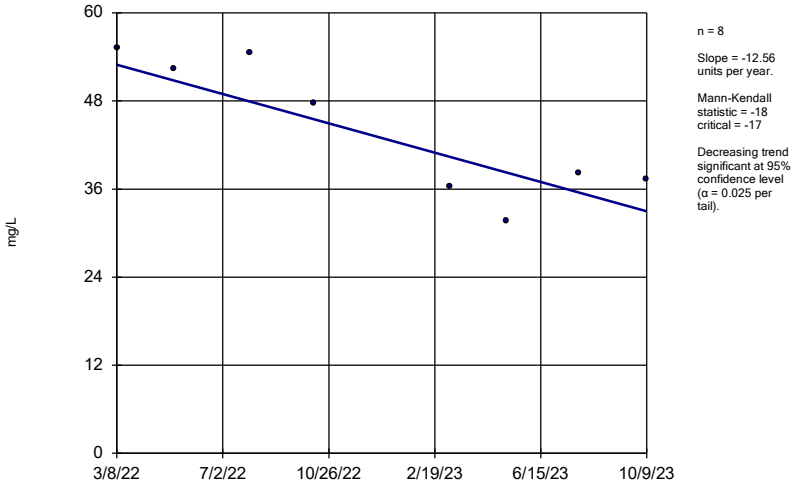
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Chloride

MW-50



n = 8

Slope = -12.56 units per year.

Mann-Kendall statistic = -18
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

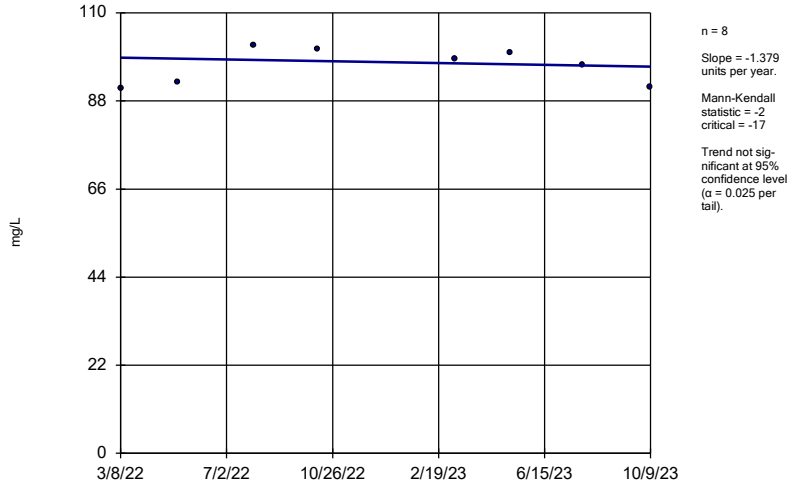
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

MW-51



n = 8

Slope = -1.379 units per year.

Mann-Kendall statistic = -2
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

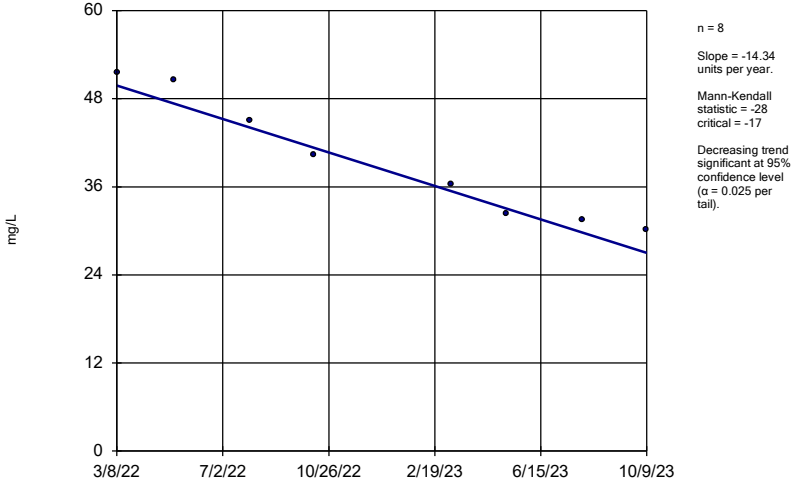
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

MW-52



n = 8

Slope = -14.34 units per year.

Mann-Kendall statistic = -28
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

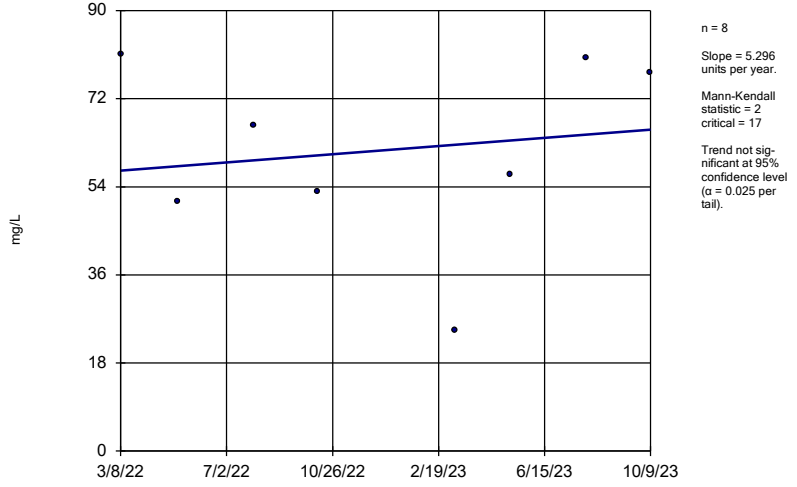
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

MW-53



n = 8

Slope = 5.296 units per year.

Mann-Kendall statistic = 2
critical = 17

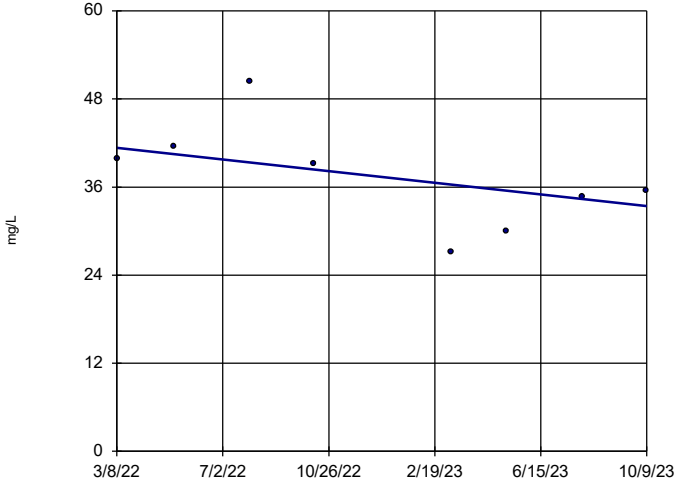
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Chloride

MW-53R



n = 8

Slope = -4.993 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

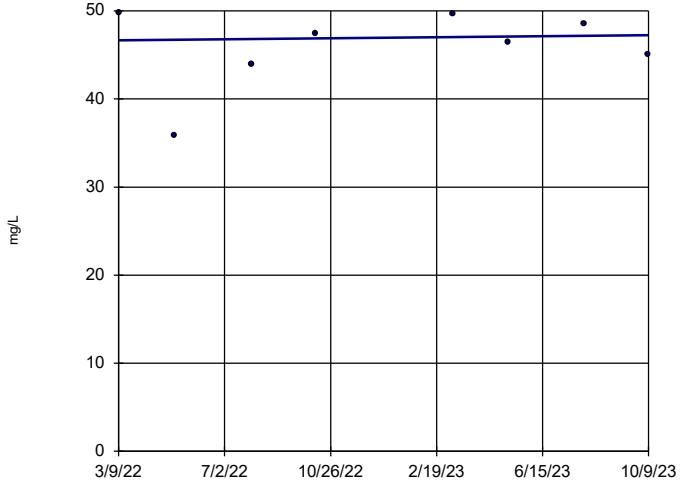
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

MW-54R



n = 8

Slope = 0.3626 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

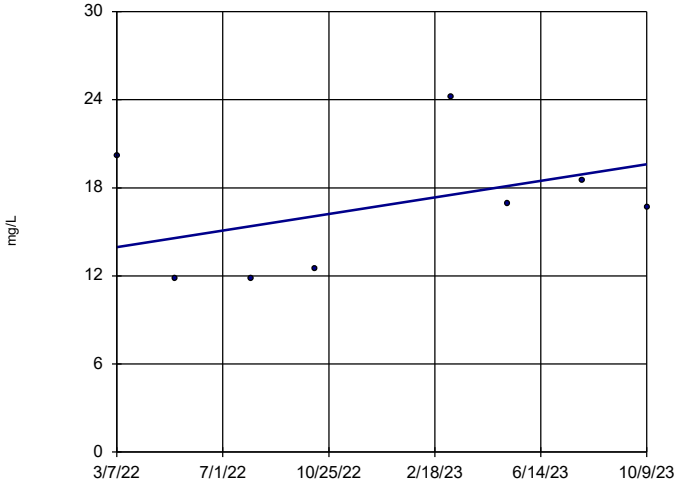
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

MW-55



n = 8

Slope = 3.555 units per year.

Mann-Kendall statistic = 5 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

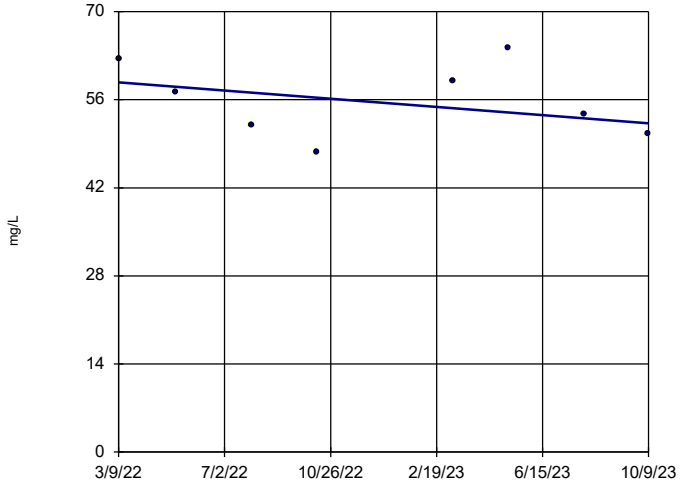
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Chloride

OW-57ROUT



n = 8

Slope = -4.115 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

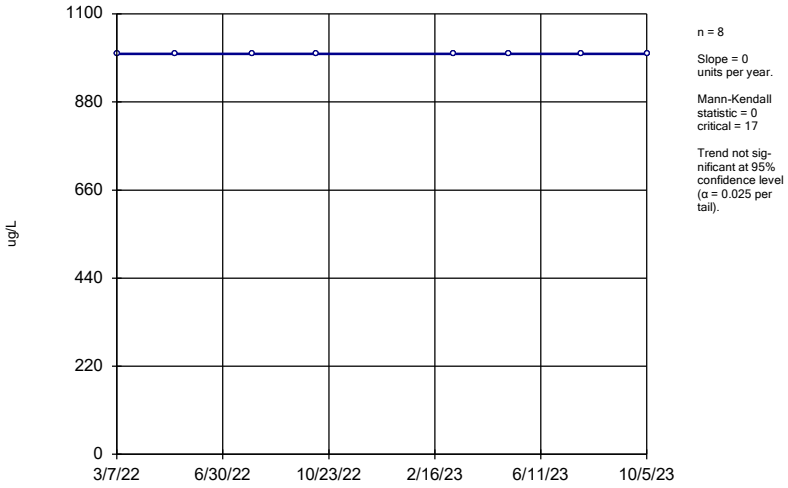
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18001



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

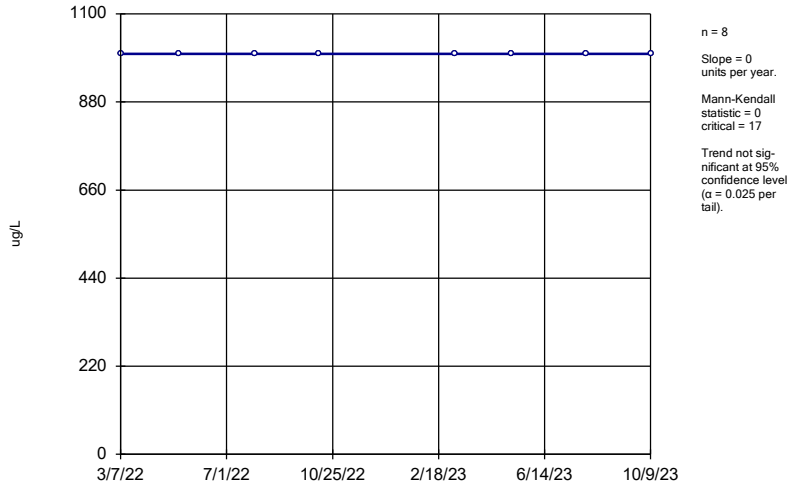
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

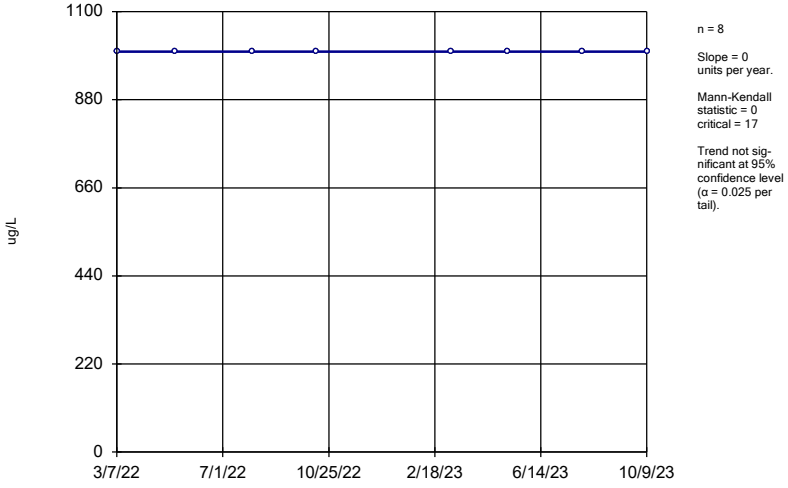
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18005



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

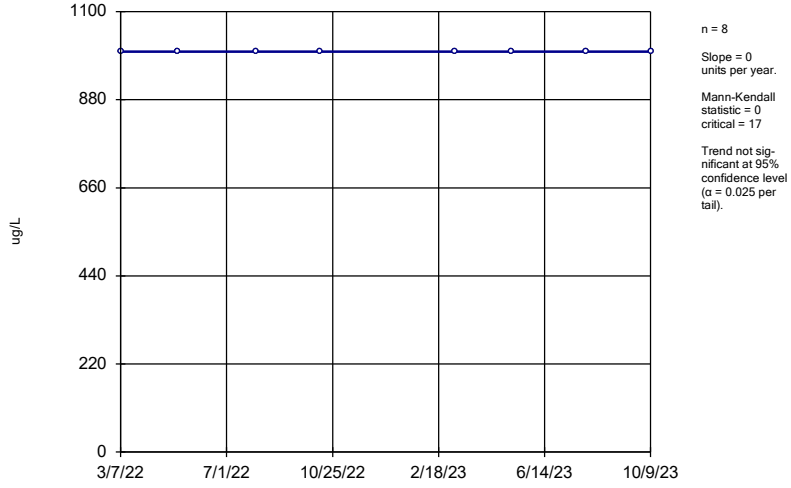
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

JCW-MW-18006



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

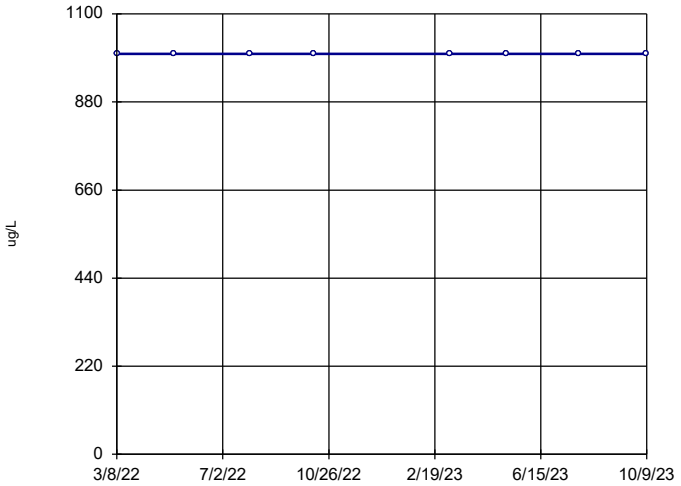
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-50



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

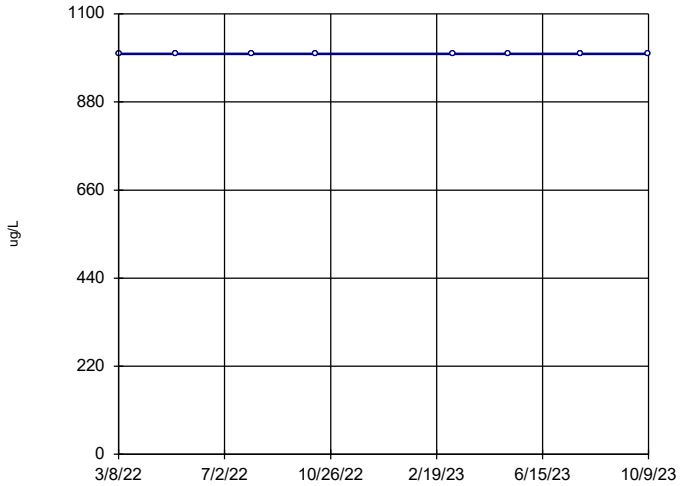
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-51



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

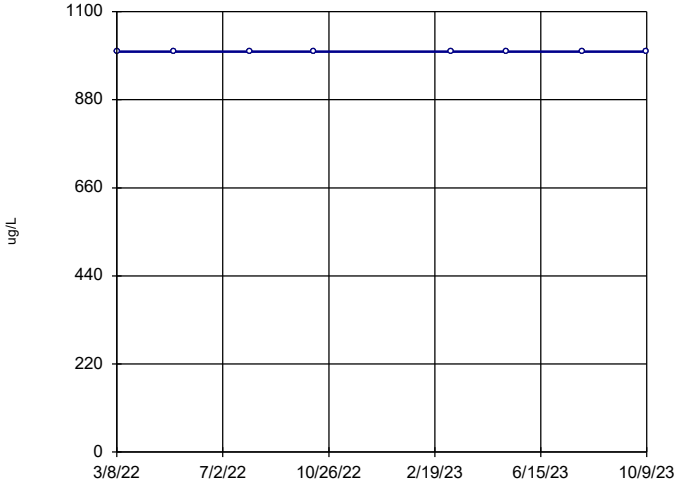
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-52



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

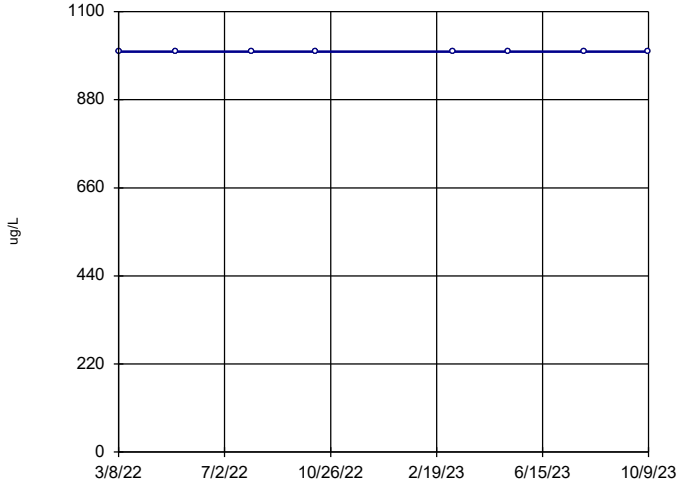
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

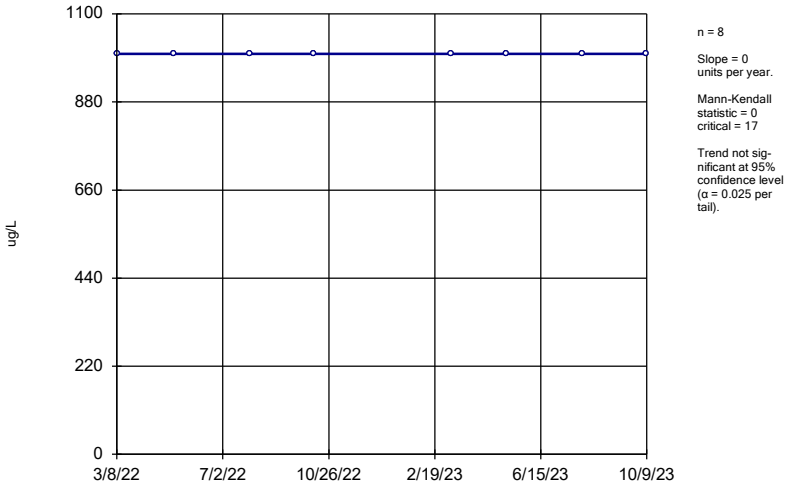
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-53R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

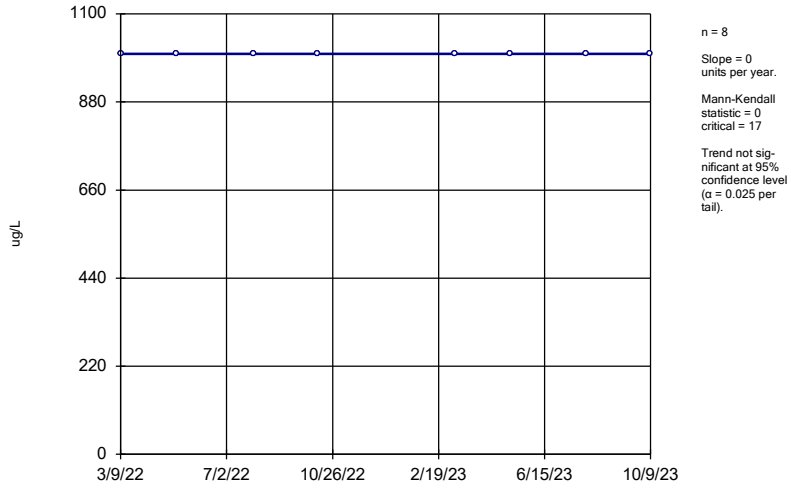
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-54R



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

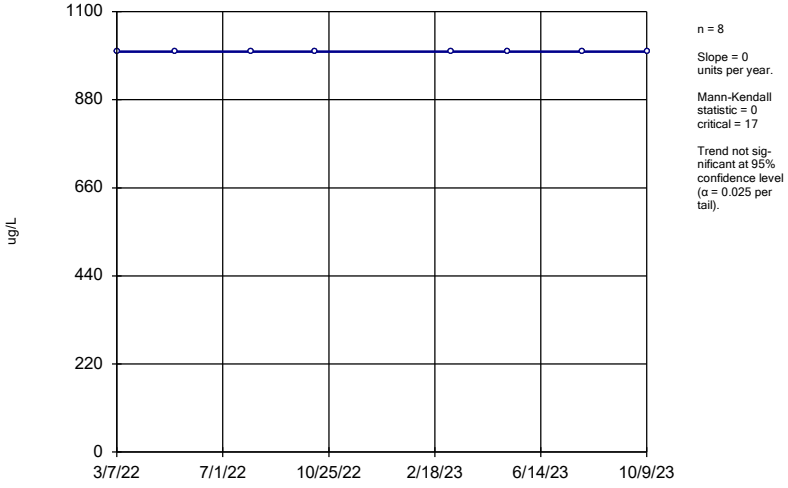
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

MW-55



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

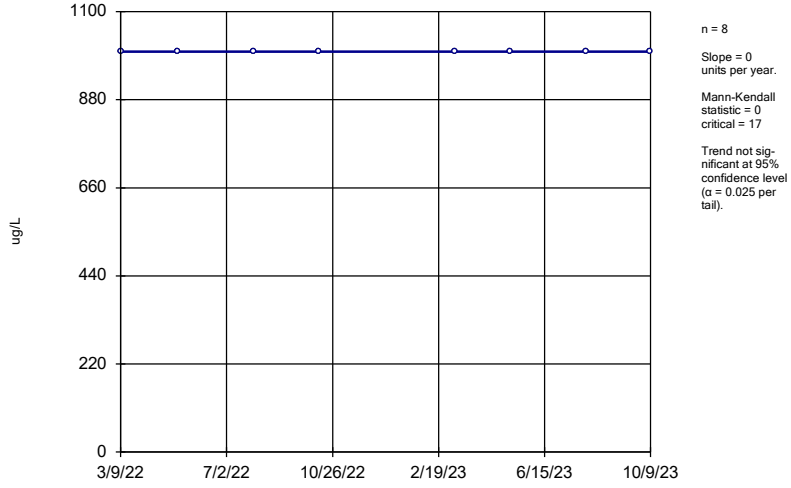
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG
Hollow symbols indicate censored values.

Fluoride

OW-57ROUT



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 17

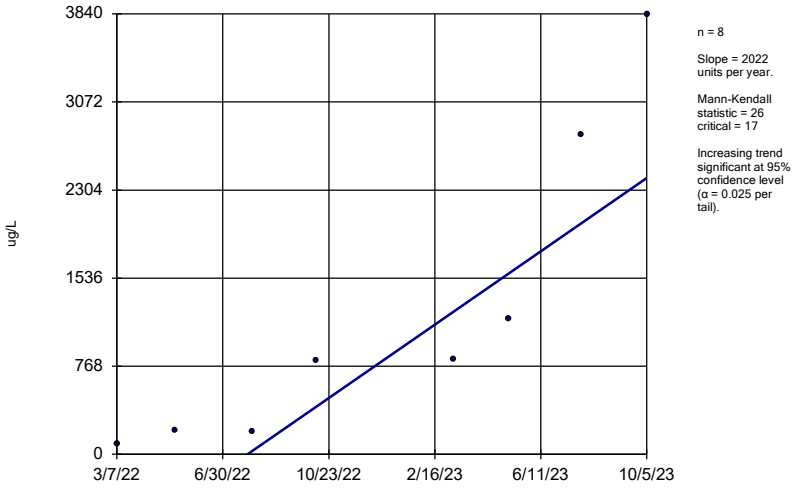
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

JCW-MW-18001



n = 8

Slope = 2022 units per year.

Mann-Kendall statistic = 26
critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

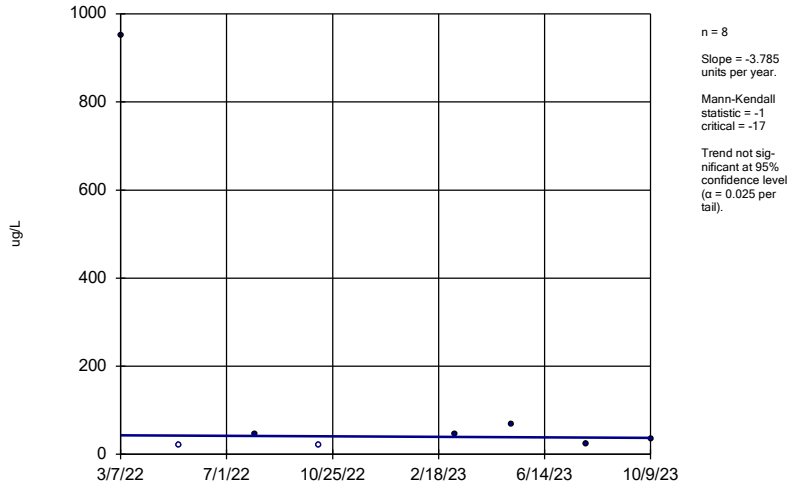
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Hollow symbols indicate censored values.

Iron, Total

JCW-MW-18004



n = 8

Slope = -3.785 units per year.

Mann-Kendall statistic = -1
critical = -17

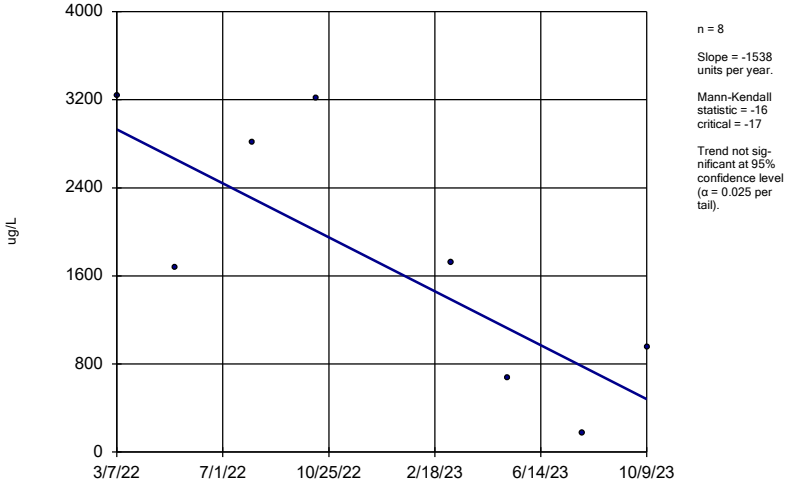
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

JCW-MW-18005



n = 8

Slope = -1538 units per year.

Mann-Kendall statistic = -16
critical = -17

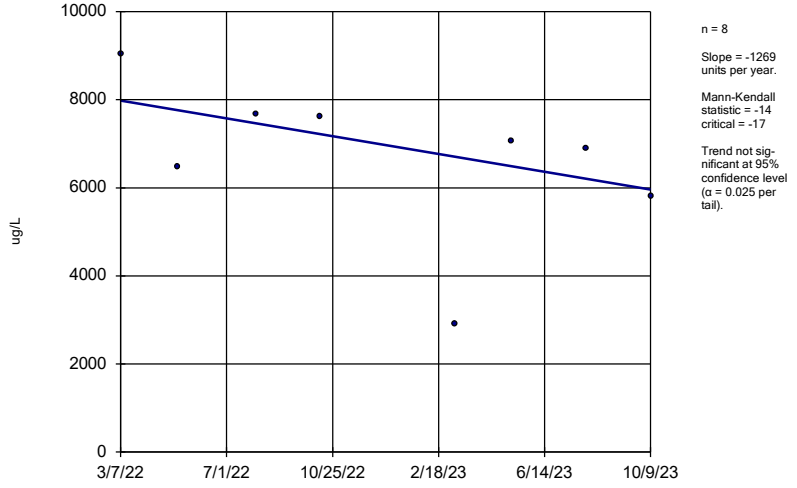
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

JCW-MW-18006



n = 8

Slope = -1269 units per year.

Mann-Kendall statistic = -14
critical = -17

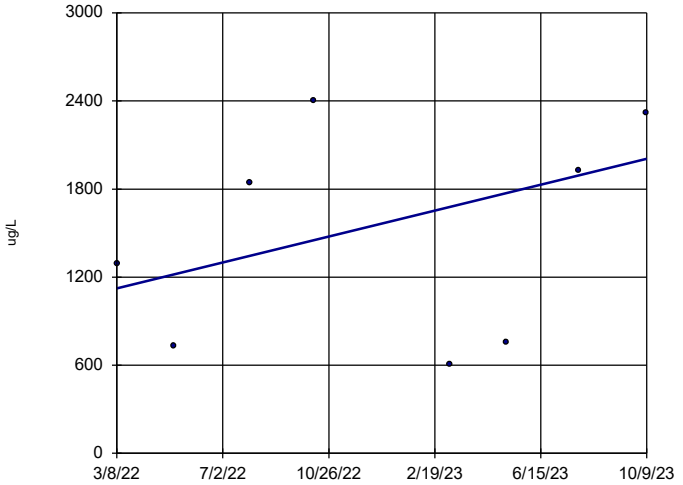
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

MW-50



n = 8

Slope = 555.4 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

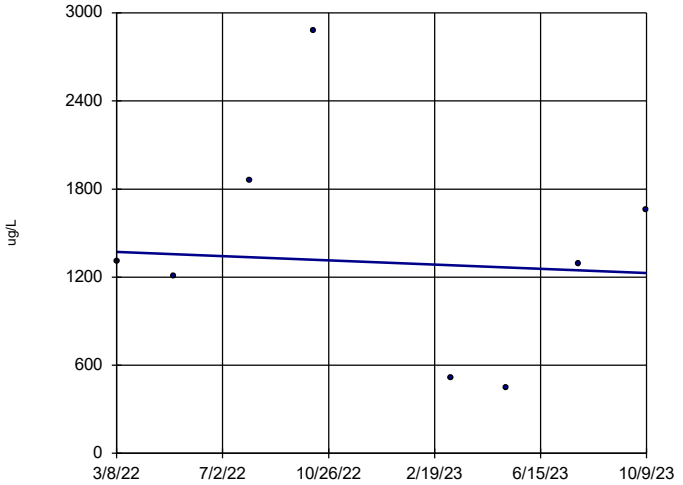
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Iron, Total

MW-51



n = 8

Slope = -91.33 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

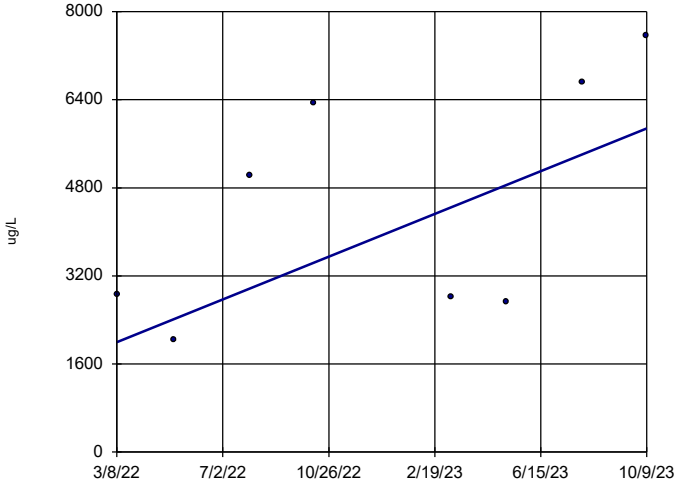
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Iron, Total

MW-52



n = 8

Slope = 2446 units per year.

Mann-Kendall statistic = 12 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

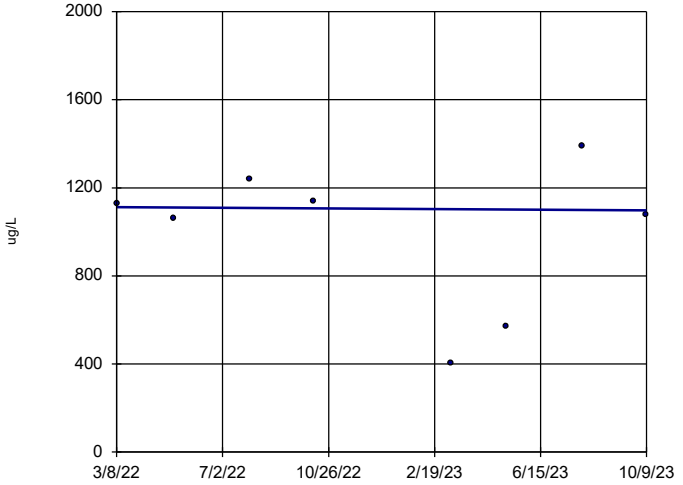
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Iron, Total

MW-53



n = 8

Slope = -8.686 units per year.

Mann-Kendall statistic = 0 critical = 17

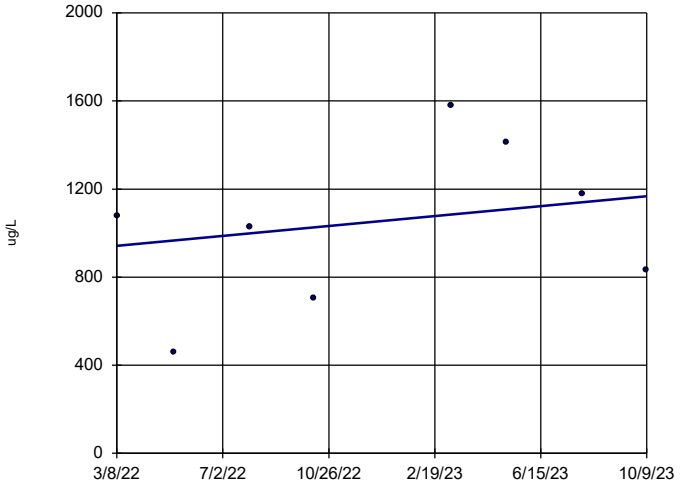
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

MW-53R



n = 8

Slope = 141.4 units per year.

Mann-Kendall statistic = 4 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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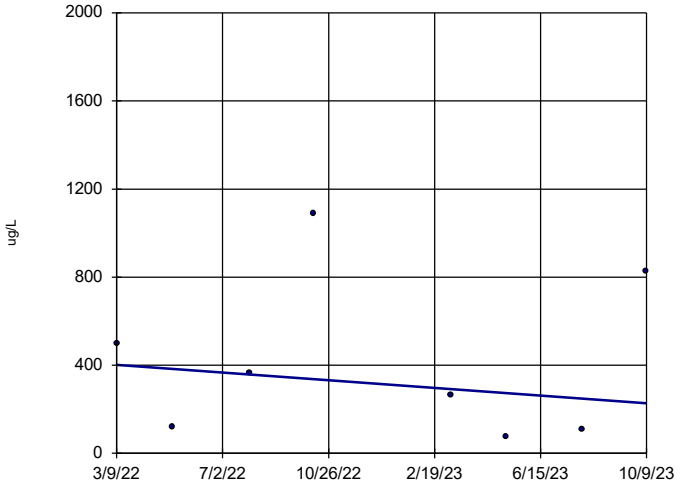
Iron, Total

MW-54R



n = 8

Slope = -110.6 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

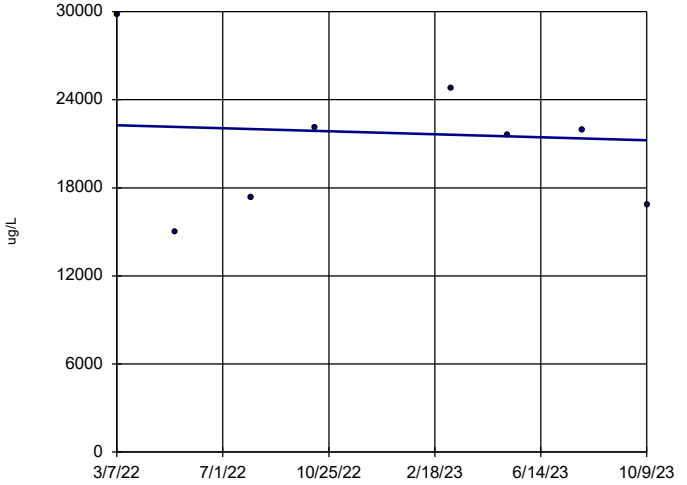
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Iron, Total

MW-55



n = 8

Slope = -642.7 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

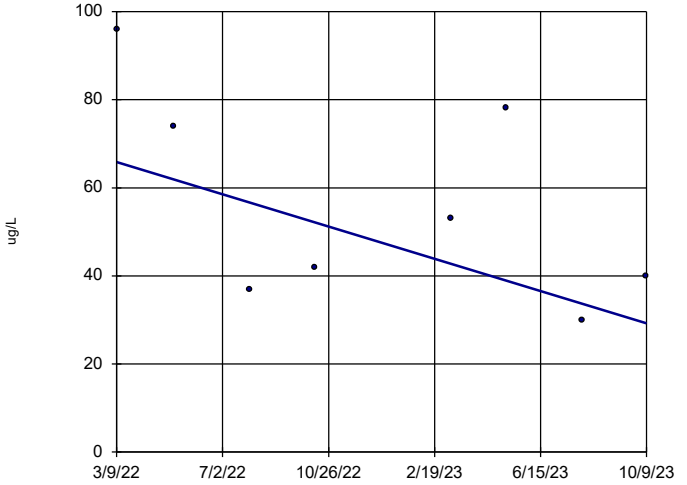
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Iron, Total

OW-57ROUT



n = 8

Slope = -23.09 units per year.

Mann-Kendall statistic = -10 critical = -17

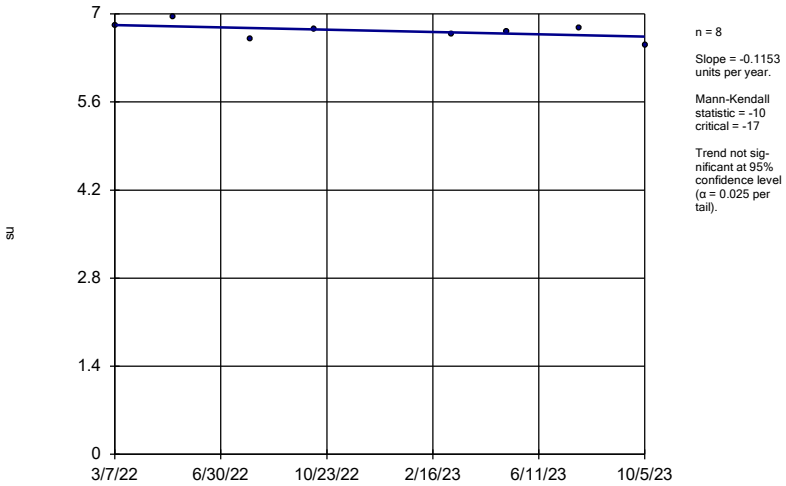
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

JCW-MW-18001



n = 8

Slope = -0.1153 units per year.

