

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
DE Karn Lined Impoundment Coal Combustion Residuals (CCR) Unit

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 257.90-98), apply to the Consumers Energy Company (Consumers Energy) Lined Impoundment at the DE Karn Power Plant Site. Pursuant to the CCR Rule, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). On behalf of Consumers Energy, TRC has prepared this Annual Groundwater Monitoring Report for the Karn Lined Impoundment to cover the period of January 1, 2023 to December 31, 2023.

This 2023 Karn Lined Impoundment Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Appendix III to Part 257 of the CCR Rule) for the four quarterly groundwater monitoring events completed in 2023 for the Lined Impoundment. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring constituents to determine if concentrations in detection monitoring well samples exceed background levels.

After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) December 28, 2018 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. This alignment would ensure compliance with the CCR standards through a state-approved

permitting program that would be deemed to be “equivalent to” or “as protective as” through an administrative application that would be reviewed and authorized by U.S. EPA.

On November 6, 2020 Consumers Energy submitted the Karn Lined Impoundment Hydrogeological Monitoring Plan (November 2020 HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and the four quarterly events completed in 2023 were performed in accordance with the EGLE-approved HMP. This letter and four quarterly reports (Enclosures 2 through 5) collectively comprise the 2023 Annual Groundwater Monitoring and Corrective Action Report and meet the requirements of §257.90(e) as documented in the enclosed checklist (Enclosure 1).

In 2023, Consumers Energy continued to assert an Alternate Source Demonstration (ASD), for the following SSIs over background limits:

- Chloride and total dissolved solids in DEK-MW-15003; and
- pH in monitoring well OW-11.

As detailed in the First, Second, and Third Quarter 2023 Hydrogeological Monitoring Reports (Enclosures 2-4), a source other than the Karn Lined Impoundment CCR Unit caused the SSIs. There were no SSIs observed in the Fourth Quarter 2023 Hydrogeological Monitoring Reports (Enclosure 5). As such, Consumers Energy will continue with the detection monitoring program at the Karn Lined Impoundment in conformance with §257.90 - §257.94.

No corrective actions were performed in 2023. Per the November 2020 HMP, quarterly monitoring will be performed at the Karn Lined Impoundment in 2024. The next annual monitoring report will cover monitoring conducted in the 2024 calendar year and will be submitted no later than January 31, 2025.

Sincerely,



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cc: Mr. Jim Ferritto, EGLE Bay City District Office
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Mr. Joe Firlit, Consumers Energy
Ms. Darby Litz, TRC
Ms. Kristin Lowery, TRC
Mr. Andrew Whaley, TRC

Enclosures: 1) CCR Annual Groundwater Report Requirements: § 257.90(e). Checklist for the Karn Lined Impoundment CCR Unit.
2) First Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. (TRC; April 27, 2023)
3) Second Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. (TRC; July 21, 2023)
4) Third Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. (TRC; October 30, 2023)
5) Fourth Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. (TRC; January 30, 2024)

CCR Annual Groundwater Report Requirements: § 257.90(e)
Checklist for the Karn Lined Impoundment 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	Annual 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.	Certified ASD ^{(2),(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;	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;	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 4.3 Alternate Source Demonstration ^{(2),(3),(4)} ; Certified ASD ⁽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	Certified ASD ⁽³⁾ ; remaining in Detection Monitoring
(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Not Applicable; Detection Monitoring
(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:	Not Applicable; Detection Monitoring
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	Not Applicable; Detection Monitoring
(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Not Applicable; Detection Monitoring
(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Not Applicable; Detection Monitoring
(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Not Applicable; Detection Monitoring
(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	Not Applicable; Detection Monitoring
(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.	Not Applicable; Detection Monitoring

Notes:

- (1) 2023 Annual Groundwater Monitoring and Corrective Action Report Karn Lined Impoundment Coal Combustion Residuals CCR Unit. Consumers Energy. January 30, 2024.
- (2) First Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. TRC. April 27, 2023.
- (3) Second Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. TRC. July 21, 2023.
- (4) Third Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. TRC. October 30, 2023.
- (5) Fourth Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. TRC. January 30, 2024.



First Quarter 2023 Hydrogeological Monitoring Report

DE Karn Lined Impoundment CCR Unit

Essexville, Michigan

April 2023

A handwritten signature in blue ink that reads "Darby Litz".

Darby Litz
Project Manager/Hydrogeologist

Prepared For:

Consumers Energy
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Prepared By:

TRC
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A handwritten signature in blue ink that reads "Kristin Lowery".

Kristin Lowery, E.I.T.
Project Engineer

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1.0 Introduction

Pursuant to the Federal CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After Consumers Energy established the groundwater monitoring system and detection monitoring program pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 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 amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This First Quarter 2023 Karn Lined Impoundment 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 impoundment. 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, *Format for Solid Waste Disposal Facility Monitoring Submittals*, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (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 Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

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.

1. Monitoring of secondary collection system flow rates and water quality to detect leaks in the liner; and
2. Groundwater monitoring to determine if there are potential new releases from the Karn Lined Impoundment.

Based on sampling results for the first quarter 2023, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

1.3 Site Overview

The Karn Lined Impoundment is located within the DE Karn Power Plant site (Site) located north of the former JC Weadock Power Plant, east of the Saginaw River, south and west of Saginaw Bay (Figure 1). Two coal-fired power generating units (Karn Units 1 & 2) began generating electricity in 1958 and 1959, respectively. Karn Units 3 & 4, co-located with the coal-fired generating units, are oil- and natural gas-fueled. Two other areas of coal ash management within the Karn site are the former Karn Bottom Ash Pond that was closed by removal and the Karn Landfill that was certified closed and now in post-closure care.

1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. 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 (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 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 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. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

The Site is bound by several surface water features (Figures 1 and 2): the Saginaw River to the west, Saginaw Bay (Lake Huron) to the north and east, and a discharge channel to the south. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In the vicinity of the Karn Lined Impoundment, the shallow groundwater flow is generally radial, with a potentiometric high point near the unlined ditch north of the Karn Lined Impoundment and near DEK-MW-15003, flowing outward toward the surrounding surface water bodies.

2.0 Second Collection System Monitoring

Consumers Energy initiated secondary collection system flow monitoring to comply with the EGLE-approved HMP in December 2020. The SCS serves as a leak detection system and the SCS flow rate data is used to demonstrate compliance with Part 115. Consumers Energy continues to comply with the requirements for unmonitorable units under Rule 437 of the Part 115 Rules.

Increased average daily flow rates noted for the period from December 10, 2020 – January 6, 2021 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner in 2021, the daily average flow rates were reduced, and the three-month average dropped below the response action flow rate of 25 gallons per acre per day (GPAD). The average daily flow rate for January through March 2023 (three-month average) was calculated as 4.9 GPAD and continues to demonstrate that the daily average flow rate is below the threshold value of the response action flow rate of 25 GPAD. Trend evaluations for weekly and monthly average flow rates continue to support that no additional engineering or operational modifications are necessary, and Consumers continues to document this information in their operating record.

In response to the prior exceedance of the SCS Response Action Flow Rate, samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

- Primary Indicator Parameters: Section 11511a(3)(c) - Detection Monitoring Constituents
- Alternative Indicator Parameters: Section 11519b(2) - Assessment Monitoring Constituents
- Optional Analyses in support of Piper or Stiff diagrams

The KLI-PCS and KLI-SCS data were evaluated for comparison to groundwater quality and water chemistry and to also assess potential of hazard and mobility of constituents. A series of time-series plots are included in Appendix E to illustrate water quality data changes over time for the secondary collection system from the start of operation in June 2018 to present. This analysis demonstrates that each monitored constituent is generally present at concentrations less than the Groundwater Protection Standard (GWPS) established under 40 CFR 257.95(h) for the Karn Bottom Ash Pond or generic groundwater surface water interface (GSI) criteria adopted by the Department pursuant to Section 20120a, with the exception of total dissolved solids and chloride. A few notable observations:

- **Arsenic concentrations are higher in groundwater than the primary and secondary collection system:** Arsenic was detected in the primary collection system at a concentration of 2 ug/L and in the secondary collection system at a concentration of 1 ug/L in March 2023. As shown in Appendix E, the arsenic concentrations observed in the primary and secondary collections system have been consistently low. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the repaired liner areas, is 79 ug/L, which is consistent with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- **Vanadium is detected in the primary and secondary collection system and not in groundwater:** Vanadium is generally present in the primary collection system samples at higher concentrations (17ug/L in March 2023) than the vanadium concentration observed in the secondary collection system (3 ug/L in March 2023) (Appendix E). Vanadium was not detected in the wells nearest the observed liner damage: OW-12 (<2 ug/L) or DEK-MW-18001 (<2 ug/L) providing additional evidence that a release has not adversely affected groundwater conditions.
- **Secondary Collection System chemistry has not appreciably changed:** The time series plots in Appendix E show relatively stable trends in chemistry for samples collected from the primary and secondary collection systems, except for total dissolved solids (TDS) and sulfate in the secondary collection system and chloride in both the primary and secondary collection systems. TDS and sulfate concentrations in the primary collection system leachate is significantly lower in concentration than the concentration in the secondary collection system leachate, suggesting that the elevated TDS and sulfate is not likely from the primary collection system leachate. The TDS and sulfate concentrations in the secondary collection system are beginning to stabilize and are also more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.

Water quality data collected for this event are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored.

3.0 Groundwater Monitoring

3.1 Monitoring Well Network

In accordance with §257.91, Consumers Energy developed a groundwater monitoring system for the Karn Lined Impoundment prior to the initial receipt of waste in the CCR unit (TRC, 2018c). Given the radial groundwater flow direction and that constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the Karn Bottom Ash Pond, the groundwater monitoring system design incorporates an intrawell statistical approach for detection monitoring as described in the HMP and in accordance with the “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance” (USEPA, 2009). Five monitoring wells that are screened in the uppermost saturated unit were selected for the Karn Lined Impoundment HMP detection monitoring (DEK-MW-15003, DEK-MW-18001, OW-10, OW-11, and OW-12). Monitoring well locations are shown on Figure 2.

3.2 March 2023 Detection Monitoring Event

In accordance with the HMP, TRC conducted the first quarter 2023 monitoring event for the Karn Lined Impoundment on March 8th and 9th, 2023. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the first quarter 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

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

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide further evaluation of groundwater chemistry. Analytical results from this event monitoring event are included in the attached laboratory reports (Appendix A).

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 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 B).

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. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater 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 one field blank, one equipment blank, one field duplicate (OW-12), and field matrix spike/matrix spike duplicate samples collected at DEK-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 data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during this groundwater monitoring event are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in March 2023 are generally within the range of 579 to 586 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the

process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in the vicinity of the former Karn Bottom Ash Pond in March 2023 demonstrate a reduction in groundwater elevation measurements by several feet when compared to the measurements collected prior to June 2018, when active loading was occurring to the bottom ash pond. Groundwater at the Site is locally influenced by incidental infiltration from precipitation over the uncovered acreage and the unlined low volume miscellaneous wastewater conveyance associated with the permitted NPDES discharge system, which is located just north of the Karn Lined Impoundment. Monitoring wells OW-11, OW-12, and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric “high”, as illustrated in Figure 3.

The average hydraulic gradient observed on March 6, 2023 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0047 ft/ft. The gradients were calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005, DEK-MW-15003/DEK-MW-15006, and OW-11/MW-08, as well as the monitoring well water elevation difference and distance between DEK-MW-18001 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same date as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.24 ft/day or 88 ft/year in March 2023 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

Due to the operational changes of the former bottom ash pond and the completion of the landfill capping activities in 2020, the gradient between the area of the Karn Bottom Ash Pond and Karn Lined Impoundment and the surrounding surface water bodies is flattening out as compared to previous quarters and is also attempting to reach a new equilibrium, as expected. The general flow direction relative to the Karn Lined Impoundment is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III/IV parameters that could potentially migrate from the Karn Lined Impoundment.

4.0 Data Evaluation

Based on sampling results for this event the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the first quarter 2023 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria and the generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017 and in accordance with the December 23, 2015 mixing zone determination.

4.1 Statistical Evaluation of Trends

Groundwater in the vicinity of the Karn Lined Impoundment has been affected by CCR management before commencement of operation (January 2019, TRC). Given that the constituents associated with CCR currently managed in the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, intrawell trend tests, in conjunction with KLI-SCS flow rates, will be utilized to assess whether a release has occurred from operation of the unit. The detection monitoring constituent concentrations will be analyzed using Mann-Kendall and Sen's Slope trend tests to determine if there is an upward trend that may indicate a release from the Karn Lined Impoundment. The data will be analyzed in the context of the Site hydrogeologic characteristics, and an assessment made as to whether the source of an upward trend, if identified, is from a possible release from the Karn Lined Impoundment, another on-site release, or on-site migration of nearby impact (i.e., former Karn Bottom Ash Pond).

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas™ Statistical Software (Sanitas™). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from May 2021 through March 2023 were analyzed using Mann-Kendall and Sen's Slope 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. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.

Data trends for detection monitoring constituents are generally stable (i.e., no trend) or declining for the majority of the monitoring well/constituent pairs with the following exceptions:

- The increasing trend in chloride and total dissolved solids concentrations continue to be observed in DEK-MW-15003.
- The increasing trend for pH continued to be observed in OW-11.

4.2 Detection Monitoring Data Discussion

Groundwater quality is generally consistent with previous monitoring events and the majority of the well/constituent pairs are exhibiting no trend or decreasing concentrations. Although increasing trends of detection monitoring (Appendix III) constituents exist, the groundwater conditions do not conclusively indicate a release from the unit, as discussed further in Section 4.3. The location of one of the identified liner damage locations was approximately 40-ft upgradient from monitoring well OW-12 and the second location was approximately 130-ft upgradient from monitoring well DEK-MW-18001. Both leaks have been repaired. Detection monitoring constituent concentrations at OW-12, located closest to the identified liner damage, exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The increasing trends at noted in section 4.1 will continue to be evaluated within context of changes in the site operational status.

4.3 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed in the Fourth Quarter 2022 Hydrogeological Monitoring Report (TRC, January 2023):

- pH in monitoring well OW-11; and
- Chloride and total dissolved solids in monitoring well DEK-MW-15003.

Although increasing trends of detection monitoring (Appendix III) constituents exist, as noted in Section 4.1, the groundwater conditions do not conclusively indicate a release from the unit for several reasons as detailed below.

Timing of Changes in Concentrations

Time-series plots included in Appendix F illustrate that the change in chloride and TDS at DEK-MW-15003 is likely a result of changes in the groundwater flow regime or redox conditions as a result of the Bottom Ash Pond closure activities, rather than a result of a release from the unit.

- Chloride and TDS at DEK-MW-15003 initially decreased after the Bottom Ash Pond closure activities. In early 2020, chloride concentrations began to increase, followed by increases in TDS beginning in 2021. Both constituents appear to be approaching the concentrations observed pre-construction. Chloride is one of the components of TDS. Other components of TDS, such as calcium, iron, magnesium, potassium, sodium, and sulfate have remained relatively consistent from 2020 to present and the increases in TDS are correlated with the increases in chloride. The slight increase in chloride began before the noted leak in the Karn Lined Impoundment liner system was observed; therefore, the recent increase in concentrations is not due to a release from the unit.

Groundwater Flow Direction

OW-11 and DEK-MW-15003 are not located downgradient of either area of the noted liner damage, due to the position of the wells relative to the groundwater elevation high point, as shown in Figure 3. Furthermore, OW-11 has distinct chemistry as compared to the KLI-SCS data as shown in Table 3. Boron, which can be used as a conservative tracer, is six times higher in OW-11 than what has been observed in the KLI-SCS samples. The pH observed at OW-11 is 2 standard units higher than what is observed in the KLI-SCS sample and higher than other nearby wells, which indicate a source other than the Karn Lined Impoundment is influencing chemistry at OW-11.

Leachate Chemistry

Analysis of the KLI-PCS and KLI-SCS data provide additional lines of evidence to support a source other than the unit is contributing to groundwater conditions.

- Arsenic concentrations are higher in groundwater than in the secondary collection system; therefore, arsenic present in groundwater does not appear to be a result of a release from the unit (Section 2.0).
- Vanadium is detected in the primary and secondary collection system and not in groundwater in the wells nearest the observed liner damage OW-12 or DEK-MW-18001 (<2 ug/L), providing additional evidence that a release has not adversely affected groundwater conditions.

5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in two wells in first quarter 2023, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the March 2023 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in fourth quarter 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored and recent data demonstrate that the daily average flow rate has been reduced to less than the threshold value of the Response Flow Rate of 25 gallons per acre per day after the documented repairs and response activities were completed in 2021. The second quarter monitoring event is scheduled for May 2023.

6.0 References

- AECOM. October 30, 2009. Potential Failure Mode Analysis (PFMA) Report. DE Karn Electric Generation Facility Ash Dike Risk Assessment Essexville, Michigan. Prepared for Consumers Energy Company.
- Consumers Energy. December 19, 2017. Hydrogeological Monitoring Plan, Rev. 3. DE Karn Solid Waste Disposal Area.
- Natural Resource Technology. September 2005. Phase II Groundwater Discharge Evaluation at the Consumers Energy DE Kam and JC Weadock Solid Waste Disposal Areas.
- TRC. January 2019. 2018 Annual Groundwater Report for the DE Karn Power Plant Bottom Ash Pond CCR Unit, Essexville, Michigan. Prepared for Consumers Energy Company.
- TRC. November 2020. Karn Lined Impoundment Hydrogeological Monitoring Plan for the DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.
- TRC. January 2023. Fourth Quarter 2022 Hydrogeological Monitoring Report for the DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. Prepared for Consumers Energy Company.
- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.
- USEPA. April 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301).
- USEPA. July 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435).

Tables

Table 1
 Summary of Groundwater Elevation Data
 DE Karn Lined Impoundment – 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)
DEK Bottom Ash Pond					
DEK-MW-15002	590.87	Sand	578.3 to 575.3	5.98	584.89
DEK-MW-15005	589.72	Sand	572.3 to 567.3	10.19	579.53
DEK-MW-15006	589.24	Sand	573.0 to 568.0	9.70	579.54
DEK Bottom Ash Pond & Karn Lined Impoundment					
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.72	584.75
Karn Lined Impoundment					
DEK-MW-15003	602.74	Sand	578.8 to 574.8	17.74	585.00
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.40	585.18
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	22.57	585.33
OW-12	603.10	Silty Sand	584.2 to 579.2	17.03	586.07
DEK Nature and Extent					
DEK-MW-15004	611.04	Sand	576.6 to 571.6	28.62	582.42
MW-01	597.02	Sand	573.0 to 570.0	17.65	579.37
MW-03	597.30	Sand	569.8 to 566.8	17.79	579.51
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	9.31	580.13
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.60	581.18
MW-10	596.97	Sand	582.5 to 572.5	16.96	580.01
MW-12	598.60	Sand	583.9 to 573.9	19.08	579.52
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	14.71	579.66
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	16.00	579.80
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.96	582.03
MW-23	595.57	Ash/Sand	576.9 to 571.9	14.60	580.97
DEK Static Water Level					
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	18.00	579.34
MW-04	598.01	NR	569.5 to 564.5	18.68	579.33
MW-17	597.91	Sand	577.0 to 574.0	13.10	584.81
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	26.20	583.02
MW-19	597.28	NR	572.1 to 567.1	17.19	580.09
MW-20	632.75	Sand	582.3 to 579.3	53.05	579.70
MW-21	632.91	Sand	587.1 to 584.1	51.55	581.36
OW-01	631.33	NR	572.5 to 567.5	51.58	579.75
OW-02	598.01	Fly Ash	579.4 to 576.4	15.85	582.16
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	17.55	580.39
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	10.60	579.61
OW-05	593.53	Sand	576.9 to 571.9	13.78	579.75
OW-06	603.95	NR	580.9 to 575.9	22.52	581.43
OW-07	596.41	Ash	583.3 to 580.3	15.52	580.89
OW-08	593.93	NR	581.0 to 576.0	10.86	583.07
OW-09	593.45	NR	585.5 to 580.5	10.23	583.22
OW-13	588.52	NR	579.5 to 574.5	3.36	585.16
OW-15	587.75	NR	572.8 to 567.8	2.36	585.39

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.

NR: Not Recorded

Table 2
 Summary of Field Parameters
 DE Karn Lined Impoundment – 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)
Karn Lined Impoundment							
DEK-MW-15003	3/8/2023	0.90	-146.5	7.97	442	16.3	2.3
DEK-MW-18001	3/7/2023	1.00	-133.5	7.67	697	10.3	2.9
KLI-PCS	3/8/2023	12.70	-36.8	8.30	504	5.9	20.6
KLI-SCS	3/9/2023	4.20	9.4	7.41	1,342	3.7	9.6
OW-10	3/8/2023	1.10	-134.8	7.26	865	10.2	7.9
OW-11	3/8/2023	1.90	-91.1	9.80	326	10.1	5.0
OW-12	3/8/2023	1.00	-116.3	7.17	711	11.8	4.3
SW-DITCH	3/8/2023	11.70	7.2	8.48	541	10.1	14.7

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 Lined Impoundment – Hydrogeological Monitoring Program
 Essexville, Michigan

		Sample Location:				DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	KLI-PCS	KLI-SCS	SW-DITCH
		Sample Date:				3/8/2023	3/7/2023	3/8/2023	3/8/2023	3/8/2023	3/8/2023	3/9/2023	3/8/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Upgradient	Downgradient		Upgradient	Downgradient	Supplemental		
Appendix III⁽¹⁾													
Boron	ug/L	NC	500	500	4,000	816	945	1,430	3,690	1,060	349	595	65
Calcium	mg/L	NC	NC	NC	500 ^{EE}	29.2	56.1	123	5.77	64.8	69	94.6	59.1
Chloride	mg/L	250**	250 ^E	250 ^E	50	58.7	63.7	74.4	59.5	59.7	79.4	52.6	74.8
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,900	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 ^E	250 ^E	500 ^{EE}	41.8	161	11.3	17.4	142	60.2	457	37.6
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	282	534	673	233	522	422	1,360	389
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	7.97	7.67	7.26	9.80	7.17	8.30	7.41	8.48
Appendix IV⁽¹⁾													
Antimony	ug/L	6	6.0	6.0	2.0	1	< 1	< 1	3	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	401	228	2	769	79	2	1	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	44	149	166	21	100	352	50	111
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	< 1	< 1	< 1	4	1	1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,900	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	21	20	31	< 10	33	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	23	8	< 5	158	13	13	8	< 5
Selenium	ug/L	50	50	50	5.0	1	< 1	1	3	< 1	1	3	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 115⁽²⁾													
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	178	1,060	3,590	86	4,950	1,090	2,320	790
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1	< 1	2	< 1	< 1	4	2	4
Nickel	ug/L	NC	100	100	120	3	< 2	< 2	2	2	4	4	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	3	1,020	< 2	17	3	5
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 10	13	< 10	< 10	12	< 10

Notes:

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

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

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

NC - no criteria; -- - not analyzed.

* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020.

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

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO₃/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote (G) of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote (H). GSI criterion is protective for surface water used as a drinking water source as described in footnote (X). GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote (FF)

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

^E - Criterion is the aesthetic drinking water value per footnote (E).

^{EE} - Criterion is based on the total dissolved solids GSI value per footnote (EE).

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

Table 4
 Summary of Statistical Exceedances – March 2023
 DE Karn Lined Impoundment – 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: Karn Lined Impoundment – WDS# 392503

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								

Figures

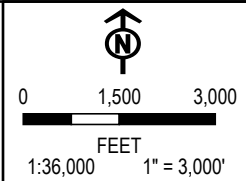
COORDINATE SYSTEM: NAD 1983 STATEPLANE MICHIGAN SOUTH FIPS 2113 FEET; MAP ROTATION: 0
 - SAVED BY: ADAIR ON 4/21/2023, 09:04:16 AM; FILE PATH: T:\1-PROJECTS\CONSUMERS_ENERG\464095_DEKARN\APPX: LAYOUT NAME: 514404-TOPO-001-202301



JC WEADOCK
POWER PLANT

DE KARN
POWER PLANT

JC WEADOCK
SOLID WASTE DISPOSAL
AREA



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

TITLE: **SITE LOCATION MAP**

DRAWN BY:	A. ADAIR	PROJ. NO.:	514404.0001
CHECKED BY:	J. KRENZ	FIGURE 1	
APPROVED BY:	D. LITZ		
DATE:	APRIL 2023		



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

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

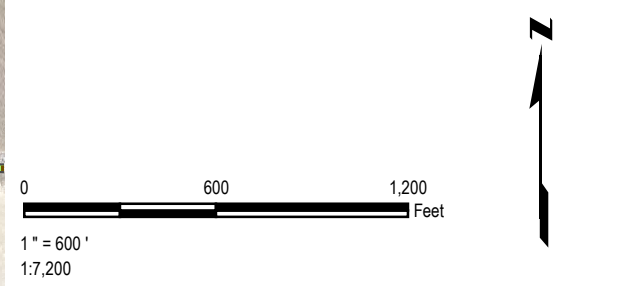
FILE: 464095_DEKARN



LEGEND

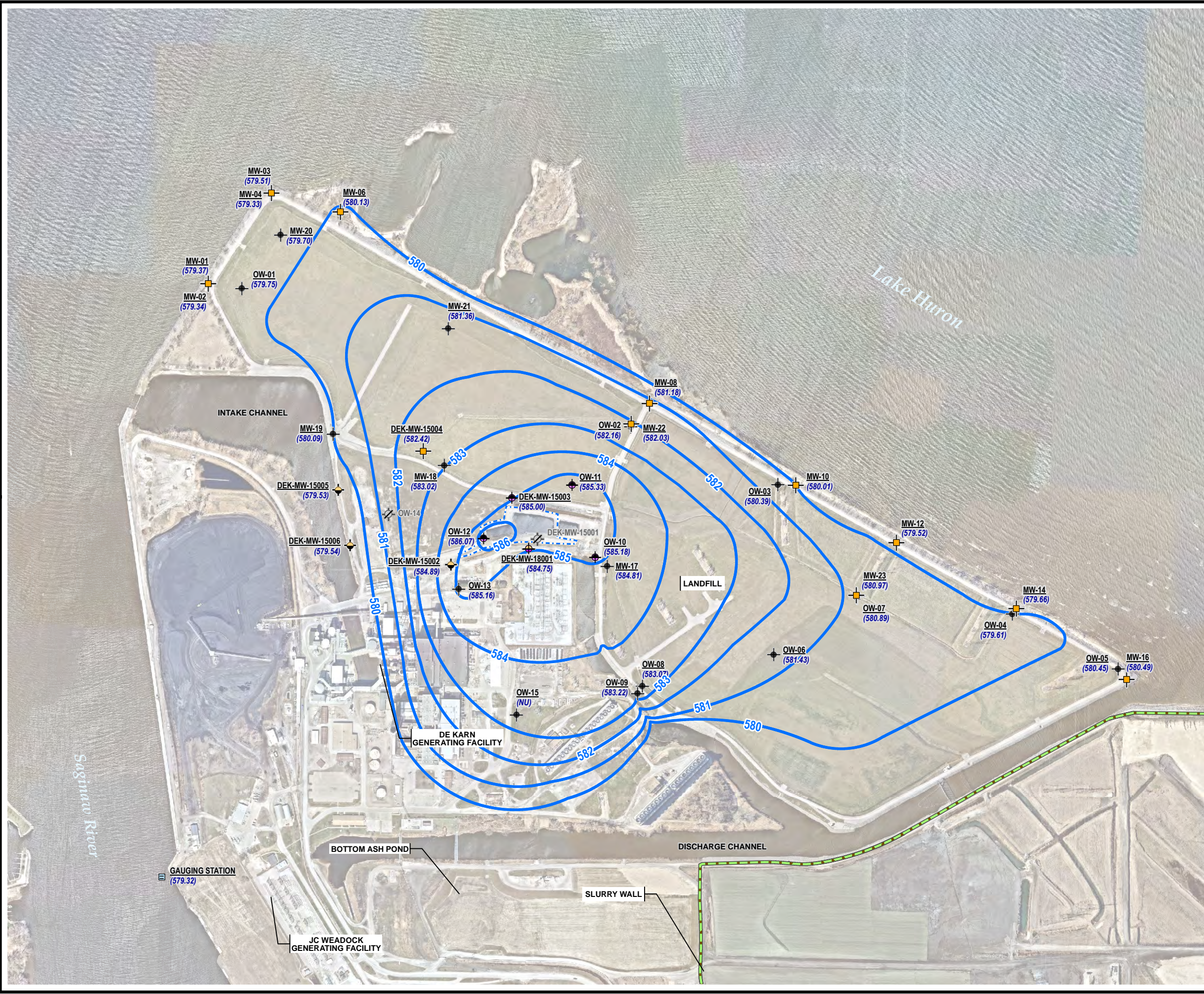
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- PRIMARY CONTAINMENT SYSTEM SAMPLE (KLI-PCS)
- SURFACE WATER SAMPLE (SW-DITCH)
- SECONDARY CONTAINMENT SUMP (KLI-SCS)
- SLURRY WALL (APPROXIMATE)
- EXTENT OF GEOSYNTHETICS

- ### NOTES
- BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
 - WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 - NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 - A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02, MW-03/MW-04, OW-02/MW-22, AND OW-07/MW-23 AS THE WELLS ARE LOCATED WITHIN 15-FT OF EACH OTHER.



PROJECT:	
CONSUMERS ENERGY COMPANY DE KARN AND JC WEADOCK POWER PLANTS ESSEXVILLE, MICHIGAN	
TITLE:	
SITE LAYOUT MAP	
DRAWN BY: A. ADAIR	PROJ NO.: 464095.0001
CHECKED BY: J. KRENZ	FIGURE 2
APPROVED BY: D. LITZ	
DATE: APRIL 2023	
1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com	
FILE NO.: 514404-SLM-002-2023Q1.mxd	

Plot Date: 4/26/2023 08:39:10 AM by ADAIR -- LAYOUT: ANSIB(11"x17")
 Path: T:\1-PROJECTS\Consumers Energy\464095 DEKARN2-APRX\514404-SGW-003-2023Q1.mxd
 Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
 Map Rotation: 0
 TRC - GIS




LEGEND

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- SLURRY WALL (APPROXIMATE)
- LINED IMPOUNDMENT (COVENANT BOUNDARY)
- (580.50) GROUNDWATER ELEVATION
- (NU) NOT USED

- ### NOTES
- BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
 - WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 - NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 - GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



PROJECT:		CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE:		SHALLOW GROUNDWATER CONTOUR MAP MARCH 2023	
DRAWN BY:	A. ADAIR	PROJ NO.:	514404.0001
CHECKED BY:	J. KRENZ	FIGURE 3	
APPROVED BY:	D. LITZ		
DATE:	APRIL 2023		



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

FILE NO: 514404-SGW-003-2023Q1.mxd

Appendix A

Laboratory Analytical Reports

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 24, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. 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: 23-0168

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment 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 03/08/2023.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q1-2023 DEK Bottom Ash Pond & Lined Impoundment
Date Received: 3/8/2023
Chemistry Project: 23-0168

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0168-01	DEK-MW-18001	Groundwater	03/07/2023 13:59	DEK Bottom Ash Pond & Lined Impoundment
23-0168-02	DEK-MW-18001 MS	Groundwater	03/07/2023 13:59	DEK Bottom Ash Pond & Lined Impoundment
23-0168-03	DEK-MW-18001 MSD	Groundwater	03/07/2023 13:59	DEK Bottom Ash Pond & Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0168-01
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

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

Aliquot #: 23-0168-01-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	228		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	149		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	945		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	56100		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	1060		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	20		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	10700		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	155		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	8		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	5490		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	107000		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0168-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0168-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/08/2023	AB23-0309-01
Nitrite	ND		ug/L	100.0	03/08/2023	AB23-0309-01

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

Aliquot #: 23-0168-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	63700		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0168-01
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0168-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	161000		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0168-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	2000		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0168-01-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	534		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0168-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	183000		ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Bicarbonate	183000		ug/L	10000.0	03/13/2023	AB23-0313-09
Alkalinity Carbonate	ND		ug/L	10000.0	03/13/2023	AB23-0313-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0168-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/11/2023	AB23-0310-10

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0168-02
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

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

Aliquot #: 23-0168-02-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	104		%	1.0	03/13/2023	AB23-0313-11
Arsenic	96		%	1.0	03/13/2023	AB23-0313-11
Barium	102		%	5.0	03/13/2023	AB23-0313-11
Beryllium	100		%	1.0	03/13/2023	AB23-0313-11
Boron	117		%	20.0	03/13/2023	AB23-0313-11
Cadmium	104		%	0.2	03/13/2023	AB23-0313-11
Calcium	97.8		%	1000.0	03/13/2023	AB23-0313-11
Chromium	98		%	1.0	03/13/2023	AB23-0313-11
Cobalt	99		%	6.0	03/13/2023	AB23-0313-11
Copper	95		%	1.0	03/13/2023	AB23-0313-11
Iron	114		%	20.0	03/13/2023	AB23-0313-11
Lead	96		%	1.0	03/13/2023	AB23-0313-11
Lithium	100		%	10.0	03/13/2023	AB23-0313-11
Magnesium	105		%	1000.0	03/13/2023	AB23-0313-11
Manganese	107		%	5.0	03/13/2023	AB23-0313-11
Molybdenum	110		%	5.0	03/13/2023	AB23-0313-11
Nickel	97		%	2.0	03/13/2023	AB23-0313-11
Potassium	103		%	100.0	03/13/2023	AB23-0313-11
Selenium	101		%	1.0	03/13/2023	AB23-0313-11
Silver	93.4		%	0.2	03/13/2023	AB23-0313-11
Sodium	104		%	1000.0	03/13/2023	AB23-0313-11
Thallium	94		%	2.0	03/13/2023	AB23-0313-11
Vanadium	102		%	2.0	03/13/2023	AB23-0313-11
Zinc	98		%	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0168-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	110		%	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0168-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	95		%	100.0	03/08/2023	AB23-0309-01
Nitrite	89		%	100.0	03/08/2023	AB23-0309-01

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

Aliquot #: 23-0168-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106		%	1000.0	03/13/2023	AB23-0313-02

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0168-02
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0168-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	96		%	1000.0	03/13/2023	AB23-0313-02
Sulfate	106		%	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0168-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	93		%	25.0	03/14/2023	AB23-0314-06

Alkalinity by SM 2320B Aliquot #: 23-0168-02-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	97.5		%	10000.0	03/13/2023	AB23-0313-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0168-02-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	03/11/2023	AB23-0310-10

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0168-03
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

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

Aliquot #: 23-0168-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	106		%	1.0	03/13/2023	AB23-0313-11
Arsenic	94		%	1.0	03/13/2023	AB23-0313-11
Barium	104		%	5.0	03/13/2023	AB23-0313-11
Beryllium	98		%	1.0	03/13/2023	AB23-0313-11
Boron	116		%	20.0	03/13/2023	AB23-0313-11
Cadmium	106		%	0.2	03/13/2023	AB23-0313-11
Calcium	99.0		%	1000.0	03/13/2023	AB23-0313-11
Chromium	98		%	1.0	03/13/2023	AB23-0313-11
Cobalt	98		%	6.0	03/13/2023	AB23-0313-11
Copper	92		%	1.0	03/13/2023	AB23-0313-11
Iron	103		%	20.0	03/13/2023	AB23-0313-11
Lead	97		%	1.0	03/13/2023	AB23-0313-11
Lithium	98		%	10.0	03/13/2023	AB23-0313-11
Magnesium	108		%	1000.0	03/13/2023	AB23-0313-11
Manganese	100		%	5.0	03/13/2023	AB23-0313-11
Molybdenum	110		%	5.0	03/13/2023	AB23-0313-11
Nickel	94		%	2.0	03/13/2023	AB23-0313-11
Potassium	107		%	100.0	03/13/2023	AB23-0313-11
Selenium	100		%	1.0	03/13/2023	AB23-0313-11
Silver	95.4		%	0.2	03/13/2023	AB23-0313-11
Sodium	112		%	1000.0	03/13/2023	AB23-0313-11
Thallium	93		%	2.0	03/13/2023	AB23-0313-11
Vanadium	100		%	2.0	03/13/2023	AB23-0313-11
Zinc	94		%	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0168-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	108		%	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0168-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	95		%	100.0	03/08/2023	AB23-0309-01
Nitrite	89		%	100.0	03/08/2023	AB23-0309-01

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

Aliquot #: 23-0168-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	103		%	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0168-03
 Matrix: Groundwater

Laboratory Project: **23-0168**
 Collect Date: 03/07/2023
 Collect Time: 01:59 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0168-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	95		%	1000.0	03/13/2023	AB23-0313-02
Sulfate	108		%	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0168-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	94		%	25.0	03/14/2023	AB23-0314-06

Alkalinity by SM 2320B Aliquot #: 23-0168-03-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	97.1		%	10000.0	03/13/2023	AB23-0313-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0168-03-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	03/11/2023	AB23-0310-10



Analytical Report

Report Date: 03/24/23

Laboratory Services
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Data Qualifiers	Exception Summary
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No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-016E

Inspection Date: 3-8-23

Inspection By: CLE

Sample Origin/Project Name: Q1-2023 DEK BAP + LI (Shipped w/ 23-016E)

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: 395460652639 Shipping Form Attached: Yes No _____

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 1.2 - 3.1 °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 <u>60mL</u>)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>12</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
250 500 mL (plastic)	<u>1</u>	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 24, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 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: 23-0169

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment 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 and 03/10/2023.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted in 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; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q1-2023 DEK Lined Impoundment
Date Received: 3/09/2023 and 3/10/2023
Chemistry Project: 23-0169

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0169-01	DEK-MW-15003	Groundwater	03/08/2023 12:25	DEK Lined Impoundment
23-0169-02	OW-10	Groundwater	03/08/2023 11:15	DEK Lined Impoundment
23-0169-03	OW-11	Groundwater	03/08/2023 13:20	DEK Lined Impoundment
23-0169-04	OW-12	Groundwater	03/08/2023 09:40	DEK Lined Impoundment
23-0169-05	KLI-SCS	Groundwater	03/09/2023 08:40	DEK Lined Impoundment
23-0169-06	KLI-PCS	Groundwater	03/08/2023 10:05	DEK Lined Impoundment
23-0169-07	SW-DITCH	Groundwater	03/08/2023 13:50	DEK Lined Impoundment
23-0169-08	DUP-KLI	Groundwater	03/08/2023 00:00	DEK Lined Impoundment
23-0169-09	EB-KLI	Water	03/08/2023 14:10	DEK Lined Impoundment
23-0169-10	FB-KLI	Water	03/08/2023 12:25	DEK Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0169-01
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 12:25 PM

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

Aliquot #: 23-0169-01-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	1		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	401		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	44		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	816		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	29200		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	178		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	21		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	4840		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	79		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	23		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	3		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	4030		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	1		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	55300		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	58700		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0169-01
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 12:25 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	41800		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	2150		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-01-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	282		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	96500		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Bicarbonate	96500		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0313-10

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	240		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0169-02
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 11:15 AM

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

Aliquot #: 23-0169-02-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	2		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	166		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	1430		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	123000		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	2		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	3590		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	31		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	23900		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	512		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	5620		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	1		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	71100		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	3		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	74400		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0169-02
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 11:15 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	11300		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3950		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-02-C04-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

Alkalinity by SM 2320B Aliquot #: 23-0169-02-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	499000		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Bicarbonate	499000		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0313-10

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-02-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	140		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0169-03
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 01:20 PM

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

Aliquot #: 23-0169-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	3		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	769		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	21		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	3690		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	5770		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	86		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	158		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	2		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	3470		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	3		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	65400		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	1020		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	13		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	221		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	59500		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0169-03
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 01:20 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	2900		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	17400		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	14000		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-03-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	233		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-03-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	92000		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Bicarbonate	16600		ug/L	10000.0	03/14/2023	AB23-0313-10
Alkalinity Carbonate	75400		ug/L	10000.0	03/14/2023	AB23-0313-10

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-03-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0169-04
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 09:40 AM

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

Aliquot #: 23-0169-04-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	79		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	100		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	1060		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	64800		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	4950		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	33		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	26600		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	121		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	13		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	2		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	5740		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	61300		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-04-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-04-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-04-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	59700		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0169-04
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 09:40 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-04-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	142000		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-04-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	918		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-04-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	522		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-04-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	208000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Bicarbonate	208000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0314-04

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-04-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0169-05
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/09/2023
 Collect Time: 08:40 AM

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

Aliquot #: 23-0169-05-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	1		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	50		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	595		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	94600		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	1		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	2		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	2320		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	38000		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	84		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	8		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	4		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	3230		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	3		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	351000		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	3		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	12		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-05-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-05-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	1320		ug/L	100.0	03/10/2023	AB23-0310-13
Nitrite	ND		ug/L	100.0	03/10/2023	AB23-0310-13

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

Aliquot #: 23-0169-05-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	52600		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0169-05
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/09/2023
 Collect Time: 08:40 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-05-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	457000		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-05-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-05-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1360		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-05-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	592000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Bicarbonate	592000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0314-04

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-05-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0169-06
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 10:05 AM

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

Aliquot #: 23-0169-06-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	2		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	352		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	349		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	69000		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	4		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	4		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	1090		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	18600		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	11		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	13		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	4		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	2790		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	1		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	46200		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	17		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-06-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-05

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-06-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	3830		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-06-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	79400		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0169-06
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 10:05 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-06-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	60200		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-06-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	139		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-06-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	422		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-06-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	185000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Bicarbonate	182000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0314-04

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-06-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa Aliquot #: 23-0169-06-C08-A01 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Arsenic	1		ug/L	1.0	03/13/2023	AB23-0313-12
Barium	213		ug/L	5.0	03/13/2023	AB23-0313-12
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Boron	378		ug/L	20.0	03/13/2023	AB23-0313-12
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-12
Calcium	65000		ug/L	1000.0	03/21/2023	AB23-0313-12
Chromium	4		ug/L	1.0	03/13/2023	AB23-0313-12
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-12
Copper	2		ug/L	1.0	03/13/2023	AB23-0313-12
Iron	ND		ug/L	20.0	03/13/2023	AB23-0313-12
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-12
Magnesium	18900		ug/L	1000.0	03/21/2023	AB23-0313-12



Analytical Report

Report Date: 03/24/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **KLI-PCS**
Lab Sample ID: 23-0169-06
Matrix: Groundwater

Laboratory Project: **23-0169**
Collect Date: 03/08/2023
Collect Time: 10:05 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa

Aliquot #: 23-0169-06-C08-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Manganese	ND		ug/L	5.0	03/13/2023	AB23-0313-12
Molybdenum	12		ug/L	5.0	03/13/2023	AB23-0313-12
Nickel	3		ug/L	2.0	03/13/2023	AB23-0313-12
Potassium	3110		ug/L	100.0	03/21/2023	AB23-0313-12
Selenium	2		ug/L	1.0	03/13/2023	AB23-0313-12
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-12
Sodium	47800		ug/L	1000.0	03/21/2023	AB23-0313-12
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-12
Vanadium	12		ug/L	2.0	03/13/2023	AB23-0313-12
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-12

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0169-07
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 01:50 PM

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

Aliquot #: 23-0169-07-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	111		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	65		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	59100		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	1		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	4		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	790		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	18600		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	20		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	3		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	2550		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	45200		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	5		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-07-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-05

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-07-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	4100		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-07-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	74800		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0169-07
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 01:50 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-07-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	37600		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-07-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	113		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-07-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	389		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-07-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	182000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Bicarbonate	182000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0314-04

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-07-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa Aliquot #: 23-0169-07-C08-A01 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Arsenic	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Barium	85		ug/L	5.0	03/13/2023	AB23-0313-12
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Boron	64		ug/L	20.0	03/13/2023	AB23-0313-12
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-12
Calcium	58400		ug/L	1000.0	03/21/2023	AB23-0313-12
Chromium	1		ug/L	1.0	03/13/2023	AB23-0313-12
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-12
Copper	3		ug/L	1.0	03/13/2023	AB23-0313-12
Iron	54		ug/L	20.0	03/13/2023	AB23-0313-12
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-12
Magnesium	19400		ug/L	1000.0	03/21/2023	AB23-0313-12



Analytical Report

Report Date: 03/24/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **SW-DITCH**
Lab Sample ID: 23-0169-07
Matrix: Groundwater