Mann-Kendall statistic = -10 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

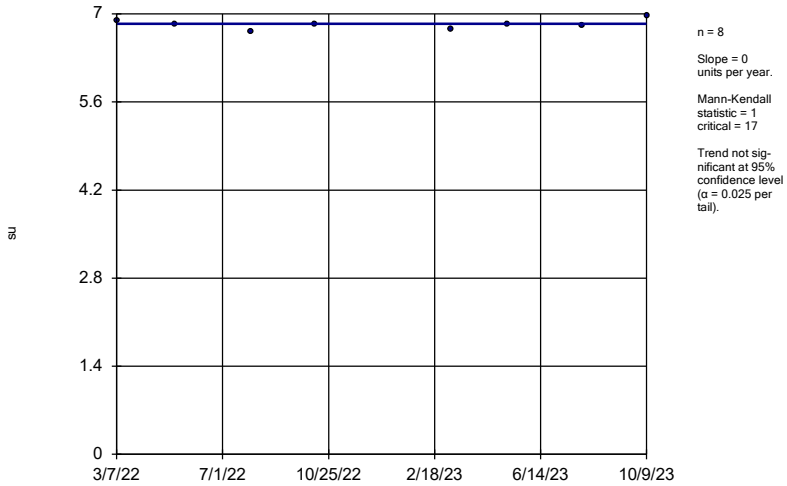
Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

pH, Field

JCW-MW-18004



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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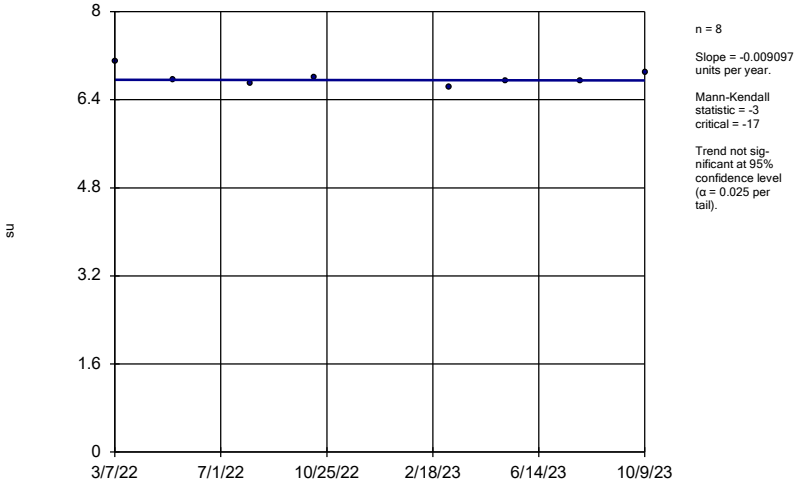
pH, Field

JCW-MW-18005



n = 8

Slope = -0.009097 units per year.

Mann-Kendall statistic = -3 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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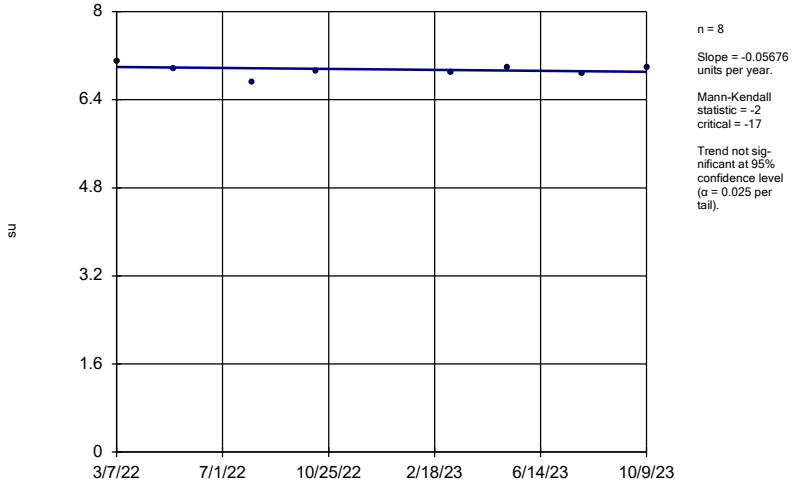
pH, Field

JCW-MW-18006



n = 8

Slope = -0.05676 units per year.

Mann-Kendall statistic = -2 critical = -17

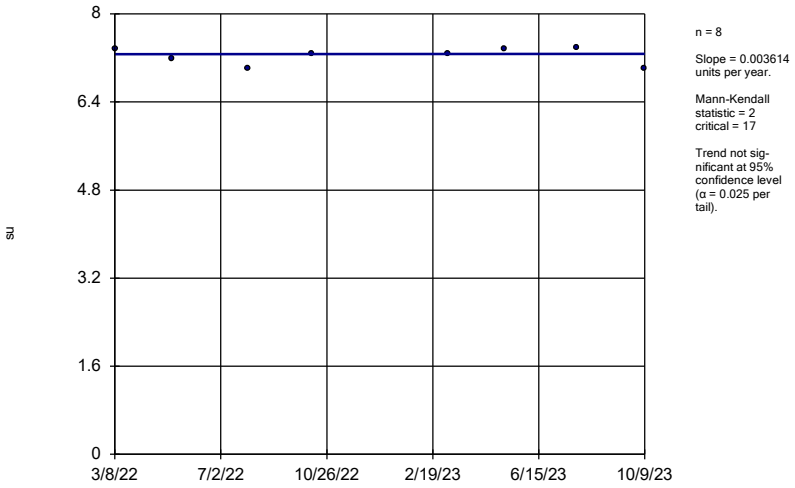
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

MW-50



n = 8

Slope = 0.003614 units per year.

Mann-Kendall statistic = 2
critical = 17

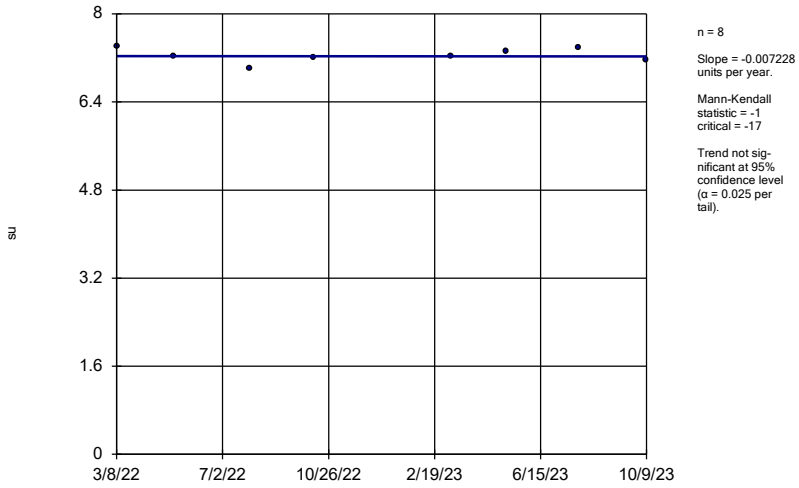
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:45 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

MW-51



n = 8

Slope = -0.007228 units per year.

Mann-Kendall statistic = -1
critical = -17

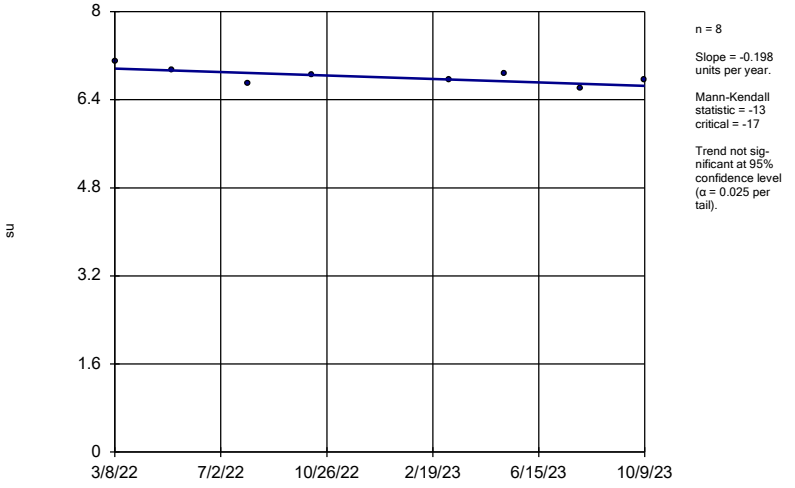
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

MW-52



n = 8

Slope = -0.198 units per year.

Mann-Kendall statistic = -13
critical = -17

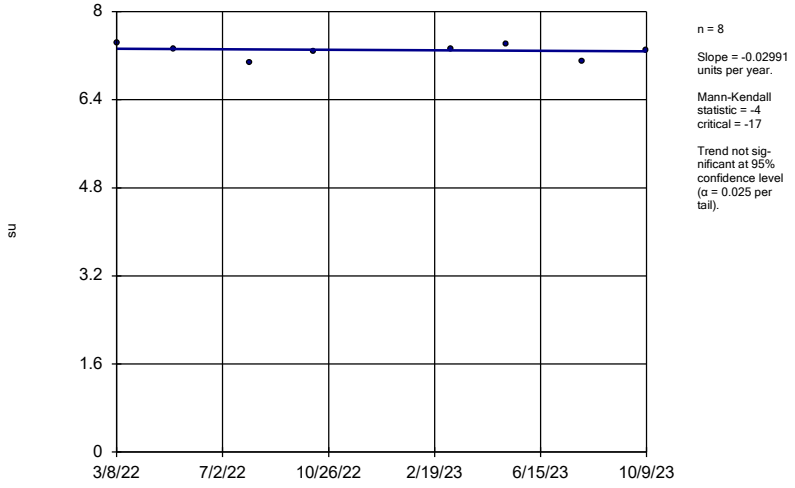
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

MW-53



n = 8

Slope = -0.02991 units per year.

Mann-Kendall statistic = -4
critical = -17

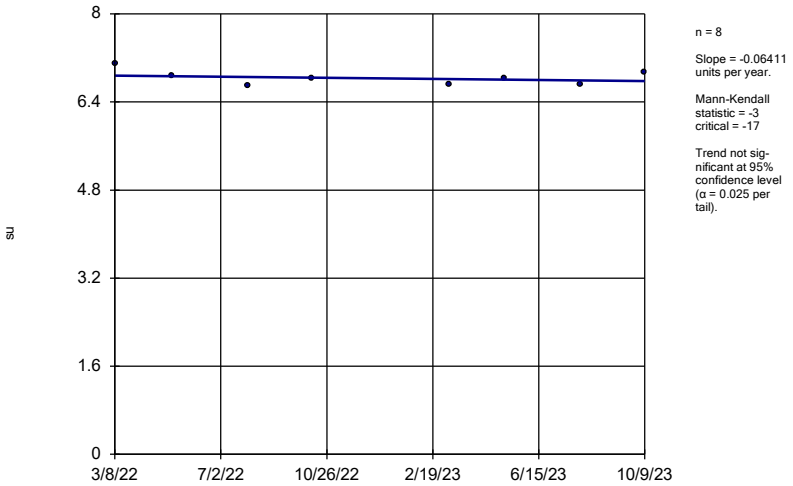
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

pH, Field

MW-53R



n = 8

Slope = -0.06411 units per year.

Mann-Kendall statistic = -3
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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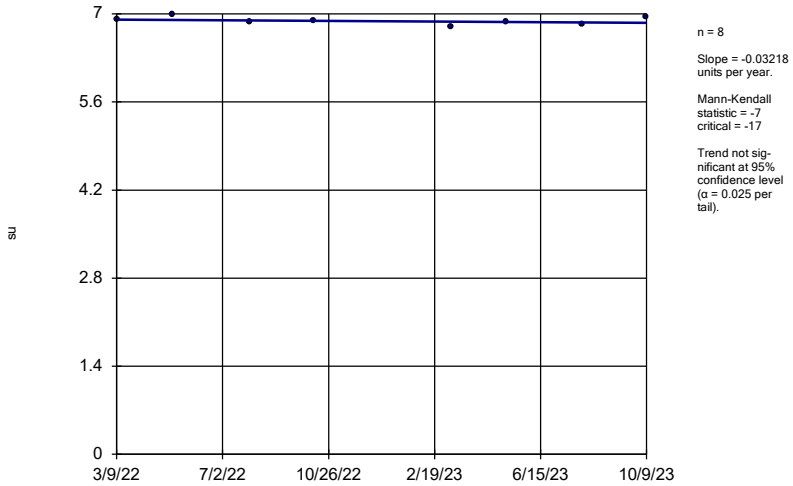
pH, Field

MW-54R



n = 8

Slope = -0.03218 units per year.

Mann-Kendall statistic = -7
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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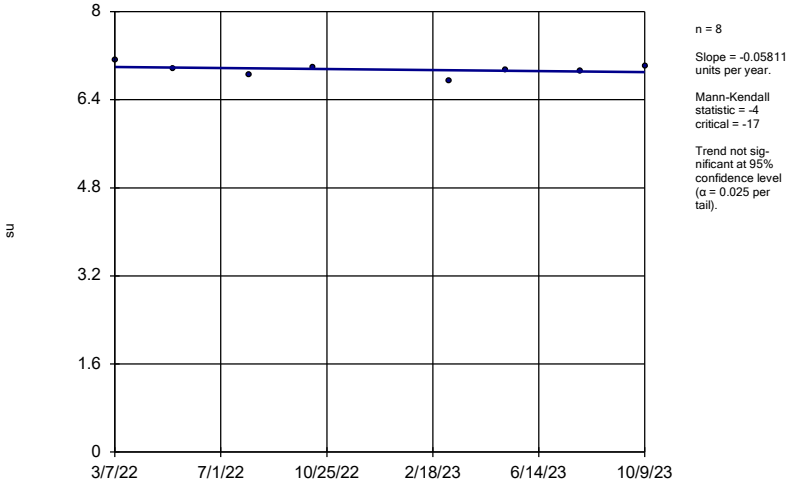
pH, Field

MW-55



n = 8

Slope = -0.05811 units per year.

Mann-Kendall statistic = -4
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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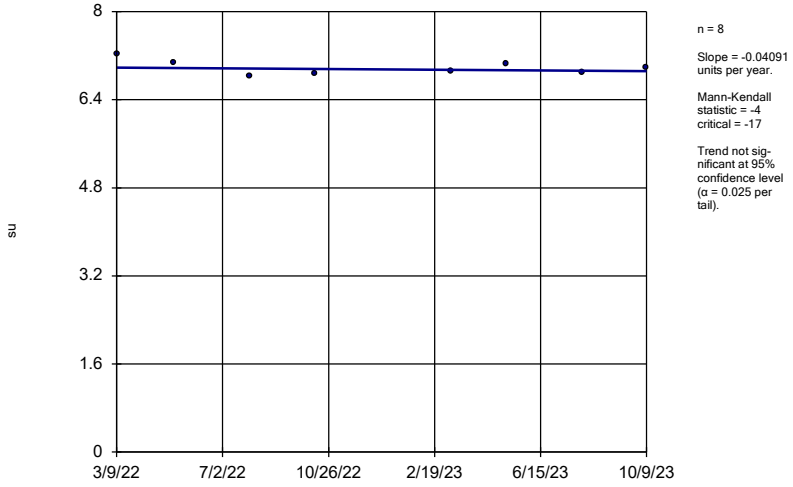
pH, Field

OW-57ROUT



n = 8

Slope = -0.04091 units per year.

Mann-Kendall statistic = -4
critical = -17

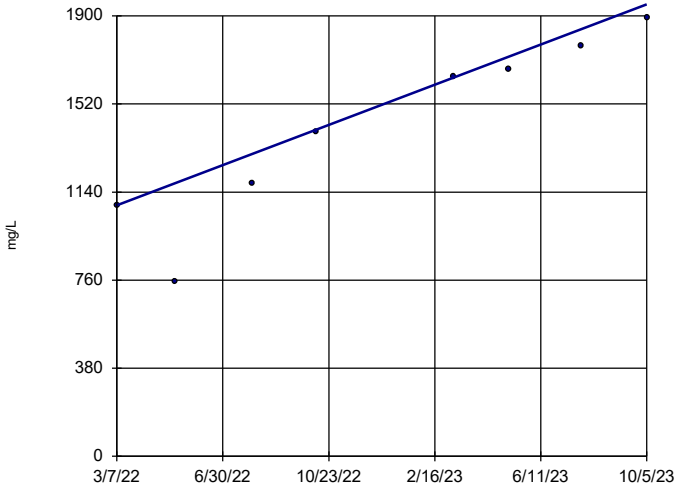
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sulfate

JCW-MW-18001



n = 8

Slope = 548.4 units per year.

Mann-Kendall statistic = 26 critical = 17

Increasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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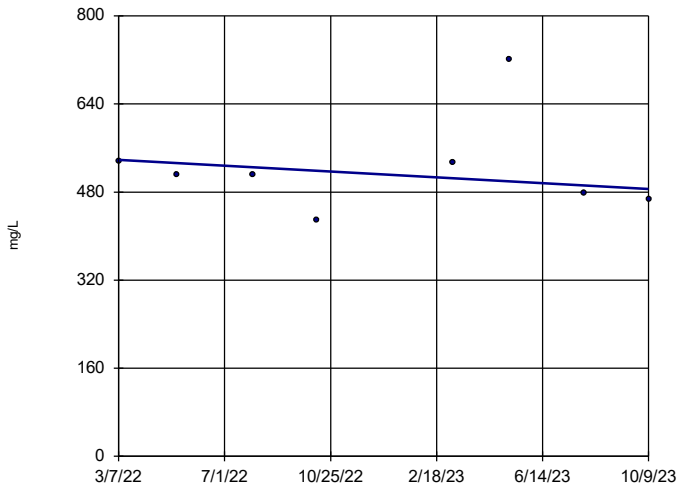
Sulfate

JCW-MW-18004



n = 8

Slope = -33.28 units per year.

Mann-Kendall statistic = -7 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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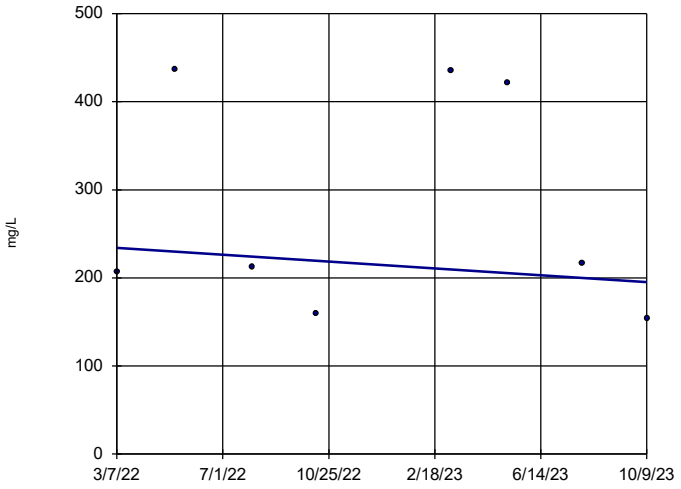
Sulfate

JCW-MW-18005



n = 8

Slope = -24.33 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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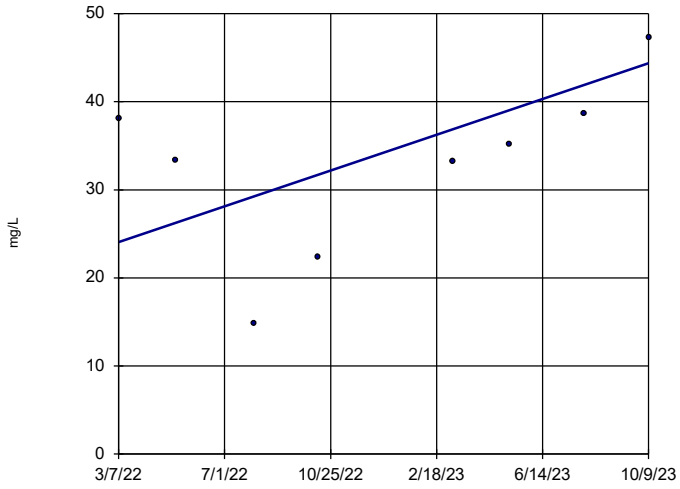
Sulfate

JCW-MW-18006



n = 8

Slope = 12.74 units per year.

Mann-Kendall statistic = 12 critical = 17

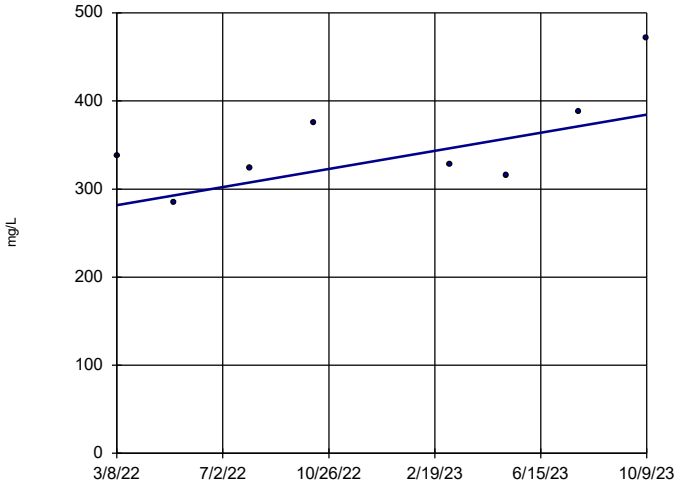
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sulfate

MW-50



n = 8

Slope = 64.64 units per year.

Mann-Kendall statistic = 12
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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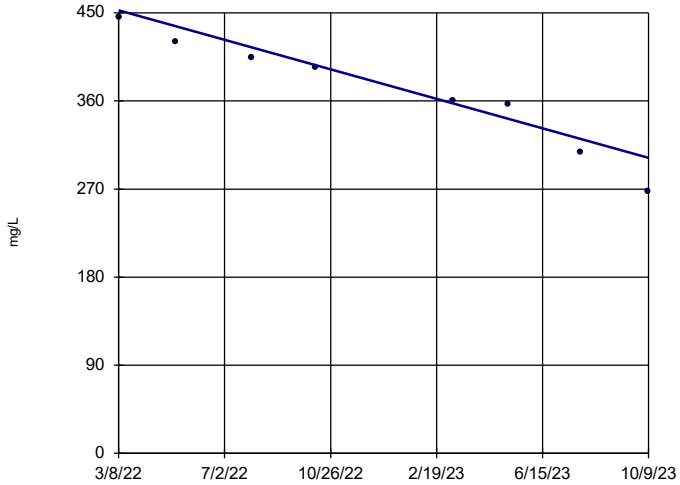
Sulfate

MW-51



n = 8

Slope = -94.94 units per year.

Mann-Kendall statistic = -28
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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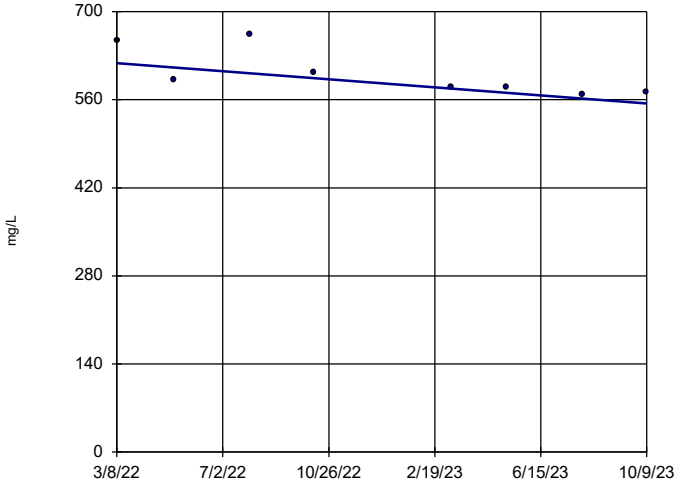
Sulfate

MW-52



n = 8

Slope = -40.22 units per year.

Mann-Kendall statistic = -19
critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

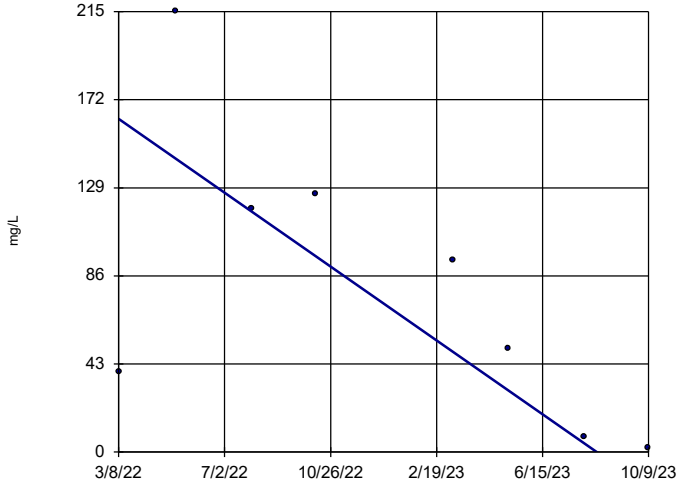
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Sulfate

MW-53



n = 8

Slope = -113.5 units per year.

Mann-Kendall statistic = -16
critical = -17

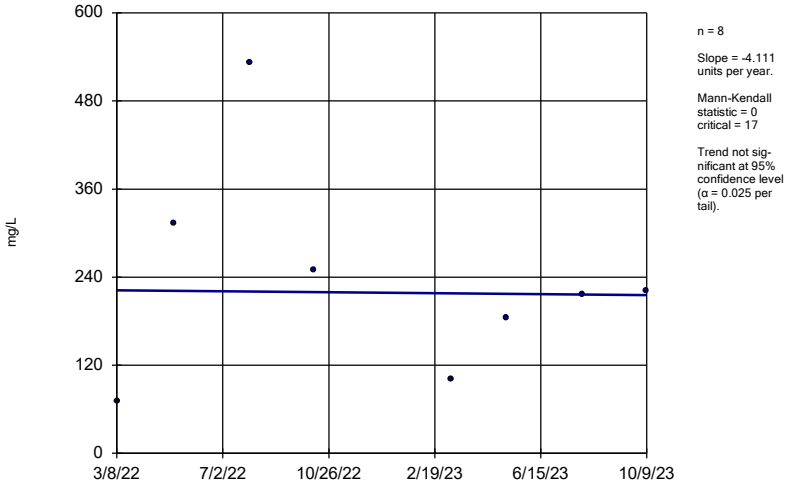
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sulfate

MW-53R



n = 8

Slope = -4.111 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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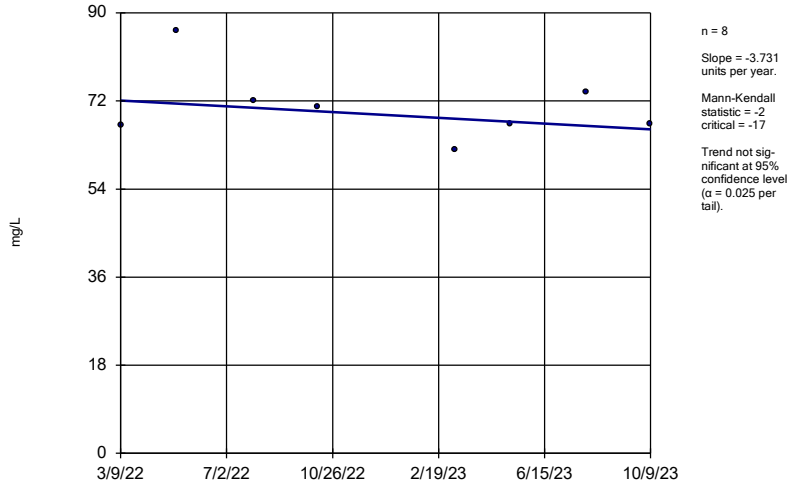
Sulfate

MW-54R



n = 8

Slope = -3.731 units per year.

Mann-Kendall statistic = -2 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

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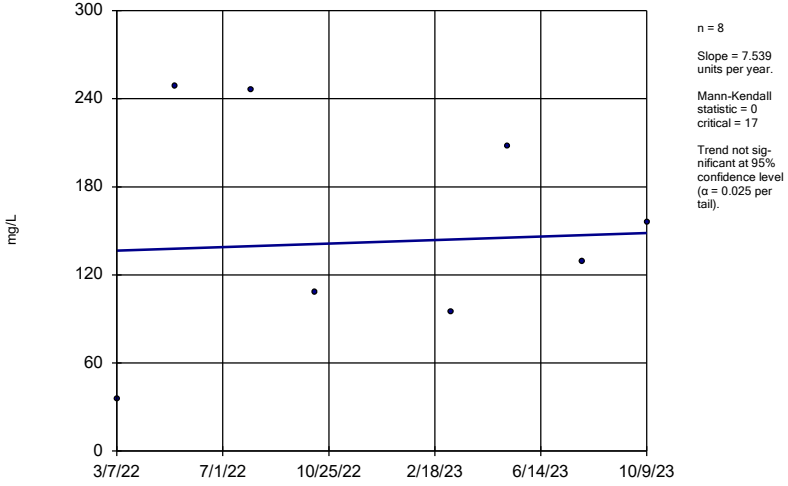
Sulfate

MW-55



n = 8

Slope = 7.539 units per year.

Mann-Kendall statistic = 0 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

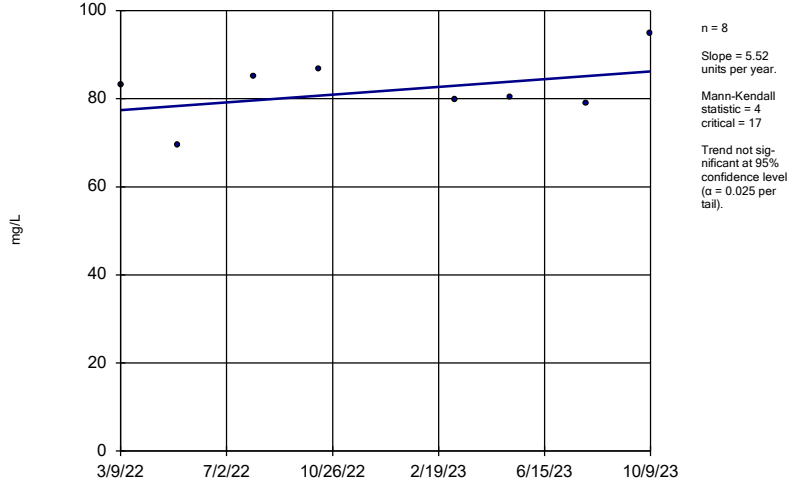
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Sulfate

OW-57ROUT



n = 8

Slope = 5.52 units per year.

Mann-Kendall statistic = 4 critical = 17

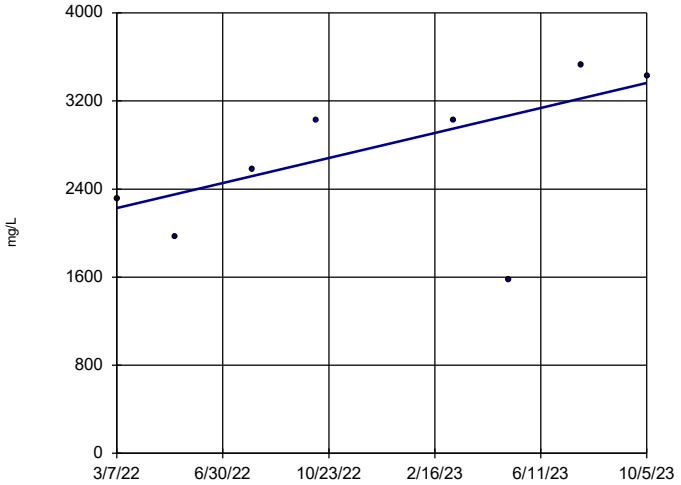
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Total Dissolved Solids

JCW-MW-18001



n = 8

Slope = 719.8 units per year.

Mann-Kendall statistic = 14 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

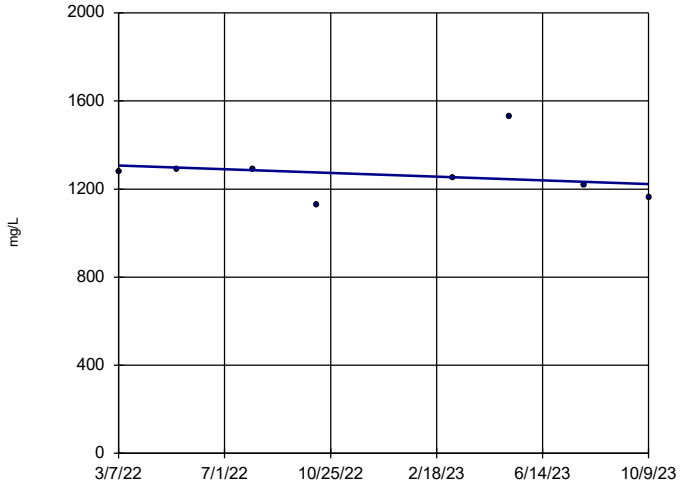
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

JCW-MW-18004



n = 8

Slope = -52.67 units per year.

Mann-Kendall statistic = -7 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

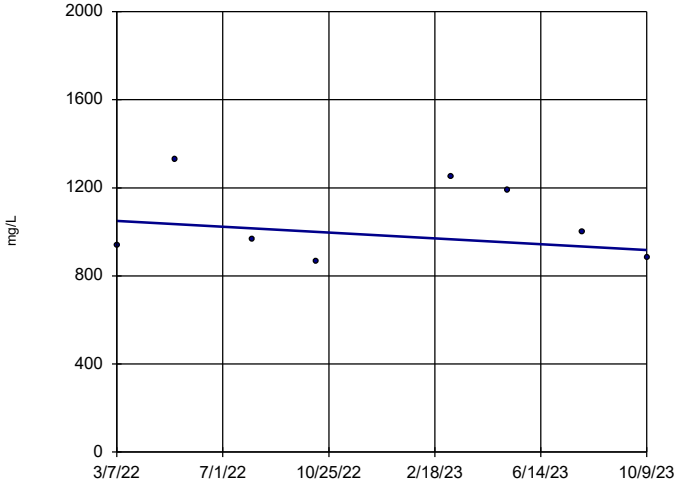
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

JCW-MW-18005



n = 8

Slope = -83.17 units per year.

Mann-Kendall statistic = -4 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

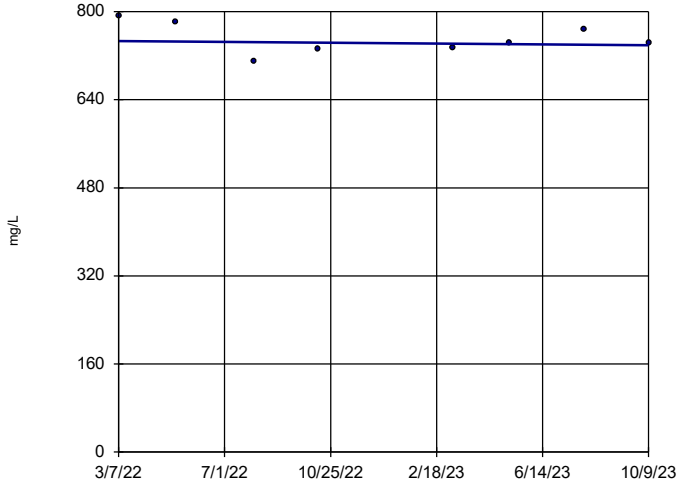
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

JCW-MW-18006



n = 8

Slope = -4.496 units per year.

Mann-Kendall statistic = 0 critical = 17

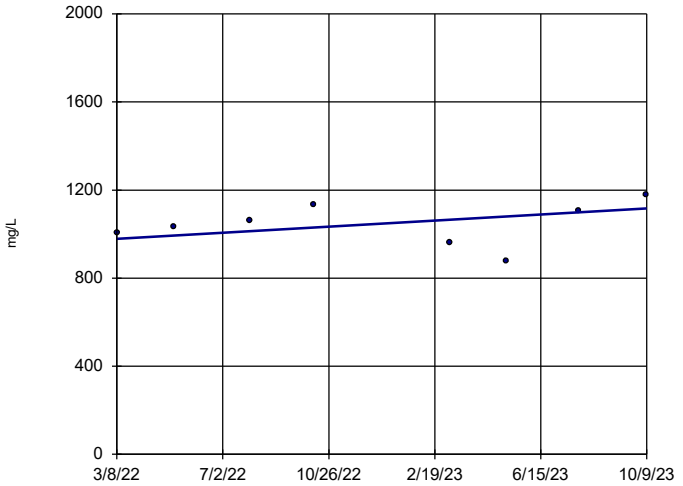
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Total Dissolved Solids

MW-50



n = 8

Slope = 86.78 units per year.

Mann-Kendall statistic = 8 critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

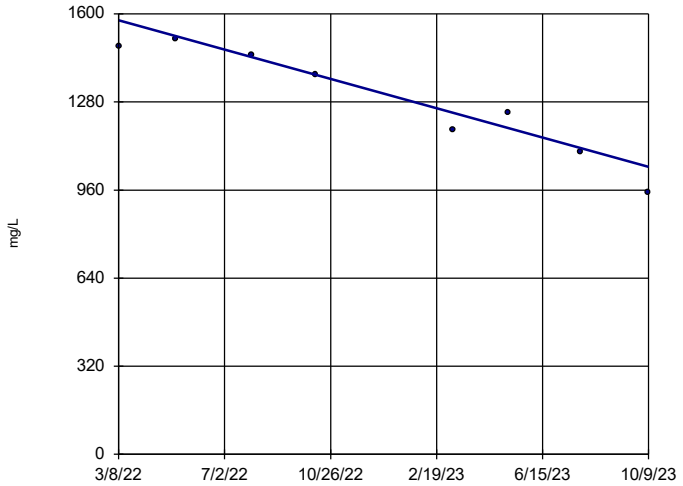
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

MW-51



n = 8

Slope = -335 units per year.

Mann-Kendall statistic = -24 critical = -17

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

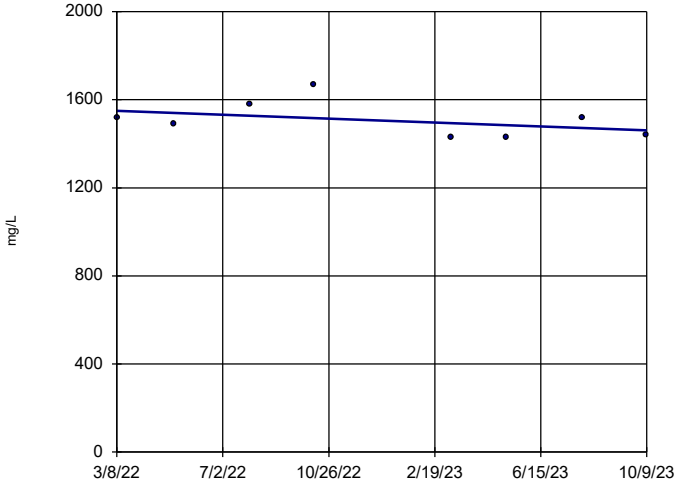
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

MW-52



n = 8

Slope = -55.25 units per year.

Mann-Kendall statistic = -6 critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

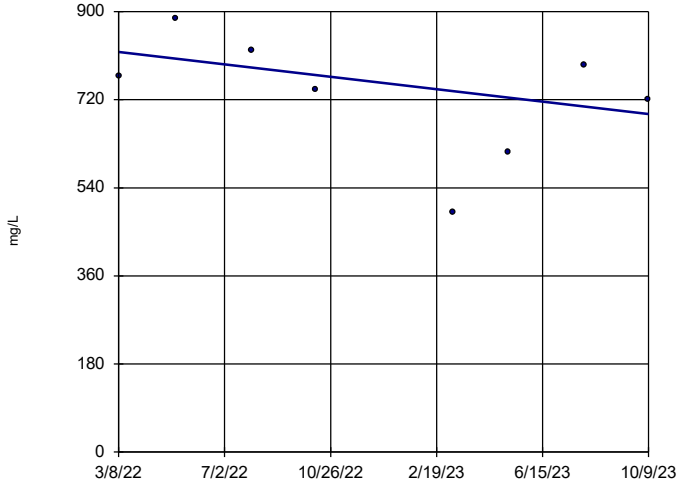
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

MW-53



n = 8

Slope = -79.5 units per year.

Mann-Kendall statistic = -10 critical = -17

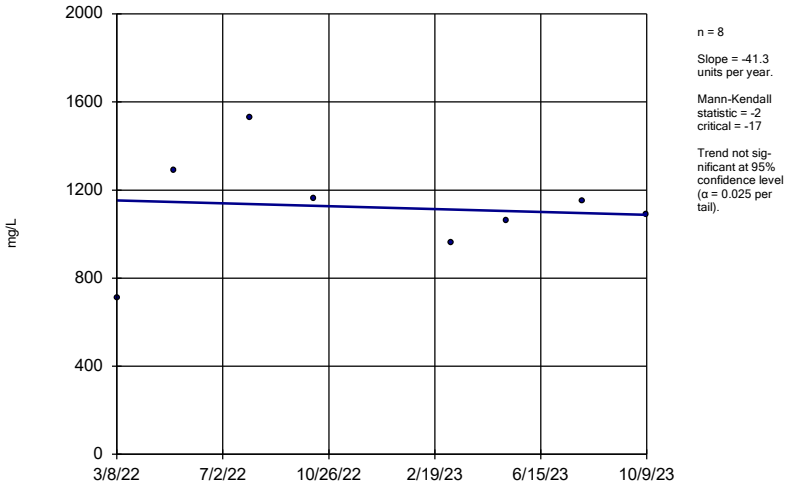
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Total Dissolved Solids

MW-53R



n = 8

Slope = -41.3 units per year.

Mann-Kendall statistic = -2
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

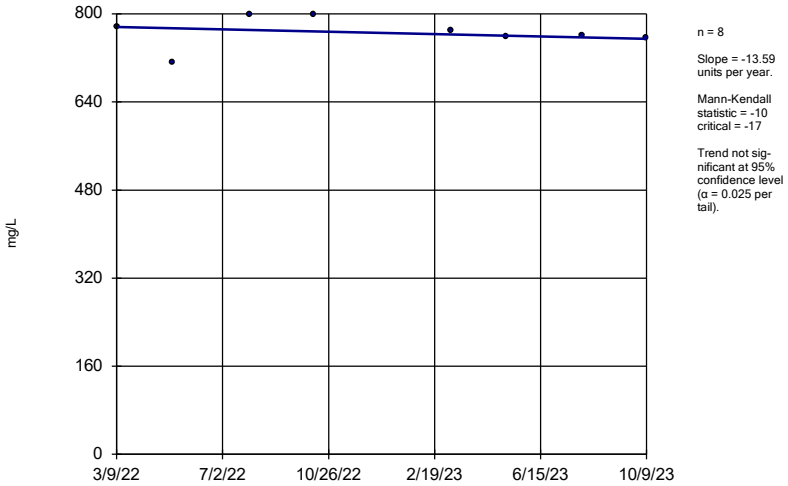
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

MW-54R



n = 8

Slope = -13.59 units per year.

Mann-Kendall statistic = -10
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

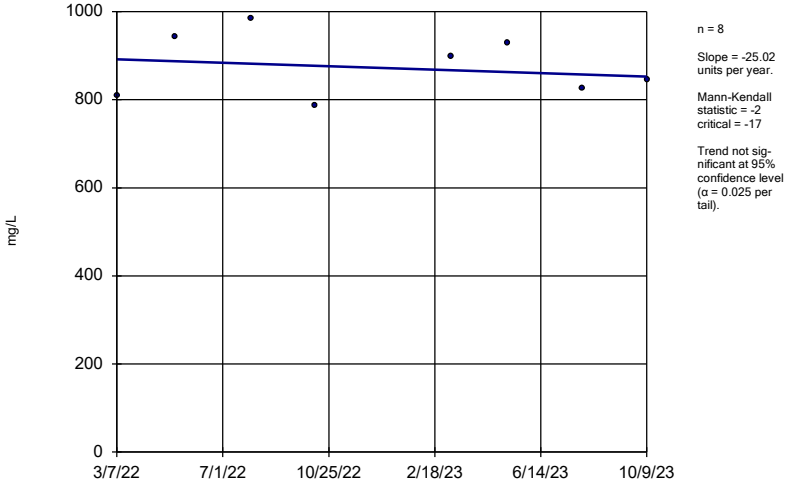
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

MW-55



n = 8

Slope = -25.02 units per year.

Mann-Kendall statistic = -2
critical = -17

Trend not significant at 95% confidence level (α = 0.025 per tail).

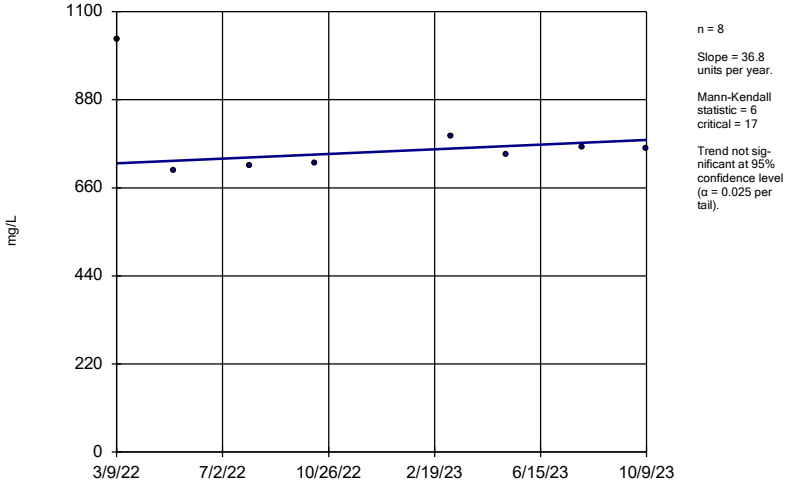
Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Sanitas™ v.10.0.13 Sanitas software licensed to Consumers Energy. UG

Total Dissolved Solids

OW-57ROUT



n = 8

Slope = 36.8 units per year.

Mann-Kendall statistic = 6
critical = 17

Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 5:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Appendix D
Assessment Monitoring and GSI Statistical Evaluation

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Technical Memorandum

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 Rule[1] 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 Report[2]. 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

[1] 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).

[2] 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

[3] 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™ 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 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[4] 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™ 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™ 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 α = 0.01. Non-detect data was handled in accordance with the HMP for the purposes of calculating the confidence intervals.

[4] Confidence level is assessed for each individual comparison (i.e., per well and per constituent).

The Sanitas™ 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 to 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™ 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
Normalized by power transformation	Boron at MW-52 (square root) Boron at MW-53R (squared)
Not Applicable – confidence bands used	Boron at MW-55 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 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 (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™ 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

		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[1]				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[1]																		
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
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	GWPS								
Appendix III[1]										
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[1]										
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.

(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:	MW-52							
		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[1]										
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[1]										
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.
(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:	MW-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	GWPS								
Appendix III[(1)]										
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[(1)]										
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 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:	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	GWPS								
Appendix III[1]										
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[1]										
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.
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:	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[1]										
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[1]										
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.
(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:	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[1]						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[1]											
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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		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[1]										
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[1]										
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.

(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-MW-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[1]										
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[1]										
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.
(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-MW-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[1]										
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[1]										
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.

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-MW-18005								
		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[1]				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[1]											
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.

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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.

Table 1
Comparison of Groundwater Sampling Results to Groundwater Protection Standards
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

		Sample Location:	JCW-MW-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[1]					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[1]																
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.

(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:	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	Generic GSI^	Chronic-Based Mixing Zone GSI Criteria*	Acute-Based Mixing Zone GSI Criteria*	GSI**																
Appendix III(1)							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[F]	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(1)																					
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[H]	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 Parameters(2)																					
Iron	ug/L	500,000[EE]	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

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) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	12	10	15	18	10	8	10	18
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (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-52							
					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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (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-53						
						Sample Date:	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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	1	< 1	1	2	< 1	< 1	1	1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (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-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[(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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	10	8	17	20	17	14	17	16
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (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-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[(1)]													
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[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	1	< 1	2	2	1	< 1	< 1	1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

						MW-55								
					Sample Location:									
					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(1)									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[F]	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(1)														
Arsenic	ug/L	10	100	680	**100**	88	48	80	78	**126**	68	44	75	75
Chromium	ug/L	11[H]	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 Parameters(2)														
Iron	ug/L	500,000[EE]	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) .

[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) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Table 2
Comparison of Groundwater Sampling Results to GSI
JC Weadock Landfill – Hydrogeological Monitoring Program
Essexville, Michigan

					Sample Location:	JCW-MW-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[(1)]													
Boron	ug/L	4,000	44,000	69,000	44,000	259	226	313	343	180	227	310	319
Sulfate	mg/L	1,200[F]	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[(1)]													
Arsenic	ug/L	10	100	680	**100**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chromium	ug/L	11[H]	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 Parameters[(2)]													
Iron	ug/L	500,000[EE]	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.

** GSI criteria is the generic GSI criteria or the Chronic-Based Mixing Zone criteria, if applicable.

[F] - Criterion is the Final Acute Value (FAV) .

[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.

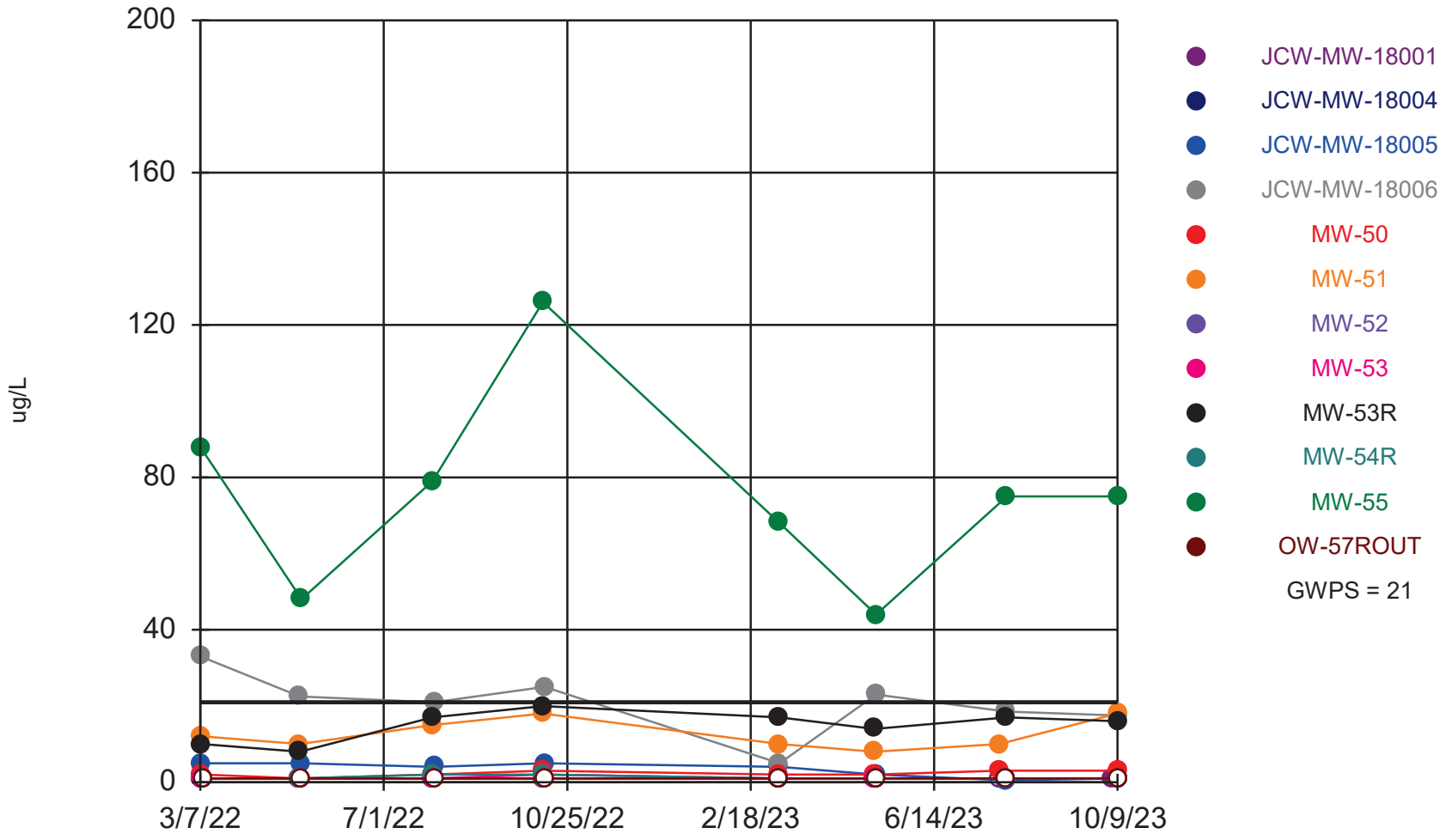
(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendments - Public Act No. 640 of 2018 Section 11519b(2) addtional assessment monitoring constituents (vanadium and zinc) are reported.

Attachment 1
Assessment Monitoring Sanitas™ Output Files

Hollow symbols indicate censored values.

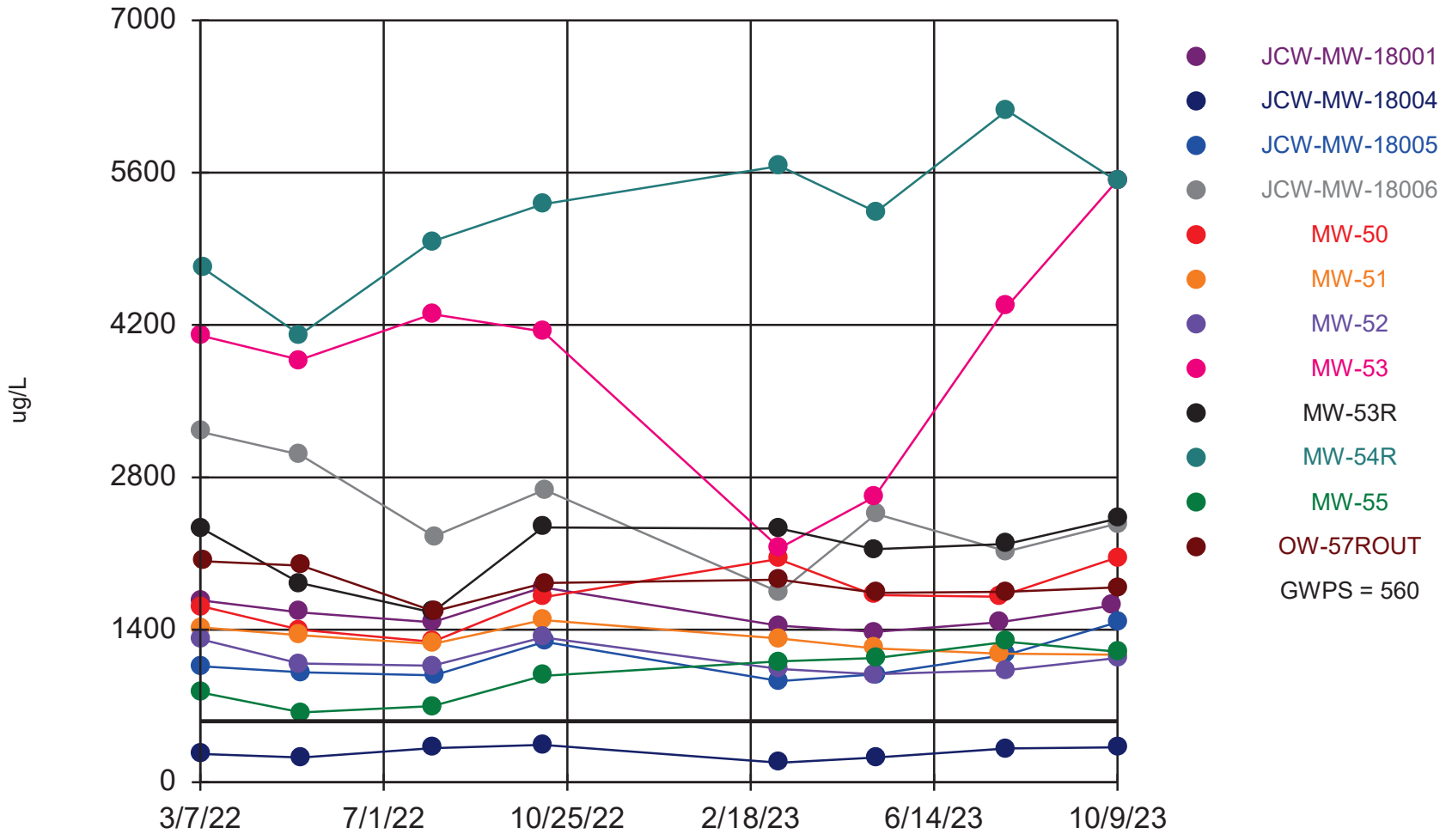
Arsenic Comparison to GWPS



Time Series Analysis Run 11/21/2023 2:40 PM

Data: JCW_HMPCCR_Sanitas_23Q4

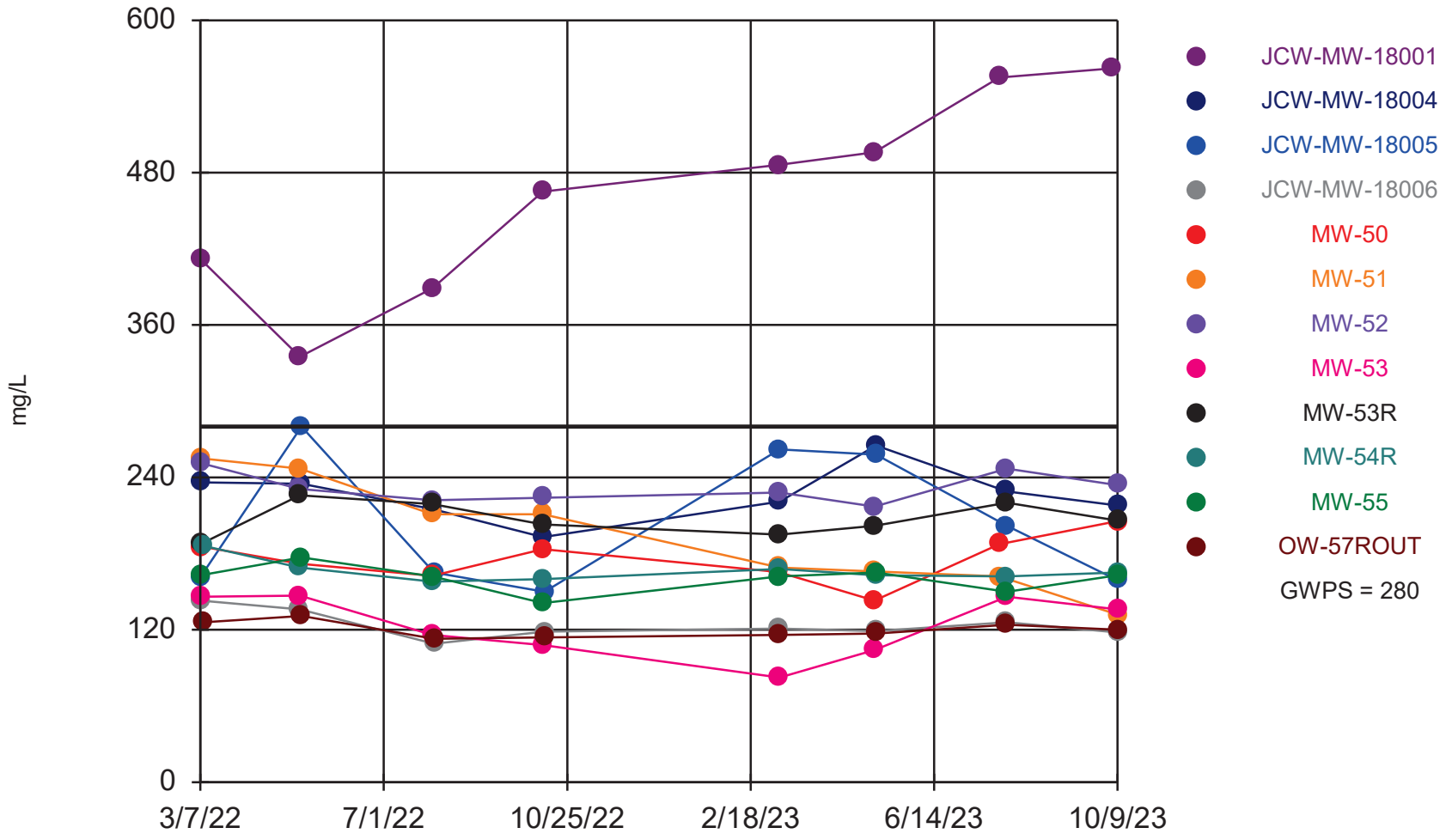
Boron Comparison to GWPS



Time Series Analysis Run 11/21/2023 2:49 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Calcium Comparison to GWPS

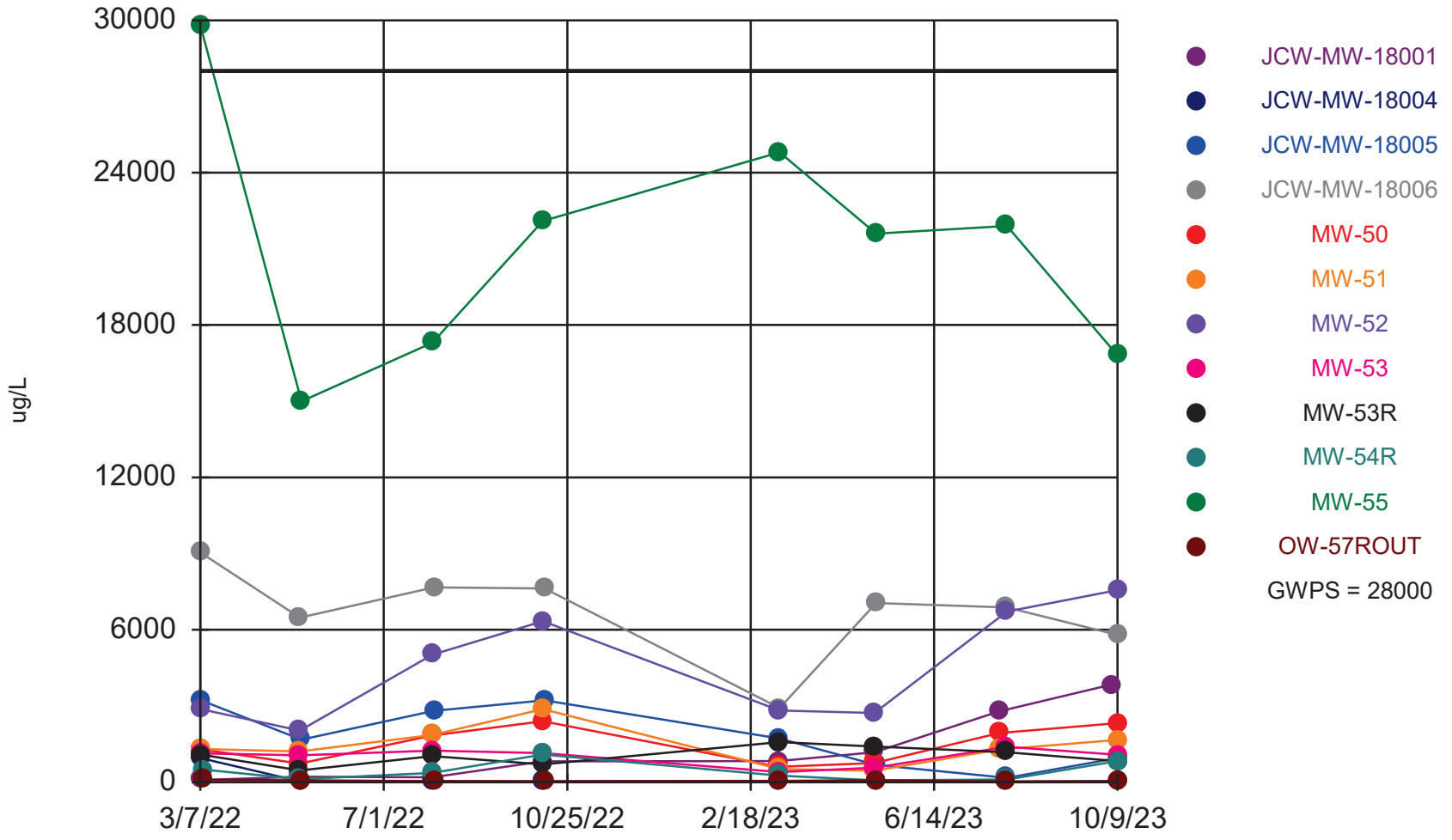


Time Series Analysis Run 11/21/2023 2:50 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Hollow symbols indicate censored values.

Iron Comparison to GWPS

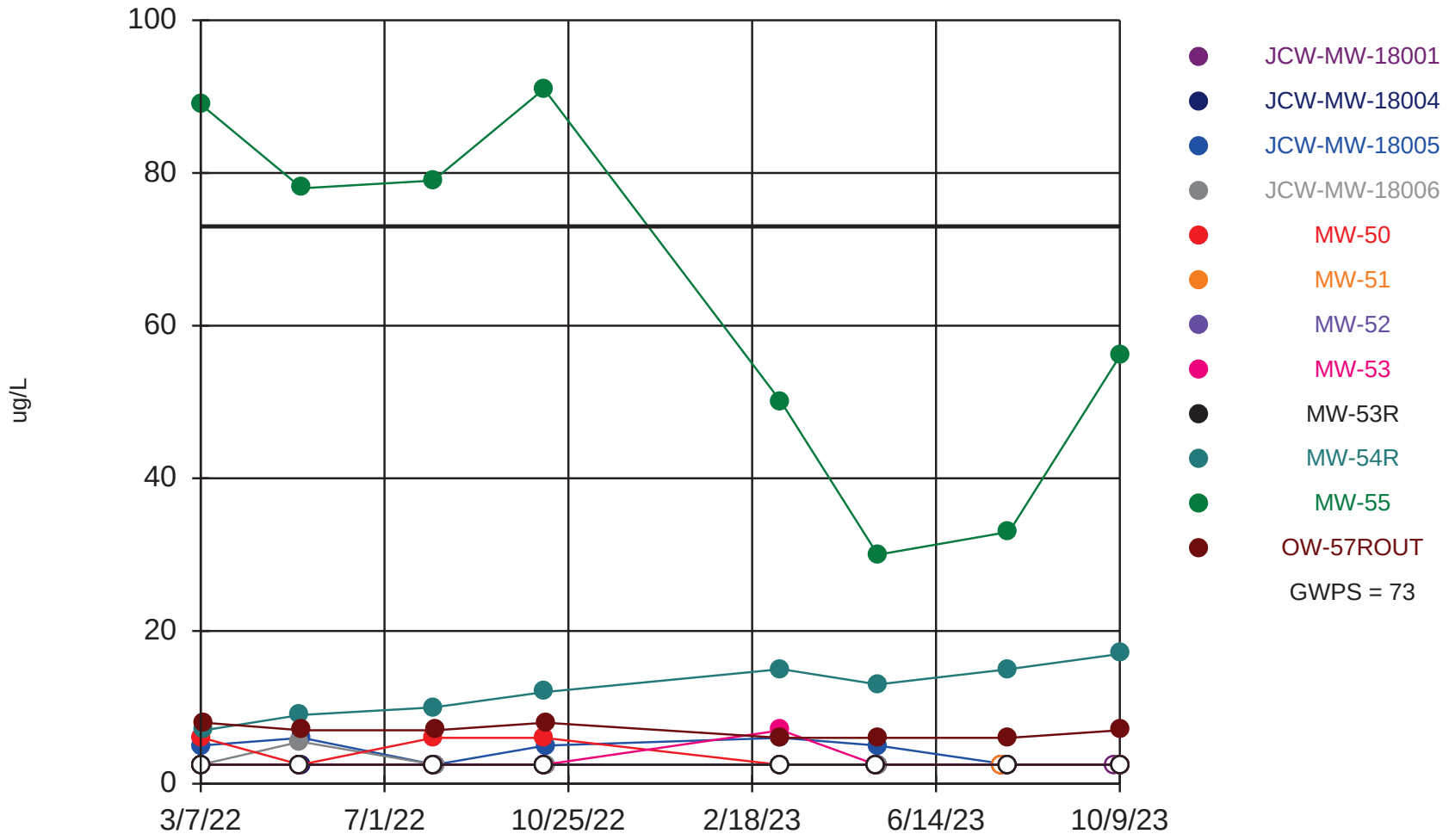


Time Series Analysis Run 11/21/2023 2:47 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Hollow symbols indicate censored values.

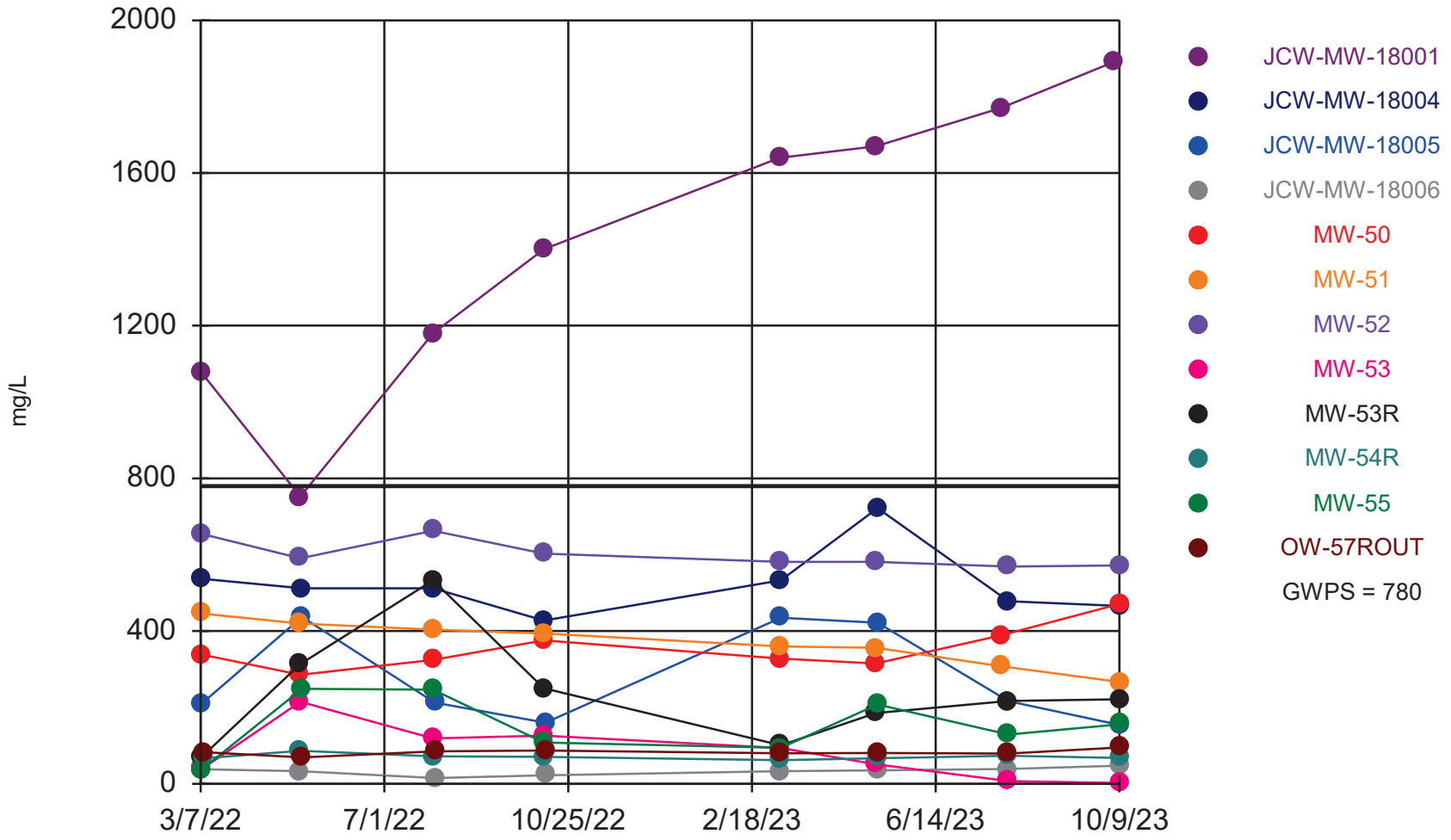
Molybdenum, Total



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

Data: JCW_HMPCCR_Sanitas_23Q4

Summary Report

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

Well	#Obs.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

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

Well	#Obs.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

Summary Report

Constituent: Sulfate Analysis Run 11/21/2023 2:54 PM
Data: JCW_HMPCCR_Sanitas_23Q4

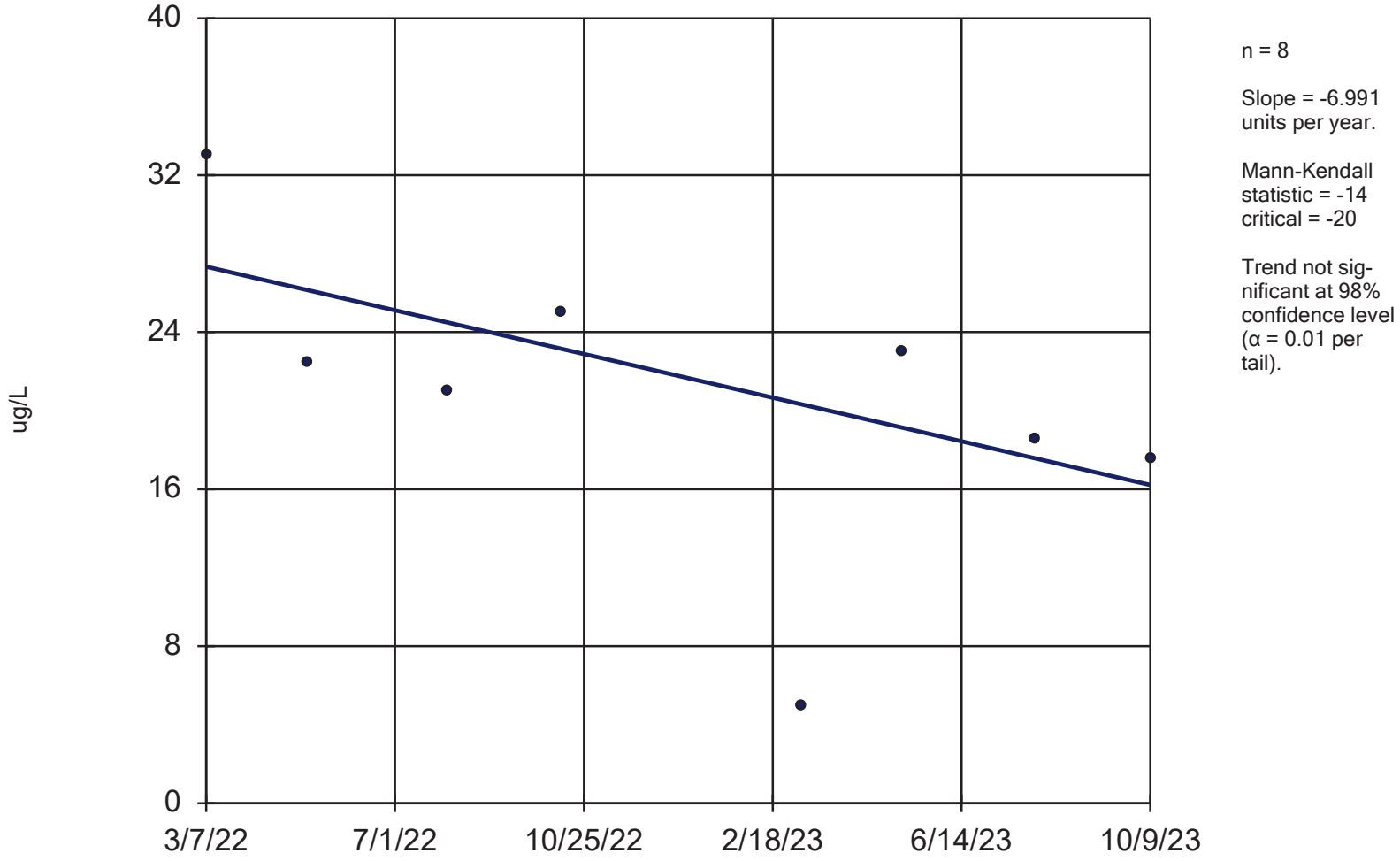
For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

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.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
JCW-MW-18001	8	0%	752	1890	1423	1520	391.7	0.2753	-0.4754
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

Arsenic, Total

JCW-MW-18006



n = 8

Slope = -6.991 units per year.

Mann-Kendall statistic = -14
critical = -20

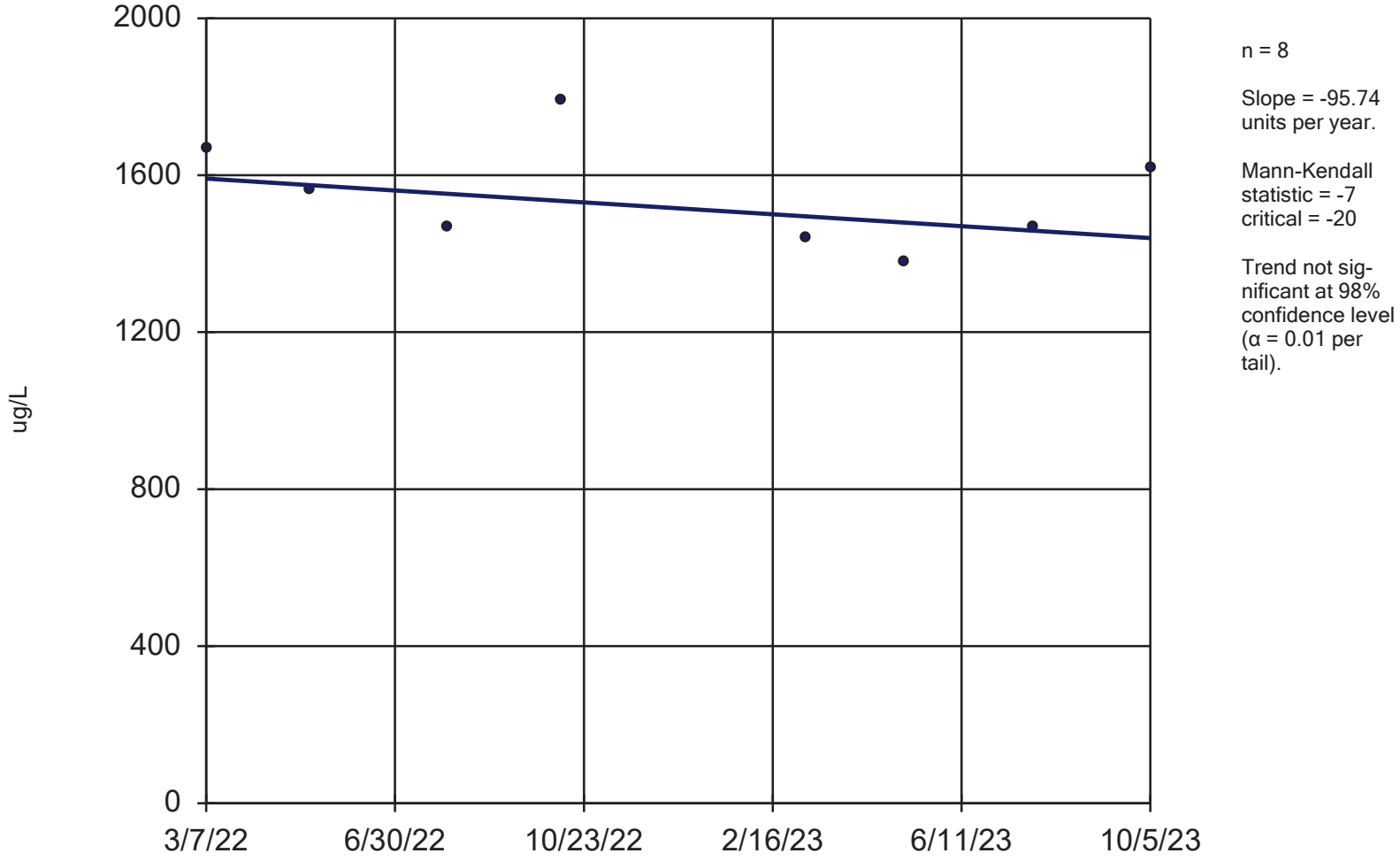
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:52 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

JCW-MW-18001



n = 8

Slope = -95.74 units per year.

Mann-Kendall statistic = -7
critical = -20

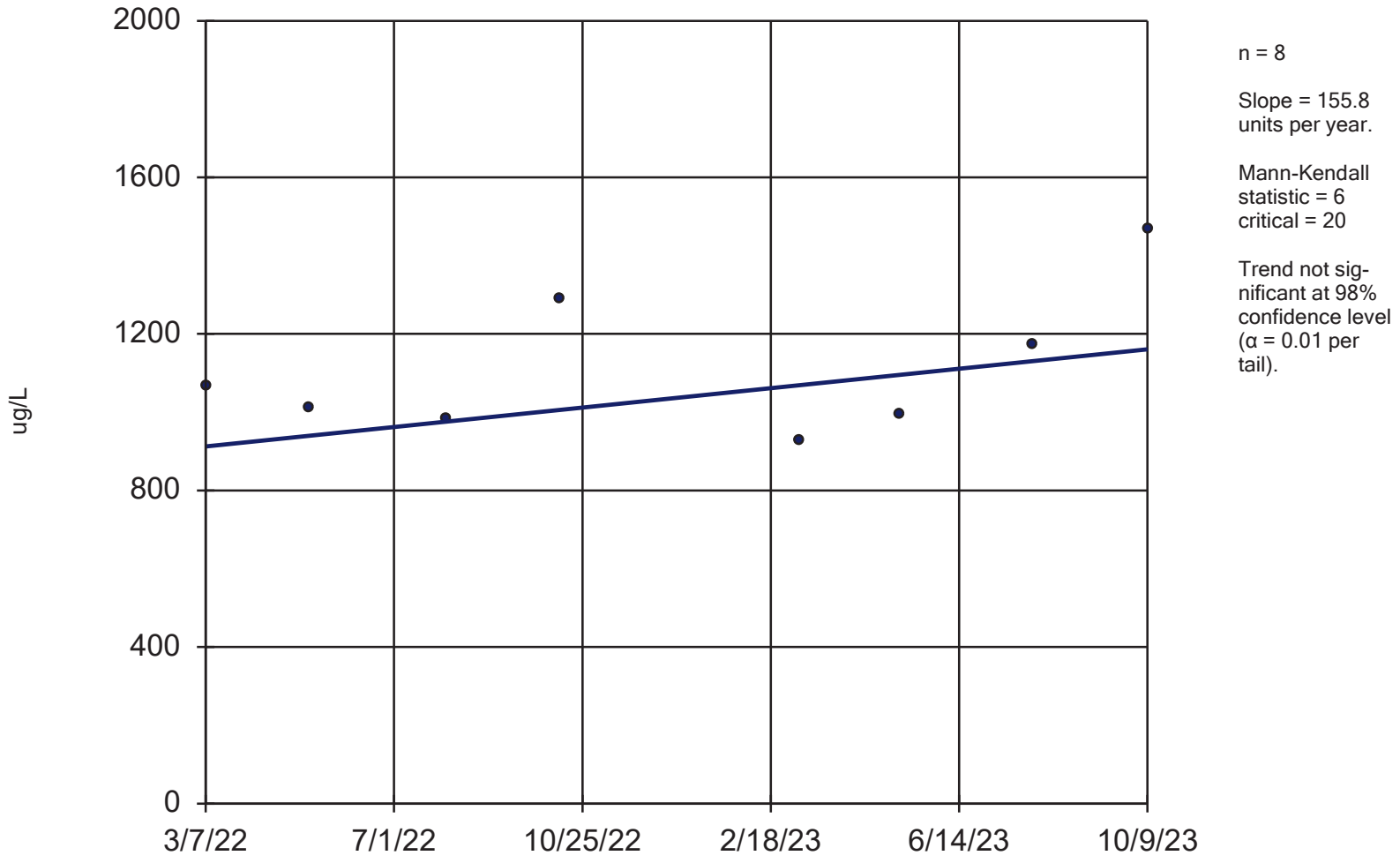
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

JCW-MW-18005



n = 8

Slope = 155.8 units per year.