Laboratory Project: **23-0169**
Collect Date: 03/08/2023
Collect Time: 01:50 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa

Aliquot #: 23-0169-07-C08-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Manganese	8		ug/L	5.0	03/13/2023	AB23-0313-12
Molybdenum	ND		ug/L	5.0	03/13/2023	AB23-0313-12
Nickel	3		ug/L	2.0	03/13/2023	AB23-0313-12
Potassium	2720		ug/L	100.0	03/21/2023	AB23-0313-12
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-12
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-12
Sodium	44400		ug/L	1000.0	03/21/2023	AB23-0313-12
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-12
Vanadium	3		ug/L	2.0	03/13/2023	AB23-0313-12
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-12

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0169-08
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 12:00 AM

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

Aliquot #: 23-0169-08-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	78		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	102		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	1060		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	66000		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	4950		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	32		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	26900		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	124		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	13		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	2		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	5990		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	62600		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-08-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-05

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-08-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

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

Aliquot #: 23-0169-08-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	60000		ug/L	1000.0	03/13/2023	AB23-0313-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0169-08
 Matrix: Groundwater

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 12:00 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0169-08-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	03/13/2023	AB23-0313-02
Sulfate	140000		ug/L	1000.0	03/13/2023	AB23-0313-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0169-08-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	931		ug/L	25.0	03/14/2023	AB23-0314-06

Total Dissolved Solids by SM 2540C Aliquot #: 23-0169-08-C04-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	518		mg/L	10.0	03/10/2023	AB23-0310-05

Alkalinity by SM 2320B Aliquot #: 23-0169-08-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	209000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Bicarbonate	209000		ug/L	10000.0	03/14/2023	AB23-0314-04
Alkalinity Carbonate	ND		ug/L	10000.0	03/14/2023	AB23-0314-04

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0169-08-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **EB-KLI**
 Lab Sample ID: 23-0169-09
 Matrix: Water

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 02:10 PM

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

Aliquot #: 23-0169-09-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	ND		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	ND		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	ND		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-09-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-05

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-09-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0169-09-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	03/14/2023	AB23-0314-06



Analytical Report

Report Date: 03/24/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **EB-KLI**
Lab Sample ID: 23-0169-09
Matrix: Water

Laboratory Project: **23-0169**
Collect Date: 03/08/2023
Collect Time: 02:10 PM

Sulfide, Total by SM 4500 S2D **Aliquot #: 23-0169-09-C04-A01** **Analyst: Merit**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **FB-KLI**
 Lab Sample ID: 23-0169-10
 Matrix: Water

Laboratory Project: **23-0169**
 Collect Date: 03/08/2023
 Collect Time: 12:25 PM

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

Aliquot #: 23-0169-10-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Arsenic	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Barium	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Beryllium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Boron	ND		ug/L	20.0	03/13/2023	AB23-0313-11
Cadmium	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Calcium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Chromium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Cobalt	ND		ug/L	6.0	03/13/2023	AB23-0313-11
Copper	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Iron	ND		ug/L	20.0	03/13/2023	AB23-0313-11
Lead	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Lithium	ND		ug/L	10.0	03/13/2023	AB23-0313-11
Magnesium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Manganese	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Molybdenum	ND		ug/L	5.0	03/13/2023	AB23-0313-11
Nickel	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Potassium	ND		ug/L	100.0	03/13/2023	AB23-0313-11
Selenium	ND		ug/L	1.0	03/13/2023	AB23-0313-11
Silver	ND		ug/L	0.2	03/13/2023	AB23-0313-11
Sodium	ND		ug/L	1000.0	03/13/2023	AB23-0313-11
Thallium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Vanadium	ND		ug/L	2.0	03/13/2023	AB23-0313-11
Zinc	ND		ug/L	10.0	03/13/2023	AB23-0313-11

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0169-10-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/15/2023	AB23-0315-05

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0169-10-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	03/09/2023	AB23-0310-01
Nitrite	ND		ug/L	100.0	03/09/2023	AB23-0310-01

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0169-10-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	03/14/2023	AB23-0314-06



Analytical Report

Report Date: 03/24/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **FB-KLI**
Lab Sample ID: 23-0169-10
Matrix: Water

Laboratory Project: **23-0169**
Collect Date: 03/08/2023
Collect Time: 12:25 PM

Sulfide, Total by SM 4500 S2D

Aliquot #: 23-0169-10-C04-A01

Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	03/13/2023	AB23-0310-11

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0169

Inspection Date: 3-9-23 Inspection By: TWR

Sample Origin/Project Name: Q1-2023 DGR Lined Impoundment

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: 3955 1052 3340 Shipping Form Attached: Yes _____ No _____

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 1.1-3.2 °C Samples Received on Ice: Yes No _____

M&TE # and Expiration L8027723 / 05-25-23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	<u>14</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>38</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other <u>250 mL plastic</u>	<u>7</u>	_____	_____	_____	_____

pH paper
Lot # 2135150
5-15-23

Lot # 270320
10-30-23

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page 1 of 1

SAMPLING SITE / CUSTOMER: Q1-2023 DEK Lined Impoundment			PROJECT NUMBER: 23-0169			SAP CC or WO#: REQUESTER: Harold Register			ANALYSIS REQUESTED (Attach List if More Space is Needed)							QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____						
SAMPLING TEAM: <i>TRC</i>			TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____																			
SEND REPORT TO: Caleb Batts		email:		phone:									<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____									
COPY TO: Harold Register		MATRIX CODES:		CONTAINERS																		
TRC		GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste		PRESERVATIVE																		
LAB SAMPLE ID	SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION			TOTAL #								REMARKS							
	DATE	TIME						None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other		Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	<i>Dissolved Metals</i>
23-0169-01	<i>3-8-23</i>	<i>1225</i>	GW	DEK-MW-15003			7	4	1	1	1											
-02		<i>1115</i>	GW	OW-10			7	4	1	1	1											
-03		<i>1320</i>	GW	OW-11			7	4	1	1	1											
-04		<i>0940</i>	GW	OW-12			7	4	1	1	1											
-05			W	KLI-SCS			7	4	1	1	1											
-06		<i>1005</i>	SW	KLI-PCS			7	4	1	1	1											<i>X</i>
-07		<i>1350</i>	SW	SW-DITCH			7	4	1	1	1											<i>X</i>
-08		<i>—</i>	GW	DUP-KLI			7	4	1	1	1											
-09		<i>1410</i>	W	EB-KLI			4	1	1	1	1											
-10		<i>1225</i>	W	FB-KLI			4	1	1	1	1											

RELINQUISHED BY: <i>AL Ky</i>		DATE/TIME: <i>3-8-23/1545</i>		RECEIVED BY: <i>FedEx</i>		COMMENTS: Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>LS 027723</u> Temperature: <u>1.1 - 3.2</u> °C Cal. Due Date: <u>05-25-23</u>					
RELINQUISHED BY: <i>Fed Ex</i>		DATE/TIME: <i>03-09-23 12:05 PM</i>		RECEIVED BY: <i>J</i>							

TITLE: SAMPLE LOG-IN -- SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0169-05

Inspection Date: 03.10.23

Inspection By: UE

Sample Origin/Project Name: DEK LI

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 11 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 LS023723

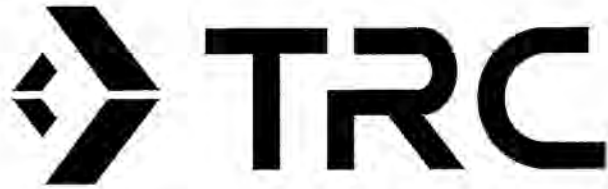
5.25.23

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or <u>60mL</u>)	<u>2</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>4</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
150 100 mL (plastic)	<u>1</u>	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

Appendix B

Field Notes



PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance

PROJECT NUMBER: 514404.0001.0000

PROJECT MANAGER: Darby Litz

SITE LOCATION: 2742 Weadock Hwy
Essexville, MI 48732

DATES OF FIELDWORK: 3/6/23 TO 3/9/23
2/27/2023 TO 3/3/2023

PURPOSE OF FIELDWORK: First Quarter Supplemental Sampling Event

WORK PERFORMED BY: Jake Krenz, Javier Jasso, Andrew Whaley

[Signature] 3-10-23
SIGNED DATE

[Signature] 3-15-23
CHECKED BY DATE



GENERAL NOTES

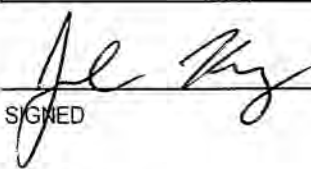
PROJECT NAME: CEC Kam LF: 2023 GW Complan	DATE: 3-6-23	TIME ARRIVED: 0800
PROJECT NUMBER: 514404.0000.0000	AUTHOR: J. Krenz	TIME LEFT: 1600

WEATHER		
TEMPERATURE: 30 °F	WIND: 5-10 MPH	VISIBILITY: cloudy / Snowy
WORK / SAMPLING PERFORMED		
met with Caleb for site safety training		
Assessed Transect location conditions		
Sampled wells MW-01, MW-03, MW-06, MW-08		

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


 3-15-23
 CHECKED BY _____ DATE



GENERAL NOTES

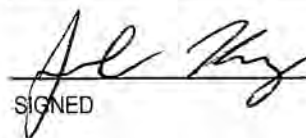
PROJECT NAME: CEC Kam LF: 2023 GW Complan	DATE: 3-7-23	TIME ARRIVED: 0730
PROJECT NUMBER: 514404.0000.0000	AUTHOR: J. Krenz	TIME LEFT: 1500

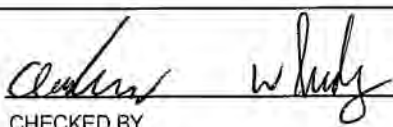
WEATHER		
TEMPERATURE: 40 °F	WIND: 5-10 MPH	VISIBILITY: clear
WORK / SAMPLING PERFORMED		
Sampled wells MW-10, MW-12, MW-14, and MW-16		
Sampled BAP/LI wells, on DEK-MW-15005, DEK-MW-15006, DEK-MW-18001		
Shipped samples collected on 3/6/23 and 3/7/23		

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 _____

 3-15-23
 CHECKED BY _____ DATE _____



GENERAL NOTES

PROJECT NAME: CEC Kam LF: 2023 GW Complan	DATE: 3-8-23	TIME ARRIVED: 0730
PROJECT NUMBER: 514404.0000.0000	AUTHOR: Ji Krenz	TIME LEFT: 1530

WEATHER		
TEMPERATURE: 42 °F	WIND: 5-10 MPH	VISIBILITY: clear
WORK / SAMPLING PERFORMED		
Sampled wells DEK-MW-15002, OW-12, OW-10, OW-11, DEK-MW-15003, MW-18,		
collected surface water samples KLI-PCS, SW-Ditch		
shipped samples		

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 *Al Ryz* DATE 3-13-23

CHECKED BY *Quinn Whaley* DATE 3-15-23



GENERAL NOTES

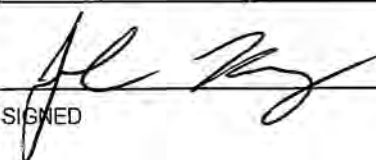
PROJECT NAME:	CEC Kam BAP/LI: 2023 GW Comp	DATE:	3-9-23	TIME ARRIVED:	0730
PROJECT NUMBER:	514404.0001.0000	AUTHOR:	ake Krenz Javier Jasso	TIME LEFT:	1000

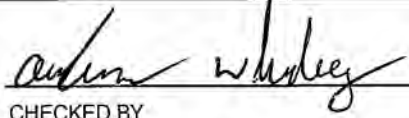
WEATHER		
TEMPERATURE:	38 °F	WIND: 5-10 MPH
		VISIBILITY: Clear
WORK / SAMPLING PERFORMED		
Sampled MW-19, Sampled KLI-SC5		
checked out areas for stilling wells for transducer study.		

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	Purge to Ground


 3-19-23
 SIGNED DATE


 3-15-23
 CHECKED BY DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn LF; 2023 GW Compliance	MODEL: YSI Pro DSS	SAMPLER: AW, JJ <u>(JK)</u>
PROJECT NO.: 514404.0000.0000	SERIAL #: Ann Arbor	DATE: 3-6-23

PH CALIBRATION CHECK

pH 7 (LOT #): 2GI834 (EXP. DATE): Sep/24	pH 4 / 10 (LOT #): 2GI306 (EXP. DATE): Sep/24	CAL RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.02 / 7.02	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	0933
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING (LOT #): 2GK498 (EXP. DATE): Nov/23	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
1413 / 1413	22.1	<input checked="" type="checkbox"/> WITHIN RANGE	0930
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 22G100076 (EXP. DATE): Sept/23	TEMPERATURE (*CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
228.1 / 228.9	21.2	<input type="checkbox"/> WITHIN RANGE	0936
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING (SATURATED AIR)			
8.65 / 8.65	20.1	<input checked="" type="checkbox"/> WITHIN RANGE	0941
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): A2172 (EXP. DATE): 6/24	(LOT #): <u>ATK</u> (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
10.1 / 10.0	/	<input type="checkbox"/> WITHIN RANGE	0946
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
	⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

<div style="border-bottom: 1px solid black; width: 100%;"></div>
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PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

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SIGNED: fl Ky 3-13-23
DATE

CHECKED BY: Andrew W. Kelly 3-15-23
DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	MODEL: YSI Pro Dss	SAMPLER: AW, (JK, JJ)
PROJECT NO.: 514404.0001.0000	SERIAL #: Ann Arbor	DATE: 3-8-23

PH CALIBRATION CHECK

pH 7 (LOT #): 26i 874 (EXP. DATE): Sep/24	pH 4 / 10 (LOT #): 26i 306 (EXP. DATE): Sep/24	CAL RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.00 / 7.00	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	0628
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 26K 498 (EXP. DATE): NOV/27	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
1413 / 1413	22.8	<input checked="" type="checkbox"/> WITHIN RANGE	0620
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 226t00076 (EXP. DATE): Sep/23	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
222.1 / 222.1	22.1	<input checked="" type="checkbox"/> WITHIN RANGE	0628
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / SATURATED AIR			
8.62 / 8.62	22.0	<input checked="" type="checkbox"/> WITHIN RANGE	0633
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): A2172 (EXP. DATE): Sep/23	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
10.1 / 10.0	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED: Jul Ky 3-13-23 DATE

CHECKED BY: cedric whaley 3-15-23 DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Kam LF; 2023 GW Compliance	MODEL: YSI Pro DSS	SAMPLER: AW, JJ (JK)
PROJECT NO.: 514404.0000.0000	SERIAL #: Ann Arbor	DATE: 3-9-23

PH CALIBRATION CHECK

pH 7 (LOT #): 26I 874 (EXP. DATE): Sep 124	pH 4 / 10 (LOT #): 26I 306 (EXP. DATE): Sep 124	CAL RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.00 / 7.00	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	0645
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING (LOT #): 26K 498 (EXP. DATE): Nov 123	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
1413 / 1413	22.1	<input checked="" type="checkbox"/> WITHIN RANGE	0641
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL READING (LOT #): 226100076 (EXP. DATE): Sep 123	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
226.7 / 226.7	22.4	<input checked="" type="checkbox"/> WITHIN RANGE	0647
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / SATURATED AIR			
8.57 / 8.57	22.7	<input type="checkbox"/> WITHIN RANGE	0650
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): A2172 (EXP. DATE): Sep 123	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
10.2 / 10.0	/	<input checked="" type="checkbox"/> WITHIN RANGE	0650
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #): (EXP. DATE):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED

JL My

3-17-23
DATE

CHECKED BY

Clem Whaley

3-15-23
DATE



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: AW, <u>AKJJ</u>	DATE: <u>3-7-23</u>	BY: <u>AW</u>	DATE: <u>3-15-23</u>
SAMPLE ID: <u>DEK-MW-15005</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>1126</u>	DATE: <u>3-7-23</u>	SAMPLE	TIME: <u>1208</u>	DATE: <u>3-7-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: <u>7.59</u> SU		CONDUCTIVITY: <u>961</u> umhos/cm	
		ORP: <u>-127.7</u> mV		DO: <u>1.0</u> mg/L	
DEPTH TO WATER: <u>10.02</u> T/ PVC		TURBIDITY: <u>1.79</u> NTU			
DEPTH TO BOTTOM: <u>22.27</u> T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>10.2</u> °C		OTHER: _____	
VOLUME REMOVED: <u>8</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>clear</u>		ODOR: <u>none</u>	
COLOR: <u>clear</u>		ODOR: <u>none</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: _____		FILTRATE ODOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:			

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)
1128	200	7.88	956	-10.4	4.3	2.09	9.1	10.29	INITIAL
1133	200	7.72	939	-31.7	1.6	1.96	9.8	10.29	1
1138	200	7.66	972	-64.3	1.3	1.85	10.0	10.29	2
1143	200	7.63	979	-91.0	1.2	1.82	10.0	10.29	3
1148	200	7.61	970	-105.3	1.1	1.83	10.1	10.29	4
1153	200	7.60	966	-113.7	1.0	1.85	10.2	10.29	5
1158	200	7.59	959	-120.6	1.0	1.74	10.1	10.29	6
1203	200	7.59	957	-125.5	1.0	1.82	10.1	10.29	7
1208	200	7.59 7.59	961	-127.7	1.0	1.79	10.2	10.29	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	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	V0A	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	125mL	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125mL	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125mL	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-7-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>BJ</u>	DATE: <u>3-7-23</u>
	BY: <u>AW</u>	DATE: <u>3-15-23</u>

SAMPLE ID: <u>DEK-MW-15006</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1227</u>	DATE: <u>3-7-23</u>	SAMPLE	TIME: <u>1310</u>	DATE: <u>3-7-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.68</u> SU	CONDUCTIVITY: <u>953</u> umhos/cm	ORP: <u>-145.6</u> mV	DO: <u>0.9</u> mg/L	
DEPTH TO WATER: <u>9.43</u> T/ PVC	TURBIDITY: <u>1.81</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>21.50</u> T/ PVC	TEMPERATURE: <u>10.8</u> °C	OTHER: _____			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>	ODOR: <u>none</u>			
VOLUME REMOVED: <u>2</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____ FILTRATE ODOR: _____			
COLOR: <u>clear</u> ODOR: <u>none</u>	TURBIDITY <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	COMMENTS: <u>FB - DEK - BAP collected</u>				

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1230	200	7.92	864	-47.4	2.1	3.29	10.3	9.66	INITIAL
1235	200	7.67	919	-71.0	1.2	2.07	10.6	9.66	1
1240	200	7.64	940	-98.6	1.1	1.79	10.8	9.66	2
1245	200	7.64	944	-117.6	1.0	1.67	10.8	9.66	3
1250	200	7.66	952	-124.8	0.9	1.71	10.9	9.66	4
1255	200	7.67	953	-133.0	0.9	1.65	10.8	9.66	5
1300	200	7.68	954	-138.8	0.9	1.62	10.8	9.66	6
1305	200	7.68	958	-143.1	0.9	1.73	10.9	9.66	7
1310	200	7.68	957	-145.6	0.9	1.81	10.8	9.66	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	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60ml	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125ml	plastic	A	<input type="checkbox"/> Y <input type="checkbox"/> N	
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	B	<input type="checkbox"/> Y <input type="checkbox"/> N	
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	C	<input type="checkbox"/> Y <input type="checkbox"/> N	
1	250ml	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	D	<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-7-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>

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WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, JJ	DATE: 3-7-23

SAMPLE ID: DEK-MW-18001	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1326	DATE: 3-7-23	SAMPLE	TIME: 1359	DATE: 3-7-23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 7.67	SU	CONDUCTIVITY: 697	umhos/cm	
DEPTH TO WATER: 8.75 T/ PVC	ORP: -133.5	mV	DO: 1.0	mg/L	
DEPTH TO BOTTOM: 19.66 T/ PVC	TURBIDITY: 2.86	NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 10.3	°C	OTHER: _____		
VOLUME REMOVED: 6 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: clear		ODOR: none		
COLOR: clear w/ orange float	ODOR: _____		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY	FILTRATE COLOR: _____		FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	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)
1329	200	7.84	696	-70.2	1.9	44.5	10.1	8.93	INITIAL
1334	200	7.71	692	-97.4	1.4	22.5	9.9	8.93	1
1339	200	7.68	694	-108.6	1.2	11.1	10.1	8.93	2
1344	200	7.67	694	-119.8	1.1	6.34	10.1	8.93	3
1349	200	7.67	694	-124.6	1.1	5.30	10.1	8.93	4
1354	200	7.66	697	-129.9	1.0	4.46	10.3	8.93	5
1359	200	7.67	697	-133.5	1.0	2.86	10.3	8.93	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
3	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	6	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
3	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Fedex	DATE SHIPPED: 3-7-23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <i>jl King</i>	DATE SIGNED: 3-10-23



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>JK</u> JJ	DATE: <u>3-8-23</u>
	BY: <u>AW</u>	DATE: <u>3-15-23</u>

SAMPLE ID: <u>DEK-MW-15002</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0733</u>	DATE: <u>3-8-23</u>	SAMPLE	TIME: <u>0830</u>	DATE: <u>3-8-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.36</u> SU		CONDUCTIVITY: <u>935</u> umhos/cm		
	ORP: <u>-120.5</u> mV		DO: <u>1.0</u> mg/L		
DEPTH TO WATER: <u>5.99</u> T/ PVC			TURBIDITY: <u>1.90</u> NTU		
DEPTH TO BOTTOM: <u>15.72</u> T/ PVC			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>9.2</u> °C		
VOLUME REMOVED: <u>11</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u> ODOR: <u>none</u>		
COLOR: <u>clear</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>DEK-BAP</u>		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
<u>0750</u>	<u>200</u>	<u>6.03</u>	<u>1008</u>	<u>131.9</u>	<u>2.0</u>	<u>6.29</u>	<u>7.5</u>	<u>6.35</u>	INITIAL
<u>0740</u>	<u>200</u>	<u>6.88</u>	<u>947</u>	<u>66.6</u>	<u>1.3</u>	<u>5.22</u>	<u>8.1</u>	<u>6.35</u>	<u>1</u>
<u>0745</u>	<u>200</u>	<u>7.11</u>	<u>959</u>	<u>15.3</u>	<u>1.1</u>	<u>3.54</u>	<u>8.3</u>	<u>6.35</u>	<u>2</u>
<u>0750</u>	<u>200</u>	<u>7.22</u>	<u>950</u>	<u>-34.6</u>	<u>1.1</u>	<u>2.70</u>	<u>8.7</u>	<u>6.35</u>	<u>3</u>
<u>0755</u>	<u>200</u>	<u>7.25</u>	<u>942</u>	<u>-57.0</u>	<u>1.1</u>	<u>2.64</u>	<u>8.7</u>	<u>6.35</u>	<u>4</u>
<u>0800</u>	<u>200</u>	<u>7.28</u>	<u>937</u>	<u>-76.5</u>	<u>1.0</u>	<u>2.59</u>	<u>8.7</u>	<u>6.35</u>	<u>5</u>
<u>0805</u>	<u>200</u>	<u>7.30</u>	<u>935</u>	<u>-90.0</u>	<u>1.0</u>	<u>2.27</u>	<u>8.9</u>	<u>6.35</u>	<u>6</u>
<u>0810</u>	<u>200</u>	<u>7.32</u>	<u>935</u>	<u>-99.3</u>	<u>1.0</u>	<u>2.22</u>	<u>8.9</u>	<u>6.75</u>	<u>7</u>
<u>0815</u>	<u>200</u>	<u>7.33</u>	<u>933</u>	<u>-105.8</u>	<u>1.0</u>	<u>2.14</u>	<u>8.9</u>	<u>6.75</u>	<u>8</u>
<u>0820</u>	<u>200</u>	<u>7.35</u>	<u>934</u>	<u>-112.1</u>	<u>1.0</u>	<u>2.08</u>	<u>8.9</u>	<u>6.75</u>	<u>9</u>

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
<u>2</u>	<u>125ml</u>	<u>A</u>	<u>Plastic</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>4</u>	<u>60ml</u>	<u>VOA</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
<u>2</u>	<u>↓</u>	<u>B</u>	<u>↓</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<u>2</u>	<u>↓</u>	<u>C ←</u>	<u>↓</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<u>2</u>	<u>↓</u>	<u>D</u>	<u>↓</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<u>2</u>	<u>250ml</u>	<u>A</u>	<u>↓</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: AW <u>(JK) JJ</u>	DATE: <u>3-8-23</u>	BY: <u>AW</u>	DATE: <u>3-15-23</u>
SAMPLE ID: <u>OW-10</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>1041</u>	DATE: <u>3-8-23</u>	SAMPLE	TIME: <u>1115</u>	DATE: <u>3-8-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.26</u> SU		CONDUCTIVITY: <u>865</u> umhos/cm		
DEPTH TO WATER: <u>6.46</u> T/ PVC		ORP: <u>-134.8</u> mV		DO: <u>1.1</u> mg/L	
DEPTH TO BOTTOM: <u>17.93</u> T/ PVC		TURBIDITY: <u>7.93</u> NTU			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>10.2</u> °C		OTHER: _____	
VOLUME REMOVED: <u>3</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>clear</u>		ODOR: <u>none</u>	
COLOR: <u>clear</u> ODOR: <u>none</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR: _____	
TURBIDITY <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE ODOR: _____		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1045	100	7.57	767	-29.9	4.2	9.70	8.2	6.92	INITIAL
1050	100	7.38	820	-51.8	1.7	13.8	9.7	7.40	.5
1055	100	7.31	837	-90.8	1.4	15.0	9.8	7.57	1.0
1100	100	7.27	848	-111.4	1.3	12.8	10.0	7.68	1.5
1105	100	7.27	854	-122.0	1.2	10.14	10.1	7.74	2.0
1110	100	7.26	860	-131.7	1.1	9.28	10.1	7.80	2.5
1115	100	7.26	865	-134.8	1.1	7.93	10.2	7.81	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
1	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW <u>(JK) JJ</u> DATE: <u>3-8-23</u>	BY: <u>AW</u> DATE: <u>3-15-23</u>

SAMPLE ID: <u>0w-11</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1252</u>	DATE: <u>3-8-23</u>	SAMPLE	TIME: <u>1320</u>	DATE: <u>3-8-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>9.80</u> SU CONDUCTIVITY: <u>326.1</u> umhos/cm		
DEPTH TO WATER: <u>22.59</u> T/ PVC			ORP: <u>-91.1</u> mV DO: <u>1.9</u> mg/L		
DEPTH TO BOTTOM: <u>25.42</u> T/ PVC			TURBIDITY: <u>4.98</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>2.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>10.1</u> °C OTHER: _____		
COLOR: <u>clear</u> ODOR: <u>none</u>			COLOR: <u>clear</u> ODOR: <u>none</u>		
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1255	100	9.27	340.7	-54.6	5.5	23.3	9.8	23.27	INITIAL
1300	100	9.43	339.0	-65.2	2.9	11.1	10.2	23.39	0.5
1305	100	9.62	333.1	-78.3	2.3	7.21	10.2	23.53	1.0
1310	100	9.79	328.2	-86.5	2.0	5.37	10.2	23.78	1.5
1315	100	9.82	325.4	-89.4	2.0	5.13	10.1	23.90	2.0
1320	100	9.80	326.1	-91.1	1.9	4.98	10.1	23.95	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	125mL	Plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	60mL	UBA	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>JKJJ</u> DATE: <u>3-8-23</u>	BY: <u>AW</u> DATE: <u>3-15-23</u>

SAMPLE ID: <u>0W-12</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0859</u>	DATE: <u>3-8-23</u>	SAMPLE	TIME: <u>0940</u>	DATE: <u>3-8-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.17</u> SU	CONDUCTIVITY: 711 <u>711</u> umhos/cm	ORP: <u>1.0</u> 116.3 mV	DO: <u>1.0</u> mg/L	
DEPTH TO WATER: <u>17.00</u> T/ PVC	TURBIDITY: <u>4.26</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: <u>23.42</u> T/ PVC	WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>11.8</u> °C	OTHER: _____		
VOLUME REMOVED: <u>8</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>	ODOR: <u>none</u>	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
COLOR: <u>orange</u>	ODOR: <u>none</u>	FILTRATE COLOR: _____	FILTRATE ODOR: _____	QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>KLI</u>	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0900	200	7.68	644	-88.4	4.8	135	10.3	17.06	INITIAL
0905	200	7.30	673	-109.4	1.7	81.6	11.4	17.06	1
0910	200	7.18	688	-113.8	1.3	28.4	11.6	17.06	2
0915	200	7.16	694	-112.2	1.2	22.7	11.6	17.06	3
0920	200	7.15	696	-112.2	1.1	16.2	11.6	17.06	4
0925	200	7.15	703	-112.8	1.1	11.3	11.8	17.06	5
0930	200	7.15	708	-114.0	1.1	6.27	11.8	17.06	6
0935	200	7.16	711	-115.3	1.1	4.95	11.9	17.06	7
0940	200	7.17	711	-116.3	1.0	4.26	11.8	17.06	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
2	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	4	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>3-10-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, KRJJ	DATE: 3-8-23
	BY: ACS	DATE: 3-15-23

SAMPLE ID: DEK-MW-15003	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1132	DATE: 3-8-23	SAMPLE	TIME: 1225	DATE: 3-8-23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 7.97 SU	CONDUCTIVITY: 442.0 umhos/cm	ORP: -146.5 mV	DO: 0.9 mg/L	
DEPTH TO WATER: 17.15 T/ PVC	TURBIDITY: 2.27 NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: 27.98 T/ PVC	TEMPERATURE: 16.3 °C	OTHER: _____			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: Clear	ODOR: none			
VOLUME REMOVED: 10 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____ FILTRATE ODOR: _____			
COLOR: Clear	ODOR: none	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____			
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER				
COMMENTS: FB-KLI 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)
1135	200	8.03	406.1	-99.2	3.3	3.33	14.4	18.21	INITIAL
1140	200	7.81	400.1	-96.3	1.4	2.67	15.0	19.43	1
1145	200	7.76	406.3	-96.2	1.2	2.68	15.5	19.96	2
1150	200	7.78	407.2	-99.2	1.1	2.65	15.3	20.10	3
1155	200	7.82	413.3	-108.6	1.1	2.58	15.5	20.13	4
1200	200	7.91	418.9	-121.1	1.0	2.69	15.8	20.28	5
1205	200	7.92	420.8	-122.9	1.0	2.47	15.9	20.32	6
1210	200	7.96	427.3	-133.1	1.0	2.53	16.3	20.50	7
1215	200	7.96	431.8	-140.7	0.9	2.61	16.4	20.62	8
1220	200	7.96	437.8	-144.5	0.9	2.42	16.6	20.70	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	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N

SHIPPING METHOD: Fedex	DATE SHIPPED: 3-8-23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <i>Al King</i>	DATE SIGNED: 3-10-23

Field blank



WATER SAMPLE LOG

PROJECT NAME: CEC Weadock BAP: 2023 GW	PREPARED	CHECKED
PROJECT NUMBER: 514403.0001.0000	BY: JJ	DATE: 3/13/23

SAMPLE ID: MW-15002	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 11:00	DATE: 3/13/23	SAMPLE	TIME: 11:53	DATE: 3/13/23
PURGE METHOD: <input type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> 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	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY				
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 6.1		°C		
VOLUME REMOVED: 7 <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: 100		ODOR: none		
COLOR: clear	ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY			FILTRATE COLOR: _____		
<input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- #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)
1118	240	7.63	1015	109.0	11.0	12.0	6.4	6.38	INITIAL
1123		7.43	1059	100.0	5.0	12.0	6.1	6.70	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	6.80	3
1138		7.30	1050	70.0	3.8	9.0	6.1	6.80	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	6.80	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	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	125	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	125	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> 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

SAMPLE ID: <u>MW-1501b</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1200</u>	DATE: <u>3/13/23</u>	SAMPLE	TIME: <u>1235</u>	DATE: <u>3/13/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.10</u> SU	CONDUCTIVITY: <u>970</u> umhos/cm	ORP: <u>59.0</u> mV	DO: <u>0.52</u> mg/L	
DEPTH TO WATER: <u>3.14</u> T/ PVC	TURBIDITY: <u>6.0</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>816</u> T/ PVC	TEMPERATURE: <u>3.7</u> °C	OTHER: _____			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>2 key</u>	ODOR: <u>none</u>			
VOLUME REMOVED: <u>3.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____ FILTRATE ODOR: _____			
COLOR: <u>cloudy</u> ODOR: <u>none</u>	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1200	100	7.62	812	126.5	10.0	26.0	4.3	310	INITIAL
1205		7.33	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	7.5	3.7	3.45	2
1225		7.10	957	59.8	0.52	6.0	3.7	3.45	2.1
1230		7.10	967	59.0	0.53	6.0	3.7	3.47	3
1235		7.10	970	59.0	0.52	6.0	3.7	3.41	3.1

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	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE:	DATE SIGNED: <u>3/13/23</u>



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: <u>NW-1500P/15019</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1250</u>	DATE: <u>3/13/23</u>	SAMPLE	TIME: <u>1320</u>	DATE: <u>3/13/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>6.70</u> SU	CONDUCTIVITY: <u>2064</u> umhos/cm	ORP: <u>-89.0</u> mV	DO: <u>0.30</u> mg/L	
DEPTH TO WATER: <u>6.11</u> T/ PVC	TURBIDITY: <u>4.9</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>16.67</u> T/ PVC	TEMPERATURE: <u>6.6</u> °C	OTHER: _____			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>	ODOR: <u>ADIB</u>			
VOLUME REMOVED: <u>6</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____ FILTRATE ODOR: _____			
COLOR: <u>Brownish</u> ODOR: <u>none</u>	TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	COMMENTS:				

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1250	200	7.05	1586	151.9	99	53.0	6.1	516	INITIAL
1255		6.64	2054	-92.0	1.0	7.6	6.7	527	1
1300		6.69	2073	-88.0	0.40	5.0	6.6	527	2
1305		6.70	2070	-88.5	0.40	5.0	6.7	527	3
1310		6.70	2066	-88.8	0.30	5.0	6.6	527	4
1315		6.70	2064	-88.5	0.30	4.9	6.6	527	5
1320		6.70	2064	-89.0	0.30	4.9	6.6	527	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	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE:	DATE SIGNED: <u>3/13/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Weadock BAP: 2023 GW	PREPARED	CHECKED
PROJECT NUMBER: 514403.0001.0000	BY: JJ	DATE: 3/13/23

SAMPLE ID: MW-15008	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1330	DATE: 3/17/23	SAMPLE	TIME: 1415	DATE: 3/17/23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 6.71	SU	CONDUCTIVITY: 1320	umhos/cm	
	ORP: -98.5	mV	DO: 0.19	mg/L	
DEPTH TO WATER: 431	T/ PVC	TURBIDITY: 0.0	NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	
DEPTH TO BOTTOM: 1746	T/ PVC	TEMPERATURE: 7.1	°C	OTHER:	
WELL VOLUME: NA	<input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: clear		ODOR: none	
VOLUME REMOVED: 9	<input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: FILTRATE ODOR:	
COLOR: brownish	ODOR: none	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1330	200	7.24	875	-98.5	9.5	115	6.9	439	INITIAL
1335		7.23	814	-113.5	0.79	223	6.7	440	1
1340		7.06	985	-115.0	0.38	200	6.9	440	2
1345		6.96	1146	-108.0	0.29	32.7	7.0	440	3
1350		6.80	1216	-104.0	0.24	14.0	7.0	440	4
1355		6.80	1245	-100.0	0.23	10	7.0	440	5
1400		6.80	1289	-101.5	0.20	26.5	7.1	440	6
1405		6.74	1318	-98.5	0.20	10.0	7.1	440	7
1410		6.79	1318	-98.0	0.19	10.0	7.1	440	8
1415		6.79	1320	-98.5	0.19	10.0	7.1	440	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	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	P1	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	P1	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>3-8-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE:	DATE SIGNED: <u>3/13/23</u>

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q1-2023 DEK Bottom Ash Pond Wells			PROJECT NUMBER: 23-0167			SAP CC or WO#: REQUESTER: Harold Register			ANALYSIS REQUESTED (Attach List if More Space is Needed)						QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____																																								
SAMPLING TEAM:			TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____																																																				
SEND REPORT TO: Caleb Batts		email:			phone:			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Metals</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Anions</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Ammonia</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">TDS</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Alkalinity</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Sulfide</td> <td colspan="7" style="text-align: center;">CONTAINERS</td> </tr> <tr> <td colspan="7" style="text-align: center;">PRESERVATIVE</td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Total</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">None</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">HNO₃</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">H₂SO₄</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">NaOH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">HCl</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">MeOH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Other</td> <td colspan="5"></td> </tr> </table>												Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	CONTAINERS							PRESERVATIVE							Total	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other								
Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	CONTAINERS																																																	
						PRESERVATIVE																																																	
Total	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																																																
COPY TO: Harold Register		MATRIX CODES:			CONTAINERS			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">LAB SAMPLE ID</td> <td colspan="2" style="text-align: center;">SAMPLE COLLECTION</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">MATRIX</td> <td colspan="3" style="text-align: center;">FIELD SAMPLE ID / LOCATION</td> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">TOTAL #</td> <td colspan="7" style="text-align: center;">PRESERVATIVE</td> <td colspan="5"></td> </tr> <tr> <td style="text-align: center;">DATE</td> <td style="text-align: center;">TIME</td> <td colspan="3"></td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">None</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">HNO₃</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">H₂SO₄</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">NaOH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">HCl</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">MeOH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Other</td> <td colspan="4"></td> </tr> </table>												LAB SAMPLE ID	SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION			TOTAL #	PRESERVATIVE												DATE	TIME				None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other				
LAB SAMPLE ID	SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION			TOTAL #														PRESERVATIVE																																		
	DATE	TIME																		None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																													
		GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste																																																					

RELINQUISHED BY: <i>AL King</i>		DATE/TIME: 3-7-23 11530		RECEIVED BY: <i>Fedex</i>		COMMENTS: Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>LS027723</u> Temperature: <u>12.3.1</u> °C Cal. Due Date: <u>5-25-23</u>					
RELINQUISHED BY: <i>Fedex</i>		DATE/TIME: 3-8-23 1000		RECEIVED BY: <i>CSewer</i>							

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q1-2023 DEK Bottom Ash Pond Wells		PROJECT NUMBER: 23-0167		SAP CC or WO#: REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)						QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____																																									
SAMPLING TEAM: TRC		TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____						<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">Total Metals</th> <th rowspan="2">Anions</th> <th rowspan="2">Ammonia</th> <th rowspan="2">TDS</th> <th rowspan="2">Alkalinity</th> <th rowspan="2">Sulfide</th> <th colspan="8">CONTAINERS</th> </tr> <tr> <th colspan="8">PRESERVATIVE</th> </tr> <tr> <th>TOTAL #</th> <th>None</th> <th>HNO₃</th> <th>H₂SO₄</th> <th>NaOH</th> <th>HCl</th> <th>MeOH</th> <th>Other</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </table>						Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	CONTAINERS								PRESERVATIVE								TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other										
Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	CONTAINERS																																															
						PRESERVATIVE																																															
TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																																														
SEND REPORT TO: Caleb Batts		email:		phone:		COPY TO: Harold Register		MATRIX CODES: GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste		LAB SAMPLE ID		SAMPLE COLLECTION		MATRIX		FIELD SAMPLE ID / LOCATION																																					
						TRC												REMARKS																																			

RELINQUISHED BY: <i>Al Ky</i>		DATE/TIME: 3-8-23/1545		RECEIVED BY: <i>FedEx</i>		COMMENTS:					
RELINQUISHED BY: FedEx		DATE/TIME: 03-09-23 12:05 pm		RECEIVED BY: <i>[Signature]</i>		Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>LS02723</u> Temperature: <u>1.1-3.2</u> °C Cal. Due Date: <u>05-25-23</u>					

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q1-2023 DEK Lined Impoundment		PROJECT NUMBER: 23-0169		SAP CC or WO#: REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)					QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____																	
SAMPLING TEAM: TRC		TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">CONTAINERS</th> <th rowspan="2">PRESERVATIVE</th> <th rowspan="2">Total Metals</th> <th rowspan="2">Anions</th> <th rowspan="2">Ammonia</th> <th rowspan="2">TDS</th> <th rowspan="2">Alkalinity</th> <th rowspan="2">Sulfide</th> <th rowspan="2">Dissolved Metals</th> </tr> <tr> <th>NAME</th> <th>HNO₃</th> <th>H₂SO₄</th> <th>NaOH</th> <th>HCl</th> <th>MeOH</th> <th>Other</th> </tr> </table>					CONTAINERS	PRESERVATIVE	Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	Dissolved Metals	NAME	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other	REMARKS	
CONTAINERS	PRESERVATIVE	Total Metals	Anions	Ammonia	TDS															Alkalinity	Sulfide	Dissolved Metals						
						NAME	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																
SEND REPORT TO: Caleb Batts	email:	phone:	MATRIX CODES: GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste		LAB SAMPLE ID		SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION		TOTAL #																
COPY TO: Harold Register TRC	DATE	TIME																										

RELINQUISHED BY: <i>[Signature]</i>	DATE/TIME: 3-8-23 / 1545	RECEIVED BY: <i>[Signature]</i>	COMMENTS:
RELINQUISHED BY: Fed Ex	DATE/TIME: 03-09-23 12:05 PM	RECEIVED BY: <i>[Signature]</i>	Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>LS 027723</u> Temperature: <u>1.1 - 3.2</u> °C Cal. Due Date: <u>05-25-22</u>

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q1-2023 DEK Lined Impoundment		PROJECT NUMBER: 23-0169		SAP CC or WO#: REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)						QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____																																						
SAMPLING TEAM:		TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____																																																
SEND REPORT TO: Caleb Batts		email:		phone:		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">Total Metals</th> <th rowspan="2">Anions</th> <th rowspan="2">Ammonia</th> <th rowspan="2">TDS</th> <th rowspan="2">Alkalinity</th> <th rowspan="2">Sulfide</th> <th colspan="8">CONTAINERS</th> </tr> <tr> <th colspan="8">PRESERVATIVE</th> </tr> <tr> <th>TOTAL #</th> <th>None</th> <th>HNO₃</th> <th>H₂SO₄</th> <th>NaOH</th> <th>HCl</th> <th>MeOH</th> <th>Other</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </table>						Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	CONTAINERS								PRESERVATIVE								TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other									
Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide													CONTAINERS																																
												PRESERVATIVE																																						
TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																																											
COPY TO: Harold Register TRC		MATRIX CODES: GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste		FIELD SAMPLE ID / LOCATION																																														
LAB SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOCATION		TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other	Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	REMARKS																														
23-0169-01			GW	DEK-MW-15003		7	4	1	1	1				X	X	X	X	X	X																															
-02			GW	OW-10		7	4	1	1	1				X	X	X	X	X	X																															
-03			GW	OW-11		7	4	1	1	1				X	X	X	X	X	X																															
-04			GW	OW-12		7	4	1	1	1				X	X	X	X	X	X																															
-05	3-9-23	0840	W	KLI-SCS		7	4	1	1	1				X	X	X	X	X	X																															
-06			SW	KLI-PCS		7	4	1	1	1				X	X	X	X	X	X																															
-07			SW	SW-DITCH		7	4	1	1	1				X	X	X	X	X	X																															
-08			GW	DUP-KLI		7	4	1	1	1				X	X	X	X	X	X																															
-09			W	EB-KLI		4	1	1	1	1				X	X	X			X																															
-10			W	FB-KLI		4	1	1	1	1				X	X	X			X																															

RELINQUISHED BY:	DATE/TIME: 3/10/23 0830	RECEIVED BY: Casen Gherert	DATE/TIME: 3-10-23 0845	COMMENTS:
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>L5027723</u> Temperature: <u>1.1-2.3</u> °C Cal. Due Date: <u>5-25-23</u>

Appendix C

Data Quality Reviews

Laboratory Data Quality Review Groundwater/Surface Water Monitoring Event March 2023 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the March 2023 sampling event. Samples were analyzed for total and/or dissolved metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analyses were subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0169 and S46162.01(01).