Mann-Kendall statistic = 6
critical = 20

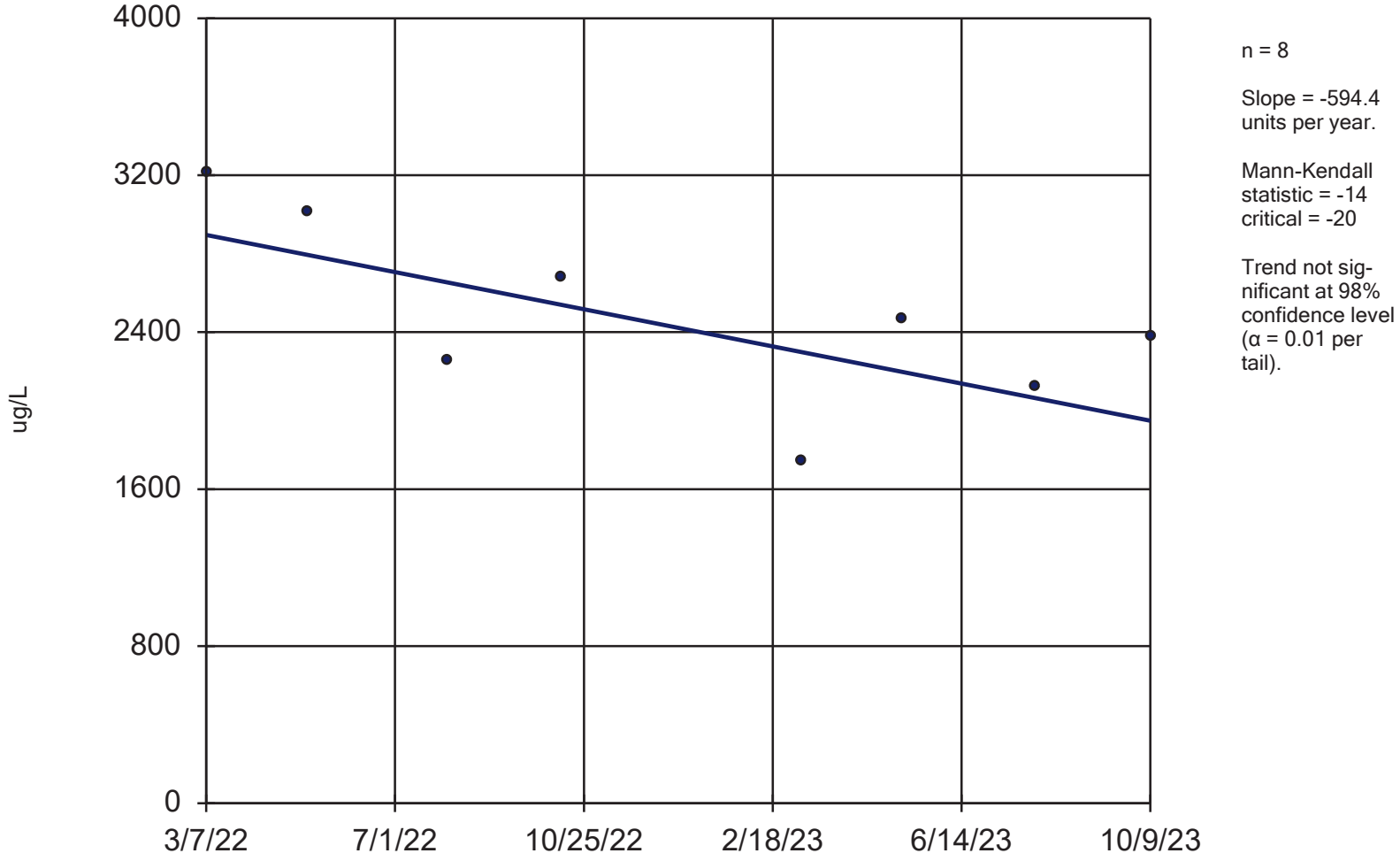
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

JCW-MW-18006



n = 8

Slope = -594.4 units per year.

Mann-Kendall statistic = -14
critical = -20

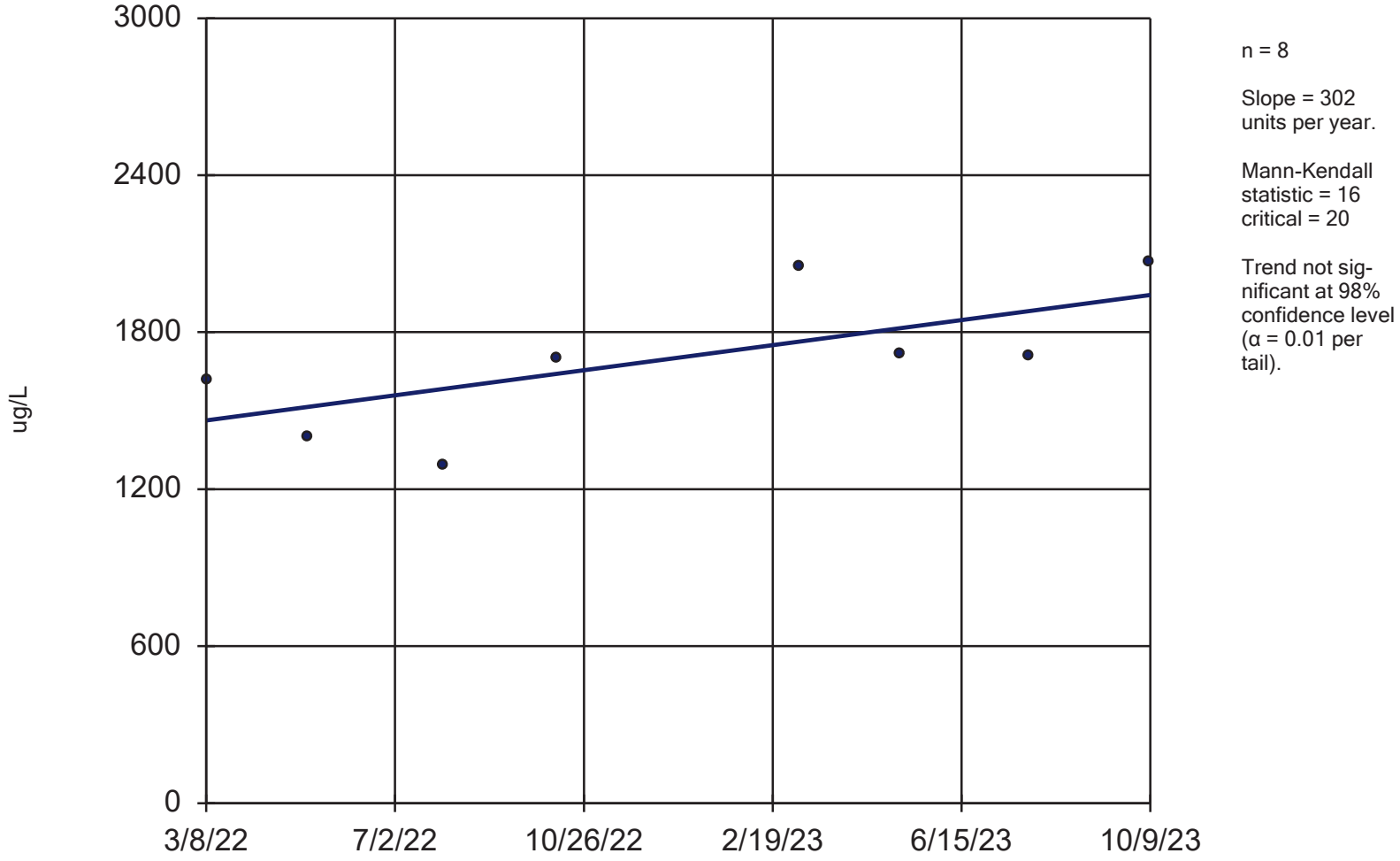
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-50



n = 8

Slope = 302 units per year.

Mann-Kendall statistic = 16 critical = 20

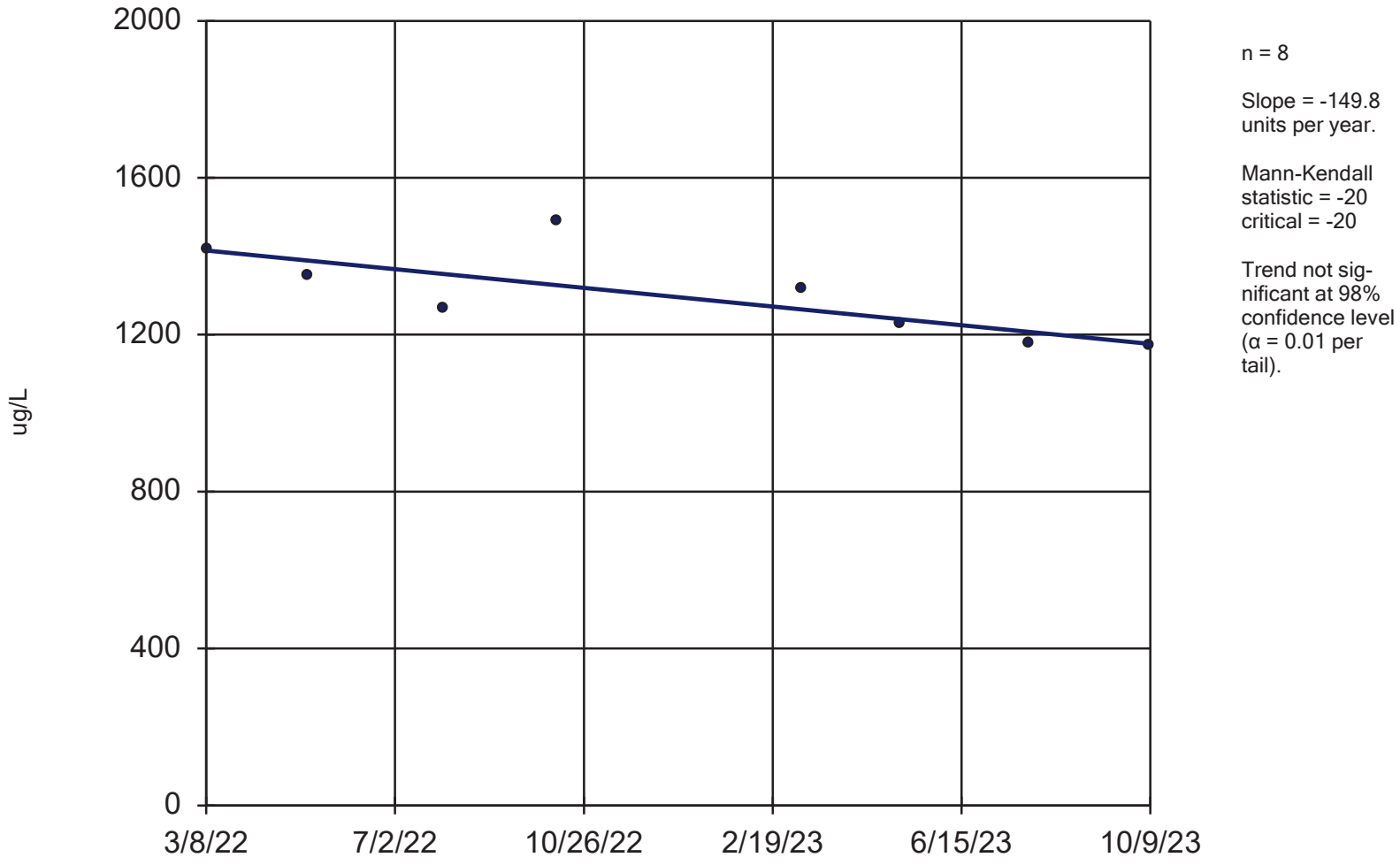
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-51



n = 8

Slope = -149.8 units per year.

Mann-Kendall statistic = -20
critical = -20

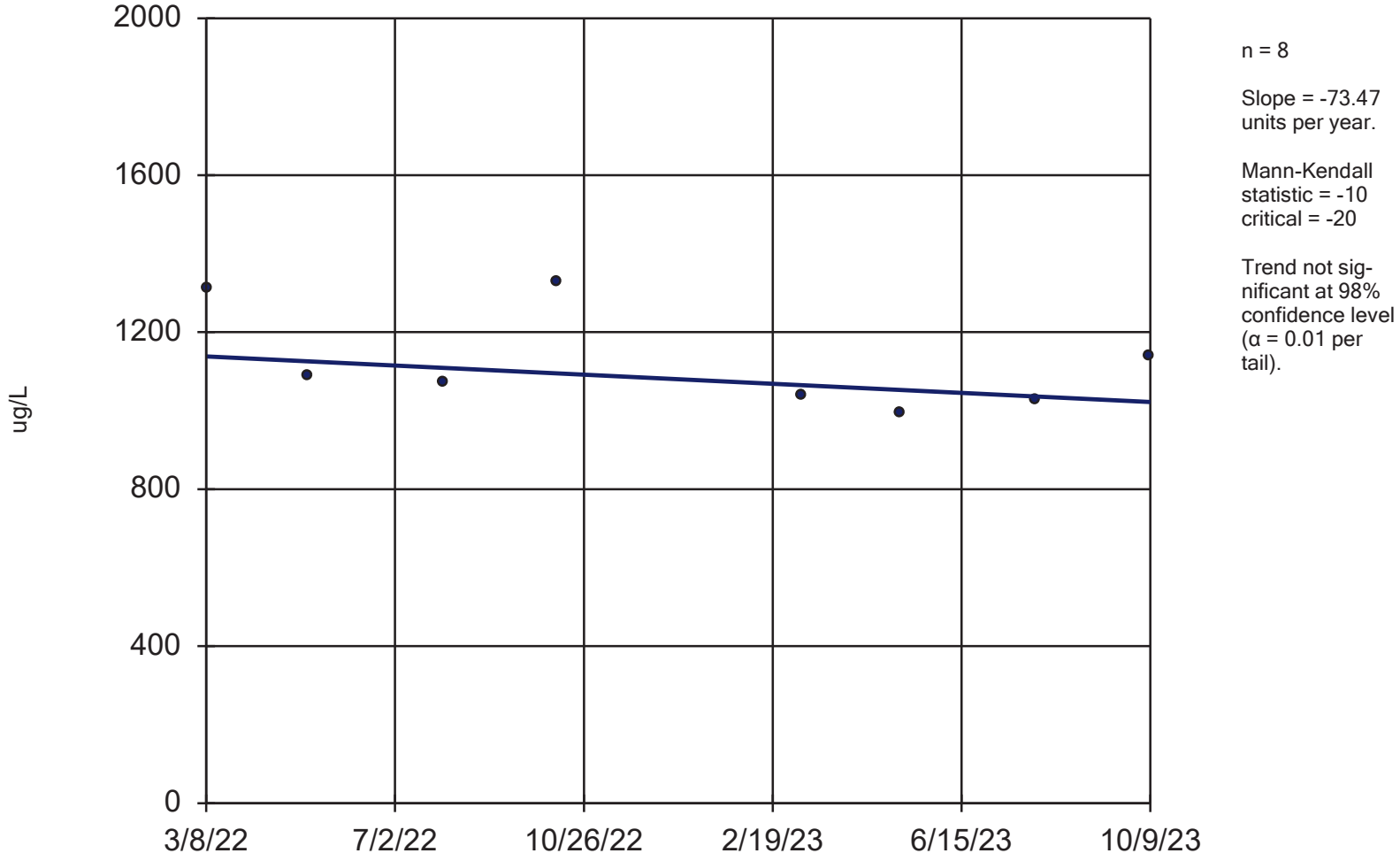
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-52



n = 8

Slope = -73.47 units per year.

Mann-Kendall statistic = -10
critical = -20

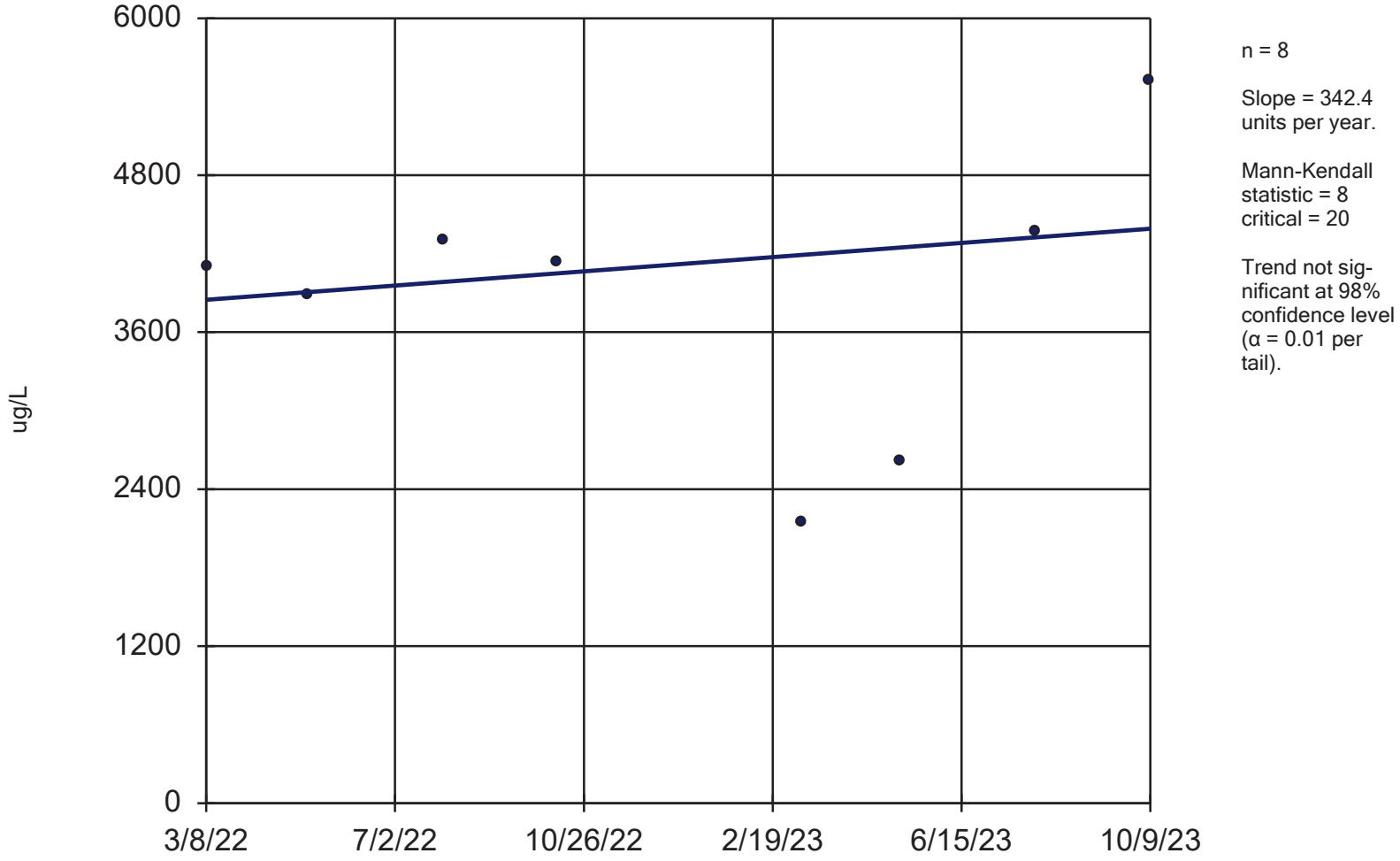
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-53



n = 8

Slope = 342.4 units per year.

Mann-Kendall statistic = 8
critical = 20

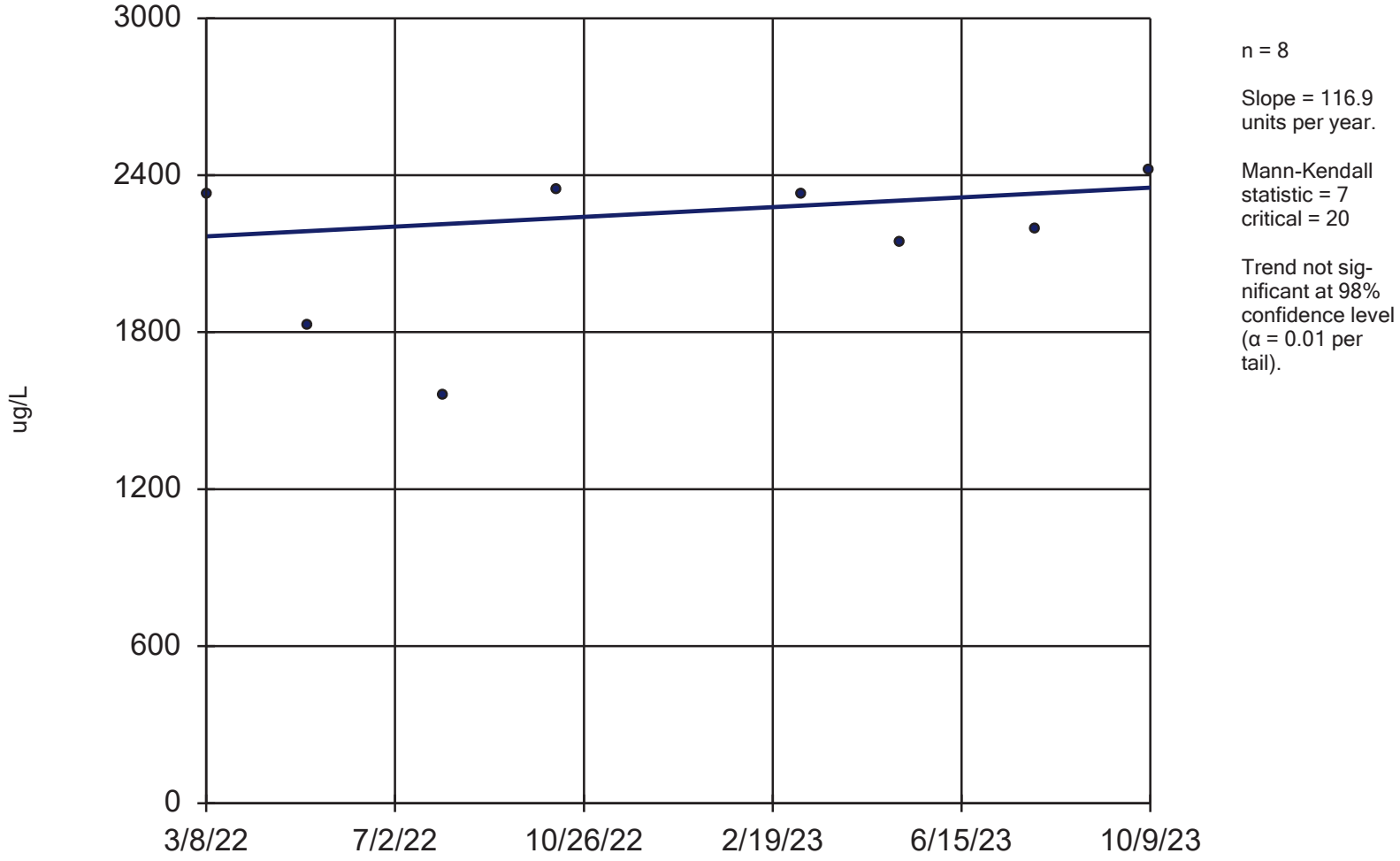
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-53R



n = 8

Slope = 116.9 units per year.

Mann-Kendall statistic = 7
critical = 20

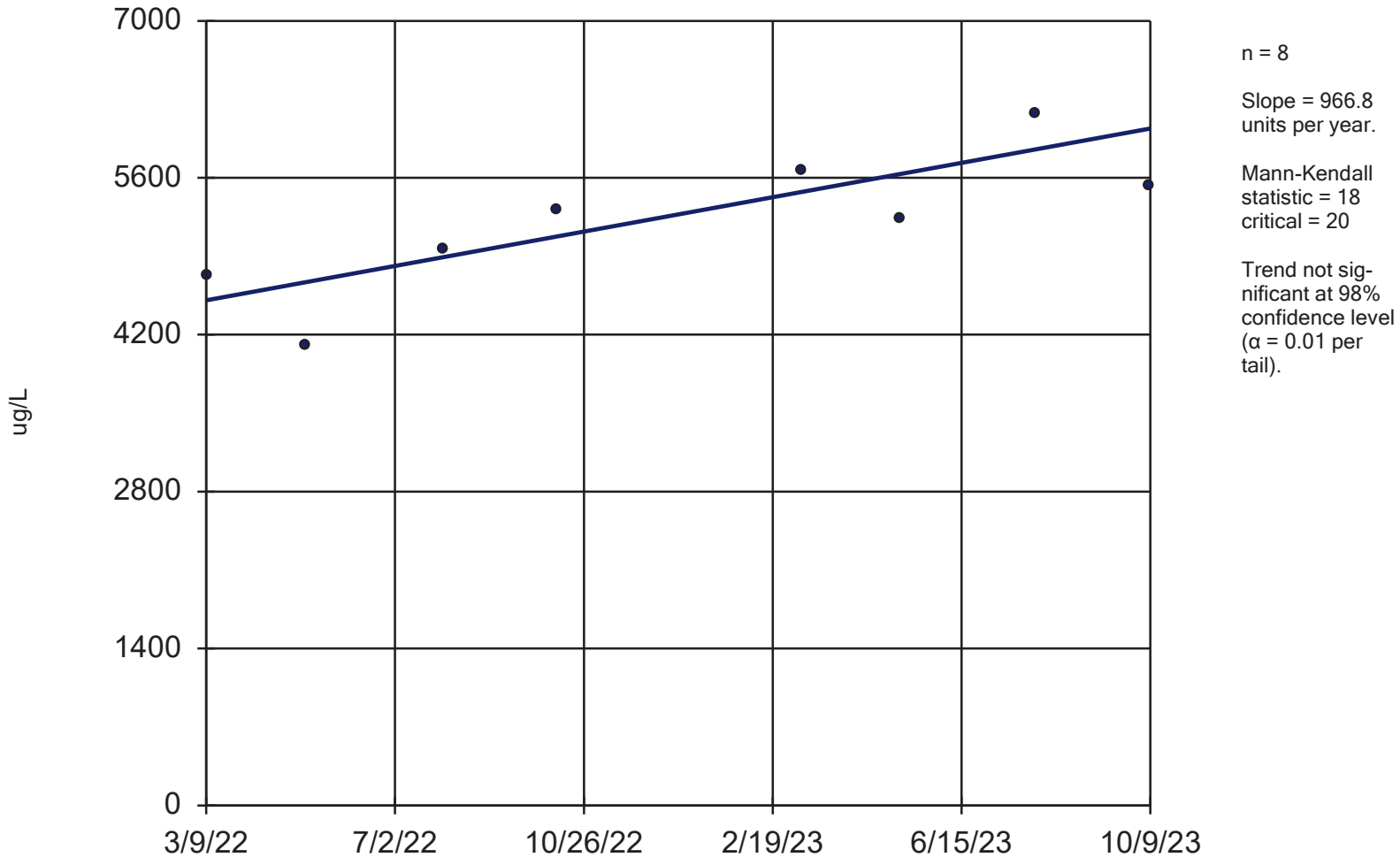
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-54R



n = 8

Slope = 966.8 units per year.

Mann-Kendall statistic = 18
critical = 20

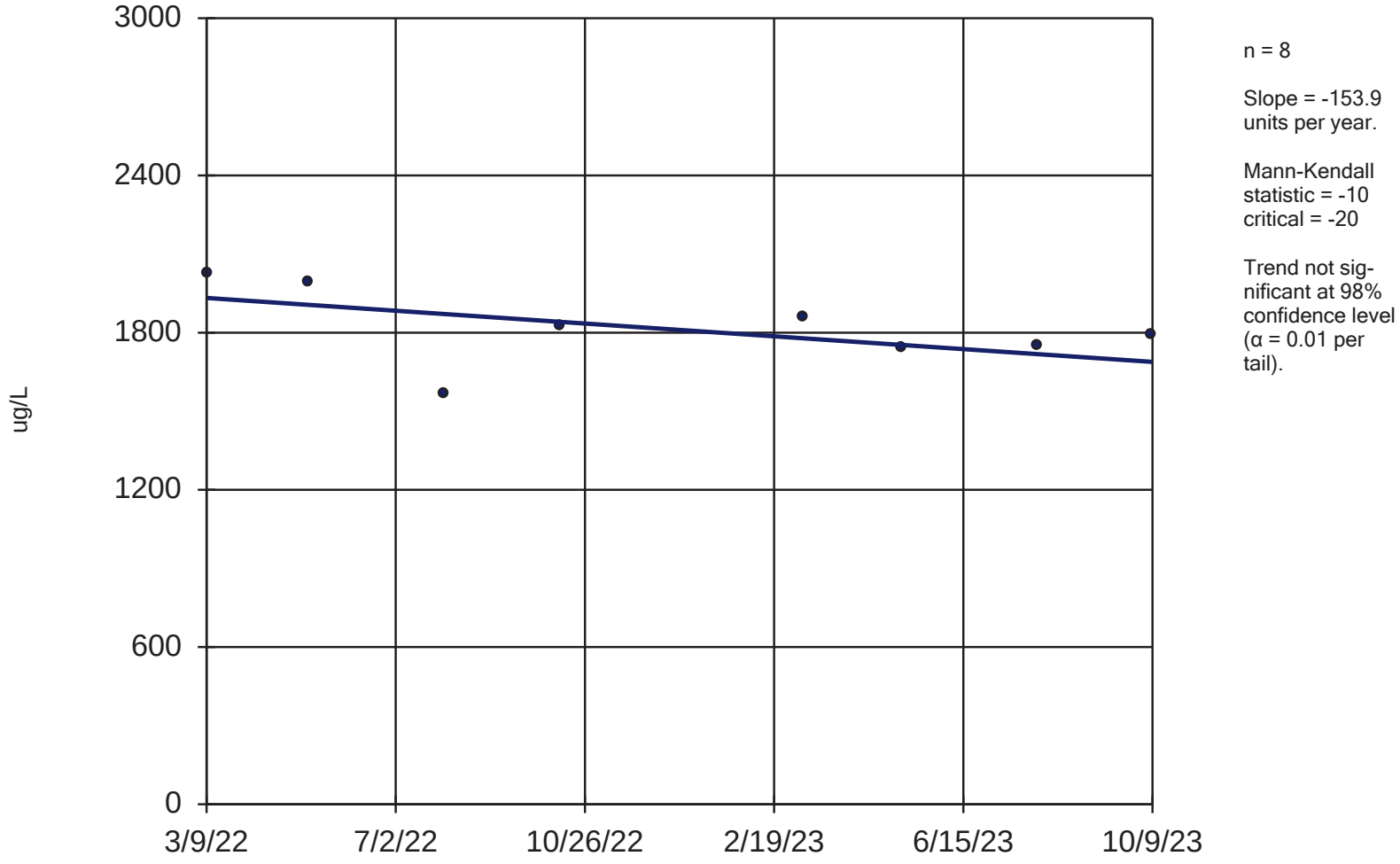
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 3:56 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

OW-57ROUT



n = 8

Slope = -153.9 units per year.

Mann-Kendall statistic = -10
critical = -20

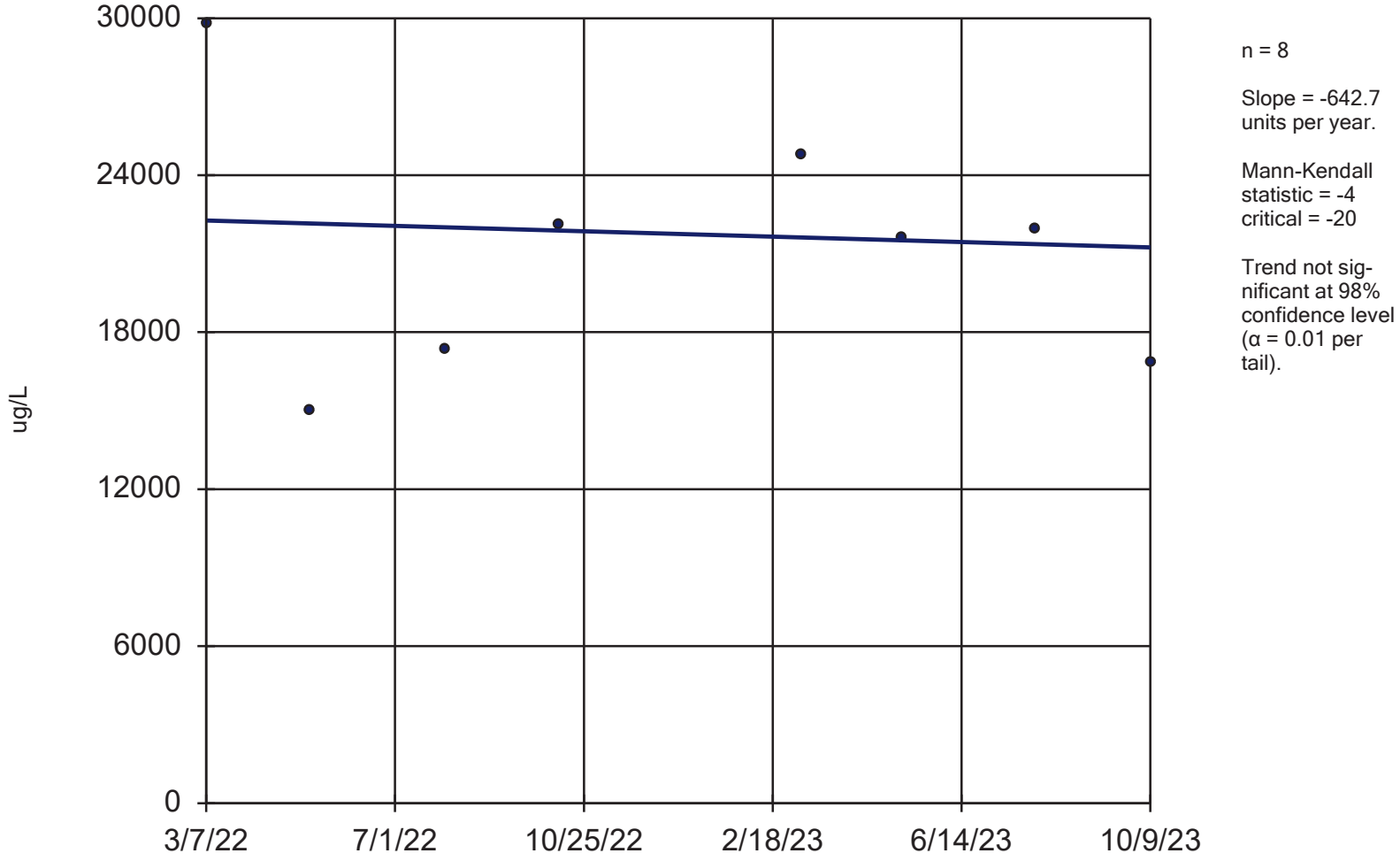
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/30/2023 1:46 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Iron, Total

MW-55



n = 8

Slope = -642.7 units per year.

Mann-Kendall statistic = -4
critical = -20

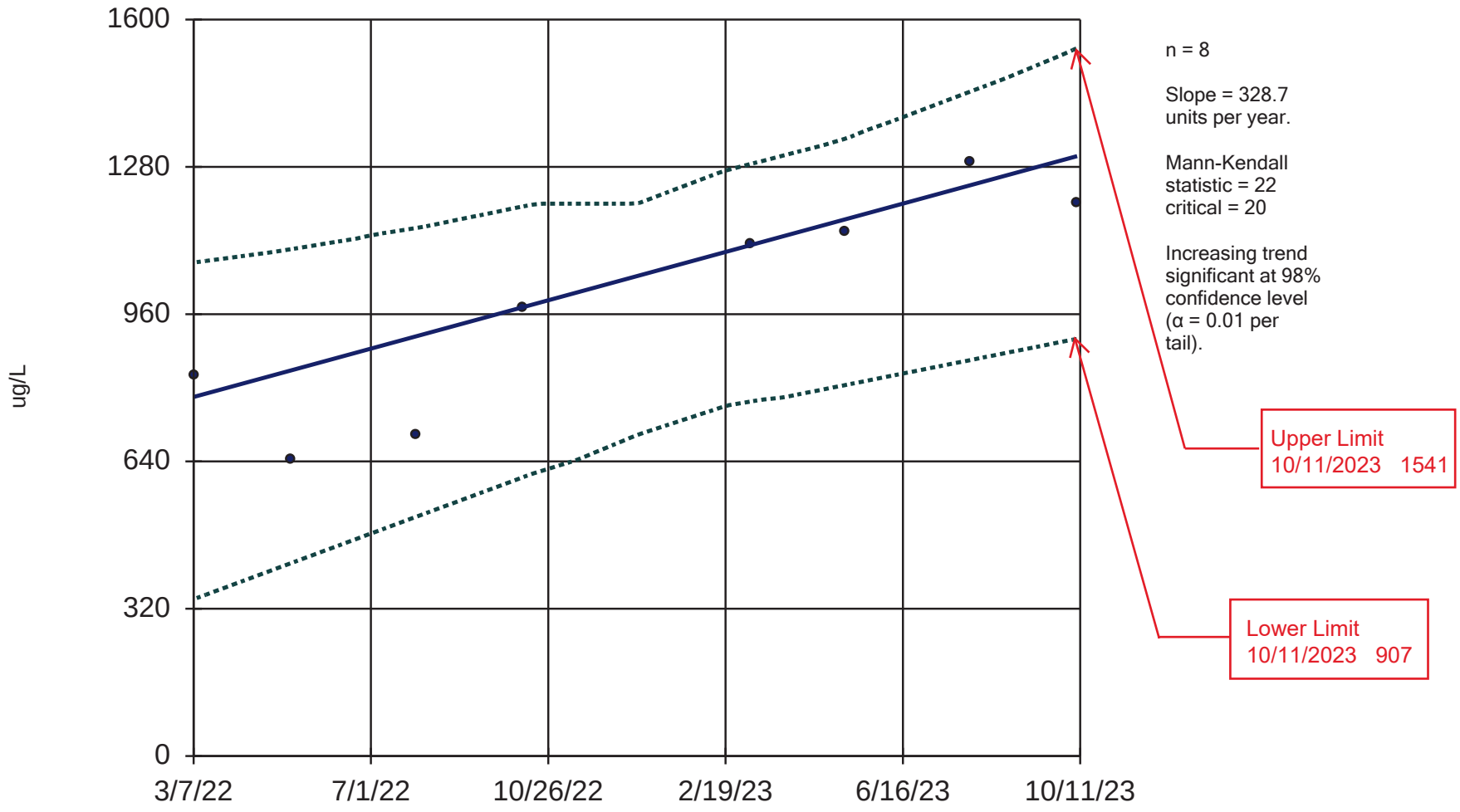
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/21/2023 4:00 PM

Data: JCW_HMPCCR_Sanitas_23Q4

Boron, Total

MW-55

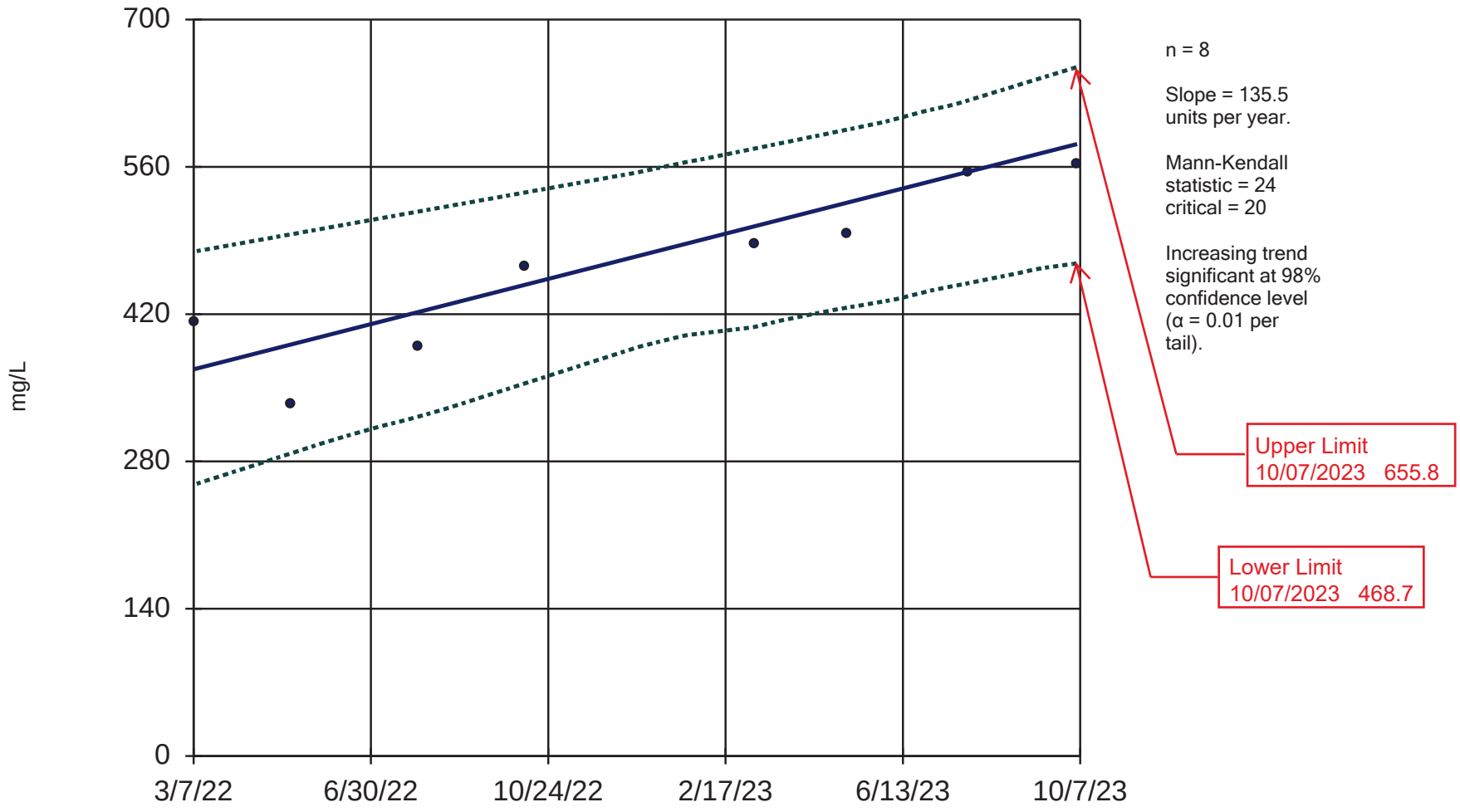


Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:10 AM

Data: JCW_HMPCCR_Sanitas_23Q4

Calcium, Total

JCW-MW-18001

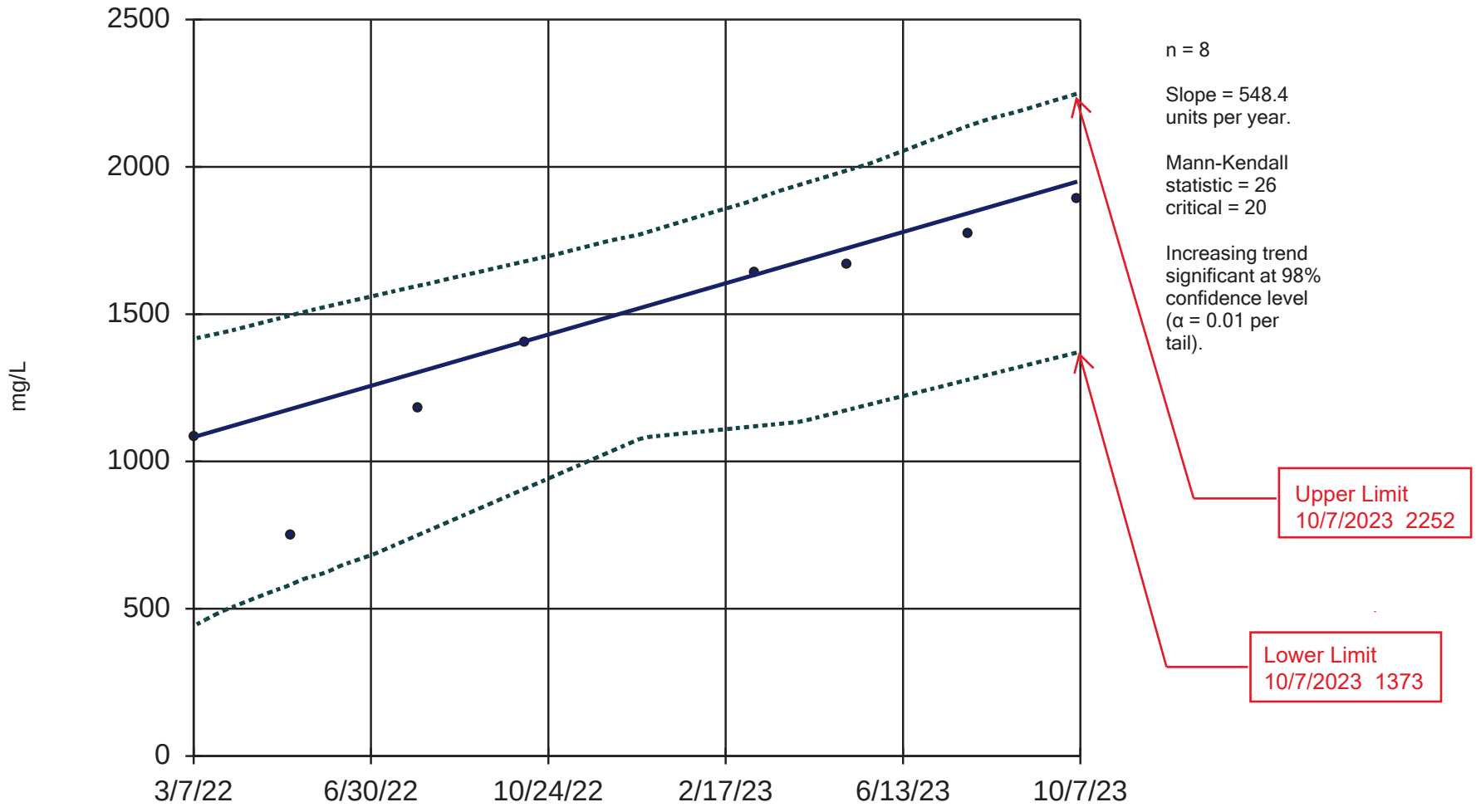


Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:12 AM

Data: JCW_HMPCCR_Sanitas_23Q4

Sulfate

JCW-MW-18001

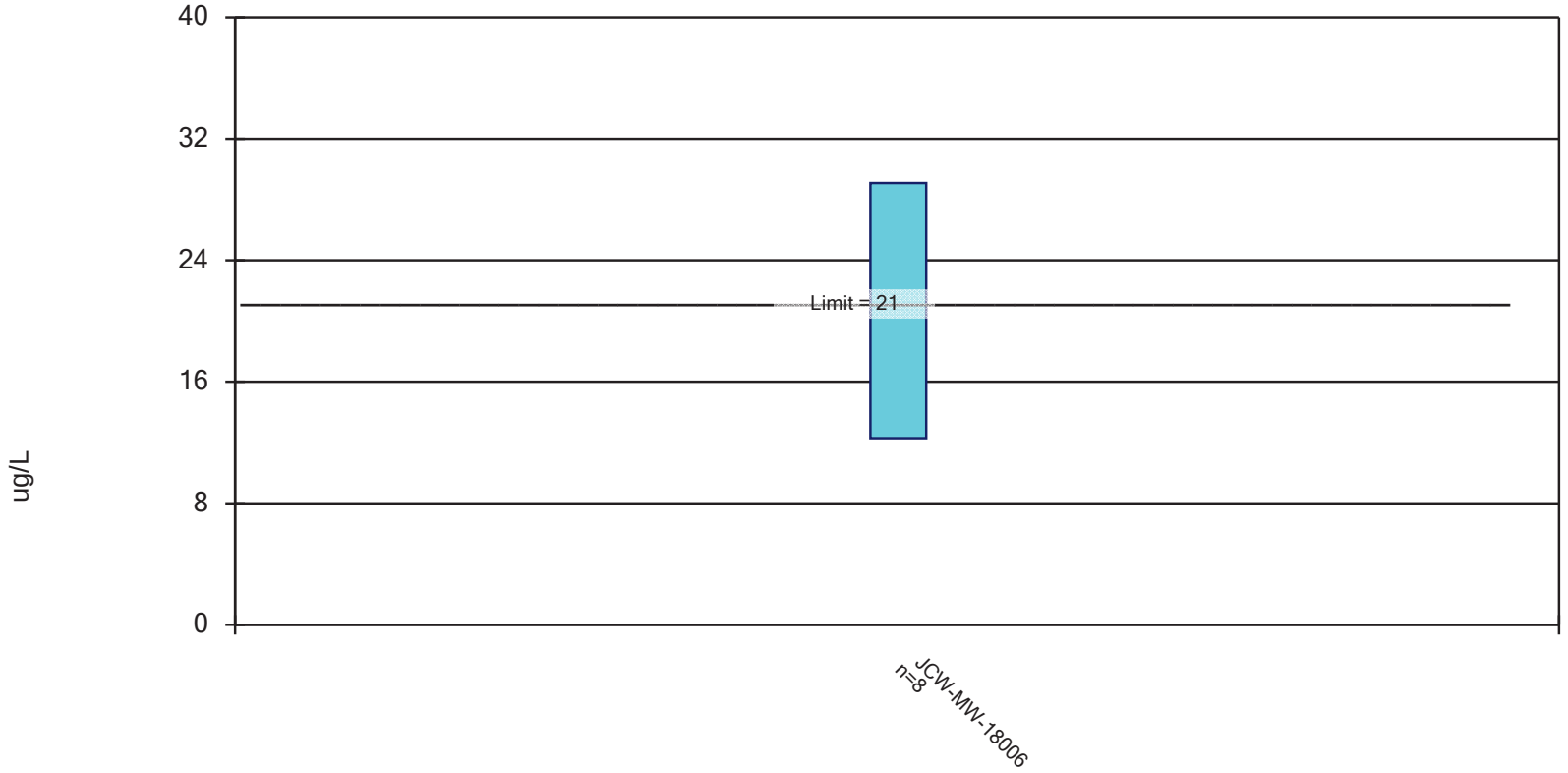


Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 10:22 AM

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

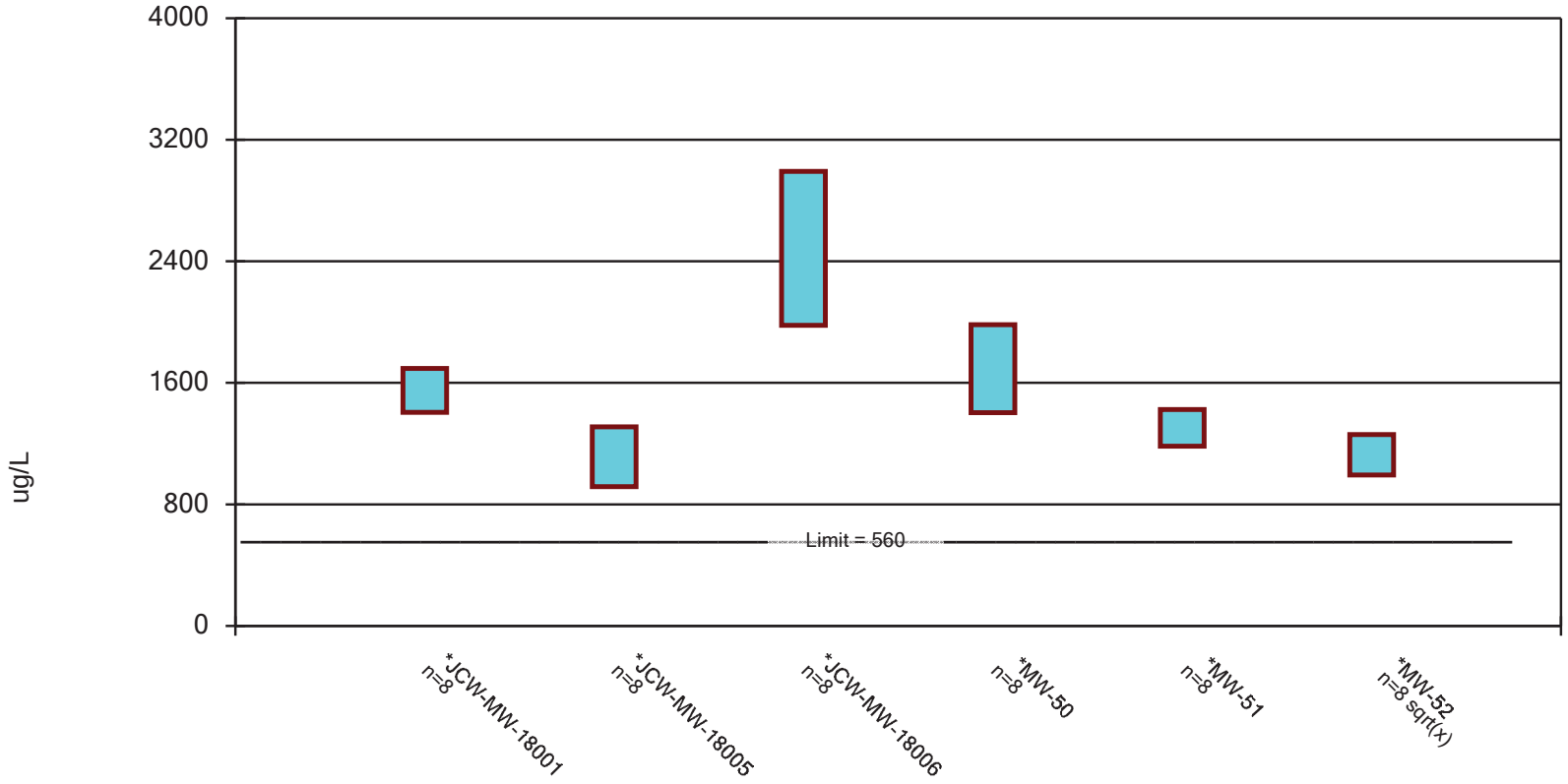
Constituent: Arsenic, Total (ug/L) Analysis Run 11/30/2023 1:40 PM

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.



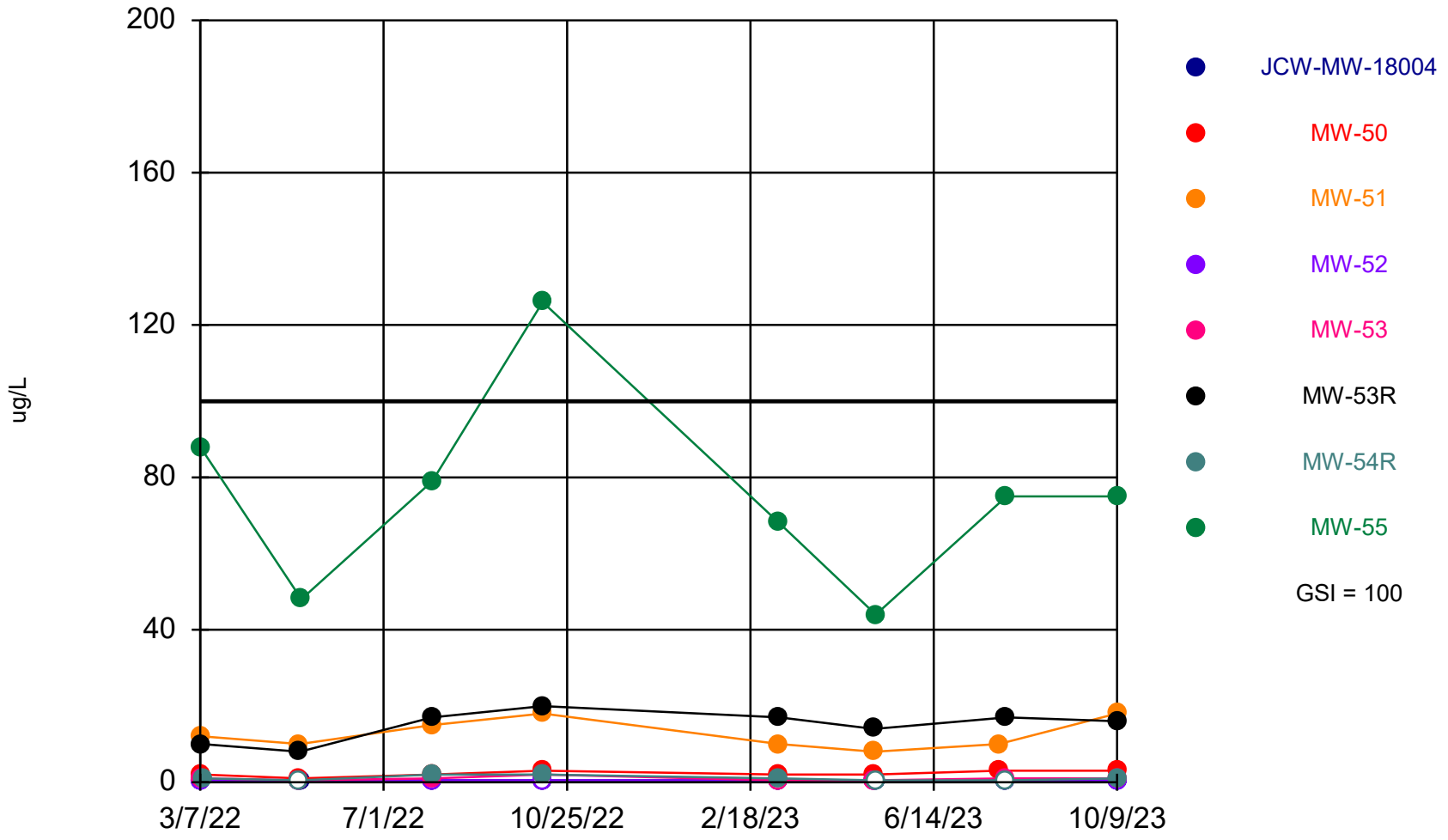
Constituent: Boron, Total Analysis Run 11/30/2023 1:41 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Attachment 2
GSI Evaluation Sanitas™ Output Files

Hollow symbols indicate censored values.

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

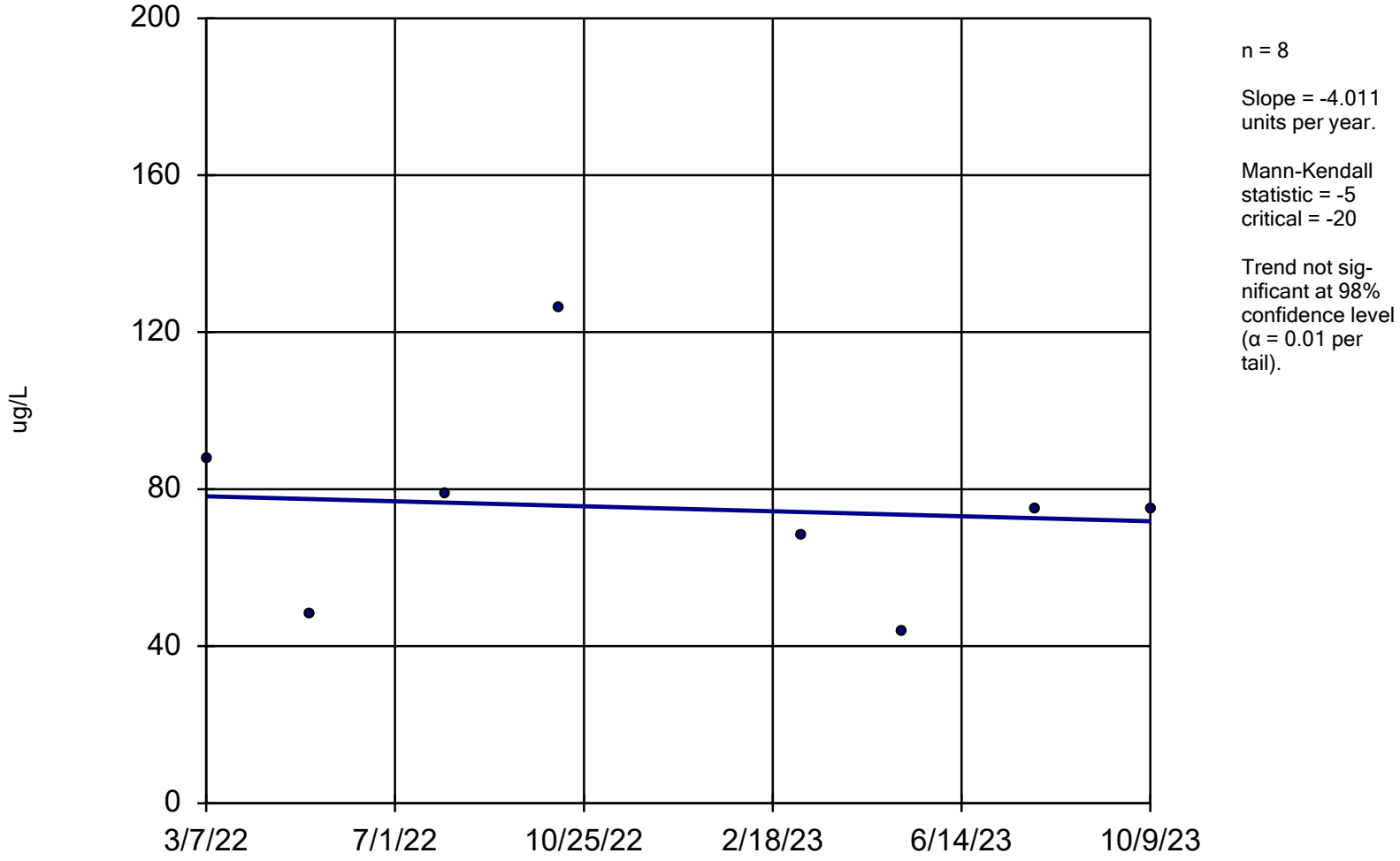
For observations made between 3/7/2022 and 10/9/2023, a summary of the selected data set:

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

Well	#Obs.	NDs	Min	Max	Mean	Median	Std.Dev.	CV	Skewness
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

MW-55



n = 8

Slope = -4.011 units per year.

Mann-Kendall statistic = -5
critical = -20

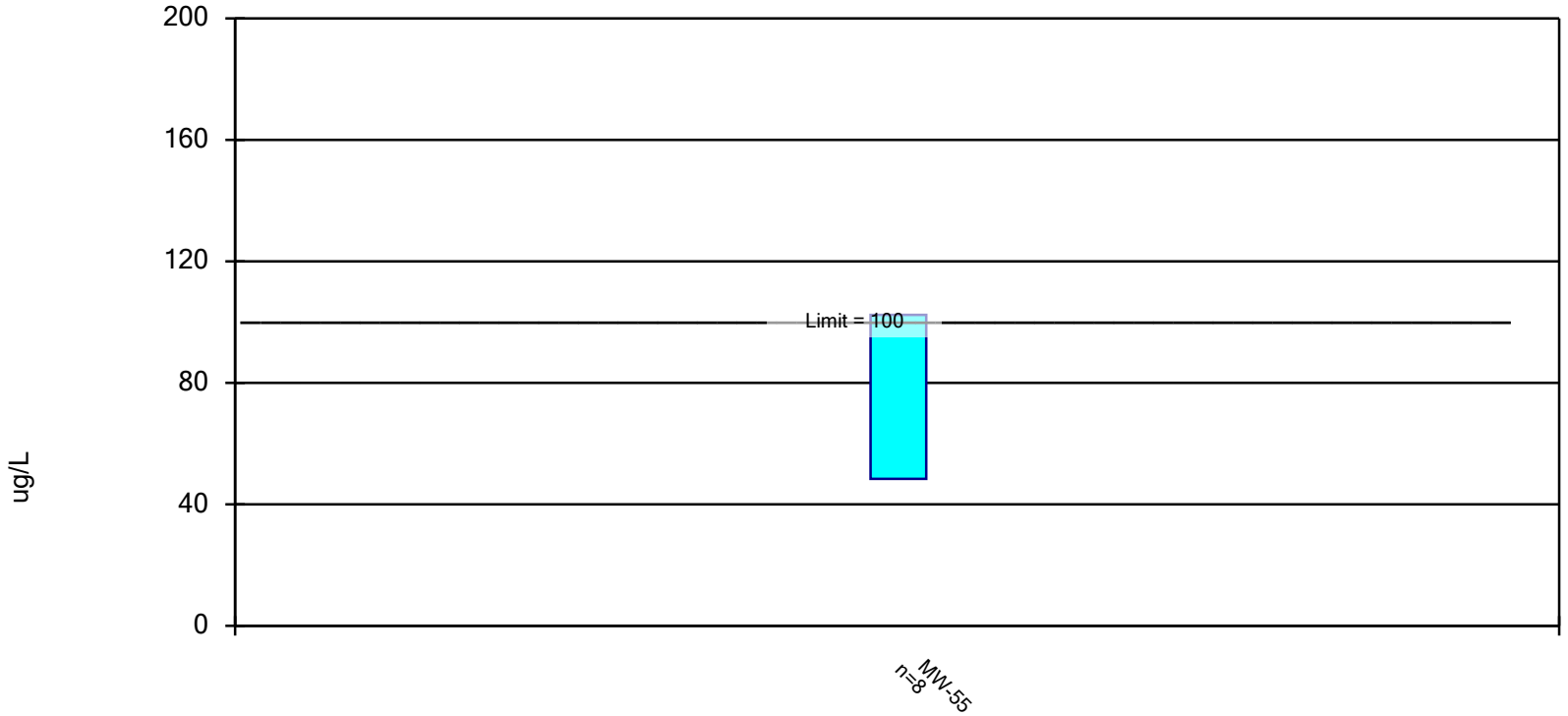
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/27/2023 11:21 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 11/27/2023 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

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 4th 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18001**
Lab Sample ID: 23-0934-01
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/05/2023
Collect Time: 06:17 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-01-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

Aliquot #: 23-0934-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-01-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 #: 23-0934-01-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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Alkalinity by SM 2320B

Aliquot #: 23-0934-01-C04-A01 **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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18004**
Lab Sample ID: 23-0934-02
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 11:45 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-02-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	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, Aqueous

Aliquot #: 23-0934-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-02-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 #: 23-0934-02-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

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18005**
Lab Sample ID: 23-0934-03
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 01:34 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-03-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 #: 23-0934-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-03-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 2540C

Aliquot #: 23-0934-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	884		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **JCW-MW-18006**
Lab Sample ID: 23-0934-04
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 03:00 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-04-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	17		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	342		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	2280		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	117000		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	5660		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	37		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	2		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 #: 23-0934-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	72300		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	46900		ug/L	1000.0	10/13/2023	AB23-1012-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0934-04-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	738		mg/L	10.0	10/11/2023	AB23-1011-02

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-50**
Lab Sample ID: 23-0934-05
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 06:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-05-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	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, Aqueous

Aliquot #: 23-0934-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-05-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 #: 23-0934-05-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	10/11/2023	AB23-1011-02

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-51**
Lab Sample ID: 23-0934-06
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 07:38 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-06-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, Aqueous

Aliquot #: 23-0934-06-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0934-06-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 #: 23-0934-06-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	952		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-52**
Lab Sample ID: 23-0934-07
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 08:30 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-07-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	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, Aqueous

Aliquot #: 23-0934-07-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, Aqueous

Aliquot #: 23-0934-07-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 2540C

Aliquot #: 23-0934-07-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1440		mg/L	10.0	10/11/2023	AB23-1011-02

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53**
Lab Sample ID: 23-0934-08
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 09:20 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-08-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	719		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	5530		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	136000		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	1080		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	42		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	2		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 #: 23-0934-08-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, Aqueous

Aliquot #: 23-0934-08-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	77400		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	2280		ug/L	1000.0	10/13/2023	AB23-1012-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0934-08-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	722		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-53R**
Lab Sample ID: 23-0934-09
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 10:15 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-09-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, Aqueous

Aliquot #: 23-0934-09-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, Aqueous

Aliquot #: 23-0934-09-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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 #: 23-0934-09-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1090		mg/L	10.0	10/11/2023	AB23-1011-02

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-54R**
Lab Sample ID: 23-0934-10
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 11:05 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-10-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, Aqueous

Aliquot #: 23-0934-10-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, Aqueous

Aliquot #: 23-0934-10-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 #: 23-0934-10-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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-11-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	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, Aqueous

Aliquot #: 23-0934-11-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, Aqueous

Aliquot #: 23-0934-11-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 #: 23-0934-11-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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **OW-57ROUT**
Lab Sample ID: 23-0934-12
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 02:24 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-12-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	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, Aqueous

Aliquot #: 23-0934-12-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, Aqueous

Aliquot #: 23-0934-12-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 2540C

Aliquot #: 23-0934-12-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	758		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **MW-58**
Lab Sample ID: 23-0934-13
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 04:15 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-13-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	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, Aqueous

Aliquot #: 23-0934-13-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, Aqueous

Aliquot #: 23-0934-13-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 2540C

Aliquot #: 23-0934-13-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1240		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-01**
Lab Sample ID: 23-0934-14
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-14-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	3		ug/L	1.0	10/12/2023	AB23-1012-04
Barium	136		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	2060		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	2340		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	2		ug/L	2.0	10/12/2023	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
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 #: 23-0934-14-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, Aqueous

Aliquot #: 23-0934-14-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	37000		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	472000		ug/L	1000.0	10/13/2023	AB23-1012-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0934-14-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1190		mg/L	10.0	10/11/2023	AB23-1011-02

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **DUP-JCW-LF-02**
Lab Sample ID: 23-0934-15
Matrix: Groundwater

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-15-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	381		ug/L	5.0	10/12/2023	AB23-1012-04
Beryllium	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Boron	2470		ug/L	20.0	10/12/2023	AB23-1012-04
Cadmium	ND		ug/L	0.2	10/12/2023	AB23-1012-04
Calcium	119000		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	5930		ug/L	20.0	10/12/2023	AB23-1012-04
Lead	ND		ug/L	1.0	10/12/2023	AB23-1012-04
Lithium	39		ug/L	10.0	10/12/2023	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
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	2		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 #: 23-0934-15-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, Aqueous

Aliquot #: 23-0934-15-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	71100		ug/L	1000.0	10/13/2023	AB23-1012-01
Fluoride	ND		ug/L	1000.0	10/13/2023	AB23-1012-01
Sulfate	47600		ug/L	1000.0	10/13/2023	AB23-1012-01

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0934-15-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	748		mg/L	10.0	10/11/2023	AB23-1011-02

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-16-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	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, Total, Aqueous

Aliquot #: 23-0934-16-C01-A02 **Analyst: CLE**

Parameter(s)	Result	Flag	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, Aqueous

Aliquot #: 23-0934-16-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-17-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	99		%	1.0	10/12/2023	AB23-1012-04
Arsenic	97		%	1.0	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
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		%	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
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
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
Sulfate	109		%	1000.0	10/13/2023	AB23-1012-01

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **FB-01**
Lab Sample ID: 23-0934-18
Matrix: Water

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 04:35 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-18-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	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, Total, Aqueous

Aliquot #: 23-0934-18-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, Aqueous

Aliquot #: 23-0934-18-C02-A01 **Analyst: KDR**

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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area, Porewater (395457)**
Field Sample ID: **EB-01**
Lab Sample ID: 23-0934-19
Matrix: Water

Laboratory Project: **23-0934**
Collect Date: 10/09/2023
Collect Time: 04:30 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0934-19-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	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, Total, Aqueous

Aliquot #: 23-0934-19-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, Aqueous

Aliquot #: 23-0934-19-C02-A01 **Analyst: KDR**

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

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0934

Inspection Date: 10.05.23 **Inspection By:** LMO

Sample Origin/Project Name: Q4-2023 Weadock Porewater Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 5.4-5.9 °C Samples Received on Ice: Yes X No _____

M&TE # and Expiration LS028757 11.15.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	24				
24 mL vial (glass)					
250 500 mL (plastic)	12				
Other					

10.5.23 LMO

pH Strip Lot # 205522 exp. 02.15.25

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

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: J. Jasso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0934-01	10/5/23	1207	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	x		
-04			GW	JCW-MW-18006	3	2	1						x	x	x		
-05			GW	MW-50	3	2	1						x	x	x		
-06			GW	MW-51	3	2	1						x	x	x		
-07			GW	MW-52	3	2	1						x	x	x		
-08			GW	MW-53	3	2	1						x	x	x		
-09			GW	MW-53R	3	2	1						x	x	x		
-10			GW	MW-54R	3	2	1						x	x	x		
-11			GW	MW-55	3	2	1						x	x	x		
-12			GW	OW-57ROUT	3	2	1						x	x	x		

RELINQUISHED BY: [signature] DATE/TIME: 10/5/23 1240 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 5.4-5.9 °C Cal. Due Date: 11-15-23

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SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: J. Josso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
~~23-0934-13~~			GW	~~MW-58~~	3	2	1						x	x	x		
~~-14~~			GW	~~DUP-JCW-LF-01~~	3	2	1						x	x	x		
~~-15~~			GW	~~DUP-JCW-LF-02~~	3	2	1						x	x	x		
-16	10/5/23	0617	GW	JCW-MW-18001 MS	2	1	1						x	x			
-17	10/5/23	0617	GW	JCW-MW-18001 MSD	2	1	1						x	x			
~~18~~			W	~~FB-01~~	2	1	1						x	x			
~~-19~~			W	~~EB-01~~	2	1	1						x	x			

RELINQUISHED BY: [signature] — DATE/TIME: 10/5/23 1240 — RECEIVED BY: [signature]

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS028757

Temperature: 5.4-5.9 °C — Cal. Due Date: 11-15-23

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0934

Inspection Date: 10.11.23 **Inspection By:** LMO

Sample Origin/Project Name: Q4-2023 Meadock Porewater Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony X FedEx ____ UPS ____ USPS ____ Airborne ____

Other/Hand Carry (whom) ____

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

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

Cooler X Cardboard Box ____ Custom Case ____ Envelope/Mailer ____

Loose/Unpackaged Containers ____ Other ____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented ____ Leaking ____

Other ____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened ____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request ____ Air Data Sheet ____ Other ____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.5-2.3 °C Samples Received on Ice: Yes X No ____

M&TE # and Expiration LSG28757 11.15.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	32				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	14				
Other					

10.11.23 LMO

pH strip Lot #: 2055 22 02.15.25

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SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit | email: | phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
~~23-0934-01~~			~~GW~~	~~JCW-MW-18001~~	5	4	1						x	x	x	x	
-02	10/9/23	1145	GW	JCW-MW-18004	3	2	1						x	x	x		
-03	10/9/23	1334	GW	JCW-MW-18005	3	2	1						x	x	x		
-04	10/10/23	1520	GW	JCW-MW-18006	3	2	1						x	x	x		
-05	10/9/23	0940	GW	MW-50	3	2	1						x	x	x		
-06	10/9/23	0735	GW	MW-51	3	2	1						x	x	x		
-07	10/9/23	0830	GW	MW-52	3	2	1						x	x	x		
-08	10/9/23	0920	GW	MW-53	3	2	1						x	x	x		
-09	10/9/23	1015	GW	MW-53R	3	2	1						x	x	x		
-10	10/9/23	1105	GW	MW-54R	3	2	1						x	x	x		
-11	10/9/23	1245	GW	MW-55	3	2	1						x	x	x		
-12	10/9/23	1424	GW	OW-57ROUT	3	2	1						x	x	x		

RELINQUISHED BY: _____ DATE/TIME: 10/10/23 0812 RECEIVED BY: _____

RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 1.5 -2.3 °C Cal. Due Date: 11-15-23

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SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: J. Josso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0934-13	10/4/23	1615	GW	MW-58	3	2	1						x	x	x		
-14	10/4/23	—	GW	DUP-JCW-LF-01	3	2	1						x	x	x		*
-15	10/4/23	—	GW	DUP-JCW-LF-02	3	2	1						x	x	x		*
-16	10/5/23	0617	GW	JCW-MW-18001 MS	2	1	1						x	x			
-17	10/5/23	0617	GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18	10/4/23	1437	W	FB-01	2	1	1						x	x			
-19	10/4/23	1437	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: [signature] — DATE/TIME: 10/5/23 1240 — RECEIVED BY: [signature]

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS: * Received on 10/05/23, all other samples received on 10/10/23

Received on Ice? ☑ Yes ☐ No — M&TE #: LS028757

Temperature: 1.5-2.3 °C — Cal. Due Date: 11-15-23

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 4th 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements. 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, 22nd Edition, 2012.

III. Results/Quality Control

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

DEFINITIONS / QUALIFIERS

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

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area - Leachate Wells**
Field Sample ID: **LH-103R**
Lab Sample ID: 23-0941-01
Matrix: Groundwater

Laboratory Project: **23-0941**
Collect Date: 10/04/2023
Collect Time: 01:32 PM

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-01-C01-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury Low Level	1.01		ng/L	0.5	10/12/2023	AB23-1012-03

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0941-01-C02-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	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 #: 23-0941-01-C02-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0941-01-C03-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area - Leachate Wells**
Field Sample ID: **LH-103R**
Lab Sample ID: 23-0941-01
Matrix: Groundwater

Laboratory Project: **23-0941**
Collect Date: 10/04/2023
Collect Time: 01:32 PM

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0941-01-C04-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	3300		mg/L	10.0	10/11/2023	AB23-1011-02

Alkalinity by SM 2320B

Aliquot #: 23-0941-01-C05-A01 **Analyst: DLS**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-02-C01-A01 **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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Groundwater		

Mercury, Low Level by EPA 1631E

Aliquot #: 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

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area - Leachate Wells**
Field Sample ID: **LH-104**
Lab Sample ID: 23-0941-05
Matrix: Groundwater

Laboratory Project: **23-0941**
Collect Date: 10/04/2023
Collect Time: 01:28 PM

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-05-C01-A01 **Analyst: CLE**

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 Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0941-05-C02-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	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 #: 23-0941-05-C02-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0941-05-C03-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	45400		ug/L	1000.0	10/12/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	352000		ug/L	1000.0	10/13/2023	AB23-1011-03

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Analytical Report

Report Date: 10/20/23

Sample Site: **JCW Solid Waste Disposal Area - Leachate Wells**
Field Sample ID: **LH-104**
Lab Sample ID: 23-0941-05
Matrix: Groundwater

Laboratory Project: **23-0941**
Collect Date: 10/04/2023
Collect Time: 01:28 PM

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0941-05-C04-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	952		mg/L	10.0	10/05/2023	AB23-1006-03

Alkalinity by SM 2320B

Aliquot #: 23-0941-05-C05-A01 **Analyst: DLS**

Parameter(s)	Result	Flag	Units	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

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Analytical Report

Report Date: 10/20/23

Sample Site:	**JCW Solid Waste Disposal Area - Leachate Wells**	Laboratory Project:	**23-0941**
Field Sample ID:	**LH-104 Dup**	Collect Date:	10/04/2023
Lab Sample ID:	23-0941-06	Collect Time:	01:28 PM
Matrix:	Groundwater		

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-06-C01-A01 **Analyst: CLE**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury Low Level	ND		ng/L	0.5	10/12/2023	AB23-1012-03

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Water		

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-07-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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Water		

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-08-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

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Analytical Report

Report Date: 10/20/23

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
Matrix:	Water		

Mercury, Low Level by EPA 1631E

Aliquot #: 23-0941-09-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

Data Qualifiers	Exception Summary
Q = Matrix spike recovery outside acceptance criteria.	No other exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0941

Inspection Date: 10.05.23 **Inspection By:** UMO

Sample Origin/Project Name: _____

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler 1 Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None _____ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed Y

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range Ambient Samples Received on Ice: Yes _____ No Y

M&TE # and Expiration N/A

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)					
24 mL vial (glass)					
500 mL (plastic)					
Other 8 oz Clear glass jar	9 UMO 10.05.3				

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Leachate Wells

PROJECT NUMBER: 23-0941

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: A. Wholey, J. Josso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed): Low Level Mercury

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Low Level Mercury	REMARKS
23-0941-01	10/4/23	1332	GW	LH-103R	1					1			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		1328	GW	LH-104	1					1			x	
-06		—	GW	LH-104 Dup	1					1			x	
-07		1332	W	FB-02	1					1			x	
-08		1415	W	EB-02	1					1			x	
-09	↓	—	W	TB-02	1					1			x	

RELINQUISHED BY: [signature] DATE/TIME: 10-5-23/0730 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☐ Yes ☑ No M&TE #: N/A

Temperature: N/A °C Cal. Due Date: N/A

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0941

Inspection Date: 10.05.23 **Inspection By:** UMO

Sample Origin/Project Name: Q4-2023 Weadock Leachate Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.9-2.1 °C Samples Received on Ice: Yes X No _____

M&TE # and Expiration LS028757 11.15.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	4				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	4				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	2				
Other					

10.05.23 UMO

pH Strip Lot #: 205522 exp. 2.15.25

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Leachate Wells

PROJECT NUMBER: 23-0941

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: A. Whaley, J. Jasso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Low Level Mercury	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0941-01	10/4/23	1332	GW	LH-103R	6	4	1			1			x	x	x	x	x	Low Level Hg on Separate COC
↓ -05	10/4/23	1328	GW	LH-104	6	4	1			1			x	x	x	x	x	

RELINQUISHED BY: [signature] [signature] — DATE/TIME: 10/5/23 / 0730 — RECEIVED BY: [signature]

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS028757

Temperature: 1.9-2.1 °C — Cal. Due Date: 11-15-23

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 4th 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section, 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:

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

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

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Work Order Sample Summary

Customer Name: 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	Matrix	Sample Date	Site
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

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15002**
Lab Sample ID: 23-0933-01
Matrix: Groundwater

Laboratory Project: **23-0933**
Collect Date: 10/04/2023
Collect Time: 09:13 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-01-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

Aliquot #: 23-0933-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0933-01-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 #: 23-0933-01-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

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15008**
Lab Sample ID: 23-0933-02
Matrix: Groundwater

Laboratory Project: **23-0933R**
Collect Date: 10/02/2023
Collect Time: 11:51 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-02-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	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		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	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, Aqueous

Aliquot #: 23-0933-02-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0933-02-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	10/12/2023	AB23-1011-03

Total Dissolved Solids by SM 2540C

Aliquot #: 23-0933-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1160		mg/L	10.0	10/05/2023	AB23-1006-05

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15016**
Lab Sample ID: 23-0933-03
Matrix: Groundwater

Laboratory Project: **23-0933**
Collect Date: 10/04/2023
Collect Time: 09:49 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-03-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	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

Aliquot #: 23-0933-03-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0933-03-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 #: 23-0933-03-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

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **MW-15019**
Lab Sample ID: 23-0933-04
Matrix: Groundwater

Laboratory Project: **23-0933R**
Collect Date: 10/02/2023
Collect Time: 12:36 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-04-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	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		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	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, Aqueous

Aliquot #: 23-0933-04-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0933-04-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 #: 23-0933-04-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	10/05/2023	AB23-1006-05

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **DUP-Background**
Lab Sample ID: 23-0933-05
Matrix: Groundwater

Laboratory Project: **23-0933R**
Collect Date: 10/02/2023
Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-05-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	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		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	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, Aqueous

Aliquot #: 23-0933-05-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 Analyte List, Cl, F, SO4, Aqueous

Aliquot #: 23-0933-05-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 #: 23-0933-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1220		mg/L	10.0	10/05/2023	AB23-1006-05

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Analytical Report

Report Date: 10/20/23

Sample Site: **DEK JCW Background**
Field Sample ID: **FB- Background**
Lab Sample ID: 23-0933-06
Matrix: Water

Laboratory Project: **23-0933R**
Collect Date: 10/02/2023
Collect Time: 12:36 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0933-06-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	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	ND		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	ND		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	ND		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	ND		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	ND		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	ND		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

Aliquot #: 23-0933-06-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0933

Inspection Date: 10.05.23 **Inspection By:** LMO

Sample Origin/Project Name: Q4-2023 JCW-DEK Background Wells

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 2.0 - 3.6 Samples Received on Ice: Yes X No ____

M&TE # and Expiration LS028757 11.15.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	11				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	5				
Other _____					

10.05.23 LMO

pH strip lot #: 205522 exp. 2.15.25

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

SAMPLING SITE / CUSTOMER: Q4-2023 JCW-DEK Background Wells

PROJECT NUMBER: 23-0933

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES:
GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0933-01	10-4-23	0913	GW	MW-15002	3	2	1						x	x	x	
-02	10-2-23	1151	GW	MW-15008	3	2	1						x	x	x	
-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						x	x	x	
-06	10-2-23	1236	W	FB- Background	1								x			

RELINQUISHED BY: [signature] DATE/TIME: 10-5-23/0730 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 2.0 - 3.6 °C Cal. Due Date: 11-15-23

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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
BLSwanberg, P22-119

Darby Litz, Project Manager
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 4th 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

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

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Work Order Sample Summary

Customer Name: 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

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0935-01
Matrix: Groundwater

Laboratory Project: **23-0935**
Collect Date: 10/05/2023
Collect Time: 07:05 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp

Aliquot #: 23-0935-01-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

Aliquot #: 23-0935-01-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 List, Cl, F, SO4, Aqueous

Aliquot #: 23-0935-01-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 #: 23-0935-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1330		mg/L	10.0	10/06/2023	AB23-1006-06

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Analytical Report

Report Date: 10/20/23

Sample Site: **JC Weadock ASD**
Field Sample ID: **JCW-OW-18001**
Lab Sample ID: 23-0935-01
Matrix: Groundwater

Laboratory Project: **23-0935**
Collect Date: 10/05/2023
Collect Time: 07:05 AM

Alkalinity by SM 2320B

Aliquot #: 23-0935-01-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

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0935

Inspection Date: 10.05.23 **Inspection By:** LMG

Sample Origin/Project Name: Q4-2023 Weadock ASD

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) TRC

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

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

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 5.9 Samples Received on Ice: Yes Y No ____

M&TE # and Expiration LS028757 11.15.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	2				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	2				
24 mL vial (glass)					
500 mL (plastic)	1				
Other					

10.5.23 LMG 250

pH Strip Lot #: 205522 exp. 2.15.25

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Page 1 of 1

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock ASD	PROJECT NUMBER: 23-0935	SAP CC or WO#:	ANALYSIS REQUESTED (Attach List if More Space is Needed)
SAMPLING TEAM: J. Jasso	TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER	REQUESTER: Harold Register	QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER
SEND REPORT TO: Joseph Firlit	email:	phone:	
COPY TO: Harold Register; TRC	MATRIX CODES: GW = Groundwater, WW = Wastewater, W = Water / Aqueous Liquid, S = Soil / General Solid, O = Oil, OX = Other, SL = Sludge, A = Air, WP = Wipe, WT = General Waste		

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0935-01	10/5/23	0705	GW	JCW-OW-18001	5	4	1						x	x	x	x	

RELINQUISHED BY: [signature] DATE/TIME: 10/5/23 1240 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 5.9 °C Cal. Due Date: 11-15-23