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

- OW-10
- OW-11
- OW-12
- DEK-MW-15003

During the March 2023 sampling event, the following water/surface water samples were collected:

- KLI-PCS
- KLI-SCS
- SW-DITCH

Each sample was analyzed for one or more of the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total & Dissolved Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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 and Merit. 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, TDS, ammonia, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One field blank (FB-KLI) and one equipment blank (EB-KLI) were collected with this data set. Target analytes were not detected in these blank samples.
- The field duplicate pair samples were DUP-KLI and OW-12; relative percent differences (RPDs) between the parent and duplicate sample 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 March 2023 DE Karn Bottom Ash Pond and Lined Impoundment

A groundwater sample was collected by TRC for the March 2023 sampling event. The sample was analyzed for total metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analysis was subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0168, and S46137.01(01).

During the March 2023 sampling event, a groundwater sample was collected from the following well:

- DEK-MW-18001

The sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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, when collected. 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 and Merit. 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, ammonia, TDS, alkalinity, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of a detection or assessment monitoring program.
- Data are usable for the purposes of the detection or assessment monitoring program.
- When the data are evaluated through a detection or assessment monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- A field blank was not collected with this data set.
- An equipment blank was not collected with this data set.
- MS and MSD analyses were performed on sample DEK-MW-18001 for total metals, anions, ammonia, total alkalinity, and sulfide. 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, with the exception of sulfide, 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.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on the sample in this data set.

Appendix D

Statistical Analysis

Appendix D
 Statistical Summary for DE Karn Lined Impoundment
 First Quarter 2023
 Data from May 2021 to March 2023

Karn Lined Impoundment Wells						
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12
Boron	Trend	○	○	○	○	○
Calcium	Trend	○	↓*	○	↓	○
Chloride	Trend	↑ ^{ASD}	○	○	↓	○
Fluoride	Trend	○*	○*	○*	○	○*
Iron	Trend	○	○	○	○	○
pH	Trend	○	○	○	↑ ^{ASD}	○
Sulfate	Trend	○	○	○	↓	○
Total Dissolved Solids	Trend	↑ ^{ASD}	○	○	○	○

Notes:

○* = Non-detect

○ = No trend

↑ = Upward trend, continuous

↑* = Upward trend, new

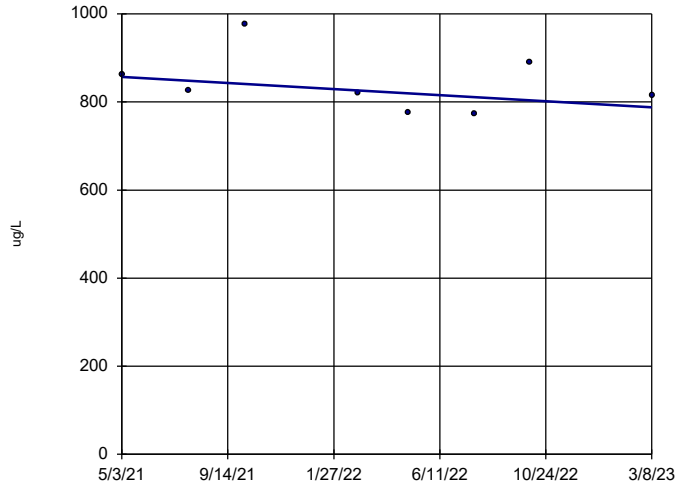
↑ = Upward trend, confirmed

↓ = Downward trend, continuous

↓* = Downward trend, new

↑^{ASD} = Alternate Source Demonstration (Fourth Quarter 2022 Hydrogeological Monitoring Report for the Karn Lined Impoundment CCR Unit, TRC, January 2023.)

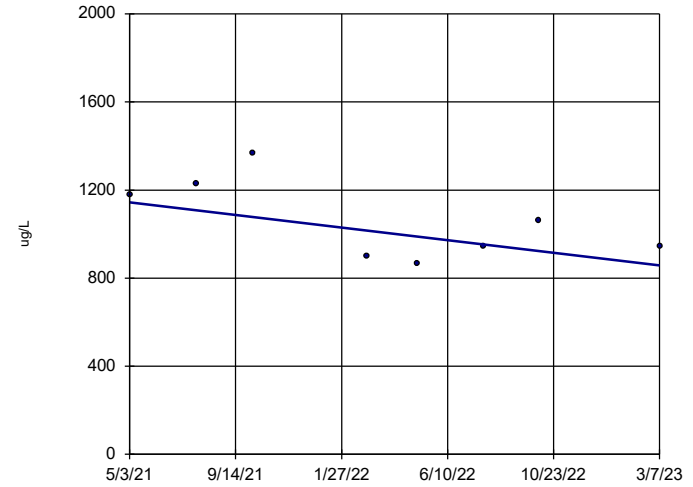
Boron, Total DEK-MW-15003



n = 8
 Slope = -37.31
 units per year.
 Mann-Kendall
 statistic = -10
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

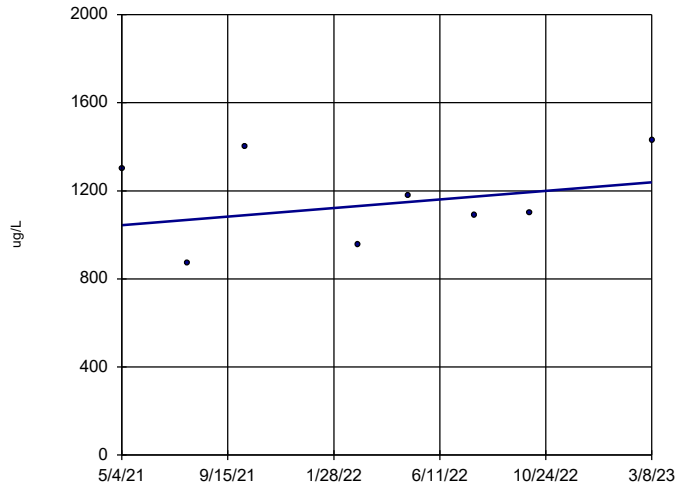
Boron, Total DEK-MW-18001



n = 8
 Slope = -155.5
 units per year.
 Mann-Kendall
 statistic = -7
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
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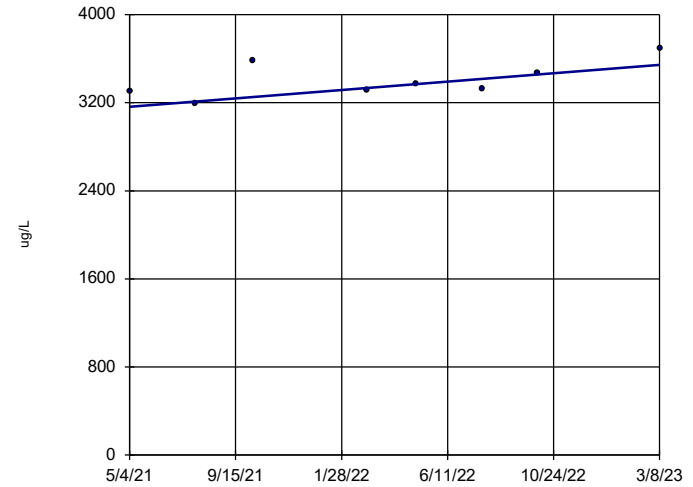
Boron, Total OW-10



n = 8
 Slope = 105.4
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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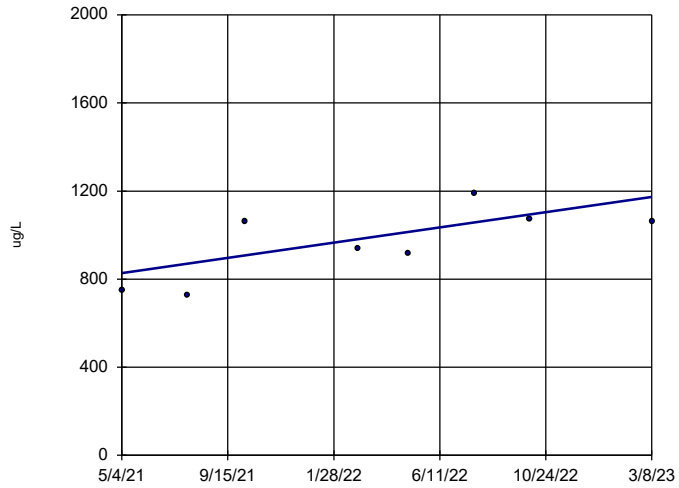
Boron, Total OW-11



n = 8
 Slope = 206.7
 units per year.
 Mann-Kendall
 statistic = 16
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
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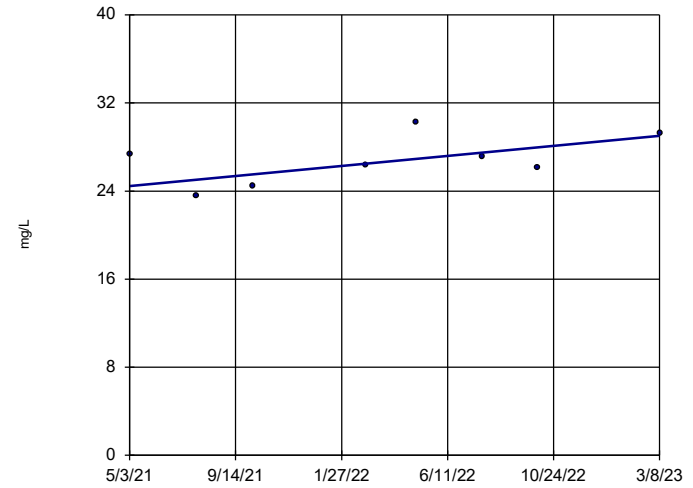
Boron, Total
OW-12



n = 8
Slope = 187.9
units per year.
Mann-Kendall
statistic = 13
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

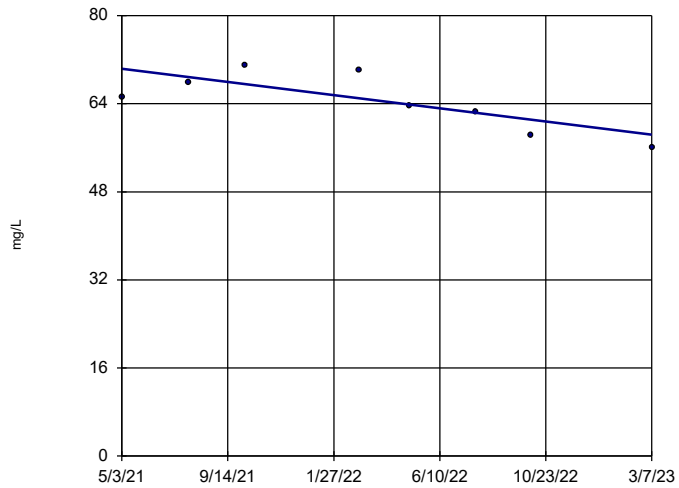
Calcium, Total
DEK-MW-15003



n = 8
Slope = 2.47
units per year.
Mann-Kendall
statistic = 8
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
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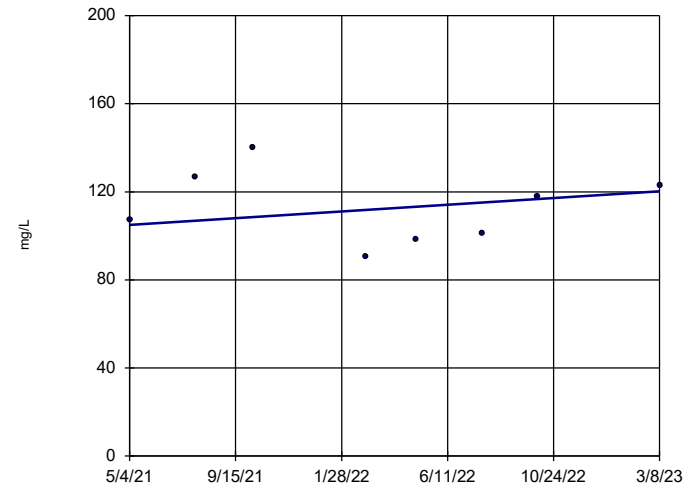
Calcium, Total
DEK-MW-18001



n = 8
Slope = -6.487
units per year.
Mann-Kendall
statistic = -18
critical = -17
Decreasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
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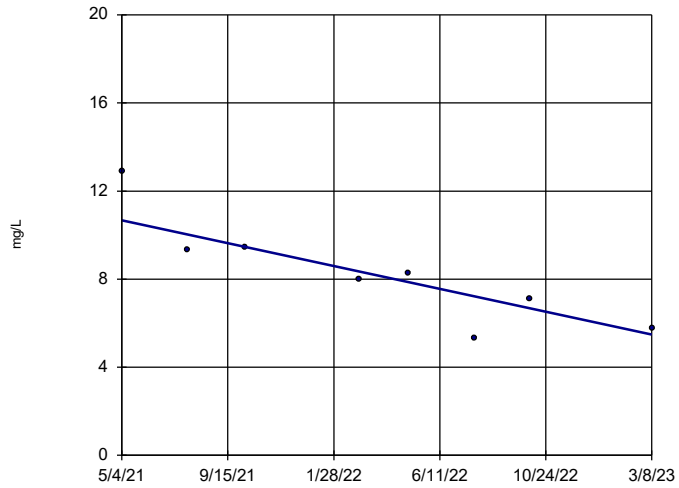
Calcium, Total
OW-10



n = 8
Slope = 8.214
units per year.
Mann-Kendall
statistic = 2
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

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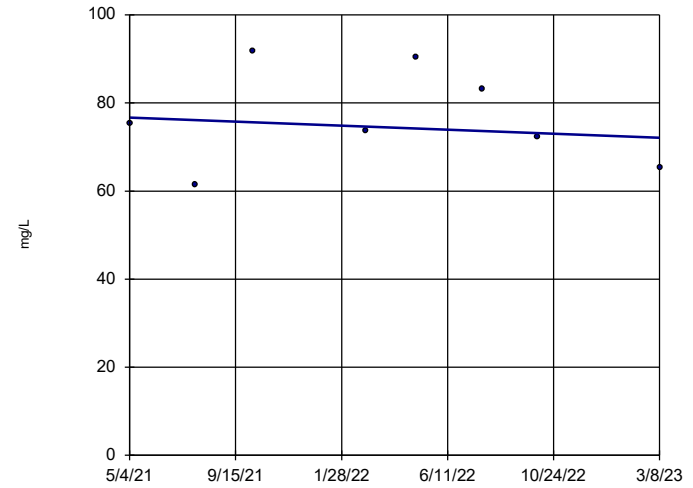
Calcium, Total
OW-11



n = 8
Slope = -2.81
units per year.
Mann-Kendall
statistic = -20
critical = -17
Decreasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

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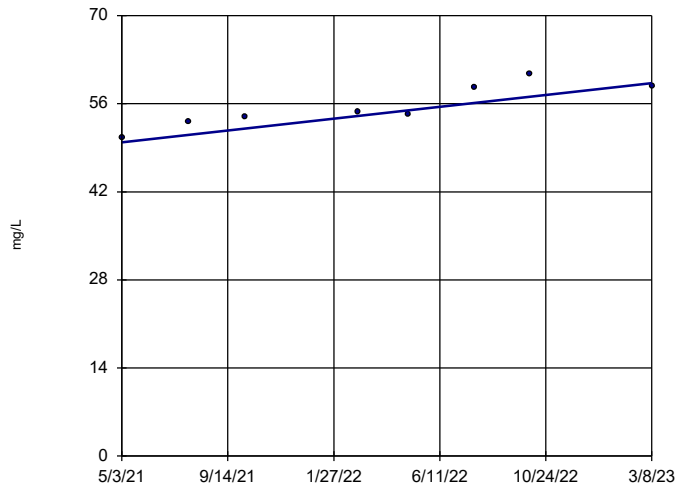
Calcium, Total
OW-12



n = 8
Slope = -2.488
units per year.
Mann-Kendall
statistic = -6
critical = -17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
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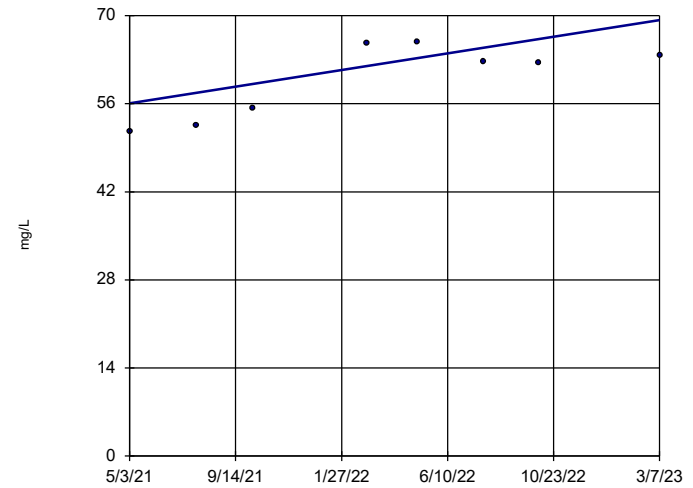
Chloride
DEK-MW-15003



n = 8
Slope = 5.085
units per year.
Mann-Kendall
statistic = 24
critical = 17
Increasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

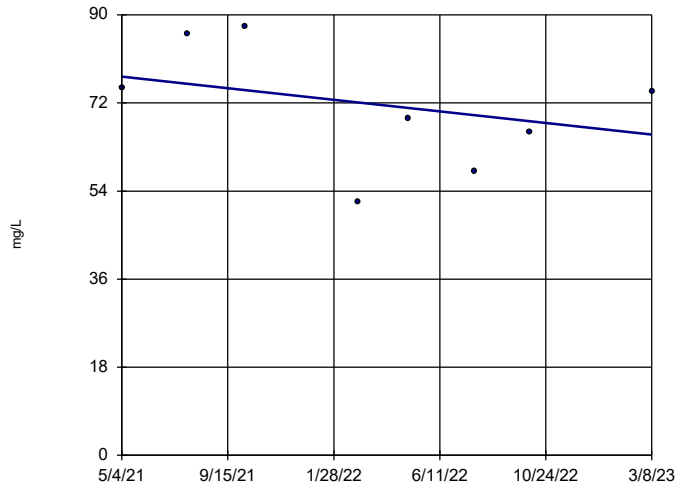
Chloride
DEK-MW-18001



n = 8
Slope = 7.156
units per year.
Mann-Kendall
statistic = 14
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:33 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

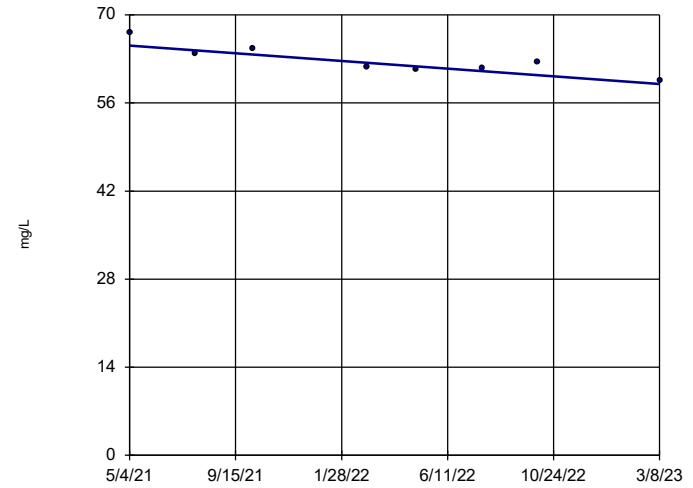
Chloride OW-10



n = 8
 Slope = -6.415 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 3/30/2023 2:33 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

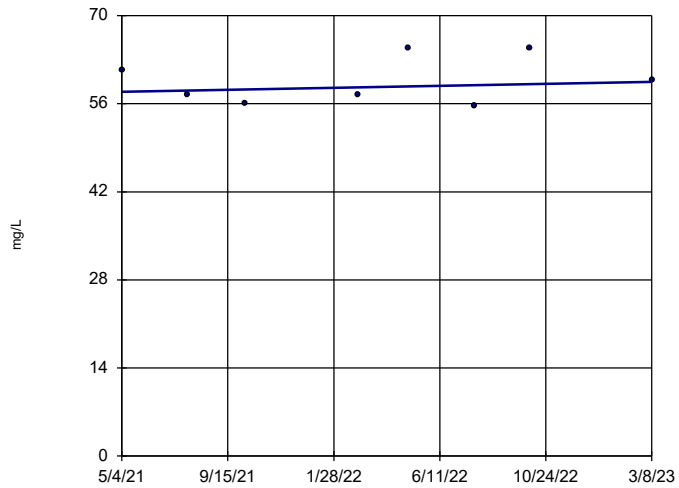
Chloride OW-11



n = 8
 Slope = -3.315 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 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

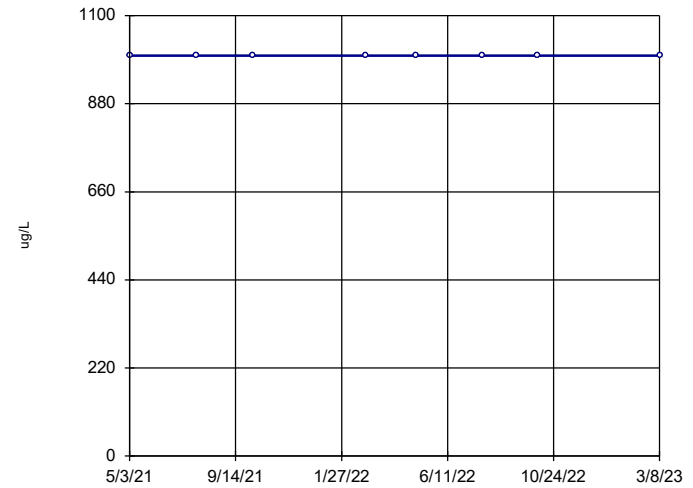
Chloride OW-12



n = 8
 Slope = 0.8436 units per year.
 Mann-Kendall statistic = 2
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

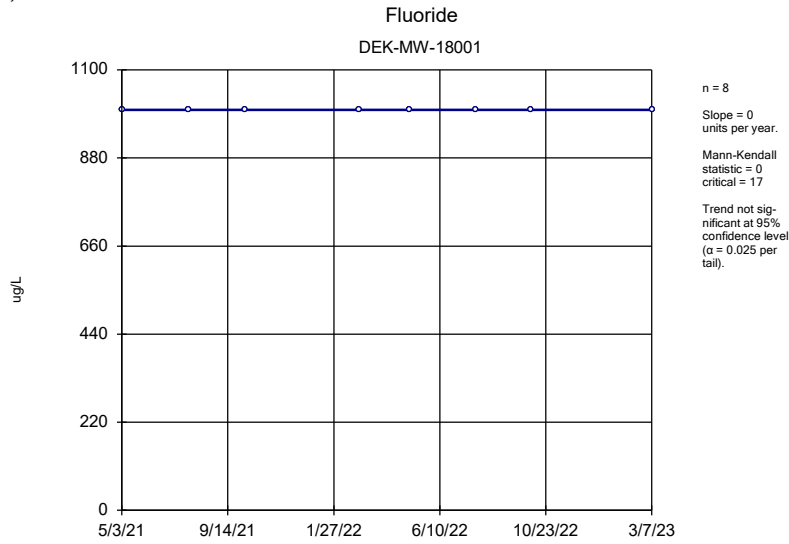
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Fluoride DEK-MW-15003

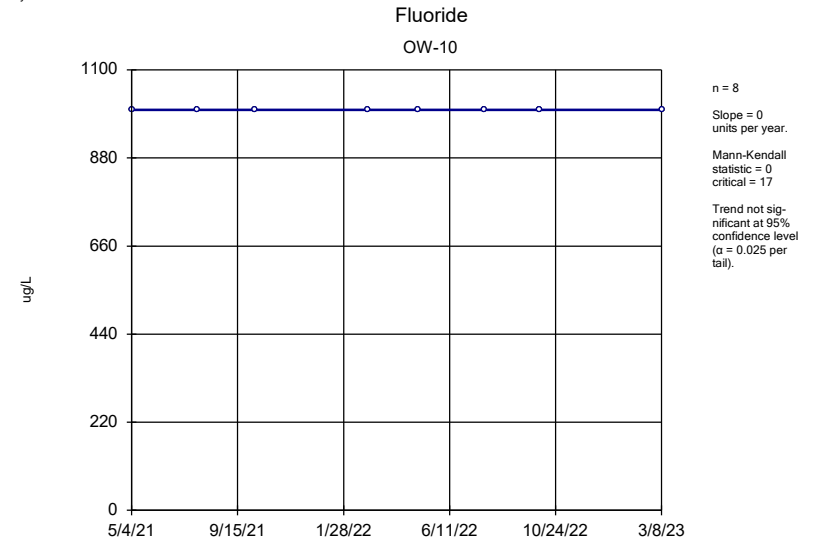


n = 8
 Slope = 0 units per year.
 Mann-Kendall statistic = 0
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

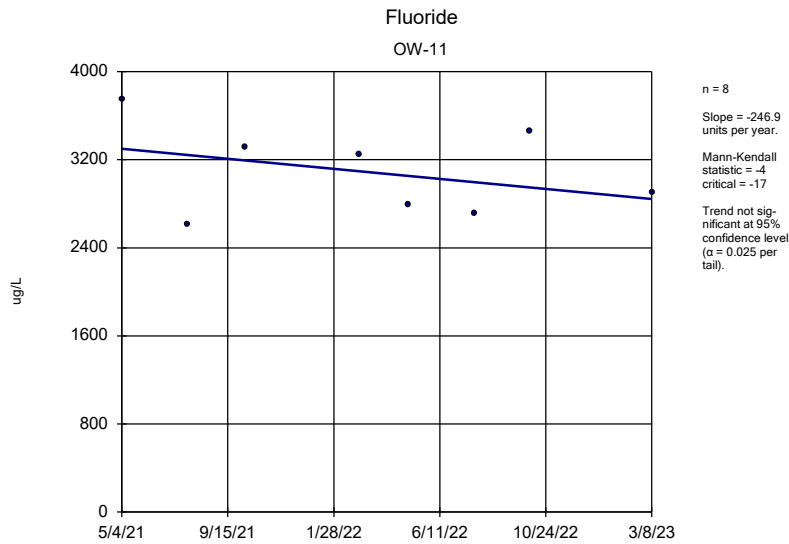
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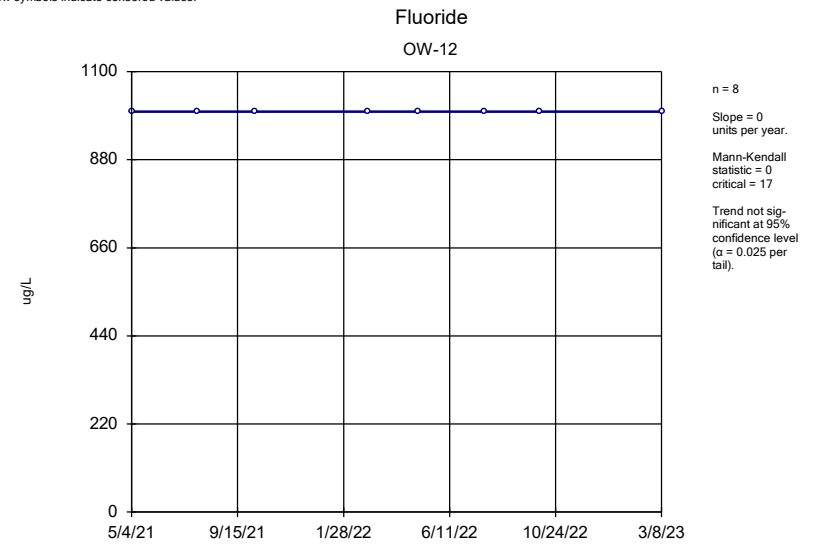
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Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
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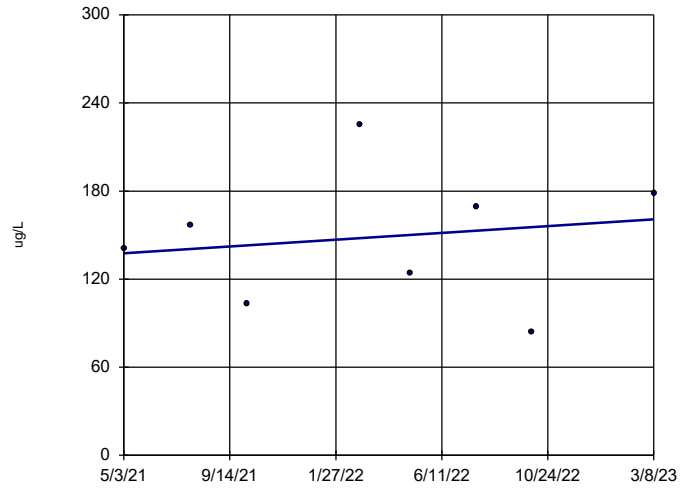


Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1



Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

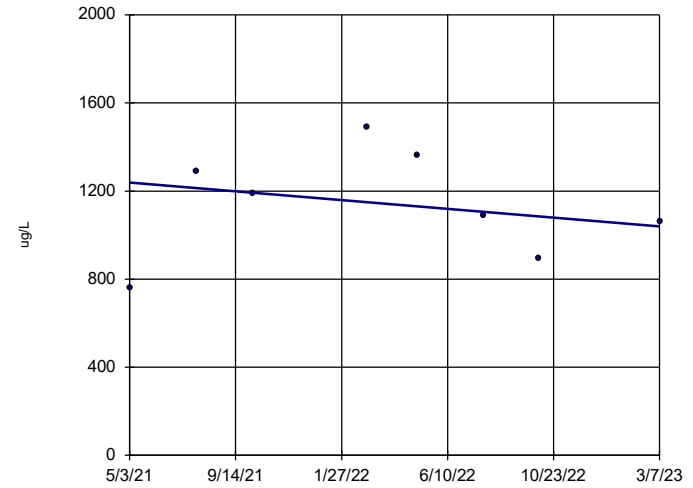
Iron, Total
DEK-MW-15003



n = 8
Slope = 12.52 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

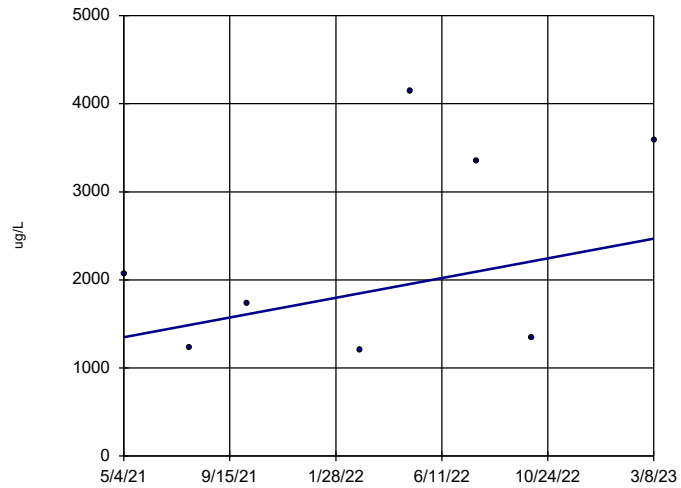
Iron, Total
DEK-MW-18001



n = 8
Slope = -108.5 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

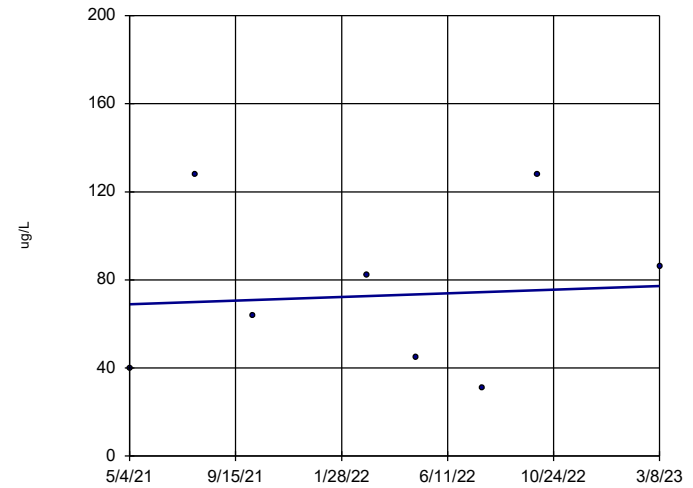
Iron, Total
OW-10



n = 8
Slope = 606.9 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

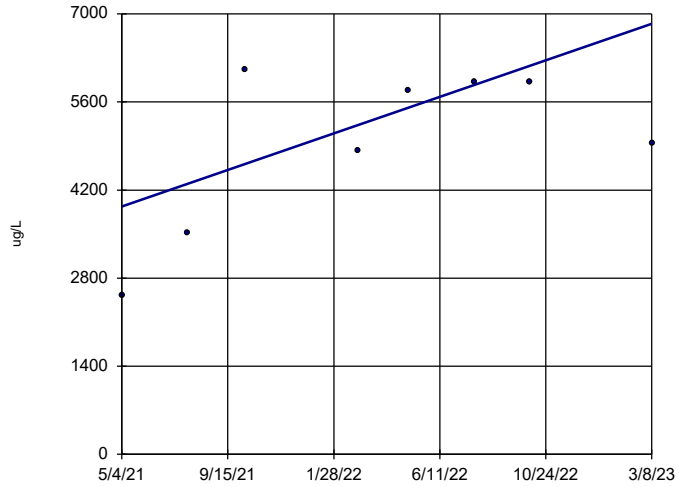
Iron, Total
OW-11



n = 8
Slope = 4.469 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

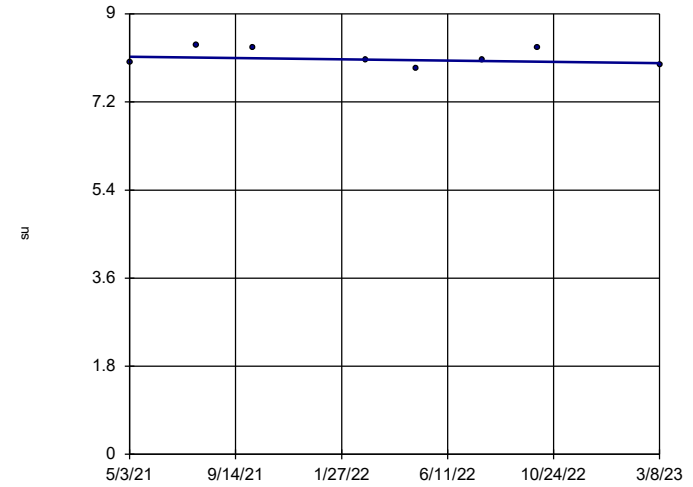
Iron, Total
OW-12



n = 8
Slope = 1574 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

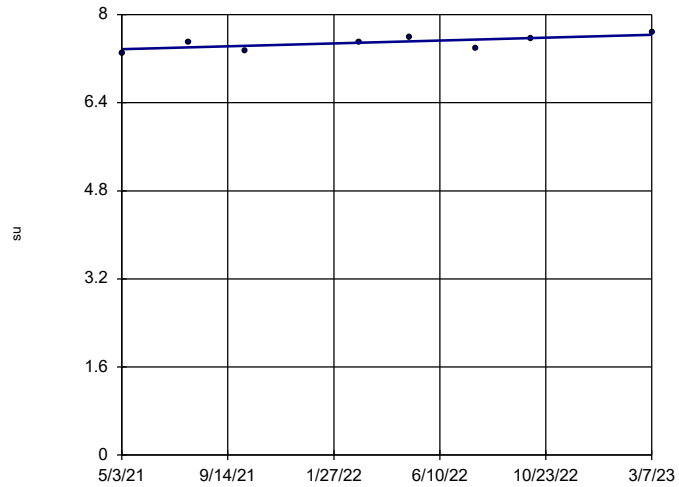
pH, Field
DEK-MW-15003



n = 8
Slope = -0.07359 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 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

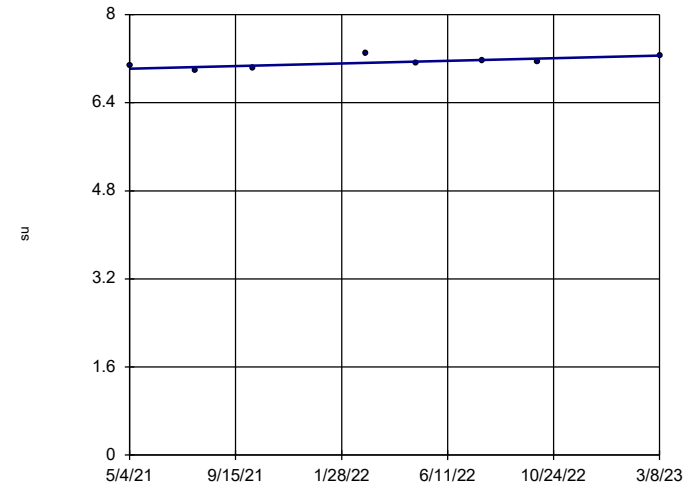
pH, Field
DEK-MW-18001



n = 8
Slope = 0.1425 units per year.
Mann-Kendall statistic = 17
critical = 17
Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

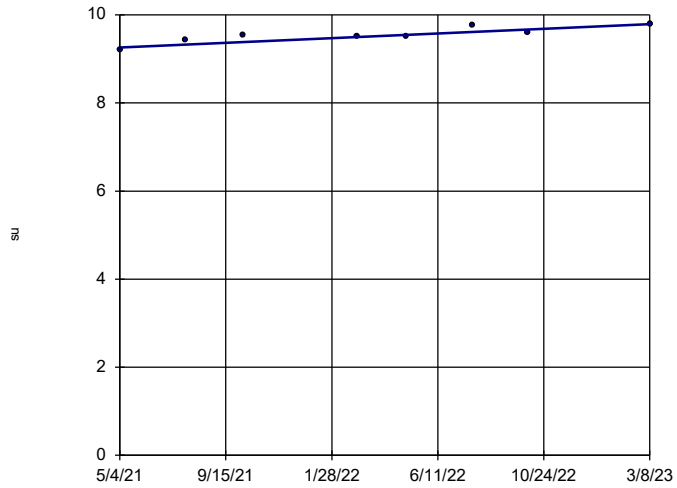
pH, Field
OW-10



n = 8
Slope = 0.1283 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 3/30/2023 2:34 PM
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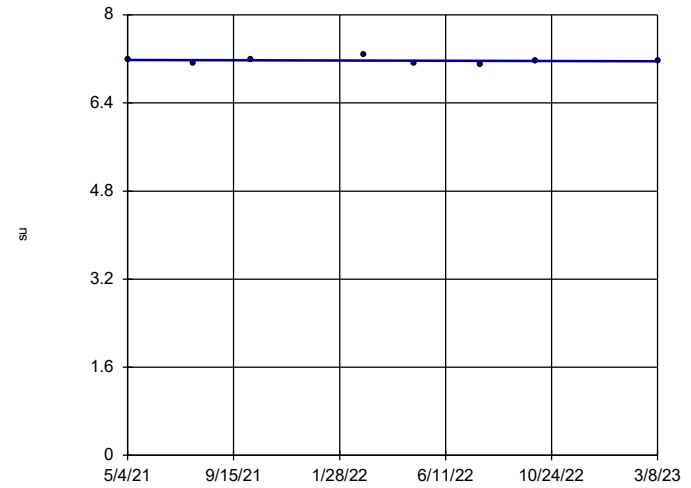
pH, Field
OW-11



n = 8
Slope = 0.2847
units per year.
Mann-Kendall
statistic = 22
critical = 17
Increasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

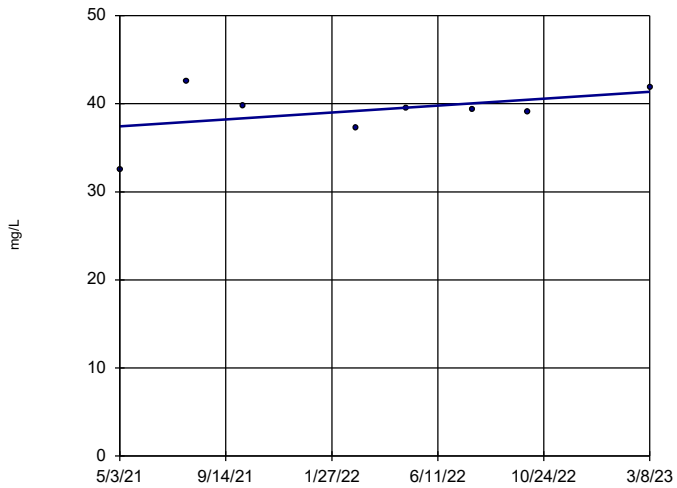
pH, Field
OW-12



n = 8
Slope = -0.01046
units per year.
Mann-Kendall
statistic = -5
critical = -17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

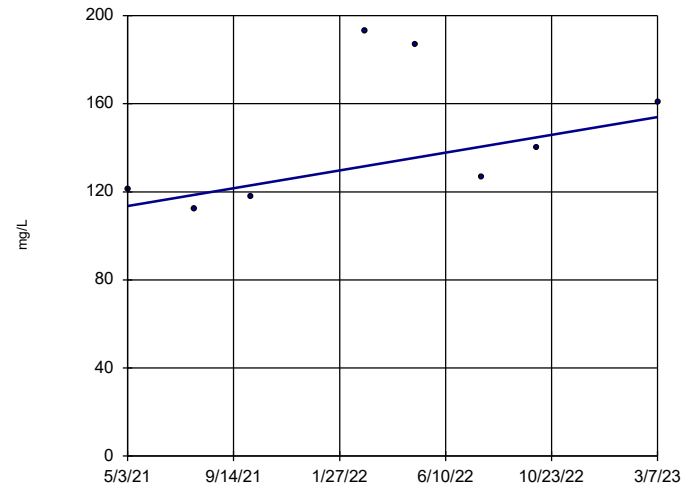
Sulfate
DEK-MW-15003



n = 8
Slope = 2.129
units per year.
Mann-Kendall
statistic = 2
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

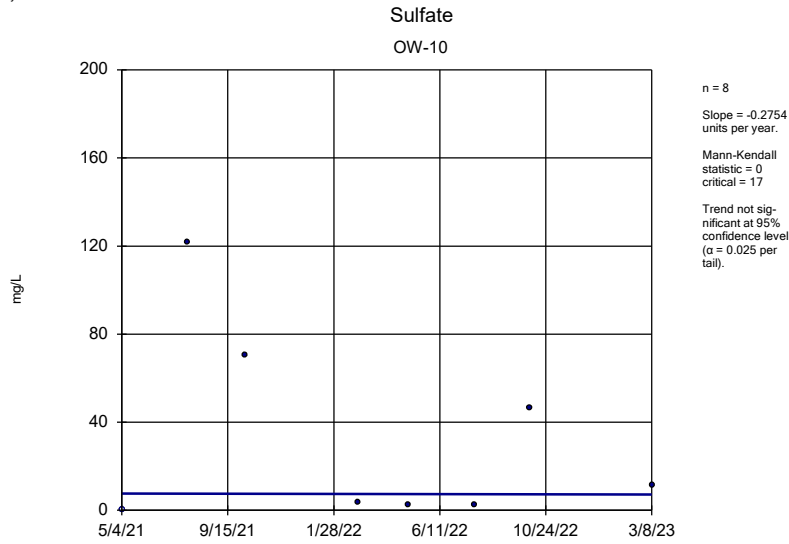
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

Sulfate
DEK-MW-18001

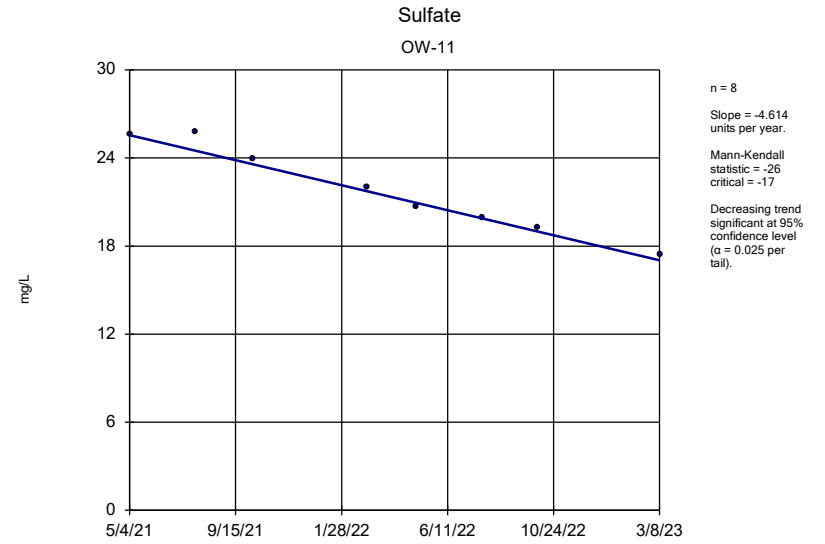


n = 8
Slope = 21.94
units per year.
Mann-Kendall
statistic = 10
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