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

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JOB DESCRIPTION

Karn/Weadock CCR JCW Landfill

JOB NUMBER

240-193278-1

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton OH 44203

See page two for job notes and contact information.

myEOL

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

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

Table of Contents

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

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

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

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 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.886**		0.400	0.406	5.00	0.538	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**1.30**		0.510	0.523	5.00	0.662	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.39		0.465	0.478	5.00	0.554	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.29		0.400	0.409	5.00	0.500	pCi/L		11/10/23 08:13	1

Client Sample ID: MW-50

Date Collected: 10/09/23 06:40
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-5

Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.44		0.438	0.451	5.00	0.520	pCi/L		11/10/23 08:13	1

Client Sample ID: MW-51
Date Collected: 10/09/23 07:38
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-6
Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.52		0.472	0.486	5.00	0.550	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.08		0.551	0.572	5.00	0.653	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.40		0.567	0.592	5.00	0.658	pCi/L		11/10/23 08:13	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.14		0.417	0.427	5.00	0.512	pCi/L		11/10/23 08:13	1

Client Sample ID: MW-54R
Date Collected: 10/09/23 11:05
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-10
Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.54		0.446	0.464	5.00	0.500	pCi/L		11/10/23 08:13	1

Client Sample ID: MW-55

Date Collected: 10/09/23 12:45
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-11

Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.67		0.548	0.561	5.00	0.668	pCi/L		11/10/23 08:13	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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	*101*		*30 - 110*	*10/13/23 10:18*	*10/28/23 11:57*	*1*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.680**		0.340	0.344	5.00	0.461	pCi/L		11/10/23 08:13	1

Client Sample ID: MW-58
Date Collected: 10/09/23 16:15
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-13
Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.06		0.573	0.589	5.00	0.703	pCi/L		11/10/23 08:13	1

Client Sample ID: DUP-01

Date Collected: 10/09/23 00:00
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-14

Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.78		0.458	0.478	5.00	0.476	pCi/L		11/10/23 08:13	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**0.909**		0.381	0.388	5.00	0.488	pCi/L		11/10/23 08:13	1

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 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.82		0.442	0.461	5.00	0.436	pCi/L		11/10/23 08:13	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation.
Job ID: 240-193278-1
Project/Site: Karn/Weadock CCR JCW Landfill

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (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 Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (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

Tracer/Carrier Legend

Ba = Ba Carrier

Tracer/Carrier Summary

Client: TRC Environmental Corporation.
Job ID: 240-193278-1
Project/Site: Karn/Weadock CCR JCW Landfill

Y = Y Carrier

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-631934/1-A
Matrix: Water
Analysis Batch: 633964

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 631934

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	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	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.8*		*30 - 110*	*10/13/23 10:18*	*10/28/23 11:53*	*1*

Lab Sample ID: LCS 160-631934/2-A
Matrix: Water
Analysis Batch: 635862

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631934

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	11.00		1.14	1.00	0.123	pCi/L	97	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*77.8*		*30 - 110*

Lab Sample ID: 240-193278-2 DU
Matrix: Water
Analysis Batch: 633964

Client Sample ID: JCW-MW-18004
Prep Type: Total/NA
Prep Batch: 631934

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.0579	U		0.1183	U	0.0945	1.00	0.132	pCi/L			0.33	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*95.4*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-631941/1-A
Matrix: Water
Analysis Batch: 632731

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 631941

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.8284		0.389	0.396	1.00	0.518	pCi/L	10/13/23 10:38	10/20/23 11:33	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.8*		*30 - 110*	*10/13/23 10:38*	*10/20/23 11:33*	*1*
Y Carrier	*83.7*		*30 - 110*	*10/13/23 10:38*	*10/20/23 11:33*	*1*

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

Lab Sample ID: LCS 160-631941/2-A
Matrix: Water
Analysis Batch: 632840

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631941

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			7.78	6.655		1.49	1.00	1.18	pCi/L	86	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*77.8*		*30 - 110*
Y Carrier	*82.2*		*30 - 110*

Lab Sample ID: 240-193278-2 DU
Matrix: Water
Analysis Batch: 632731

Client Sample ID: JCW-MW-18004
Prep Type: Total/NA
Prep Batch: 631941

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	1.24			0.7118		0.366	1.00	0.485	pCi/L			0.60	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*95.4*		*30 - 110*
Y Carrier	*77.4*		*30 - 110*

QC Association Summary

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

Rad

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	

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Matrix: Water

Date Received: 10/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-18005

Lab Sample ID: 240-193278-3

Date Collected: 10/09/23 13:34

Matrix: Water

Date Received: 10/11/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 11:34
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/10/23 08:13

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

Client Sample ID: MW-50
Date Collected: 10/09/23 06:40
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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
Date Collected: 10/09/23 07:38
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-52
Date Collected: 10/09/23 08:30
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-53
Date Collected: 10/09/23 09:20
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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
Date Collected: 10/09/23 11:05
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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-55
Date Collected: 10/09/23 12:45
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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: OW-57ROUT
Date Collected: 10/09/23 14:24
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR JCW Landfill

Job ID: 240-193278-1

Client Sample ID: MW-58
Date Collected: 10/09/23 16:15
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 Sample ID: DUP-01
Date Collected: 10/09/23 00:00
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Client Sample ID: EB-01
Date Collected: 10/09/23 16:30
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Client Sample ID: DUP #02
Date Collected: 10/09/23 00:00
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193278-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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. Job ID: 240-193278-1
Project/Site: Karn/Weadock CCR JCW Landfill

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
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone (330) 497-9396 Phone (330) 497-0772

MICHIGAN 190

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: JAVIER JASSO	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-112528-29048.1
Client Contact: Jacob Krenz	Phone: 734 904 3316	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 2
Company: TRC Environmental Corporation	PWSID:	Analysis Requested		Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 199810			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR JCW Lanfill	Project #: Eurofins 24024154			
Site:	SSOW#:			

240-193278 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
JCW-MW-18001	10/5/23	0917	G	Water	N	N	X	X	2	
JCW-MW-18004	10/4/23	1141	G	Water	N	N	X	X	2	
JCW-MW-18005	10/4/23	1334	G	Water	N	N	X	X	2	
JCW-MW-18006	10/4/23	1532	G	Water	N	N	X	X	2	
MW-50	10/4/23	0844	G	Water	N	N	X	X	2	
MW-51	10/4/23	0738	G	Water	N	N	X	X	2	
MW-52	10/4/23	0830	G	Water	N	N	X	X	2	
MW-53	10/4/23	0956	G	Water	N	N	X	X	2	
MW-53R	10/4/23	1015	G	Water	N	N	X	X	2	
MW-54R	10/4/23	1107	G	Water	N	N	X	X	2	
MW-55	10/4/23	1341	G	Water	N	N	X	X	2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		10/10/23 0741	TRC		10/10/23 745	EETC
2	Relinquished by	Date/Time 10/10/23 745	Company EETC	Received by	Date/Time 10/11/23 830	Company EETC
3	Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone (330) 497-9396 Phone (330) 497-0772

MICHIGAN 190

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: Javier J Asso	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-112528-29048.2
Client Contact: Jacob Krenz	Phone: 734 904 3710	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: TRC Environmental Corporation	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 199810			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR JCW Lanfill	Eurofins Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
OW-57ROUT	10/4/23	1434	G	Water	N	N	F	F	3	
MW-58	10/4/23	1615	G	Water	N	N	F	F	3 2	
DUP-01	10/4/23	—	G	Water	N	N	F	F	3 2	
EB-01	10/4/23	1432	G	Water	N	N	F	F	3	
DUP#02	10/4/23	—	G	Water	N	N	F	F	2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		10/10/23 0745	TRC		10/10/23 745	FEDEX
2		10/10/23 745	FEDEX		101123 800	EETNC
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins – Cleveland Sample Receipt Form/Narrative **Login # :** 193278
Barberton Facility

Client TRC Environmental Site Name _____ Cooler unpacked by: Rachelle Haidet

Cooler Received on 10 11 23 Opened on 10 11 23

FedEx: 1st Grd Exp UPS FAS (Waypoint) Client Drop Off Eurofins Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # EC 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 -0.1 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1	(Yes) No
-Were the seals on the outside of the cooler(s) signed & dated?	(Yes) No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes (No)
-Were tamper/custody seals intact and uncompromised?	(Yes) No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes (No)
4. Did custody papers accompany the sample(s)?	(Yes) No
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	(Yes) No
7. Did all bottles arrive in good condition (Unbroken)?	(Yes) No
8. Could all bottle labels (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?	(Yes) No
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# HC316719
14. Were VOAs on the COC?	Yes (No)
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)

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

Sampling time for MW-55 = 1245 Confirmed on containers. 10-11-23

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.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login #: 193278

Eurofins - Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
(EC) Client Box Other	IR GUN #: 22	0.5	0.4 ~~0.6~~	(Wet Ice) Blue Ice Dry Ice Water None
(EC) Client Box Other	IR GUN #: 22	0.3	0.2	(Wet Ice) Blue Ice Dry Ice Water None
(EC) Client Box Other	IR GUN #: 22	0.2	0.1	(Wet Ice) Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #:			Wet Ice Blue Ice Dry Ice Water None

☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative 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	240-193278-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			

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-175077.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193278-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/9/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Tnzma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
JCW-MW-18001 (240-193278-1)	10/5/23	06:17 Eastern		Water			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	2	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 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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Rachel Hancock	10/23 1200	EEINC			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

11/10/2023

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-175077.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193278-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/9/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-54R (240-193278-10)	10/9/23	11:05 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-55 (240-193278-11)	10/9/23	12:45 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-57ROUT (240-193278-12)	10/9/23	14:24 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-58 (240-193278-13)	10/9/23	16:15 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-01 (240-193278-14)	10/9/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EB-01 (240-193278-15)	10/9/23	16:30 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP #02 (240-193278-16)	10/9/23	Eastern		Water			X	X	X	2	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 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 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	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	10/11/23 1200	EET NC			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

11/10/2023

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-175077.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193278-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/9/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
JCW-MW-18001 (240-193278-1)	10/5/23	06:17 Eastern		Water			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	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			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
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Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Rachel Hansel	10/23 1200	EEN C	FED EX		
2	Relinquished by: FED EX	Date/Time:	Company	Received by: Sara Worthington	Date/Time: 10/12/2023 0840	Company GNSR
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-175077.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193278-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/9/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
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Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
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MW-54R (240-193278-10)	10/9/23	11:05 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
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OW-57ROUT (240-193278-12)	10/9/23	14:24 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-58 (240-193278-13)	10/9/23	16:15 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-01 (240-193278-14)	10/9/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EB-01 (240-193278-15)	10/9/23	16:30 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP #02 (240-193278-16)	10/9/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.

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Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:		
Relinquished by: FED EX	Date/Time: 101123 1200	Company EE/NC	Received by: FED EX	Date/Time:	Company	
Relinquished by: FED EX	Date/Time:	Company	Received by: Sierra Worthington	Date/Time: OCT 12 2023 0840	Company TMSR	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:
	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-193278-1

Login Number: 193278
List Number: 2
Creator: Worthington, Sierra M

List Source: Eurofins St. Louis
List Creation: 10/12/23 12:17 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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	

eurofins | Environment Testing

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

See page two for job notes and contact information.

myEOL

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

Table of Contents

Definitions/Glossary

Client: TRC Environmental Corporation. Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

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

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.
Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

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

Sample Summary

Client: TRC Environmental Corporation.
Job ID: 240-193059-1
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 Sample ID: MW-15002 — Lab Sample ID: 240-193059-1

Date Collected: 10/04/23 09:13 — **Matrix: Water**
Date Received: 10/06/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	4.48		0.782	0.846	5.00	0.777	pCi/L		11/07/23 15:17	1

Client: TRC Environmental Corporation.
Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

Client Sample ID: MW-15008
Lab Sample ID: 240-193059-2
Date Collected: 10/02/23 11:51
Matrix: Water
Date Received: 10/06/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	2.02		0.613	0.633	5.00	0.736	pCi/L		11/07/23 15:17	1

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

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.620	U	0.448	0.449	5.00	0.700	pCi/L		11/07/23 15:17	1

Client Sample ID: MW-15019 **Lab Sample ID: 240-193059-4**
Date Collected: 10/02/23 12:36 **Matrix: Water**
Date Received: 10/06/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
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*	*1*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.77		0.589	0.603	5.00	0.758	pCi/L		11/07/23 15:48	1

Client Sample ID: DUP-BACKGROUND **Lab Sample ID: 240-193059-5**
Date Collected: 10/02/23 00:00 **Matrix: Water**
Date Received: 10/06/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**1.07**		0.520	0.525	5.00	0.776	pCi/L		11/07/23 15:48	1

Client: TRC Environmental Corporation.
Job ID: 240-193059-1
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
Date Received: 10/06/23 08:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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*

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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 Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.407	U	0.373	0.374	5.00	0.584	pCi/L		11/07/23 15:48	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
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

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
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

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

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

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*101*		*30 - 110*	*10/10/23 12:33*	*10/24/23 09:19*	*1*

Lab Sample ID: LCS 160-631370/2-A
Matrix: Water
Analysis Batch: 633137

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631370

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	10.93		1.13	1.00	0.0948	pCi/L	97	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*101*		*30 - 110*

Lab Sample ID: 240-193059-6 DU
Matrix: Water
Analysis Batch: 633137

Client Sample ID: EQ-BACKGROUND
Prep Type: Total/NA
Prep Batch: 631370

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.0139	U		-0.03237	U	0.0368	1.00	0.102	pCi/L			0.49	1

Carrier	*DU %Yield*	*DU Qualifier*	*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

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (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

Carrier	*MB %Yield*	*MB 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*

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

Lab Sample ID: LCS 160-631371/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 632123 **Prep Batch: 631371**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			7.79	8.365		1.15	1.00	0.475	pCi/L	107	75 - 125		

Carrier	*LCS %Yield*	*LCS 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 **Prep Type: Total/NA**
Analysis Batch: 632125 **Prep Batch: 631371**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	0.393	U		-0.09251	U	0.193	1.00	0.416	pCi/L			0.86	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*95.4*		*30 - 110*
Y Carrier	*79.3*		*30 - 110*

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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	

Lab Chronicle

Client: TRC Environmental Corporation. Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

Client Sample ID: MW-15002 — Lab Sample ID: 240-193059-1

Date Collected: 10/04/23 09:13 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-193059-2

Date Collected: 10/02/23 11:51 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-193059-3

Date Collected: 10/04/23 09:49 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-193059-4

Date Collected: 10/02/23 12:36 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Lab Chronicle

Client: TRC Environmental Corporation. Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

Client Sample ID: DUP-BACKGROUND — Lab Sample ID: 240-193059-5

Date Collected: 10/02/23 00:00 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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 — Lab Sample ID: 240-193059-6

Date Collected: 10/04/23 10:02 — **Matrix: Water**
Date Received: 10/06/23 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared 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

Accreditation/Certification Summary

Client: TRC Environmental Corporation. Job ID: 240-193059-1
Project/Site: Karn/Weadock CCR Background Well

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
Iowa	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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone (330) 497-9396 Phone (330) 497-0772

MICHIGAN 190

Chain of Custody Record

1.5 / 1.4

eurofins | Environment Testing

Client Information	Sampler: Jake Krenz	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-112524-33282.1
Client Contact: Jacob Krenz	Phone: 734-395-9804	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: TRC Environmental Corporation	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 199813			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR Background Well	Eurofins Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, Ra226Ra228_GFPC	904.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
MW-15002	10-4-23	0913	G	Water	N	N	X	X	2	
MW-15008	10-2-23	1151		Water			X	X	2	
MW-15016	10-4-23	0949		Water			X	X	2	
MW-15019	10-2-23	1236		Water			X	X	2	
DUP-Background	10-2-23	—		Water			X	X	2	
EQ-Backgroud	10-4-23	1002		Water			X	X	2	
				Water						

240-193059 Chain of Custody

Possible Hazard Identification

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		10-5-23 / 1455	TRC		10/5/23 1455	EENA
2		10/5/23	EENA		10-6-23 800	EC
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins – Cleveland Sample Receipt Form/Narrative **Login # :** _____
Barberton Facility

Client TRC Env. Corp Site Name _____ Cooler unpacked by:

Cooler Received on 10-6-23 Opened on 10-6-23

FedEx: 1st Grd Exp UPS FAS (Waypoint) Client Drop Off Eurofins Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # EC 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 -0.1 °C) Observed Cooler Temp. 1.5 °C Corrected Cooler Temp. 1.4 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1	(Yes)	No
-Were the seals on the outside of the cooler(s) signed & dated?	(Yes)	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)
-Were tamper/custody seals intact and uncompromised?	Yes	No (NA)
3. Shippers' packing slip attached to the cooler(s)?	Yes	(No)
4. Did custody papers accompany the sample(s)?	(Yes)	No
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	(Yes)	No
7. Did all bottles arrive in good condition (Unbroken)?	(Yes)	No
8. Could all bottle labels (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)?	(Y)	(Y) (Y)
10. Were correct bottle(s) used for the test(s) indicated?	(Yes)	No
11. Sufficient quantity received to perform indicated analyses?	(Yes)	No
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# HC316719
14. Were VOAs on the COC?	Yes	(No)
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)

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page | Samples processed by:

_____

_____

_____

_____

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.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
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			
DUP-BACKGROUND	240-193059-A-5	Plastic 1 liter - Nitric Acid	<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	240-193059-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

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-174889.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193059-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-15002 (240-193059-1)	10/4/23	09:13 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15008 (240-193059-2)	10/2/23	11:51 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15016 (240-193059-3)	10/4/23	09:49 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15019 (240-193059-4)	10/2/23	12:36 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-BACKGROUND (240-193059-5)	10/2/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EQ-BACKGROUND (240-193059-6)	10/4/23	10:02 Eastern		Water			X	X	X	2	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 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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:			
Relinquished by:	Date/Time: 10/6/23 1640	Company EETNC	Received by: Fedex	Date/Time:	Company		
Relinquished by: Fedex	Date/Time:	Company	Received by: M. Pinette	Date/Time: OCT 09 2023 0945	Company		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-193059-1

Login Number: 193059
List Number: 2
Creator: Pinette, Meadow L

List Source: Eurofins St. Louis
List Creation: 10/09/23 01:16 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	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	

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:	10/2/2023 TO 10/10/23
PURPOSE OF FIELDWORK:	Fourth Quarter HMP Sampling Event
WORK PERFORMED BY:	Javier Jasso

SIGNED 10/10/23 DATE

CHECKED BY 10/27/23 DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 10/5/23	TIME ARRIVED: 0537
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 0745

WEATHER		
TEMPERATURE: 60 °F	WIND: 10 MPH	VISIBILITY: Overcast Rain

WORK / SAMPLING PERFORMED

MW 104, MW-1800, MSD, MSD, MW 1800,

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Peter M.	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

SIGNED 10/16/23 DATE

CHECKED BY 10/27/23 DATE

TRC

GENERAL NOTES

PROJECT NAME:	CEC Weadock LF: 2023 GW Com	DATE: 10/9/23	TIME ARRIVED: 0915
PROJECT NUMBER:	514403.0000.0000	AUTHOR: Javier Jasso	TIME LEFT: 1645

WEATHER		
TEMPERATURE: 37 °F	WIND: 13 MPH	VISIBILITY: Good Clear

WORK / SAMPLING PERFORMED

MW-50 Dup#01, MW-58, MW-52, MW-53, MW-53R, MW-54R, Dew-mw-18004, MW-55, Dew-mw-18005, MW-57 Rout, MW-MW-18006, Dup #02, MW-58, FB#01, EB#01

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Peter M.	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	To Ground

SIGNED 10/10/23 DATE

CHECKED BY 10/27/23 DATE

TRC

EQUIPMENT SUMMARY

PROJECT NAME:	CEC Weadock LF: 2023 GW Co	SAMPLER NAME:	Javier Jasso
PROJECT NO.:	514403.0000.0000		

WATER LEVEL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PURGING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

SAMPLING METHOD

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTERATION DEVICE	FILTER TYPE AND SIZE
DEDICATED POLY TUBING	☑ LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

☑ GROUND ☐ DRUM ☐ POTW ☐ POLYTANK ☐ OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
10/10/23	10/27/23
SIGNED / DATE	CHECKED BY / DATE

REVISED 04/2019

TRC

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: 10/9/23

PH CALIBRATION CHECK

pH 7 (LOT #): 36B359 (EXP. DATE): 3/25 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #): 36C916 (EXP. DATE): 3/25 POST-CAL. READING / STANDARD	CAL. RANGE	TIME
7.00 / 7.00	4.00 / 4.00	☑ WITHIN RANGE	0900
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 36C493 (EXP. DATE): 3/24 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
1413 / 1413	25.0	☑ WITHIN RANGE	0900
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 23K100180 (EXP. DATE): 10/27 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
220 / 220	25.0	☑ WITHIN RANGE	0900
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL. READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
7.89 / 7.89	26.0	☑ WITHIN RANGE	0900
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU) (LOT #): A3097- (EXP. DATE): 4/23 POST-CAL. READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL. READING / STANDARD	CAL. RANGE	TIME
0 / 0	/	☑ WITHIN RANGE	0902
100 / 100	/	☑ WITHIN RANGE	0902
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):	☑ STANDARD SOLUTION (S) LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ _____	

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED _____ 10/10/23 DATE

CHECKED BY _____ 10/27/23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE:	10/2/23
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
JCW-MW-18001	0638	TOC	17.08	23.75	NA	NM
JCW-MW-18004	0716	TOC	12.75	14.72	NA	NM
JCW-MW-18005	0738	TOC	9.18	16.28	NA	NM
JCW-MW-18006	0756	TOC	13.53	23.68	NA	NM
JCW-OW-18001	0630	TOC	6.97	20.35	NA	NM
JCW-OW-18002	0635	TOC	11.28	19.41	NA	NM
JCW-OW-18003	0645	TOC	8.20	18.65	NA	NM
JCW-OW-18004	0719	TOC	6.71	14.85	NA	NM
JCW-OW-18006	0758	TOC	7.77	23.45	NA	NM
LH-103R	0700	TOC	22.39	33.46	NA	NM
LH-104	0728	TOC	8.54	14.00	NA	NM
~~JCW~~-MW-20	0740	TOC	5.95	14.00	NA	NM
MW-50	0633	TOC	13.70	19.40	NA	NM
MW-51	0637	TOC	14.38	20.00	NA	NM
MW-52	0644	TOC	19.21	19.74	NA	NM
MW-53	0650	TOC	13.95	18.18	NA	NM
MW-53R	0700	TOC	14.51	18.80	NA	NM
MW-54R	0712	TOC	14.07	17.27	NA	NM
MW-55	0733	TOC	14.20	16.38	NA	NM
MW-58	0837	TOC	5.70	18.28	NA	NM
OW-51	0639	TOC	9.28	17.28	NA	NM
OW-53	0657	TOC	785	1800	NA	NM
OW-54	0713	TOC	7.45	16.48	NA	NM
OW-55	0734	TOC	7.83	18.43	NA	NM
OW-56	0743	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).

SIGNED 10/2/23 DATE

CHECKED 10/27/23 DATE

REVISED 04/2019

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance	DATE:	10/10/23
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	5.11	20.35	NA	NM
OW-57 IN	0752	TOC	5.29	19.60	NA	NM
OW-57R IN	0753	TOC	6.10	20.14	NA	NM
OW-57 OUT	0750	TOC	9.00	19.40	NA	NM
OW-57R OUT	0751	TOC	8.35	20.20	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
JCW-01	0653		8.35	37.15		
JCW-MW-15003	0647		15.53	DNM		
JCW-MW-15026	0701		14.35	DNM		
MW-16R	0714		14.40	19.87		
JCW-MW-15021	0733		15.74	DNM		
MW-19	0800		8.97	20.03		
MW-15030	0830		5.34	17.17		
MW-16B	0833		5.13	32.76		
MW-15024	0843		6.26	17.17		
MW-15018	0905		6.24	9.94		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 10/10/23 DATE

CHECKED 10/27/23 DATE

TRC

WATER LEVEL DATA

PROJECT NAME:	CEC WEAKOCK BAP LF 2023 GW COMLPIANCE	DATE:	10/2/23
PROJECT NUMBER:	514403.0001.0000	AUTHOR:	J JASSO

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JCW=MW 15007	0821		3.65	8.95		
JCW-MW-15009	0813		9.12	13.00		
JCW-MW-15010	0808		9.39	9.57		
JCW-MW-15028	0816		8.18	25.10		
MW-15002	0909		7.60	16.80		
MW-15008	0826		4.68	17.40		
MW-15016	0914		4.33	8.10		
MW-15019	0905		5.98	16.87		
JCW-MW-15003	0813		9.26	DUM		
MW-106B	0818		7.95	41.16		
JCW-MW-15008	0910		8.80	DUM		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED 10/10/23 DATE

CHECKED 10/27/23 DATE

REVISED 04/2019

TRC

WELL INSPECTION REPORT

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NO.:	514403.0000.0000

SAMPLER NAME:	Javier Jasso
DATE:	10/6/23

WELL ID	PROTECTIVE CASING	SURFACE SEAL	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	PERMANENT LEGIBLE LABELS	LOCK	WELL CAP	EASE OF INSERTING / REMOVING BAILER	SEDIMENT IN WELL	COMMENT
[illegible]	yes	yes	good	yes	yes	yes	yes	?	
[illegible]	yes	yes	good	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
[illegible]	yes	yes	none	yes	yes	yes	yes	?	
LH-103D	yes	yes	none	yes	yes	yes	yes	?	well is 3 inch higher than casing
EH-104	yes	yes	loose	yes	yes	yes	yes	?	
MW-20	yes	yes	none	yes	yes	yes	yes	?	
MW-50	yes	yes	none	yes	yes	yes	yes	?	
MW-51	yes	yes	none	yes	yes	yes	yes	?	
MW-52	yes	yes	none	yes	yes	yes	yes	?	
MW-53	yes	yes	none	yes	yes	yes	yes	?	
MW-53R	yes	yes	none	yes	yes	yes	yes	?	

SIGNED [signature] 10/10/23 DATE

CHECKED BY [signature] 10/27/23 DATE

REVISED 06/2011

TRC

WELL INSPECTION REPORT

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NO.:	514403.0000.0000

SAMPLER NAME:	Javier Jasso
DATE:	10/5/23

WELL ID	PROTECTIVE CASING	SURFACE SEAL	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	PERMANENT LEGIBLE LABELS	LOCK	WELL CAP	EASE OF INSERTING / REMOVING BAILER	SEDIMENT IN WELL	COMMENT
MW54R	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
MW55	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
MW58	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW51	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW53	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW54	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW55	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW56	Yes	Yes	None	Yes	No	Yes	Yes	?	
OW56R	Yes	Yes	None	Yes	No	Yes	Yes	1	
OW57IN	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW57RIN	Yes	Yes	None	Yes	No	Yes	Yes	?	
OW57out	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW57Rout	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
OW61	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
SOUMW1503S	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
SOUMW1503I	Yes	Yes	None	Yes	Yes	Yes	Yes	?	
MW14R	Yes	Yes	None	Yes	Yes	Yes	Yes	1	

SIGNED — DATE 10/10/23

REVISED 06/2011

CHECKED BY — DATE 10/27/23

TRC

WELL INSPECTION REPORT

PROJECT NAME:	CEC Weadock LF: 2023 GW Compliance
PROJECT NO.:	514403.0000.0000

SAMPLER NAME:	Javier Jasso
DATE:	10/5/23

WELL ID	PROTECTIVE CASING	SURFACE SEAL	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	PERMANENT LEGIBLE LABELS	LOCK	WELL CAP	EASE OF INSERTING / REMOVING BAILER	SEDIMENT IN WELL	COMMENT
Scamw15014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW-19	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Scamw15011	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Scamw15008	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Scamw15010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Scamw15012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15009	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15008	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Scamw15003	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW16013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW-15004	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
MW15018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	

SIGNED — DATE: 10/10/23

CHECKED BY — DATE: 10/27/23

REVISED 06/2011

TRC

WELL INSPECTION REPORT

PROJECT NAME: CEC Weadock LF: 2023 GW Compliance	SAMPLER NAME: Javier Jasso
PROJECT NO.: 514403.0000.0000	DATE: 10/2/23

WELL ID	PROTECTIVE CASING	SURFACE SEAL	DEGREE OF IMMOBILITY OF PROTECTIVE CASING	PERMANENT LEGIBLE LABELS	LOCK	WELL CAP	EASE OF INSERTING / REMOVING BAILER	SEDIMENT IN WELL	COMMENT
MW-1500S	Yes	Yes	none	Yes	Yes	Yes	Yes	?	
MW-1500I	Yes	Yes	none	Yes	Yes	Yes	Yes	?	
MW-1500D	Yes	Yes	none	Yes	Yes	Yes	Yes	?	well is a little higher than casing

SIGNED 10/10/23 DATE

CHECKED BY 10/27/23 DATE

REVISED 06/2011

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, JJ DATE: 10-4-23	BY: AW DATE: 10/31/23

SAMPLE ID: MW-15002 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0800	DATE: 10-4-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 7.67 T/ PVC

DEPTH TO BOTTOM: 16.87 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 14 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0913	DATE: 10-4-23

PH: 6.65 SU CONDUCTIVITY: 7538 umhos/cm

ORP: -96.7 mV DO: 0.2 mg/L

TURBIDITY: 3.7 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.3 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0803	200	6.80	3956	-50.3	0.9	25.8	15.3	7.90	INITIAL
0808	200	6.94	3502	-94.6	0.5	7.4	15.4	7.97	1
0813	200	6.98	3442	-107.3	0.4	5.3	15.3	8.02	2
0818	200	6.89	4354	-106.7	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	-95.4	0.3	4.7	15.2	8.12	5
0833	200	6.64	6751	-95.5	0.3	4.5	15.2	8.12	6
0838	200	6.62	7103	-94.9	0.2	4.5	15.2	8.12	7
0843	200	6.62	7407	-94.4	0.2	4.5	15.2	8.12	8
0848	200	6.63	7360	-95.0	0.2	4.5	15.2	8.12	9

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	125mL	plastic	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
1	250mL		A	☐ Y ☒ N					☐ Y ☐ N
2	1L	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: lab drop off DATE SHIPPED: 10-5-23 AIRBILL NUMBER: —

COC NUMBER: — SIGNATURE: [signature] DATE SIGNED: 10-13-23

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: 10-4-23	BY: AW	DATE: 10/5/23

SAMPLE ID: MW-15002

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0853	200	6.60	8012	-94.2	0.2	4.0	15.1	8.12	10
0858	200	6.63	7777	-95.9	0.2	3.9	15.3	8.12	11
0903	200	6.64	7441	-96.4	0.2	4.7	15.3	8.12	12
0908	200	6.65	7486	-96.6	0.2	4.3	15.3	8.12	13
0913	200	6.65	7538	-96.7	0.2	3.7	15.3	8.12	14

SIGNATURE: [signature]

DATE SIGNED: 10-13-23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER:	514404.0001.0000	BY: AW, (JK) JJ DATE: 10-2-23	BY: AW DATE: 10/31/23

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: 1120	DATE: ~~9~~ 10-2-23	SAMPLE	TIME: 1151	DATE: 10-2-23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.48 SU	CONDUCTIVITY: 1506 umhos/cm	
			ORP: -87.4 mV	DO: 0.1 mg/L	
DEPTH TO WATER:	~~6.~~ 4.67 T/ PVC		TURBIDITY: 2.7 NTU		
DEPTH TO BOTTOM:	17.44 T/ PVC		☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 15.7 °C	OTHER:	
VOLUME REMOVED:	6 ☒ LITERS ☐ GALLONS		COLOR: 4.67	ODOR:	
COLOR:	clear ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD	☒ DUP- Background	
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1121	200	6.31	1802	-21.9	1.4	6.9	15.8	4.67	INITIAL
1126	200	6.34	1760	-52.1	0.5	3.4	16.1	4.67	1
1131	200	6.39	1662	-66.3	0.3	3.3	15.8	4.67	2
1136	200	6.43	1580	-74.2	0.2	3.3	15.8	4.67	3
1141	200	6.45	1540	-79.8	0.1	3.3	15.7	4.67	4
1146	200	6.47	1525	-84.3	0.1	2.8	15.7	4.67	5
1151	200	6.48	1506	-87.4	0.1	2.7	15.7	4.67	6

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
2	250mL	Plastic	A	☐ Y ☒ N					☐ Y ☐ N
2	125mL	↓	A	☐ Y ☒ N					☐ Y ☐ N
2	125mL		B	☐ Y ☒ N					☐ Y ☐ N
4	1L	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	10-5-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:	Jennifer Kay	DATE SIGNED:	10-13-23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Kam BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER:	514404.0001.0000	BY: AW, JK, JJ DATE: 10-4-23	BY: AW DATE: 10/31/23

SAMPLE ID: MW-15016 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0932	DATE: 10-4-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 4.39 T/ PVC

DEPTH TO BOTTOM: 7.75 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 3 ☒ LITERS ☐ GALLONS

COLOR: clear ODOR: none

TURBIDITY ☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 0949	DATE: 10-4-23

PH: 6.89 SU CONDUCTIVITY: 1844 umhos/cm

ORP: -122.4 mV DO: 0.3 mg/L

TURBIDITY: 5.8 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 17.7 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS: EQ - Background collected after this sample

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0934	200	7.21	2010	-119.1	1.3	33.2	18.2	4.69	INITIAL
0939	200	6.92	1853	-121.0	0.5	6.9	17.8	4.89	1
0944	200	6.90	1846	-123.0	0.3	6.1	17.7	4.94	2
0949	200	6.89	1844	-122.4	0.3	5.8	17.7	4.96	3

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	125mL	plastic	A	☐ Y ☒ N					☐ Y ☐ N
1	125mL	↓	B	☐ Y ☒ N					☐ Y ☐ N
1	250mL		A	☐ Y ☒ N					☐ Y ☐ N
2	1L		B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	10-5-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10-13-23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER:	514404.0001.0000	BY: AW, (JK) JJ DATE: 10-2-23	BY: AW DATE: 10/11/23

SAMPLE ID: MW-15019 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1218	DATE: 10-2-23	SAMPLE	TIME: 1236	DATE: 10-2-23

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: 5.95 T/ PVC

DEPTH TO BOTTOM: 16.86 T/ PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: 3 ☒ LITERS ☐ GALLONS

COLOR: Clear ODOR: none

TURBIDITY ☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

PH: 6.55 SU CONDUCTIVITY: 1691 umhos/cm

ORP: -92.9 mV DO: 0.3 mg/L

TURBIDITY: 2.6 NTU

☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: 15.9 °C OTHER: —

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☒ NO

FILTRATE COLOR: — FILTRATE ODOR: —

QC SAMPLE: ☐ MS/MSD ☐ DUP-

COMMENTS: FB - Background collected

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1221	200	6.87	1656	-88.0	0.8	4.0	15.5	5.95	INITIAL
1226	200	6.55	1686	-88.1	0.6	3.5	15.8	5.95	1
1231	200	6.55	1689	-91.0	0.4	2.9	15.8	5.95	2
1236	200	6.55	1691	-92.9	0.3	2.6	15.9	5.95	3

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	125mL	Plastic	A	☐ Y ☒ N	1	125mL	Plastic	B	☐ Y ☒ N
1	125mL	↓	B	☐ Y ☒ N	↑				☐ Y ☐ N
1	250mL		A	☐ Y ☒ N	FB Bottle				☐ Y ☐ N
2	1L	↓	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	lab Drop off	DATE SHIPPED:	10-5-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10-13-23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10/27/23

SAMPLE ID: LH-104 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1308	DATE: 10/4/23	SAMPLE	TIME: 1320	DATE: 10/4/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.44 SU	CONDUCTIVITY: 1089	umhos/cm
			ORP: -89.3 mV	DO: 0.50	mg/L
DEPTH TO WATER:	8.54 T/ PVC		TURBIDITY: 2.0 NTU		
DEPTH TO BOTTOM:	14.06 T/ PVC		☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 18C °C	OTHER:	
VOLUME REMOVED:	2.4 ☐ LITERS ☐ GALLONS		COLOR: Clear	ODOR: NONE	
COLOR:	Clear ODOR: NONE		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1308	100	7.99	1375	56.5	2.9	40	23.8	8.45	INITIAL
1313		7.39	1191	-53	0.97	2.2	17.7	9.10	1
1318		7.45	1112	-82.5	0.63	2.2	18.0	9.15	1
1323		7.46	1091	-89.0	0.57	2.2	17.9	9.15	1.5
1328		7.44	1089	-89.3	0.50	2.0	18.0	9.11	2
1333									2.5
									3

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
2	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	250	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10/5/23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/16/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10/27/23

SAMPLE ID:	YW-MW-8001	WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER	
WELL MATERIAL:	☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL	☐ OTHER	
SAMPLE TYPE:	☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE	☐ OTHER	

PURGING	TIME: 0547	DATE: 10/5/23	SAMPLE	TIME: 0617	DATE: 10/5/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.50 SU	CONDUCTIVITY: 2660 umhos/cm	
			ORP: 16.3 mV	DO: 0.18 mg/L	
DEPTH TO WATER:	10.09 T/ PVC		TURBIDITY: 3.2 NTU		
DEPTH TO BOTTOM:	22.21 T/ PVC		☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 15.6 °C	OTHER:	
VOLUME REMOVED:	6 ☒ LITERS ☐ GALLONS		COLOR: Clear	ODOR: none	
COLOR:	Cloudy ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☒ VERY			QC SAMPLE: ☒ MS/MSD ☐ DUP-		
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0547	200	6.00	2854	22.0	7.8	130	18.7	7.18	INITIAL
0552		6.43	2682	10.6	0.82	3.8	15.6	17.22	1
0557		6.41	2757	-4.6	0.47	3.8	15.6	17.22	2
0602		6.50	2818	-15.0	0.30	4.0	15.7	17.22	3
0607		6.10	2830	-15.5	0.26	3.2	15.6	17.22	4
0612		6.52	2817	-16.6	0.20	3.2	15.6	17.22	5
0617		6.10	2660	-16.3	0.18	3.2	15.6	17.22	6

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
2	1L	glass	N	☐ Y ☒ N					☐ Y ☐ N
1	250	P	A	☐ Y ☒ N					☐ Y ☐ N
3	1L	P	A	☐ Y ☒ N					☐ Y ☐ N
3	1L	P	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-5-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-GW18001 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0645	DATE: 10/5/23	SAMPLE	TIME: 0705	DATE: 10/5/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.57 SU	CONDUCTIVITY: 1381 umhos/cm	
			ORP: -56.3 mV	DO: 0.34 mg/L	
DEPTH TO WATER: 6.47 T/ PVC			TURBIDITY: 7.0 NTU		
DEPTH TO BOTTOM: 20.71 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 15.9 °C	OTHER:	
VOLUME REMOVED: 4 ☐ LITERS ☐ GALLONS			COLOR: Clear	ODOR: None	
COLOR: Clear	ODOR: None		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0645	200	6.93	1512	-3.9	7.9	6.0	18.1	7.18	INITIAL
0650		6.58	1370	-4.6	0.80	7.2	16.1	7.30	1.0
0655		6.55	1361	-55.8	0.47	7.0	16.0	7.30	2.0
0700		6.57	1380	-55.8	0.36	7.0	15.9	7.30	3.0
0705		6.57	1381	-56.3	0.34	7.0	15.9	7.30	4.0
0710									~~5.0~~
									~~6.0~~

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Drop-Off	DATE SHIPPED: 10-5-23	AIRBILL NUMBER: —
COC NUMBER: —	SIGNATURE:	DATE SIGNED: 10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/16/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-50 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0611	DATE: 10/9/23	SAMPLE	TIME: 0640	DATE: 10/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.00 SU	CONDUCTIVITY: 1230 umhos/cm	
			ORP: -100.1 mV	DO: 0.46 mg/L	
DEPTH TO WATER: 13.72 T/ PVC			TURBIDITY: 3.0 NTU		
DEPTH TO BOTTOM: 19.66 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 11.7 °C	OTHER:	
VOLUME REMOVED: 5 ☑ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☑ DUP- HCl		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0611	200	6.00	803	220	7.64	10.0	11.6	13.71	INITIAL
0620		6.73	1307	-78	0.80	4.8	11.7	13.66	1
0625		6.95	1249	-100	0.82	4.0	11.9	13.66	2
0630		7.00	1237	-100.3	0.40	3.5	11.8	13.66	3
0635		7.00	1237	-100.5	0.46	3.0	11.7	13.66	4
0640		7.00	1230	-100.5	0.46	3.0	11.7	13.66	5
									6

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
2	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	A	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	A	☐ Y ☑ N					☐ Y ☐ N
4	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/16/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-5D | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0713	DATE: 10/4/23	SAMPLE	TIME: 0738	DATE: 10/4/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.16 SU	CONDUCTIVITY: 1158 umhos/cm	
			ORP: -1000 mV	DO: 0.40 mg/L	
DEPTH TO WATER: 14.58 T/ PVC			TURBIDITY: 4.1 NTU		
DEPTH TO BOTTOM: 20.44 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 12.3 °C	OTHER:	
VOLUME REMOVED: 3 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Clear	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0713	200	7.19	555	-661	9.4	9.6	10.6	14.8	INITIAL
0718		7.02	1164	-80	1.7	6.0	11.9	14.57	1
0723		7.04	1172	-90	0.70	5.	12.2	1415	2
0728		7.18	1164	-100	0.50	4.8	12.2	14.51	3
0733		7.14	1163	-100.5	0.40	4.8	12.3	1455	4
0738		7.16	1158	-1000	0.40	4.5	12.3	1411	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	PL	A	☐ Y ☐ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	VOA	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-50 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0950	DATE: 10/9/23	SAMPLE	TIME: 0830	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.77 SU	CONDUCTIVITY: 1460	umhos/cm
			ORP: 463 mV	DO: 0.41	mg/L
DEPTH TO WATER:	15.21 T/ PVC		TURBIDITY: 2.1 NTU		
DEPTH TO BOTTOM:	19.79 T/ PVC		☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 12.3 °C	OTHER:	
VOLUME REMOVED:	5 ☐ LITERS ☐ GALLONS		COLOR: Clear	ODOR: None	
COLOR:	Clear ODOR: None		FILTRATE (0.45 um) ☐ YES	☑ NO	
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0800	200	7.01	1324	+103.0	1.06	7.3	10.9	15.21	INITIAL
0810		6.90	1430	-61.0	0.90	4.5	11.9	15.46	1
0815		6.75	1447	-65.8	0.60	3.0	12.1	15.46	2
0820		6.76	1454	-65.8	0.50	2.5	12.2	15.46	3
0825		6.77	1460	-66.0	0.50	2.1	12.1	15.46	4
0830		6.77	1463	-66.3	0.41	2.1	12.3	15.46	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☐ N					☐ Y ☐ N
1	1PT	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/4/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-53 WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 0857	DATE: 10/4/23	SAMPLE	TIME: 0930	DATE: 10/4/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 7.30 SU	CONDUCTIVITY: 1004 umhos/cm	
			ORP: -119.1 mV	DO: 0.50 mg/L	
DEPTH TO WATER: 13.91 T/ PVC			TURBIDITY: 2.0 NTU		
DEPTH TO BOTTOM: 18.14 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 13.4 °C	OTHER:	
VOLUME REMOVED: 5 ☑ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0857	200	7.46	482	-153.5	9.0	7.6	11.7	13.92	INITIAL
0900		7.26	980	-130.0	1.4	3.5	12.6	14.05	1
0905		7.28	992	-130.5	0.70	3.0	13.1	14.05	2
0910		7.30	1003	-130.0	0.60	2.5	13.4	14.05	3
0915		7.30	1007	-119.5	0.50	2.0	13.4	14.05	4
0920		7.30	1009	-119.5	0.50	2.0	13.4	14.05	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-532	WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER	
WELL MATERIAL:	☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL	☐ OTHER
SAMPLE TYPE:	☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE	☐ OTHER

PURGING	TIME: 0945	DATE: 10/9/23	SAMPLE	TIME: 1015	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.91 SU	CONDUCTIVITY: 1341	umhos/cm
			ORP: -10.0 mV	DO: 0.60	mg/L
DEPTH TO WATER:	14.51 T/ PVC		TURBIDITY: 46.1 NTU		
DEPTH TO BOTTOM:	18.22 T/ PVC		☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 13.4 °C	OTHER:	
VOLUME REMOVED:	6 ☑ LITERS ☐ GALLONS		COLOR: Clear	ODOR: none	
COLOR:	Brownish ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0947	200	7.13	659	-165.0	9.6	2000	11.6	1478	INITIAL
0910		6.88	1479	-30	1.4	978	12.7	1490	1
0951		6.92	1421	2.1	1.3	27	13.2	1490	2
1000		6.93	1411	15.0	0.90	6.7	13.4	1490	3
1007		6.95	1389	-9.1	0.80	5.0	13.3	1490	4
1010		6.95	1391	-10.0	0.70	4.1	13.5	1490	5
1015		6.91	1345	-10.0	0.60	4.5	13.4	1490	6

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	250	PI	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PI	A	☐ Y ☑ N					☐ Y ☐ N
1	125	PI	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	PI	A	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-542 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1040	DATE: 10/9/23	SAMPLE	TIME: 1105	DATE: 10/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.96 SU	CONDUCTIVITY: 979 umhos/cm	
			ORP: -13.1 mV	DO: 0.60 mg/L	
DEPTH TO WATER: 14.67 T/ PVC			TURBIDITY: 5.2 NTU		
DEPTH TO BOTTOM: 17.00 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 13.1 °C	OTHER:	
VOLUME REMOVED: 5 ☑ LITERS ☐ GALLONS			COLOR: Clear	ODOR: NONE	
COLOR: Brownish	ODOR: NONE		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☐ MODERATE ☑ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1040	200	7.14	488	-87.0	10.6	6.0	13.7	1433	INITIAL
1045		6.95	980	-63.6	1.4	5.7	13.0	1446	1
1050		6.96	974	-30.0	0.90	13	13.3	1446	2
1055		6.96	975	-12.8	0.80	6.0	13.4	1446	3
1100		6.96	976	-13.0	0.72	5.7	13.5	1446	4
1105		6.96	979	-13.1	0.60	5.7	13.1	1446	1

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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-30-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: JCW-MW-18004 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1130	DATE: 10/9/23	SAMPLE	TIME: 1145	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 6.97 SU	CONDUCTIVITY: 1275 umhos/cm	
			ORP: 61.3 mV	DO: 5.2 mg/L	
DEPTH TO WATER: 12.75 T/ PVC			TURBIDITY: 49 NTU		
DEPTH TO BOTTOM: 14.75 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 15.7 °C	OTHER:	
VOLUME REMOVED: 1.5 ☒ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: clear	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD	☐ DUP-	
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1130	100	7.11	514	43.5	9.0	9	13.9	12.61	INITIAL
1135		6.98	1261	60.9	5.4	50	15.8	12.90	.5
1140		6.97	1268	61.0	5.3	5.0	15.8	13.10	1
1145		6.97	1275	61.3	5.2	4.9	15.7	13.30	1.5
1150									2
									2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PL	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PL	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Drop-off	DATE SHIPPED: 10-10-23	AIRBILL NUMBER: —
COC NUMBER: —	SIGNATURE:	DATE SIGNED: 10/10/23

TRC

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-55 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1220	DATE: 10/9/23	SAMPLE	TIME: 1245	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.00 SU	CONDUCTIVITY: 1150 umhos/cm	
			ORP: -112.3 mV	DO: 0.50 mg/L	
DEPTH TO WATER: 14.20 T/ PVC			TURBIDITY: 3.5 NTU		
DEPTH TO BOTTOM: 16.38 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 15.1 °C	OTHER:	
VOLUME REMOVED: 5 ☑ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Cloudy	ODOR: none		FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY ☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1220	200	7.16	570	-121.5	9.5	18	15.6	14.20	INITIAL
1225		7.00	1138	-113.0	1.0	10	15.3	1403	1
1230		7.00	1150	-110.8	0.70	6.0	15.6	1423	2
1235		7.00	1147	-111.8	0.60	4.0	15.5	1403	3
1240		7.00	1151	-112.0	0.50	3.5	15.6	1423	4
1245		7.00	1150	-112.3	0.50	3.5	15.1	1403	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: JW-MW18005 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1309	DATE: 10/9/23	SAMPLE	TIME: 1334	DATE: 10/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.90 SU	CONDUCTIVITY: 1149 umhos/cm	
			ORP: -21.5 mV	DO: 0.70 mg/L	
DEPTH TO WATER: 9.18 T/ PVC			TURBIDITY: 7.1 NTU		
DEPTH TO BOTTOM: 16.26 T/ PVC			☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 14.5 °C	OTHER:	
VOLUME REMOVED: 2.5 ☒ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Orange	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY ☐ NONE ☐ SLIGHT ☒ MODERATE ☐ VERY			FILTRATE COLOR:	FILTRATE ODOR:	
			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1309	200	7.03	597	-42.5	8.7	50	14.3	9.12	INITIAL
1314		6.90	1174	-29.0	1.1	15	14.2	10.0	1.2
1319		6.90	1145	-20.9	0.80	9.5	13.9	10.20	1.8
1324		6.90	1149	-21.8	0.70	8.0	14.6	10.12	2.5
1329		6.90	1149	-21.8	0.70	7.5	14.5	10.7	2.1
1334		6.90	1149	-21.5	0.70	7.5	14.5	11.00	2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 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	250	P1	~~A~~	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/16/23	BY: AW	DATE: 10-27-23

SAMPLE ID: OW-57R Out | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1404	DATE: 10/16/23	SAMPLE	TIME: 1424	DATE: 10/16/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: 6.99 SU	CONDUCTIVITY: 1068 umhos/cm	
			ORP: 59.1 mV	DO: 0.60 mg/L	
DEPTH TO WATER: 8.35 T/ PVC			TURBIDITY: 40 NTU		
DEPTH TO BOTTOM: 20.20 T/ PVC			☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: 14.2 °C	OTHER:	
VOLUME REMOVED: ☑ LITERS ☐ GALLONS			COLOR: Clear	ODOR: none	
COLOR: Cloudy	ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☑ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1404	100	7.37	515	260	9.0	21	15.6	8.2	INITIAL
1409		7.00	1089	39.5	2.2	8.	13.9	9.05	.5
1414		6.98	1085	59.0	0.90	4.5	14.2	9.95	1
1419		6.98	1078	59.5	0.70	4.0	14.3	11.00	1.5
1424		6.99	1068	59.5	0.60	4.0	14.2	11.95	2
									2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/16/23

TRC

WATER SAMPLE LOG

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER: 514403.0000.0000	BY: JJ	DATE: 10/9/23	BY: AW	DATE: 10-27-23

SAMPLE ID: WCW-MW1B006	WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER	
WELL MATERIAL:	☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL	☐ OTHER
SAMPLE TYPE:	☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE	☐ OTHER

PURGING	TIME: 1506	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER	
DEPTH TO WATER: 13.33	T/ PVC	
DEPTH TO BOTTOM: 23.68	T/ PVC	
WELL VOLUME: NA	☐ LITERS ☐ GALLONS	
VOLUME REMOVED: 4	☒ LITERS ☐ GALLONS	
COLOR: Cloudy	ODOR: Slight	
TURBIDITY	☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY	
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER	

SAMPLE	TIME: 1530	DATE: 10/9/23
PH: 6.99 SU	CONDUCTIVITY: 961	umhos/cm
ORP: -79.5 mV	DO: 0.66	mg/L
TURBIDITY: 40 NTU		
☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
TEMPERATURE: 12.3 °C	OTHER:	
COLOR: Clear	ODOR: none	
FILTRATE (0.45 um) ☐ YES	☒ NO	
FILTRATE COLOR:	FILTRATE ODOR:	
QC SAMPLE: ☐ MS/MSD	☒ DUP- #07	
COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1506	200	7.24	1017	-102.0	9.6	14.1	13.6	13.33	INITIAL
1507		7.05	985	-91.7	1.3	5.0	12.5	13.46	1
1510		6.99	978	-78.8	0.80	4.0	12.4	13.46	2
1513		6.99	967	-79.0	0.70	4.0	12.4	13.46	3
1520		6.99	961	-79.5	0.60	4.0	12.3	13.46	4
									1

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
2	250	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	A	☐ Y ☒ N					☐ Y ☐ N
2	125	P1	B	☐ Y ☒ N					☐ Y ☐ N
4	1L	P1	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Drop off	DATE SHIPPED: 10-10-23	AIRBILL NUMBER: —
COC NUMBER: —	SIGNATURE:	DATE SIGNED: 10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: MW-58 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1551	DATE: 10/9/23	SAMPLE	TIME: 1611	DATE: 10/9/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.00 SU	CONDUCTIVITY: 1895	umhos/cm
			ORP: -111.3 mV	DO: 0.61	mg/L
DEPTH TO WATER:	5.70 T/ PVC		TURBIDITY: 3.0 NTU		
DEPTH TO BOTTOM:	18.36 T/ PVC		☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 15.0 °C	OTHER:	
VOLUME REMOVED:	4 ☒ LITERS ☐ GALLONS		COLOR: clear	ODOR: none	
COLOR:	clear ODOR: none		FILTRATE (0.45 um) ☐ YES ☒ NO		
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP-		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1551	200	7.00	1836	-106.0	80	10	15.0	561	INITIAL
1600		6.91	1937	-100.1	1.1	4.0	14.8	561	1
1605		6.99	1929	-110.1	0.80	3.1	14.9	<561	2
1610		6.99	1900	-111.0	0.76	3.5	15.0	<561	3
1611		7.00	1895	-111.3	0.61	3.0	15.0	561	4
									5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	250	PI	A	☐ Y ☒ N					☐ Y ☐ N
1	125	PI	A	☐ Y ☒ N					☐ Y ☐ N
1	500	PI	B	☐ Y ☒ N					☐ Y ☐ N
2	1L	PI	B	☐ Y ☒ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

WATER SAMPLE LOG

PROJECT NAME:	CEC Weadock LF: 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403.0000.0000	BY: JJ	DATE: 10/10/23	BY: AW	DATE: 10-27-23

SAMPLE ID: EB EQ | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:	SAMPLE	TIME: 1430	DATE: 10/9/23
PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER			PH: NA SU	CONDUCTIVITY: NA umhos/cm	
			ORP: NA mV	DO: NA mg/L	
DEPTH TO WATER: ____ T/ PVC			TURBIDITY: NA NTU		
DEPTH TO BOTTOM: ____ T/ PVC			☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME: NA ☐ LITERS ☐ GALLONS			TEMPERATURE: NA °C	OTHER:	
VOLUME REMOVED: ____ ☐ LITERS ☐ GALLONS			COLOR: clear	ODOR: none	
COLOR: ____ ODOR: ____			FILTRATE (0.45 um) ☐ YES ☑ NO		
TURBIDITY			FILTRATE COLOR: ____	FILTRATE ODOR: ____	
☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☐ MS/MSD ☐ DUP- ____		
DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	125	P1	A	☐ Y ☑ N					☐ Y ☐ N
1	125	P1	B	☐ Y ☑ N					☐ Y ☐ N
2	1L	P1	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10-10-23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:		DATE SIGNED:	10/10/23

TRC WATER SAMPLE LOG

PROJECT NAME: CEC Weadock LF: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514403.0000.0000	BY: JJ DATE: 10/10/23	BY: AW DATE: 10-27-23

SAMPLE ID: FB#01 | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME:	DATE:

PURGE METHOD: ☑ PUMP PERISTALTIC PUMP ☐ BAILER

DEPTH TO WATER: ___ TOC PVC

DEPTH TO BOTTOM: ___ TOC PVC

WELL VOLUME: NA ☐ LITERS ☐ GALLONS

VOLUME REMOVED: ___ ☐ LITERS ☐ GALLONS

COLOR: ___ ODOR: ___

TURBIDITY
☐ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

DISPOSAL METHOD: ☑ GROUND ☐ DRUM ☐ OTHER

SAMPLE	TIME: 1103 T	DATE: 10/10/23

PH: NM SU CONDUCTIVITY: NM umhos/cm

ORP: NM mV DO: NM mg/L

TURBIDITY: NM NTU

☑ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY

TEMPERATURE: NM °C OTHER: ___

COLOR: clear ODOR: none

FILTRATE (0.45 um) ☐ YES ☑ NO

FILTRATE COLOR: ___ FILTRATE ODOR: ___

QC SAMPLE: ☐ MS/MSD ☐ DUP- ___

COMMENTS:

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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	1L	AG	A	☐ Y ☑ N					☐ Y ☐ N
1	1L	PL	B	☐ Y ☑ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N
				☐ Y ☐ N					☐ Y ☐ N

SHIPPING METHOD: Drop-off	DATE SHIPPED: 10-10-23	AIRBILL NUMBER: —
COC NUMBER: —	SIGNATURE:	DATE SIGNED: 10/10/23

TRC WATER SAMPLE LOG

Weadock LF

PROJECT NAME:	CEC ~~Karn BAP/LF~~ 2023 GW C	PREPARED		CHECKED	
PROJECT NUMBER:	514403-0000000000	BY: AW JK, JJ	DATE: 10/4/23	BY: JK	DATE 10-11-23

SAMPLE ID: LH-103R | WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER

WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER

SAMPLE TYPE: ☑ GW ☐ WW ☐ SW ☐ DI ☐ LEACHATE ☐ OTHER

PURGING	TIME: 1307	DATE 10/4/23	SAMPLE	TIME: 1332	DATE: 10/4/23
PURGE METHOD:	☑ PUMP PERISTALTIC PUMP ☐ BAILER		PH: 7.04 SU	CONDUCTIVITY: 3113.5	umhos/cm
			ORP: -167.6 mV	DO: 1.60	mg/L
DEPTH TO WATER:	19.80 T/ PVC		TURBIDITY: 0.68 NTU		
DEPTH TO BOTTOM:	NA T/ PVC		☒ NONE ☐ SLIGHT ☐ MODERATE ☐ VERY		
WELL VOLUME:	NA ☐ LITERS ☐ GALLONS		TEMPERATURE: 17.47 °C	OTHER:	—
VOLUME REMOVED:	3.0 ☒ LITERS ☐ GALLONS		COLOR: Clear	ODOR:	None
COLOR:	Clear ODOR: None		FILTRATE (0.45 um) ☐ YES	☒ NO	
TURBIDITY			FILTRATE COLOR:	FILTRATE ODOR:	
☐ NONE ☒ SLIGHT ☐ MODERATE ☐ VERY			QC SAMPLE: ☒ MS/MSD	☒ DUP- LH-103RDUP	
DISPOSAL METHOD:	☑ GROUND ☐ DRUM ☐ OTHER		COMMENTS: FB-02	EB-02 1415	

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1307	200	7.08	3050.3	-122.5	1.75	23.91	16.94	19.80	INITIAL
1312	100	7.03	3130.1	-142.5	1.69	3.55	17.82	22.50	1.0
1317	↓	7.03	3130.8	-149.0	1.69	2.50	17.87	↓	1.5
1322		7.04	3110.3	-160.4	1.62	1.25	17.65		2.0
1327		7.04	3123.2	-168.2	1.65	0.48	17.65		2.5
1332		7.04	3113.5	-167.0	1.60	0.68	17.47		3.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- **0.1** COND.: +/- **3 %** ORP: +/- **10** D.O.: +/- **0.3** 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
4	250	Glass	E	☐ Y ☒ N					☐ Y ☐ N
2	60	VOA	A	☐ Y ☒ N					☐ Y ☐ N
1	250	Plastic	A	☐ Y ☒ N					☐ Y ☐ N
1	125	↓	A	☐ Y ☒ N					☐ Y ☐ N
1	125	↓	B	☐ Y ☒ N					☐ Y ☐ N

SHIPPING METHOD:	Drop off	DATE SHIPPED:	10/5/23	AIRBILL NUMBER:	—
COC NUMBER:	—	SIGNATURE:	AW	DATE SIGNED:	10/4/23

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone (330) 497-9396 Phone (330) 497-0772

MICHIGAN
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Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: JAVIER JASSO	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-112528-29048.1
Client Contact: Jacob Krenz	Phone: 734 904 3316	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 1 of 2
Company: TRC Environmental Corporation.	PWSID:			Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 199810			
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Karn/Weadock CCR JCW Lanfill	Project #: Eurofins 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:			D	D		
JCW-MW-18001	10/5/23	0617	G	Water	N	N	Y	Y	2
JCW-MW-18004	10/4/23	1141	G	Water	N	N	Y	Y	2
JCW-MW-18005	10/4/23	1334	G	Water	N	N	Y	Y	2
JCW-MW-18006	10/4/23	1532	G	Water	N	N	Y	Y	2
MW-50	10/4/23	0844	G	Water	N	N	Y	Y	2
MW-51	10/4/23	0738	G	Water	N	Y	Y	Y	2
MW-52	10/4/23	0830	G	Water	N	N	Y	Y	2
MW-53	10/4/23	0936	G	Water	N	N	Y	Y	2
MW-53R	10/4/23	1015	G	Water	N	N	Y	Y	2
MW-54R	10/4/23	1107	G	Water	N	N	Y	Y	2
MW-55	10/4/23	1241	G	Water	N	N	Y	Y	2

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		10/10/23 0741	TRC		10/10/23 845	Test
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone (330) 497-9396 Phone (330) 497-0772

MICHIGAN 190

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: Javier J Asso	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-112528-29048.2
Client Contact: Jacob Krenz	Phone: 734 904 3710	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: TRC Environmental Corporation.	PWSID:	Analysis Requested		Job #:
Address: 1540 Eisenhower Place	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
City: Ann Arbor	TAT Requested (days):			
State, Zip: MI, 48108-7080	Compliance Project: Δ Yes Δ No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO #: 199810			Other:
Email: JKrenz@trccompanies.com	WO #:			
Project Name: Kam/Weadock CCR JCW Lanfill	Eurofins Project #: 24024154			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	904.0, Ra226Ra228_GFPC	903.0 - Standard Target List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	D	D	X	
OW-57ROUT	10/9/23	1434	G	Water	N	N	FF	4	
MW-58	10/9/23	1615	G	Water	N	N	FF	4	
DUP-01	10/9/23	—	G	Water	N	N	FF	4	
EB-01	10/9/23	1432	G	Water	N	N	FF	4	
DUP #02	10/9/23	—	G	Water	N	N	FF	4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		10/10/23 0745	TRC			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 10/10/23 745	Company ETA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

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CHAIN OF CUSTODY

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Page _____ of _____

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity					REMARKS
23-0934-01			GW	JCW-MW-18001	5	4	1						x	x	x	x					
-02	10/9/23	1145	GW	JCW-MW-18004	3	2	1						x	x	x						
-03	10/9/23	1334	GW	JCW-MW-18005	3	2	1						x	x	x						
-04	10/9/23	1520	GW	JCW-MW-18006	3	2	1						x	x	x						
-05	10/9/23	0900	GW	MW-50	3	2	1						x	x	x						
-06	10/9/23	0735	GW	MW-51	3	2	1						x	x	x						
-07	10/9/23	0830	GW	MW-52	3	2	1						x	x	x						
-08	10/9/23	0920	GW	MW-53	3	2	1						x	x	x						
-09	10/9/23	1015	GW	MW-53R	3	2	1						x	x	x						
-10	10/9/23	1105	GW	MW-54R	3	2	1						x	x	x						
-11	10/9/23	1245	GW	MW-55	3	2	1						x	x	x						
-12	10/9/23	1424	GW	OW-57ROUT	3	2	1						x	x	x						

RELINQUISHED BY: _____ DATE/TIME: 10/10/23 0812 RECEIVED BY: _____

RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☐ Yes ☐ No M&TE #: _____

Temperature: _____ °C Cal. Due Date: _____

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SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Porewater Wells

PROJECT NUMBER: 23-0934

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: J. Josso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0934-13	10/9/23	1615	GW	MW-58	3	2	1						x	x	x		
-14	10/9/23	—	GW	DUP-JCW-LF-01	3	2	1						x	x	x		
-15	10/9/23	—	GW	DUP-JCW-LF-02	3	2	1						x	x	x		
-16	10/5/23	0617	GW	JCW-MW-18001 MS	2	1	1						x	x			
-17	10/5/23	0617	GW	JCW-MW-18001 MSD	2	1	1						x	x			
-18	10/9/23	1631	W	FB-01	2	1	1						x	x			
-19	10/9/23	1630	W	EB-01	2	1	1						x	x			

RELINQUISHED BY: _____ DATE/TIME: 10/5/23 1240 RECEIVED BY: _____

RELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

COMMENTS:

Received on Ice? ☐ Yes ☐ No M&TE #: _____

Temperature: _____ °C Cal. Due Date: _____

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

SAMPLING SITE / CUSTOMER: Q4-2023 JCW-DEK Background Wells

PROJECT NUMBER: **23-0933**

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM:

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed): Total Metals; Anions; TDS

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	Anions	TDS	REMARKS
23-0933-01	10-4-23	0913	GW	MW-15002	3	2	1						x	x	x	
-02	10-2-23	1151	GW	MW-15008	3	2	1						x	x	x	
-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						x	x	x	
-06	10-2-23	1236	W	FB- Background	1								x			

RELINQUISHED BY: [signature] DATE/TIME: 10-5-23/0730 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS: 4 of 4 pages

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 2.0 - 3.6 °C Cal. Due Date: 11-15-23

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

Chain of Custody Record

eurofins
Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Brooks, Kris M	Carrier Tracking No(s):	COC No: 240-174889.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Kris.Brooks@et.eurofinsus.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-193059-1
Address: 13715 Rider Trail North,	Due Date Requested: 11/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Kam/Weadock CCR Groundwater Monitoring	Project #: 24024154			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_STD Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-15002 (240-193059-1)	10/4/23	09:13 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15008 (240-193059-2)	10/2/23	11:51 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15016 (240-193059-3)	10/4/23	09:49 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
MW-15019 (240-193059-4)	10/2/23	12:36 Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-BACKGROUND (240-193059-5)	10/2/23	Eastern		Water			X	X	X	2	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EQ-BACKGROUND (240-193059-6)	10/4/23	10:02 Eastern		Water			X	X	X	2	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 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 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	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:			
Relinquished by:	Date/Time: 10/6/23 1640	Company EEINC	Received by:	Date/Time:	Company	
Relinquished by: Fedex	Date/Time:	Company	Received by: M. Pinette Fedex	Date/Time: OCT 09 2023 0945	Company	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Page 24 of 25

11/7/2023

44 of 44

CHAIN OF CUSTODY

Consumers Energy — Count on Us®

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock ASD

PROJECT NUMBER: 23-0935

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: J. Jasso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES:
GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT:
☐ NPDES
☒ TNI
☐ ISO 17025
☐ 10 CFR 50 APP. B
☐ INTERNAL INFO
☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0935-01	10/5/23	0705	GW	JCW-OW-18001	5	4	1						x	x	x	x	

RELINQUISHED BY: [signature] DATE/TIME: 10/5/23 1240 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 5.9 °C Cal. Due Date: 11-15-23

9 of 29

CHAIN OF CUSTODY

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

Page 1 of 1

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Leachate Wells

PROJECT NUMBER: 23-0941

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: A. Whaley, J. Jassa

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	TOTAL #	CONTAINERS / PRESERVATIVE: None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Low Level Mercury	Total Metals	Anions	TDS	Alkalinity	REMARKS
23-0941-01	10/4/23	1332	GW	LH-103R	6	4	1			1			x	x	x	x	x	Low Level Hg on Separate COC
↓ -05	10/4/23	1328	GW	LH-104	6	4	1			1			x	x	x	x	x	

RELINQUISHED BY: Ceylan Whaley — DATE/TIME: 10/5/23 / 0730 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS028757

Temperature: 1.9-2.1 °C — Cal. Due Date: 11-15-23

40 of 44

CHAIN OF CUSTODY

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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q4-2023 Weadock Leachate Wells

PROJECT NUMBER: 23-0941

SAP CC or WO#:

REQUESTER: Harold Register

SAMPLING TEAM: A. Whaley, J. Jasso

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Joseph Firlit — email: — phone:

COPY TO: Harold Register; TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Low Level Mercury	REMARKS
23-0941-01	10/4/23	1338	GW	LH-103R	1					1			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		1328	GW	LH-104	1					1			x	
-06		—	GW	LH-104 Dup	1					1			x	
-07		1332	W	FB-02	1					1			x	
-08		1415	W	EB-02	1					1			x	
-09		—	W	TB-02	1					1			x	

RELINQUISHED BY: [signature] DATE/TIME: 10-5-23 / 0730 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☐ Yes ☑ No M&TE #: N/A

Temperature: N/A °C Cal. Due Date: N/A

Appendix G
Alternate Source Demonstration Supporting Information

Consumers Energy
Count on Us®

A CMS Energy Company

Date: January 30, 2024

To: Operating Record

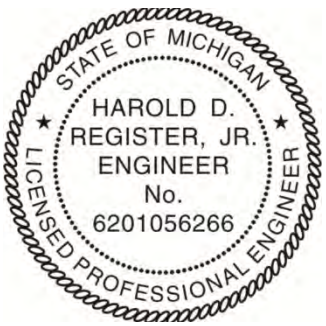
From: Harold D. Register, Jr., P.E.

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.

Harold D. Register, Jr.
Signature



01/30/2024

January 30, 2024
Date of Certification

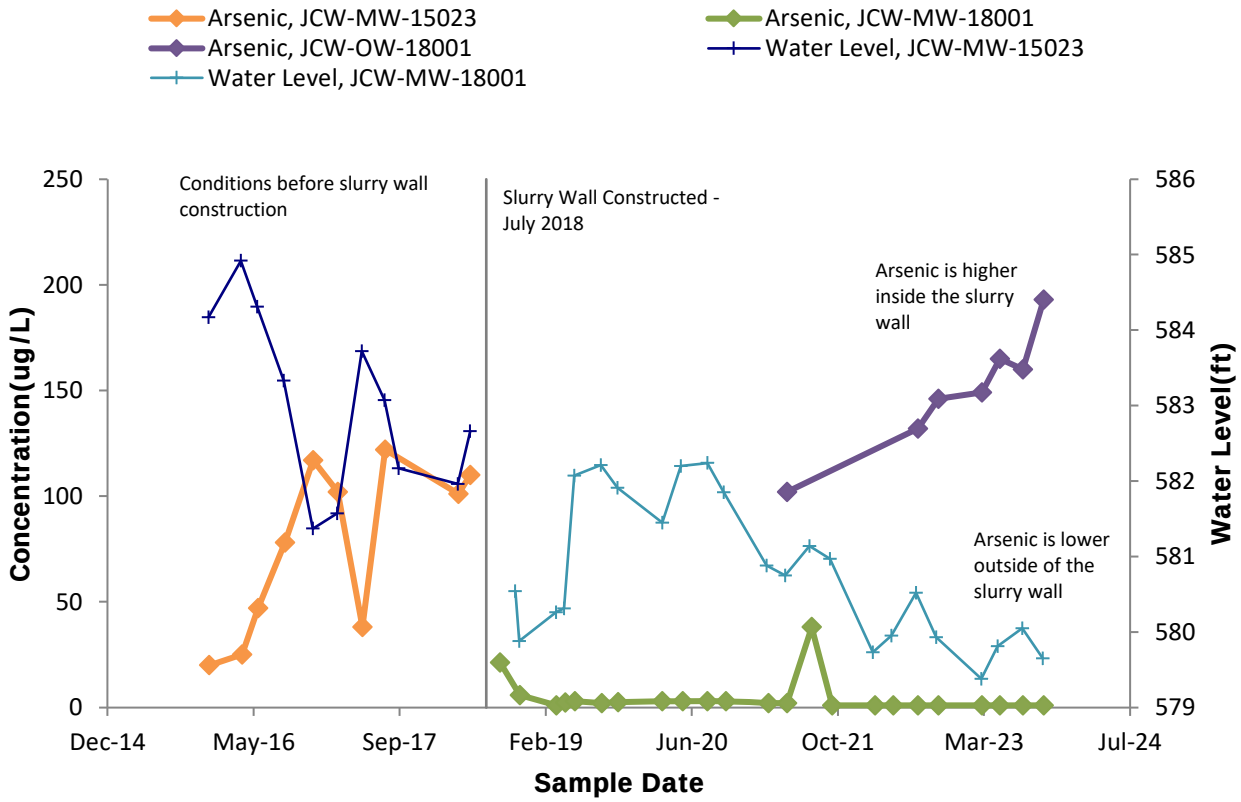
Harold D. Register, Jr., P.E.
Name

6201056266
Professional Engineer Certification Number

References

TRC (January 2024). *2023 Semiannual Groundwater Monitoring Report/Fourth Quarter 2023 Hydrogeological Monitoring Report, JC Weadock Landfill Solid Waste Disposal Area, Essexville, Michigan*

Figure G1: Time Series Plots for JCW-MW-18001 ASD



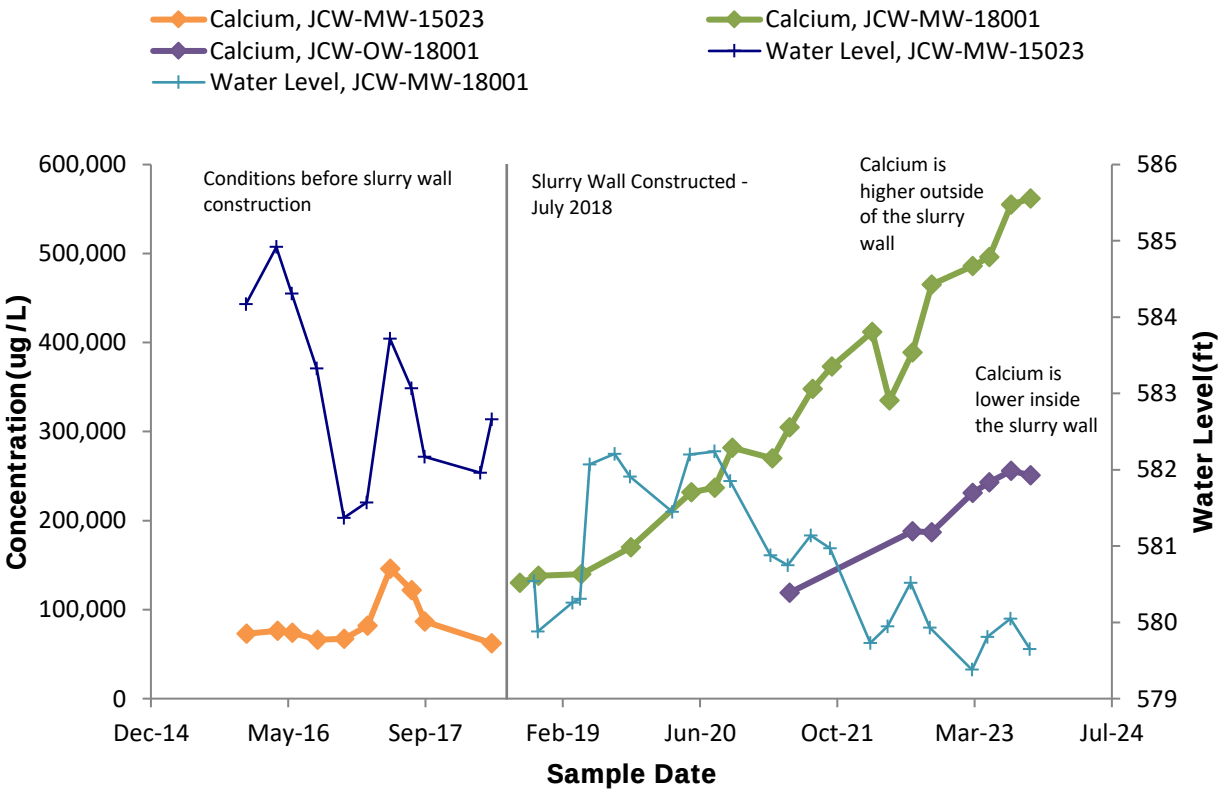
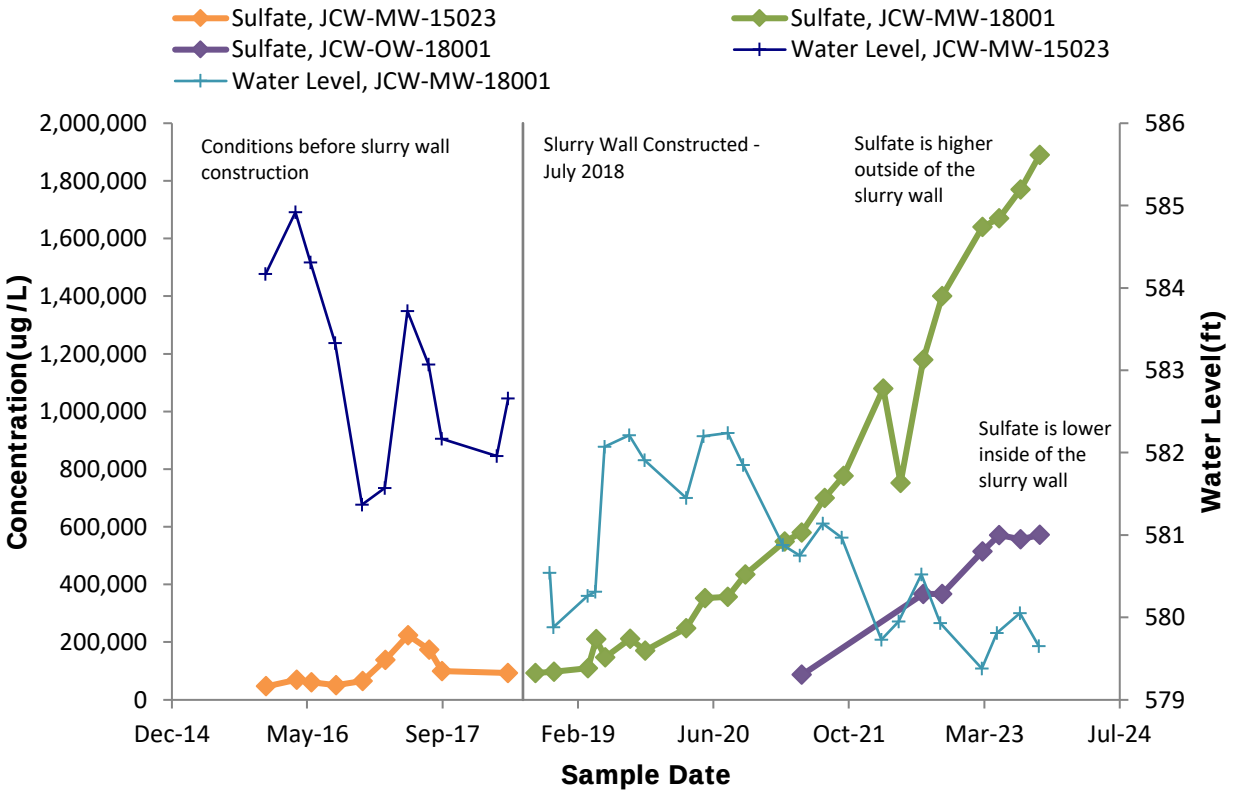


Figure G1: Time Series Plots for JCW-MW-18001 ASD



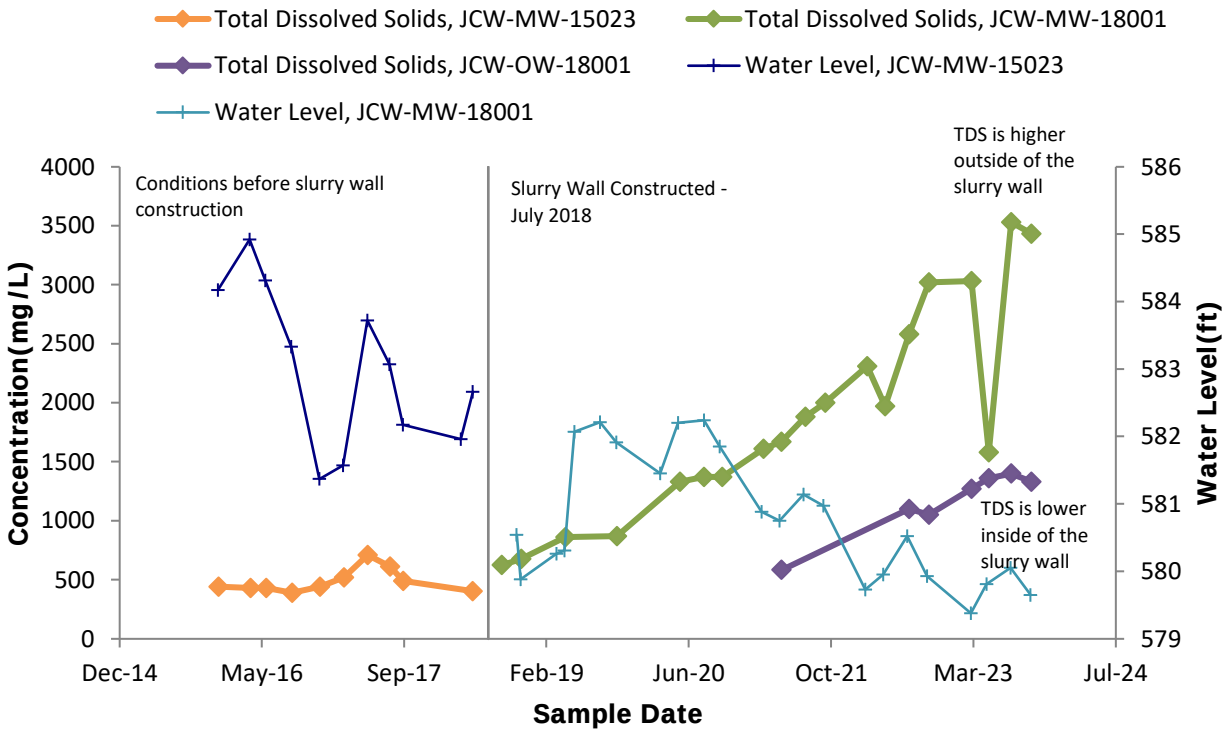
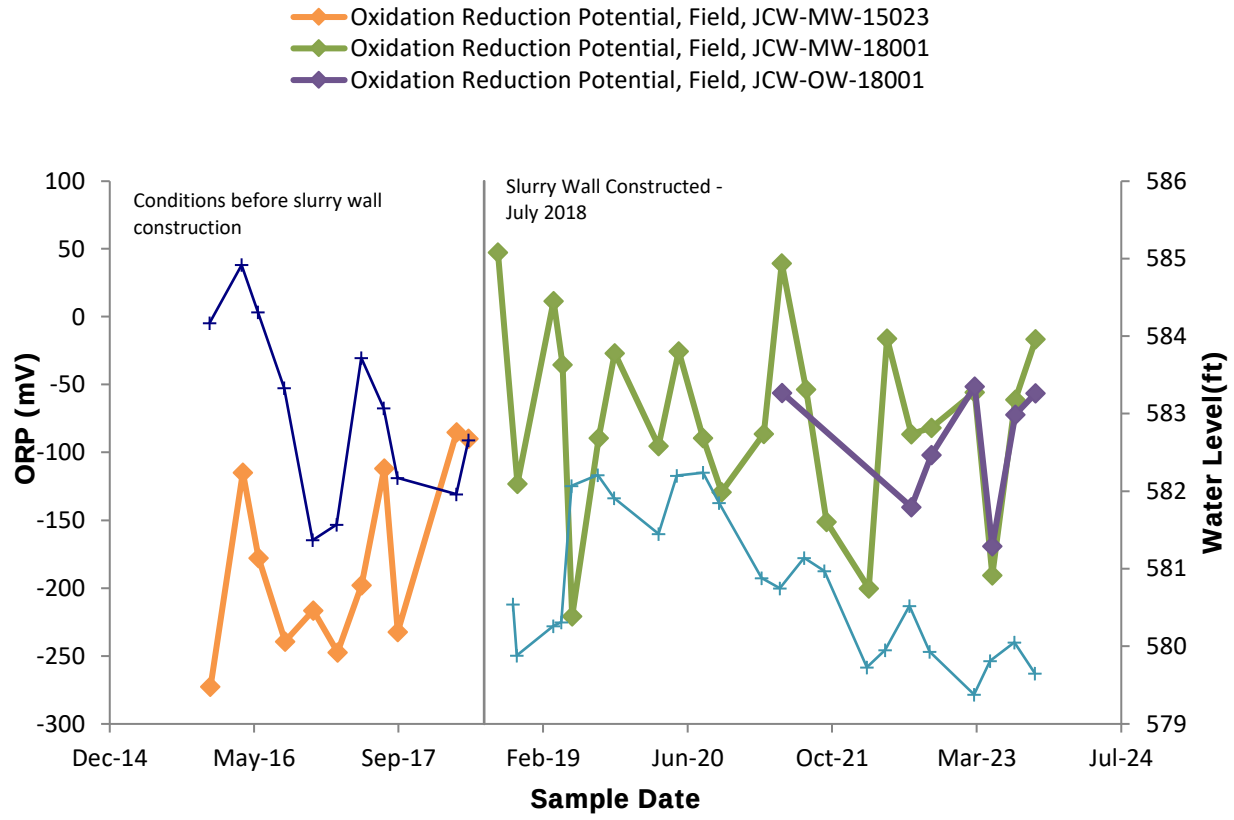