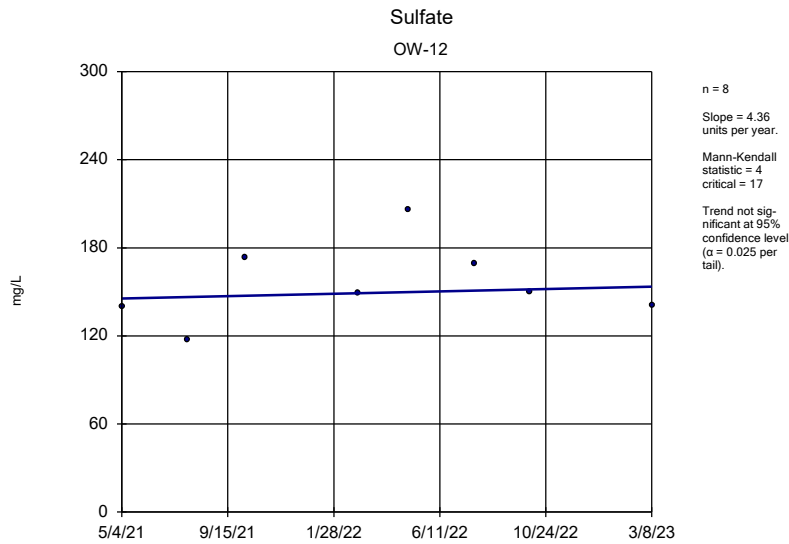
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1



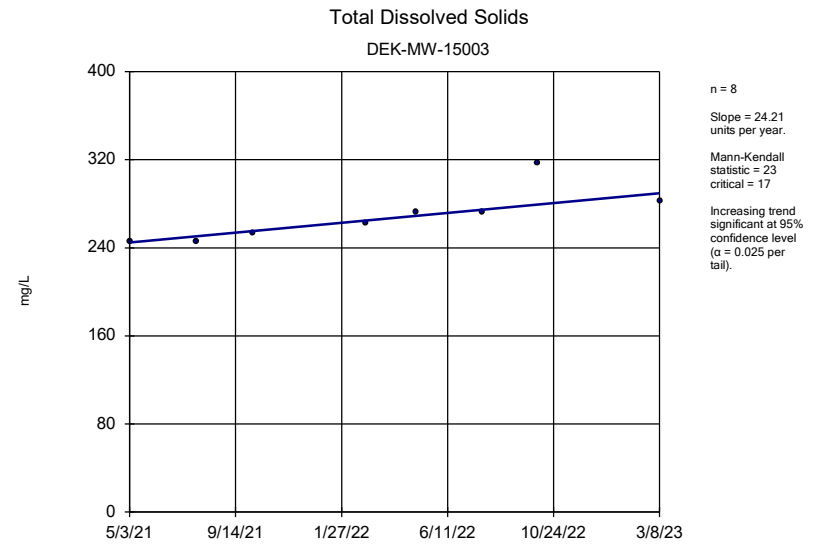
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1



Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

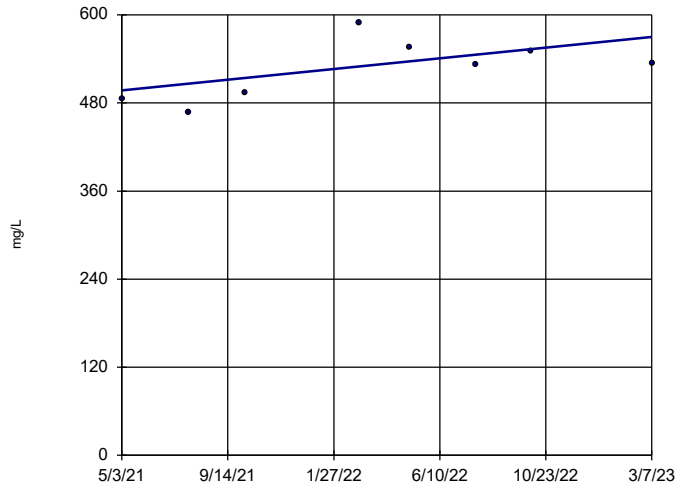


Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1



Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

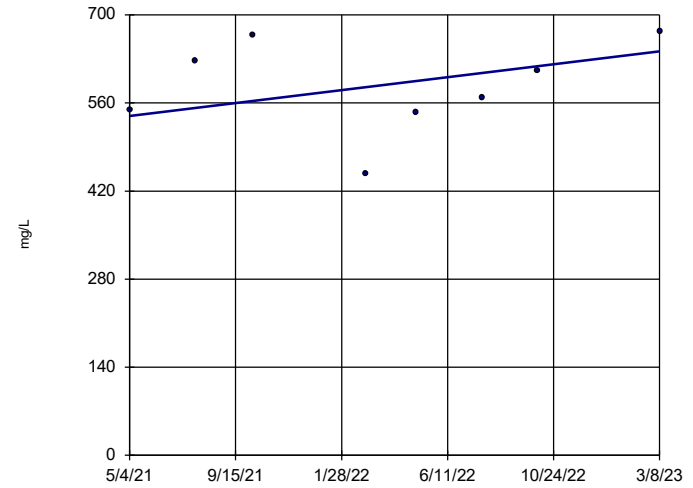
Total Dissolved Solids DEK-MW-18001



n = 8
 Slope = 39.49
 units per year.
 Mann-Kendall
 statistic = 10
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

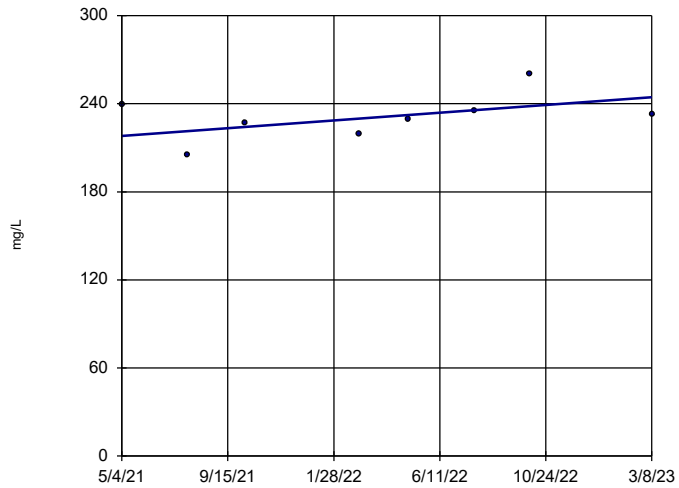
Total Dissolved Solids OW-10



n = 8
 Slope = 55.82
 units per year.
 Mann-Kendall
 statistic = 8
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

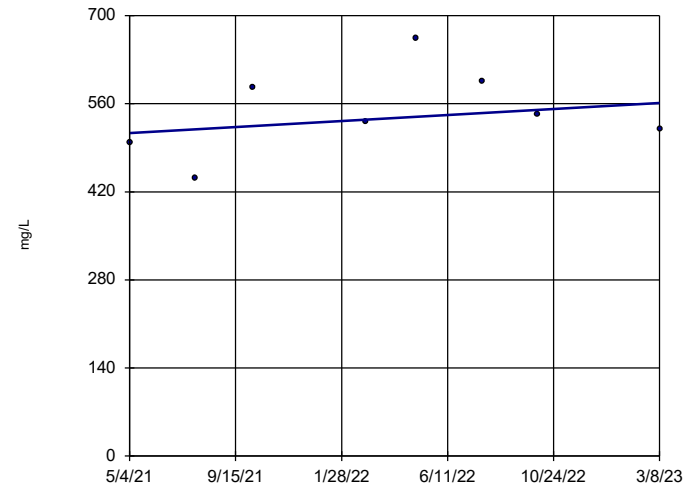
Total Dissolved Solids OW-11



n = 8
 Slope = 14.27
 units per year.
 Mann-Kendall
 statistic = 10
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

Total Dissolved Solids OW-12



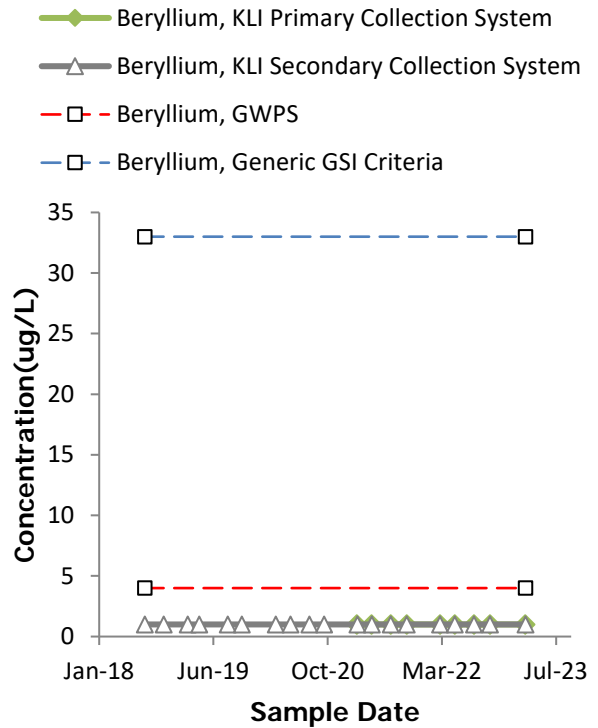
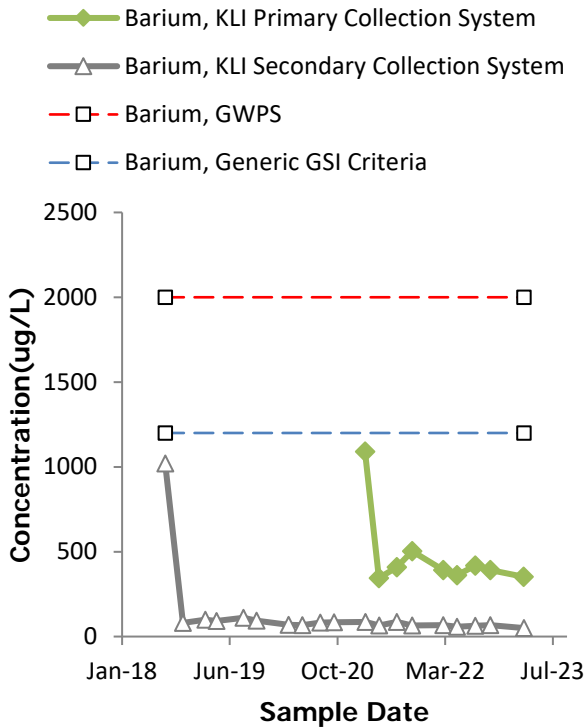
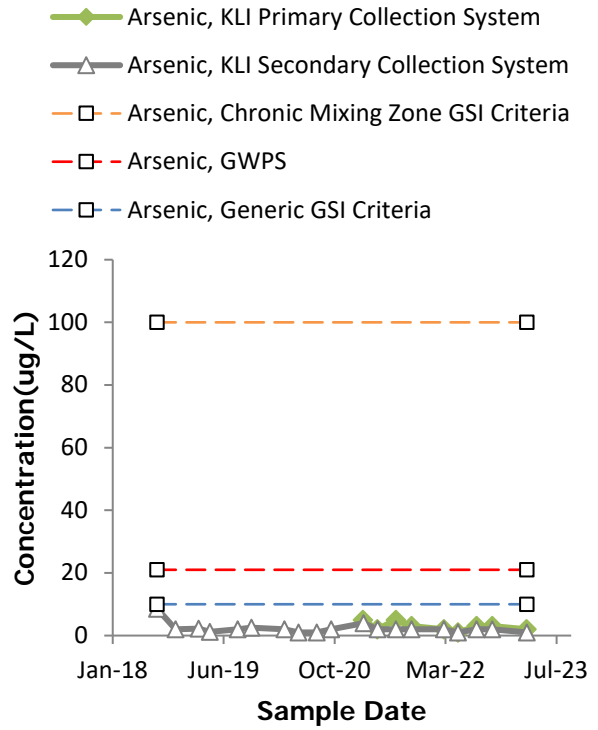
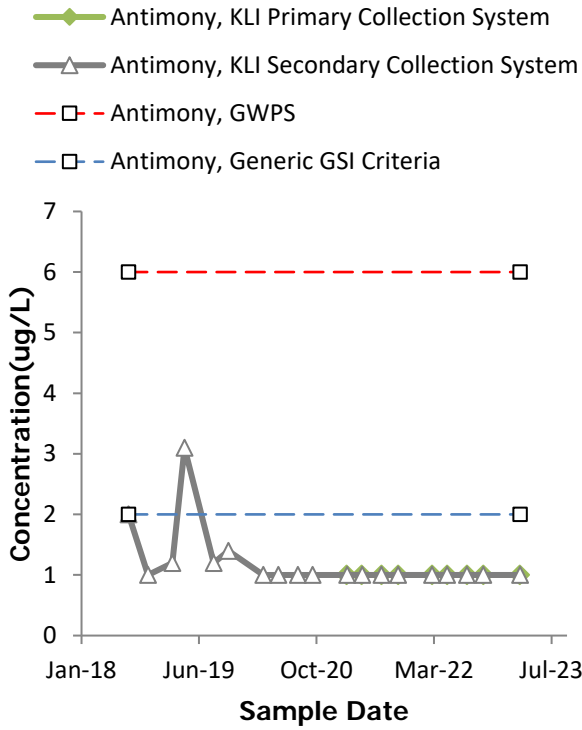
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 Slope = 25.9
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 3/30/2023 2:34 PM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q1

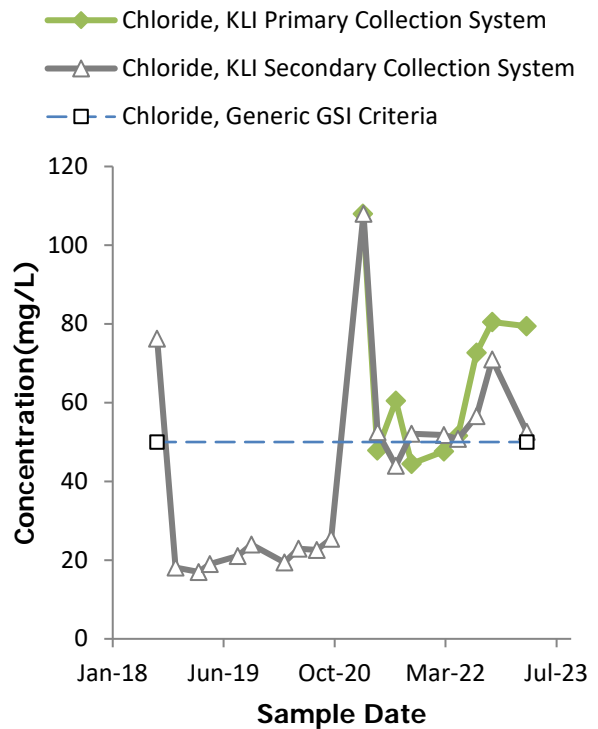
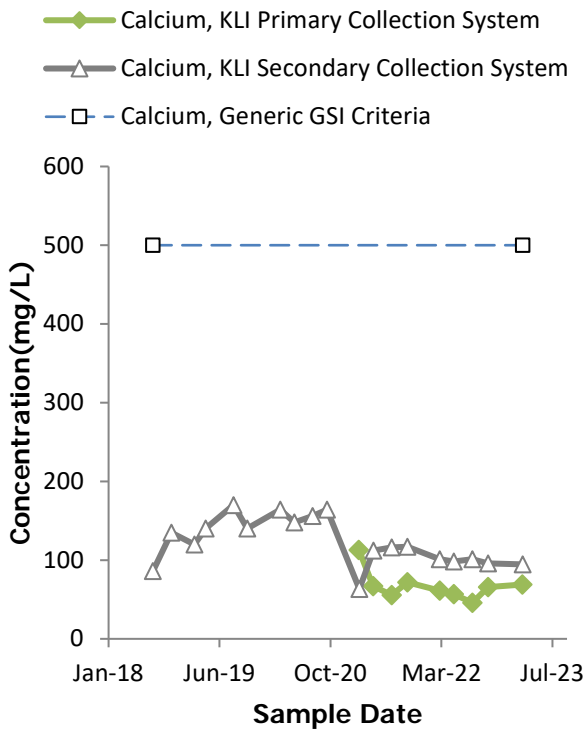
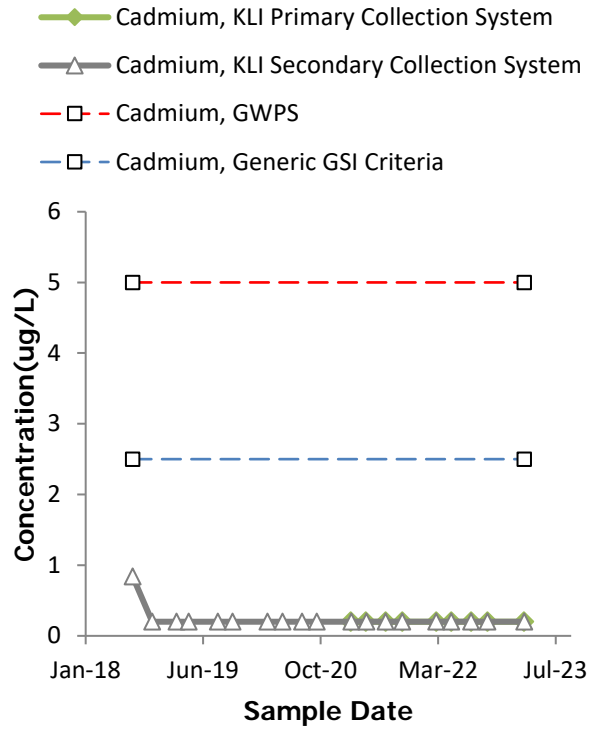
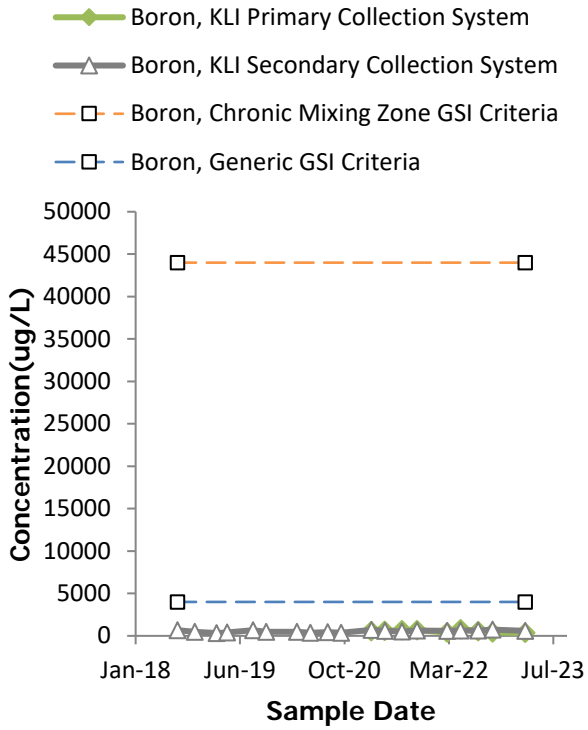
Appendix E

Secondary Leachate Collection System Monitoring

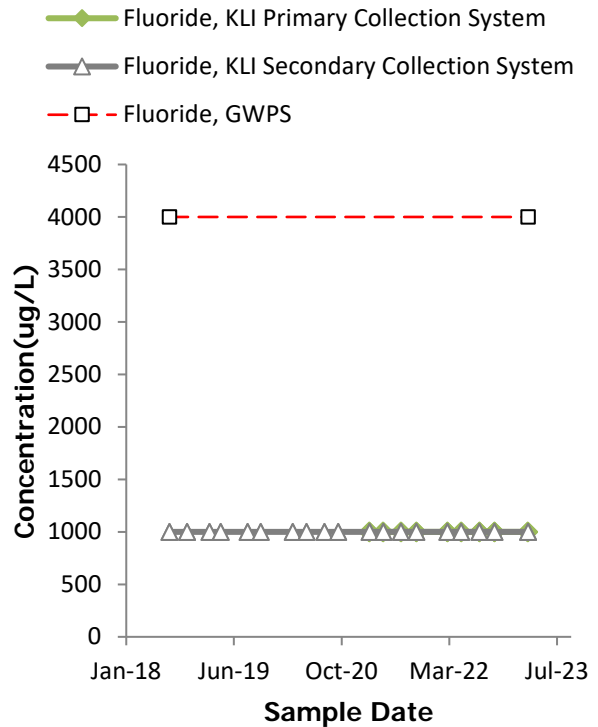
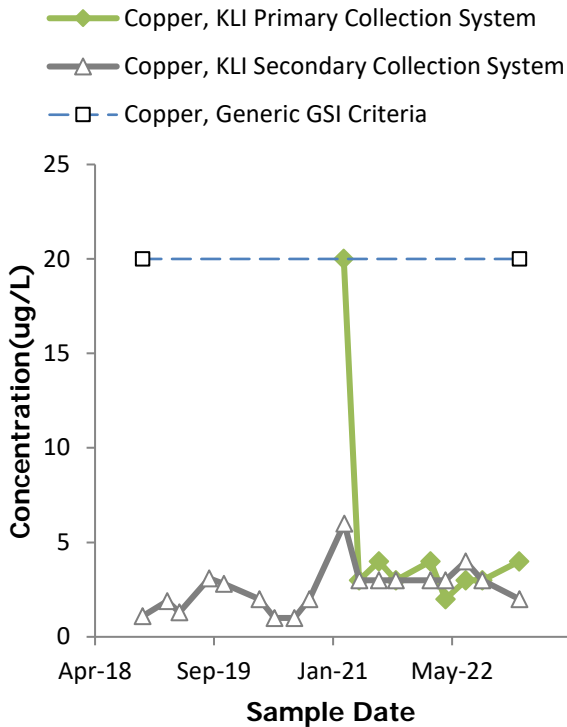
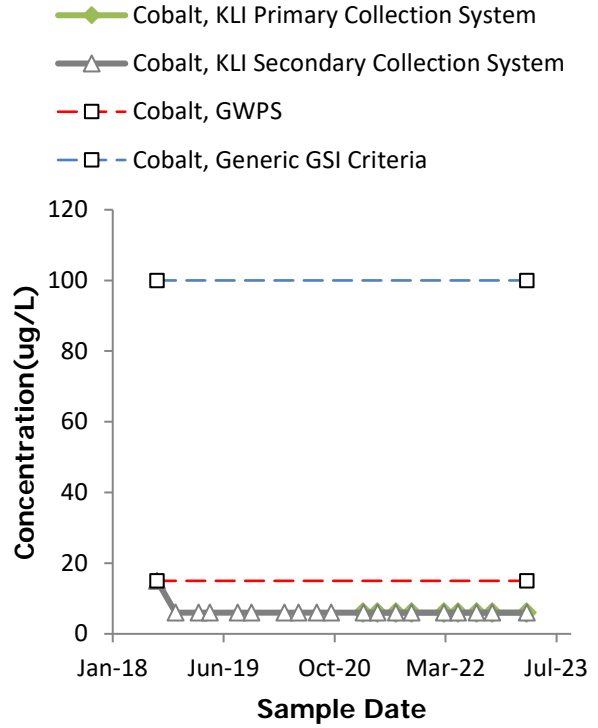
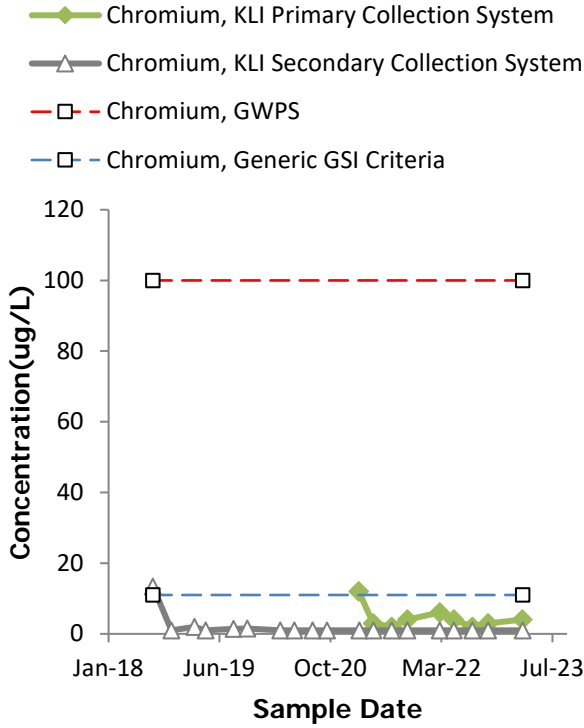
Water Quality Time Series