Figure G1: Time Series Plots for JCW-MW-18001 ASD



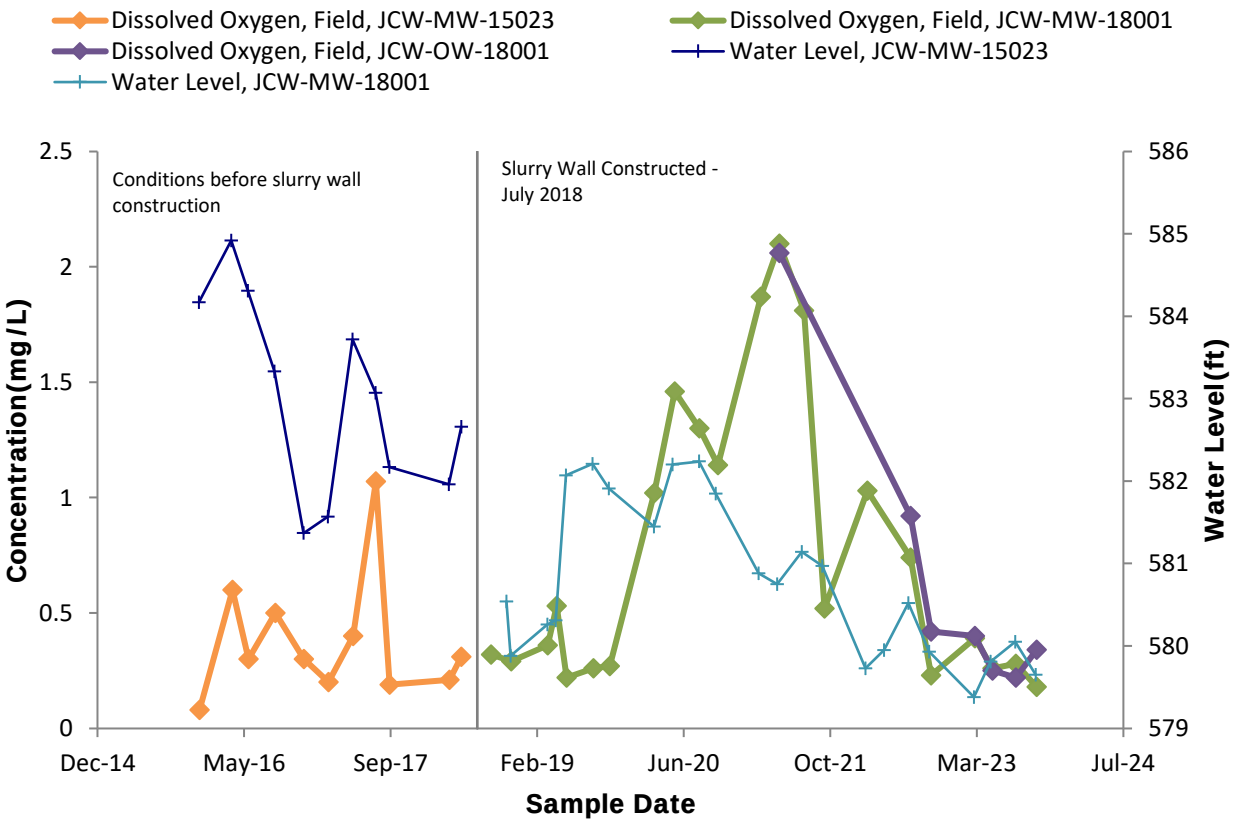
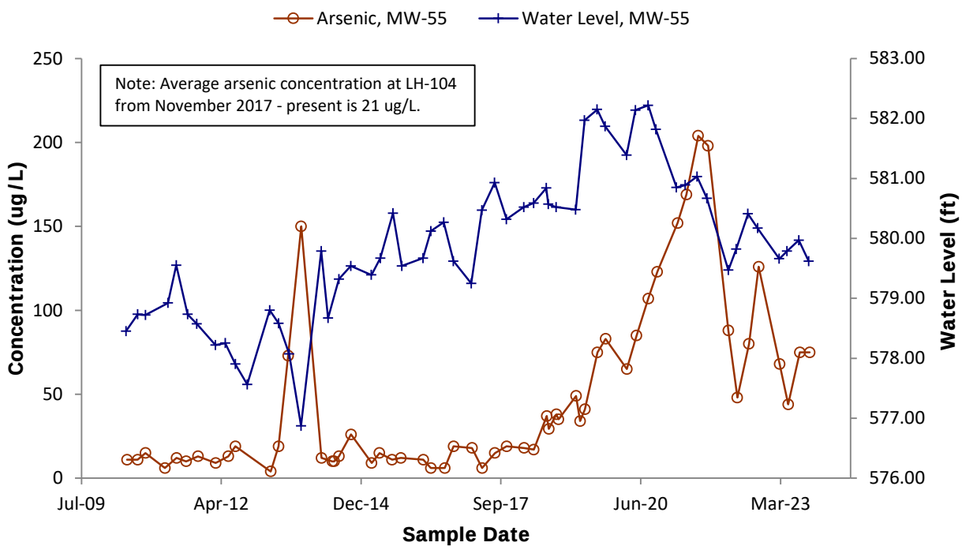
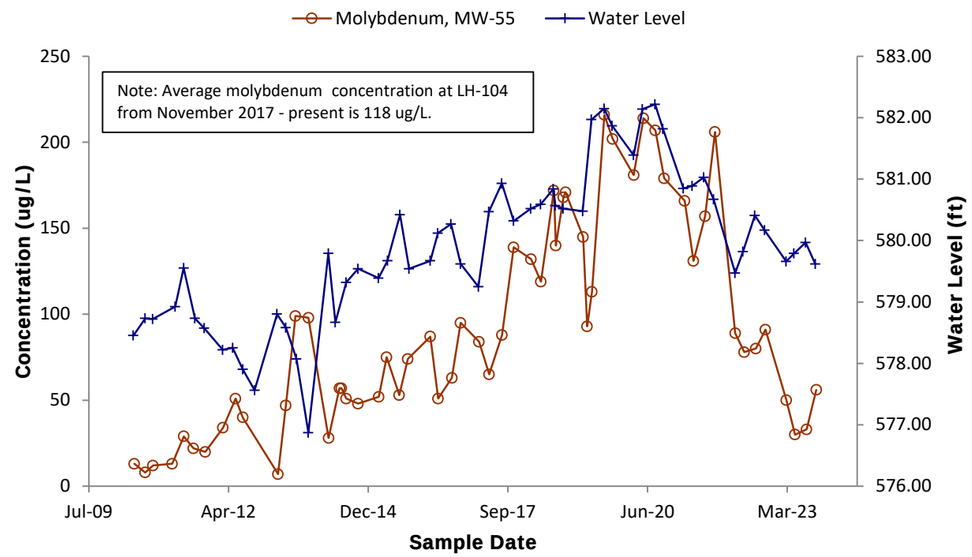
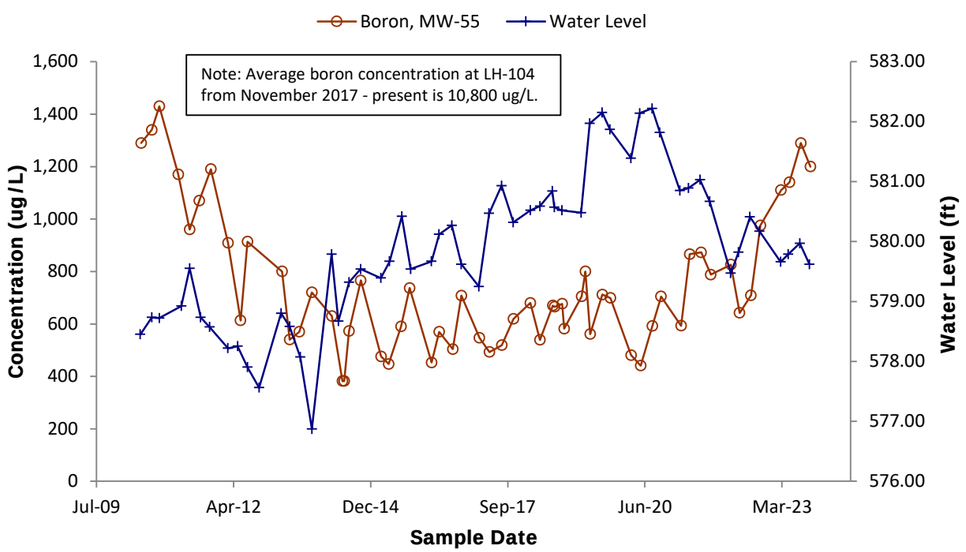
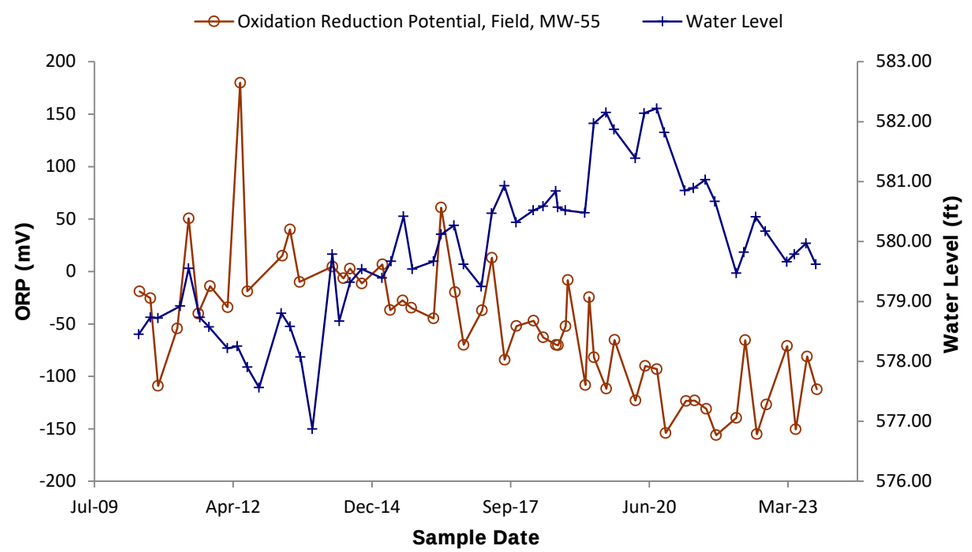


Figure G2: Time Series Plots for MW-55 ASD









1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

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[1] and beryllium and lithium were present in one downgradient monitoring well at statistically significant levels exceeding the GWPSs at the Weadock Bottom Ash Pond[2].

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)[3] 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

[1] TRC. 2019. *Statistical Evaluation of Initial Assessment Monitoring Sampling Event, JC Weadock Landfill, Consumers Energy Company, Essexville, Michigan*. January 14.

[2] TRC. 2019. *Statistical Evaluation of Initial Assessment Monitoring Sampling Event, JC Weadock Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan*. January 14.

[3] 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[4] 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).

[4] 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[5] and the Weadock Bottom Ash Pond CCR unit was certified closed[6]. 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[7]
- Orange – Statistically Significant GWPS Exceedances[8]

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*

[5] 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.
[6] Consumers Energy. 2023. JC Weadock Bottom Ash Pond 40 CFR 257.102(c) Closure by Removal Certification. November 10.
[7] 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)
[8] 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*)*[9]. 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)[10].

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.

[9] TRC. 2020. *2019 Annual Groundwater Monitoring Report* – JC Weadock Power Plant Landfill CCR Unit. Prepared for Consumers Energy Company. January 30.

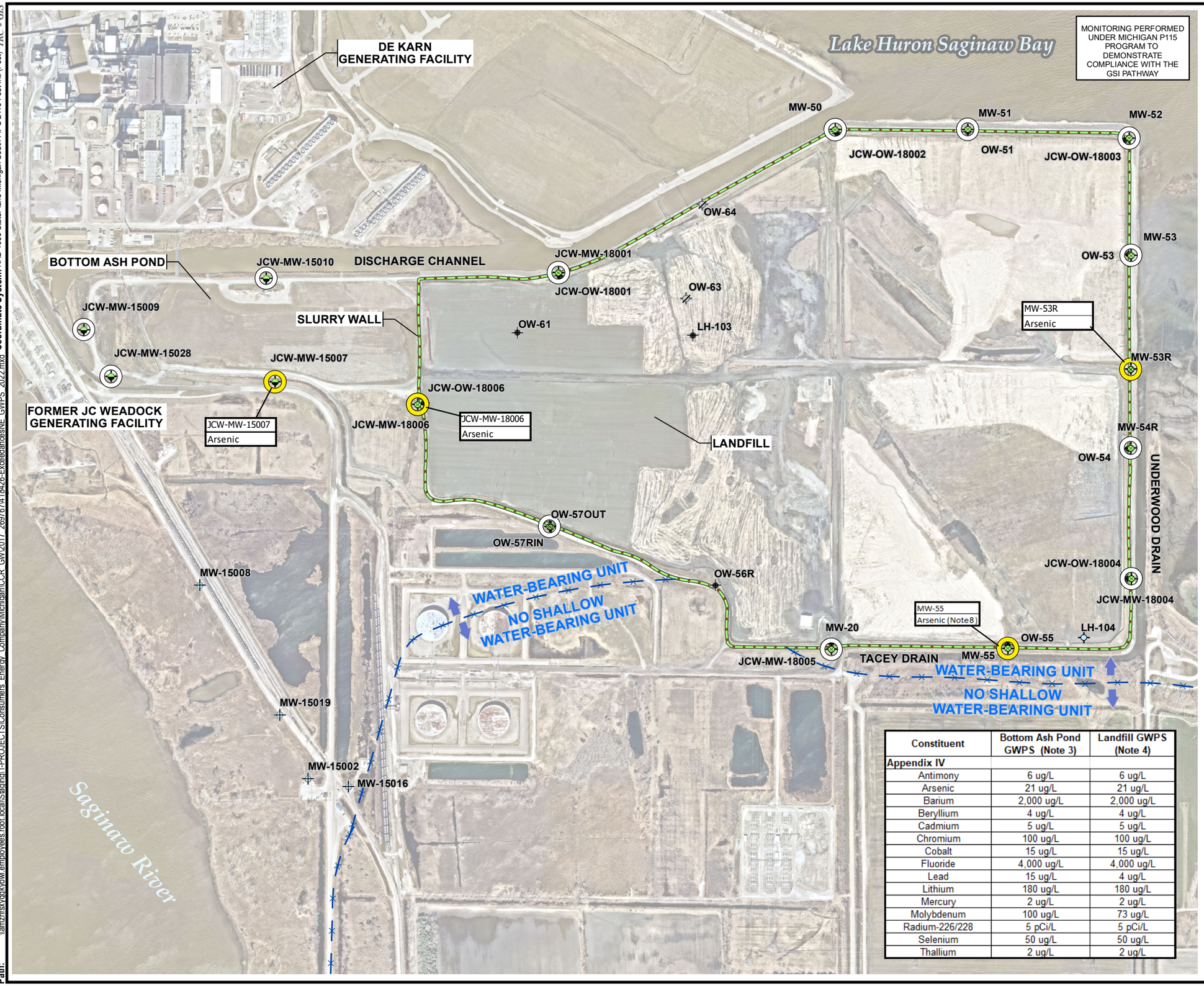
[10] TRC. 2024. *2023 Semiannual Groundwater Monitoring Report and Fourth Quarter 2024 Hydrogeological Monitoring Report* – JC Weadock Solid Waste Disposal Area. January 30.

Attachments

Figure 1 Nature and Extent Summary: GWPS Exceedances

Attachment A Time Series Graphs

Figure



LEGEND

- BACKGROUND MONITORING WELL
- JCW LANDFILL MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- JCW BOTTOM ASH POND MONITORING
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- NO EXCEEDANCES
- TWO OR MORE EXCEEDANCES (NOTES 5 & 6)
- STATISTICALLY SIGNIFICANT GWPS EXCEEDANCE (NOTE 7)
- SLURRY WALL (APPROXIMATE)
- APPROXIMATE WATER-BEARING UNIT BOUNDARY

WELL ID
CONSTITUENT(S) EXCEEDING GWPS

* GWPS EXCEEDANCE TRIGGERING ASSESSMENT OF CORRECTIVE MEASURES PURSUANT TO §257.96

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018
3. GWPS (GROUNDWATER PROTECTION STANDARD) IS THE HIGHER OF THE MAXIMUM CONTAMINANT LEVEL (MCL)/REGIONAL SCRE ENING LEVEL FROM 83 FR 36435 (RSL) AND UPPER TOLERANCE LIMIT (UTL) AS ESTABLISHED IN TRC'S TECHNICAL MEMORANDUM DATED OCTOBER 15, 2018.
4. GWPS IS THE HIGHER OF THE MCL/RSL, APPLICABLE MICHIGAN PART 201 CRITERIA, AND UTL AS ESTABLISHED IN TRC'S TECHNICAL MEMORAND UM DATED APRIL 23, 2021.
5. GROUNDWATER DATA FROM MAY 2020 TO OCTOBER 2023 ARE SCREENED AGAINST THE GWPS FOR EVALUATION PURPOSES ONLY. AN EXCEEDANCE IS DEFINED AS A SINGLE DETECTION ABOVE THE GWPS, HOWEVER, CONFIDENCE INTERVALS WILL BE USED TO DETERMINE COMPLIANCE PER THE CCR RULES.
6. AN EXCEEDANCE OF THE GWPS DOES NOT INDICATE UNACCEPTABLE RISK FROM GROUNDWATER EXPOSURE; THE DRINKING WATER PATHWAY IS NOT COMPLETE ON THE PROPERTY. GROUNDWATER CONDITIONS CONTINUE TO BE MONITORED TO INFORM THE JCW LANDFILL REMEDY SELECTION.
7. LOWER CONFIDENCE LIMIT IS ABOVE GWPS.
8. ALTERNATE SOURCE DEMONSTRATION INCLUDED IN 2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT (TRC, JANUARY 2024).

Constituent	Bottom Ash Pond GWPS (Note 3)	Landfill GWPS (Note 4)
Appendix IV		
Antimony	6 ug/L	6 ug/L
Arsenic	21 ug/L	21 ug/L
Barium	2,000 ug/L	2,000 ug/L
Beryllium	4 ug/L	4 ug/L
Cadmium	5 ug/L	5 ug/L
Chromium	100 ug/L	100 ug/L
Cobalt	15 ug/L	15 ug/L
Fluoride	4,000 ug/L	4,000 ug/L
Lead	15 ug/L	4 ug/L
Lithium	180 ug/L	180 ug/L
Mercury	2 ug/L	2 ug/L
Molybdenum	100 ug/L	73 ug/L
Radium-226/228	5 pCi/L	5 pCi/L
Selenium	50 ug/L	50 ug/L
Thallium	2 ug/L	2 ug/L

0 600 1,200 Feet

1 " = 600 '

1:7,200

N

PROJECT:
CONSUMERS ENERGY COMPANY
JC WEADOCK POWER PLANT
ESSEXVILLE, MICHIGAN

TITLE:
NATURE AND EXTENT SUMMARY GWPS EXCEEDANCES

DRAWN BY:	E. YPSILANTIS	PROJ NO.:	367389.0001
CHECKED BY:	K. LOWERY		
APPROVED BY:	D. LITZ		**FIGURE 1**
DATE:	JANUARY 2024		

TRC
1540 Eisenhower Place
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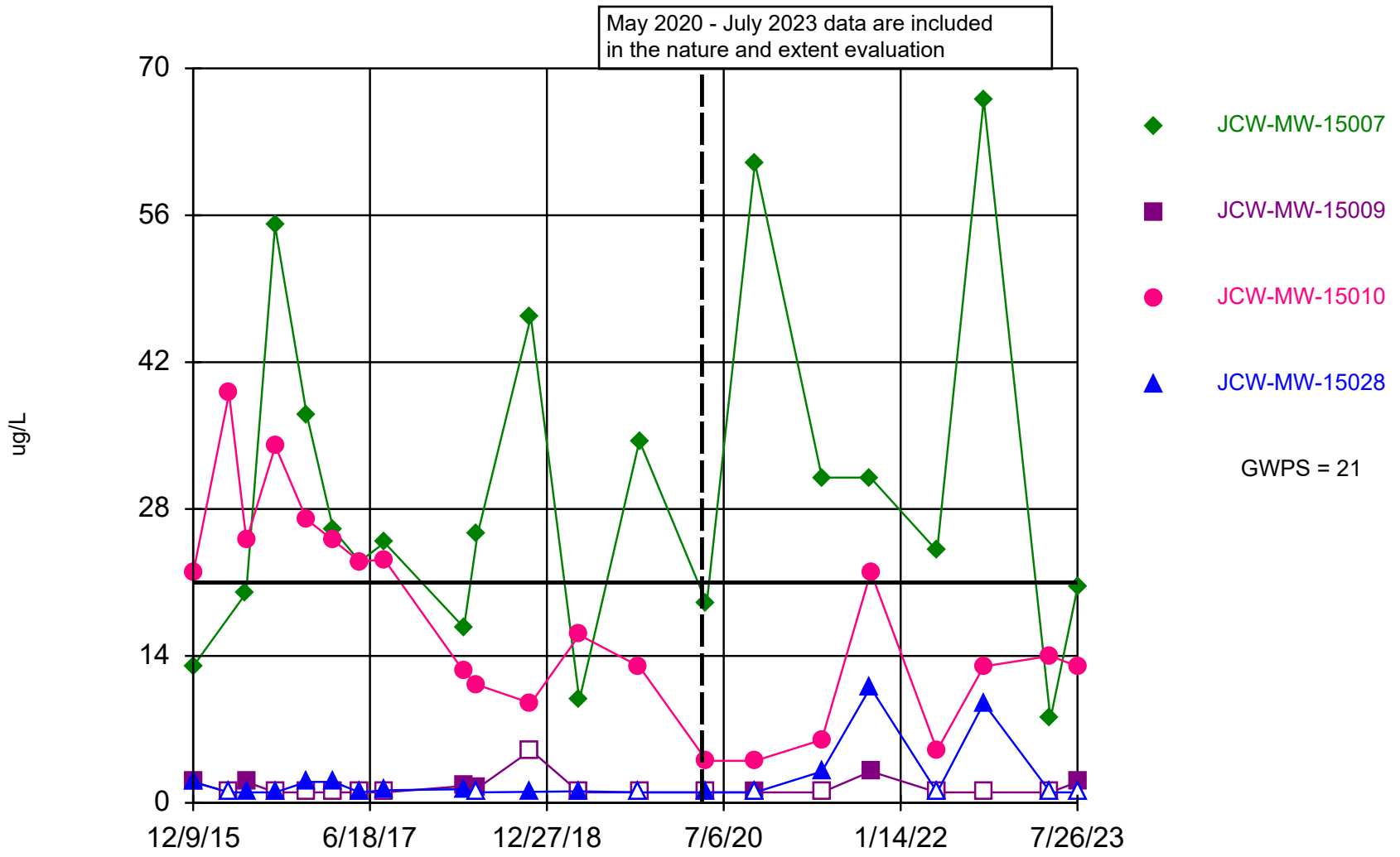
Phone: 734.971.7080
www.trccompanies.com

FILE NO.: 418426-ExceedancesNE_GWPS_2022.mxd

Attachment A
Time Series Graphs

Hollow symbols indicate censored values.

Arsenic Comparison to GWPS



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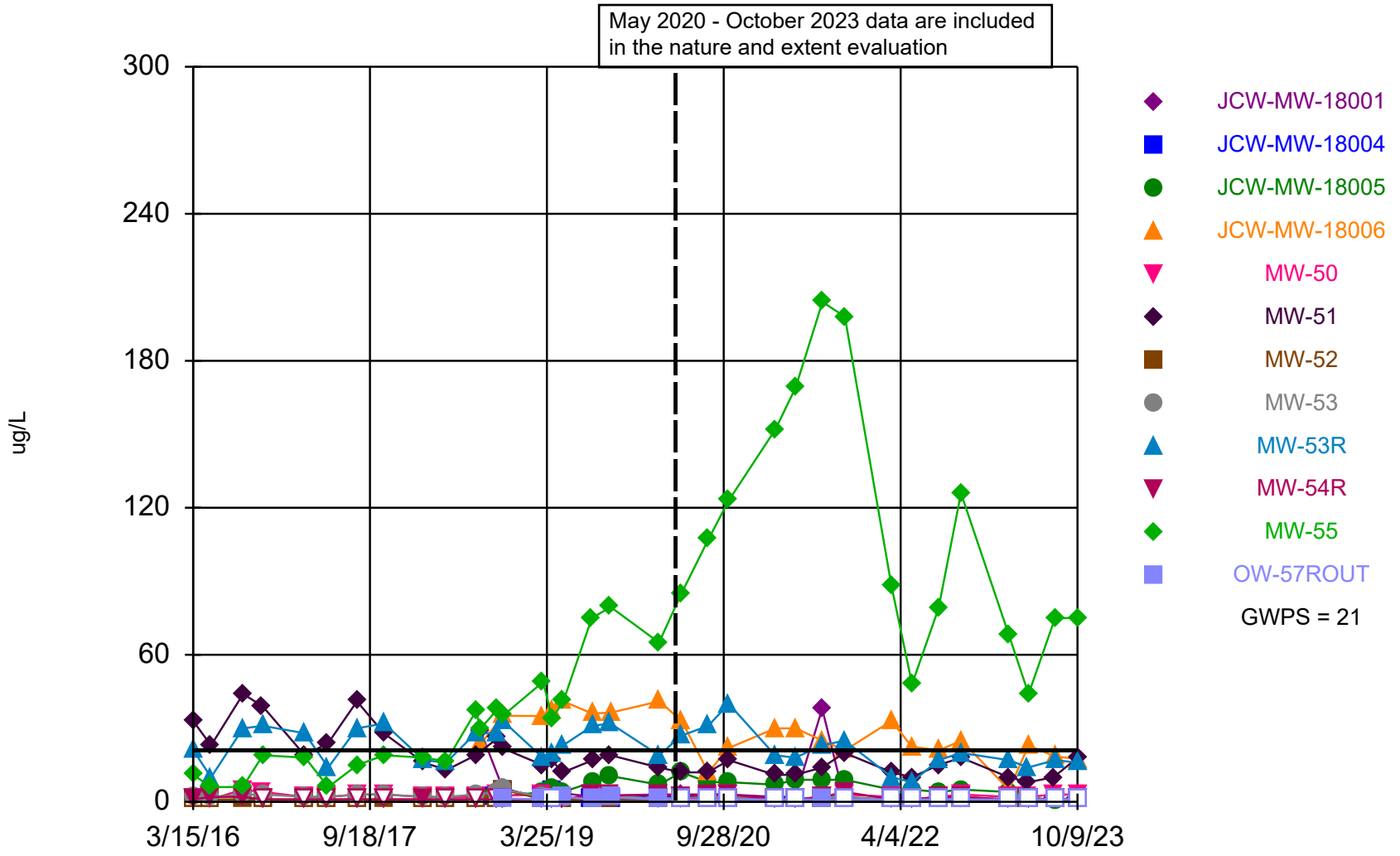
Hollow symbols indicate censored values.

Arsenic Comparison to GWPS



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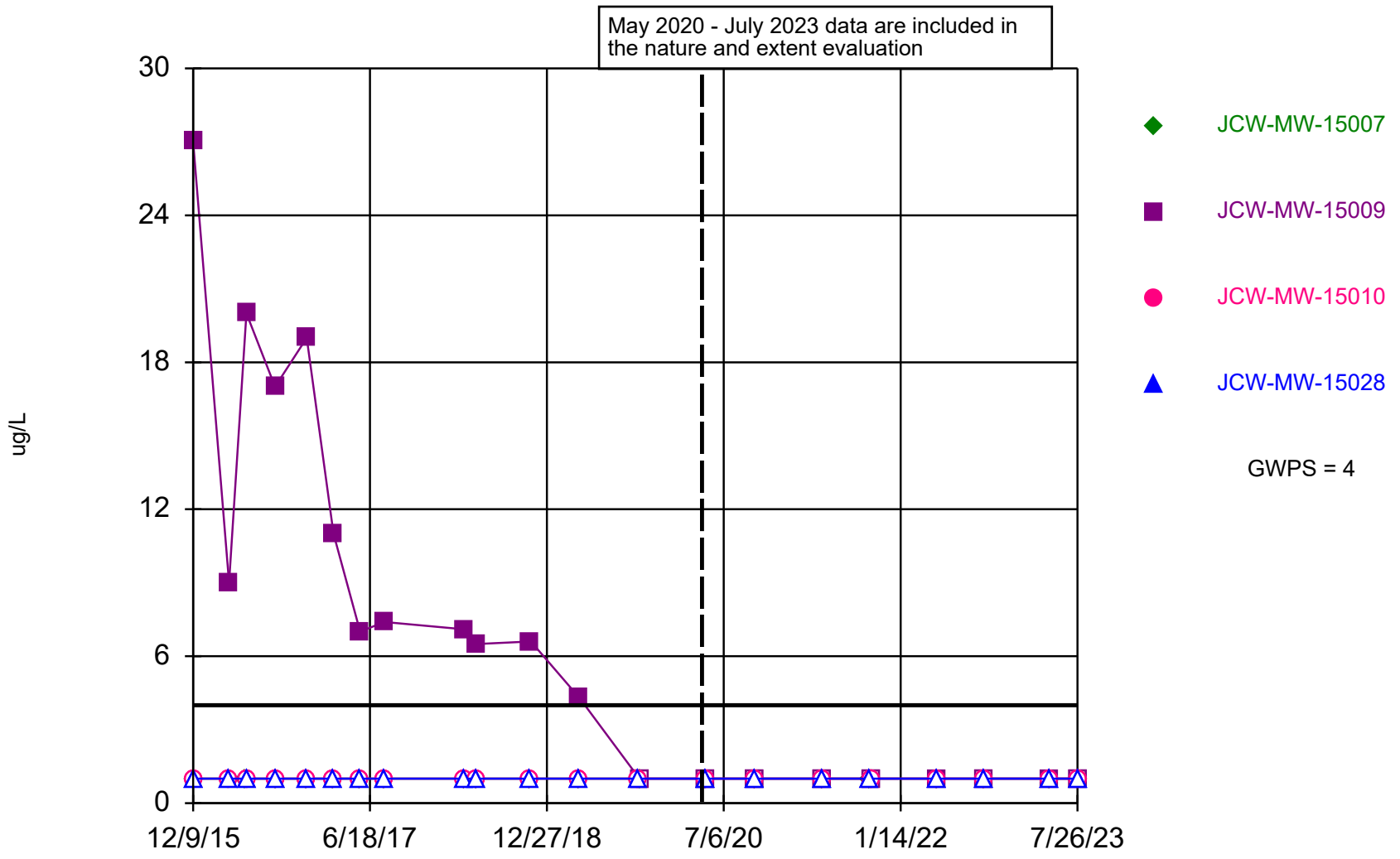
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Hollow symbols indicate censored values.

Beryllium Comparison to GWPS



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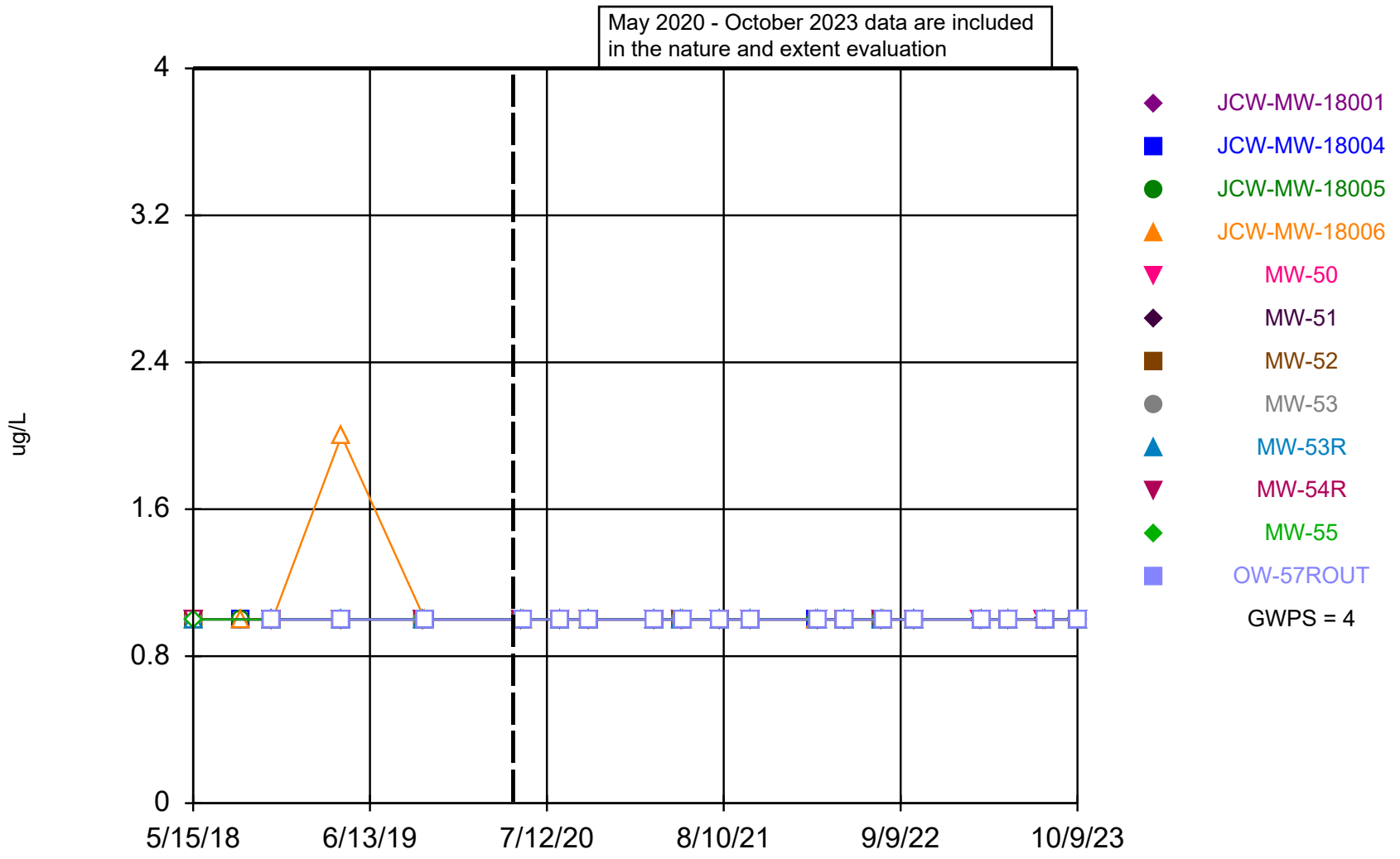
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Hollow symbols indicate censored values.

Beryllium Comparison to GWPS



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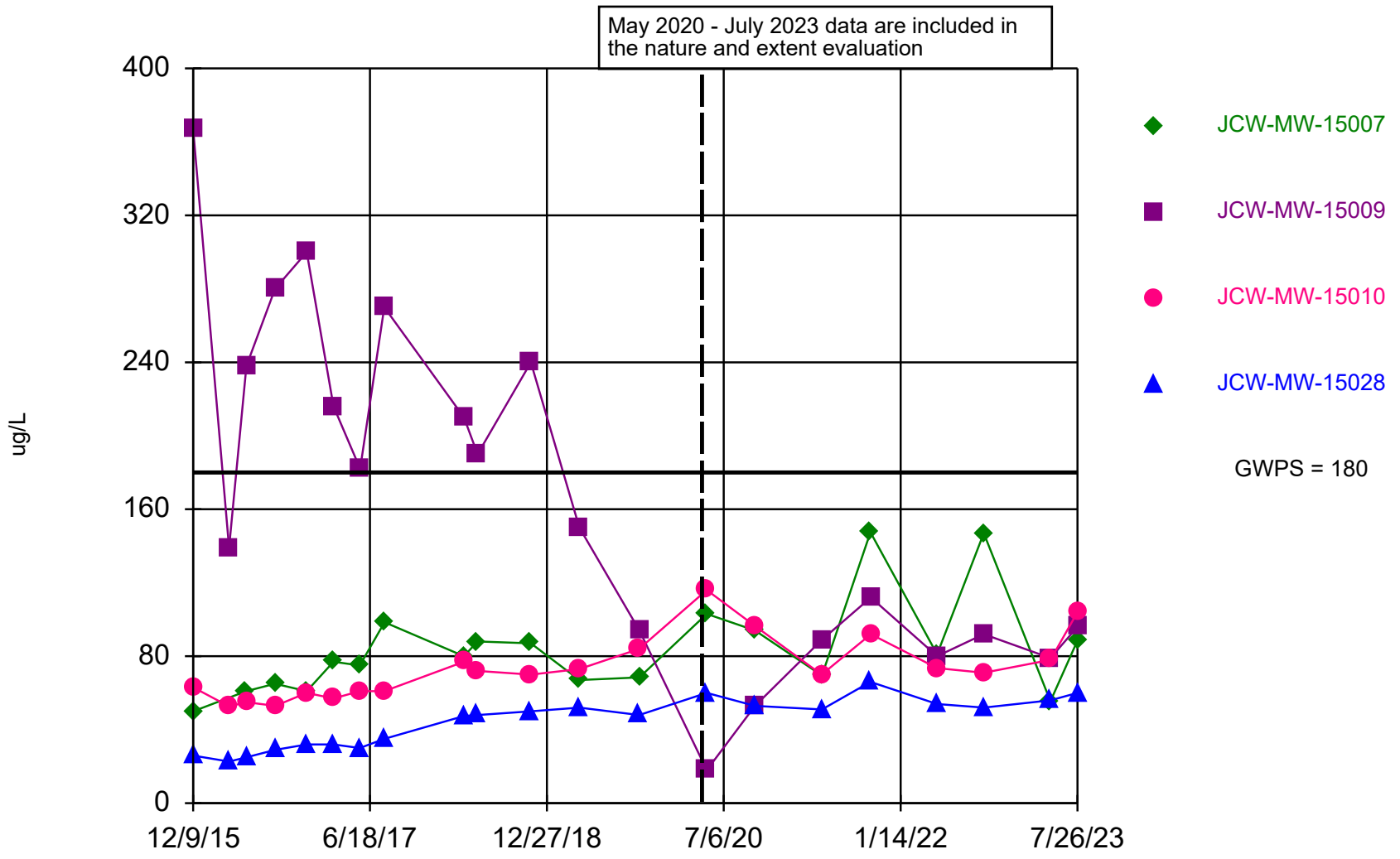
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Lithium Comparison to GWPS



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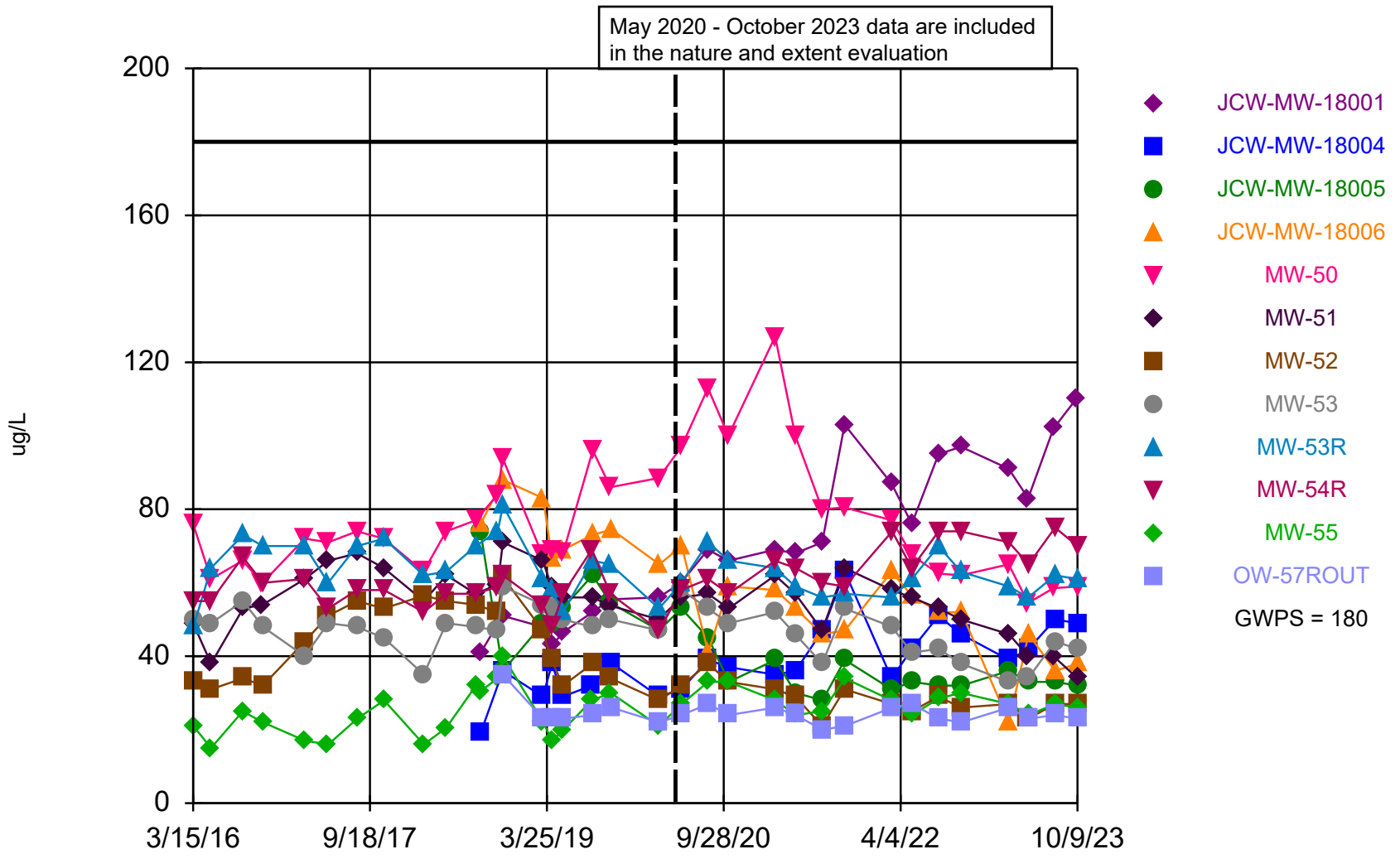
Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4

Lithium Comparison to GWPS



Time Series Analysis Run 1/10/2024 4:23 PM

Client: Consumers Energy Data: JCW_HMPCCR_Sanitas_23Q4