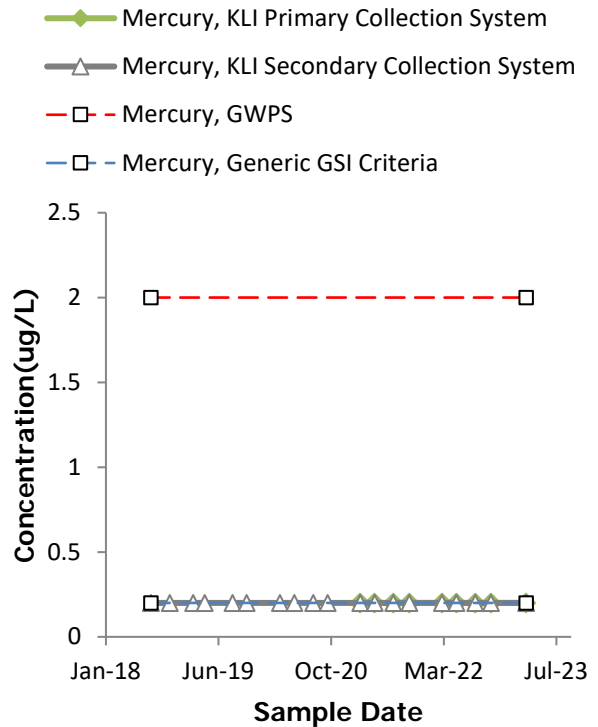
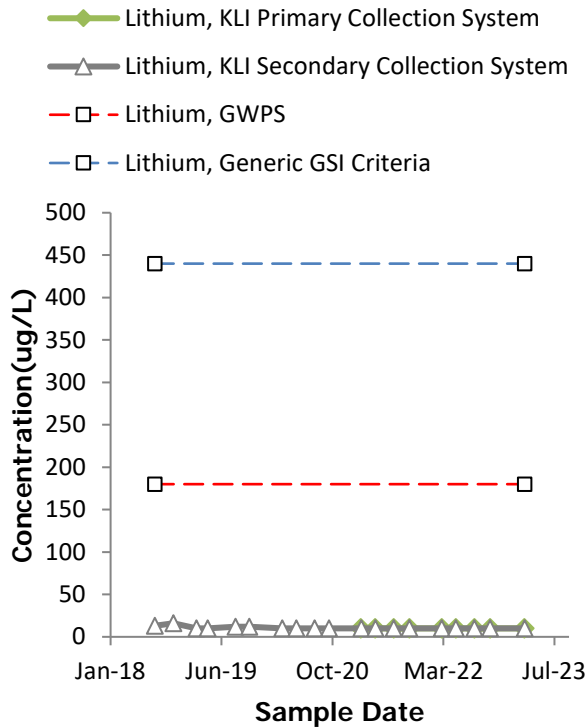
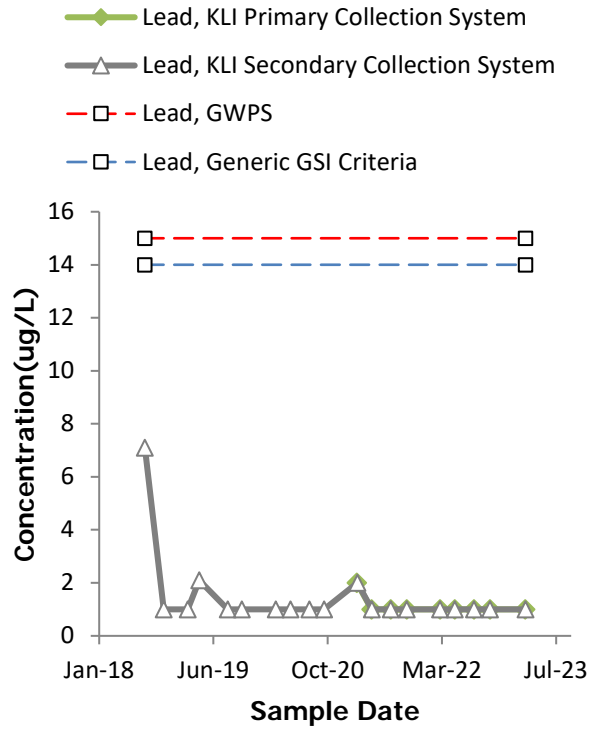
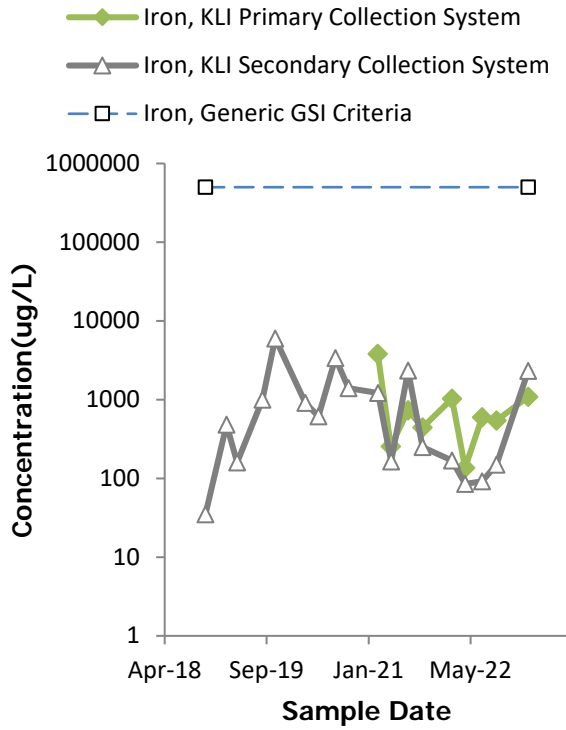
Water Quality Time Series



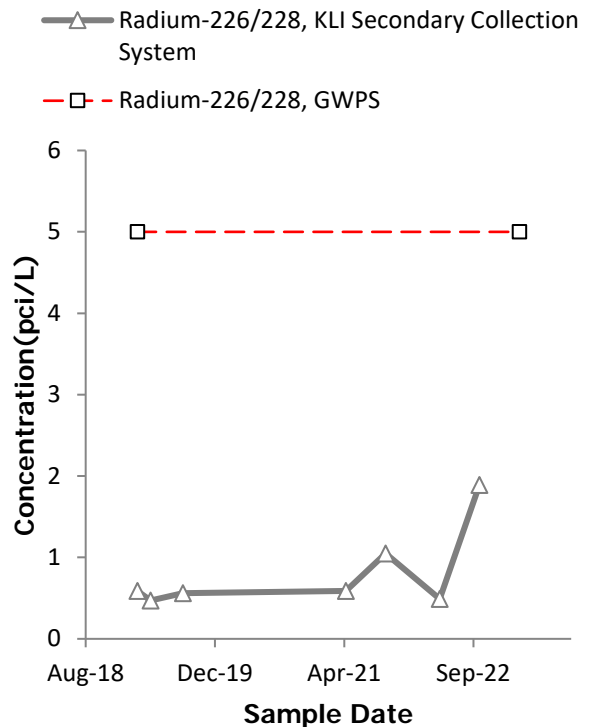
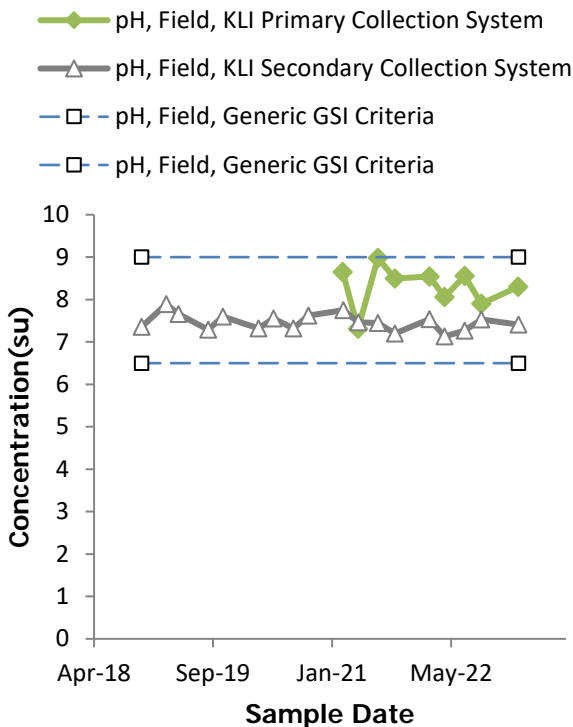
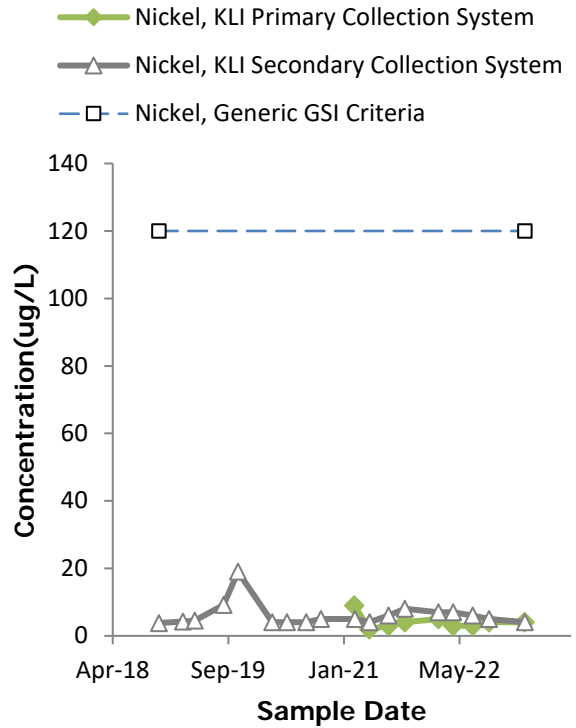
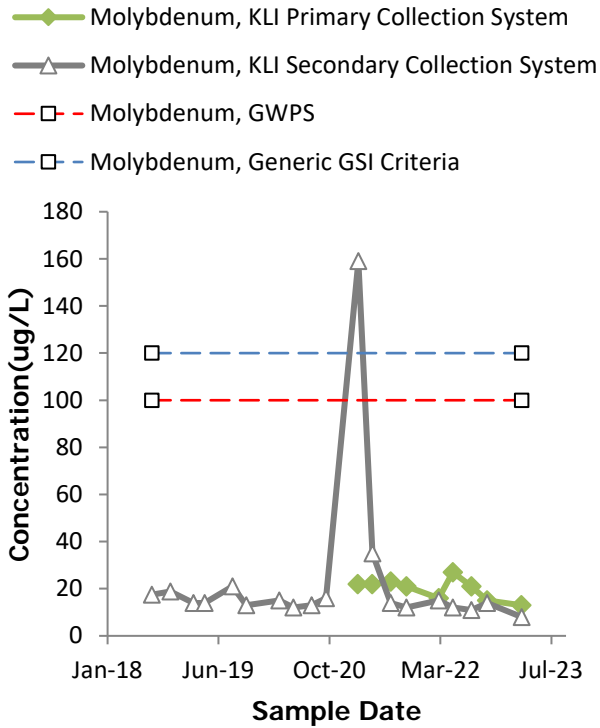
Water Quality Time Series



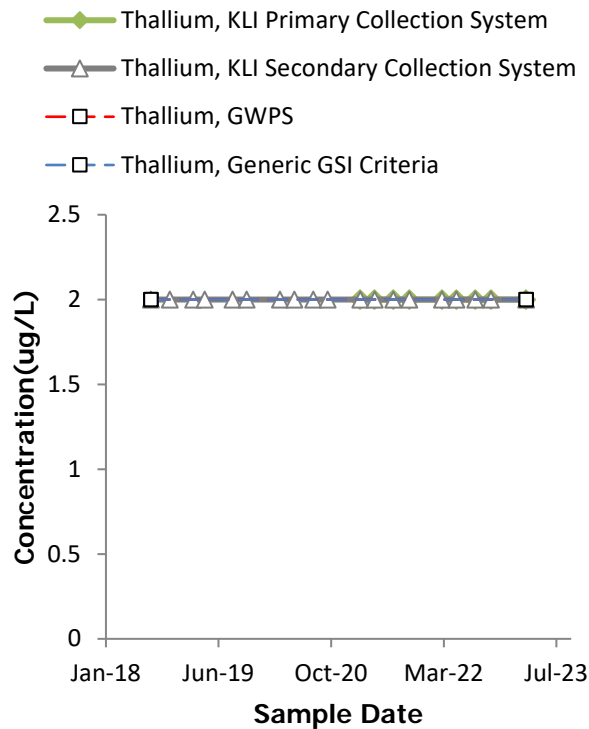
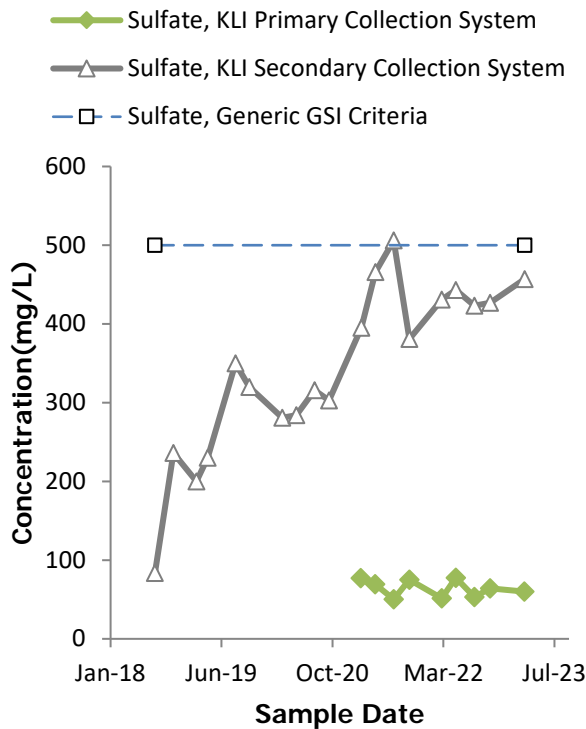
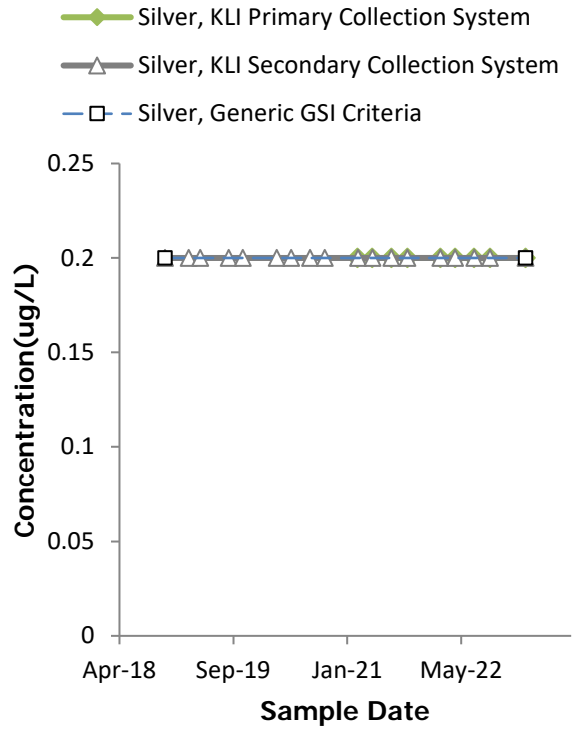
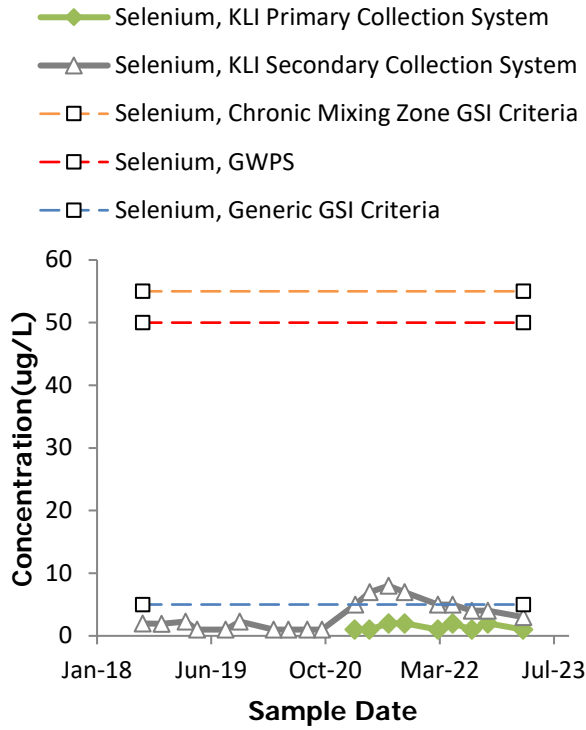
Water Quality Time Series



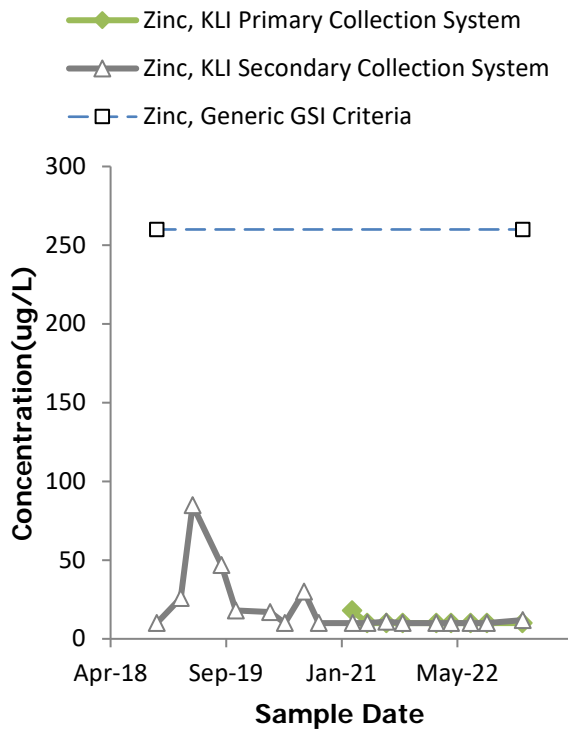
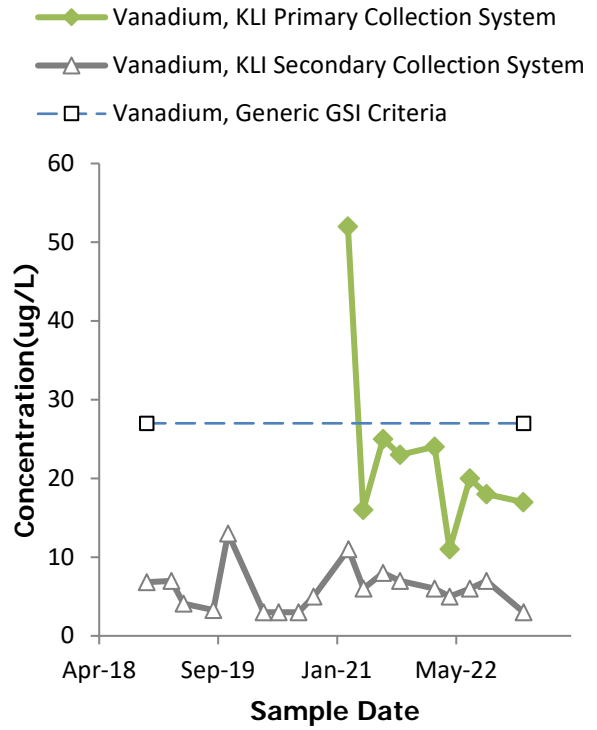
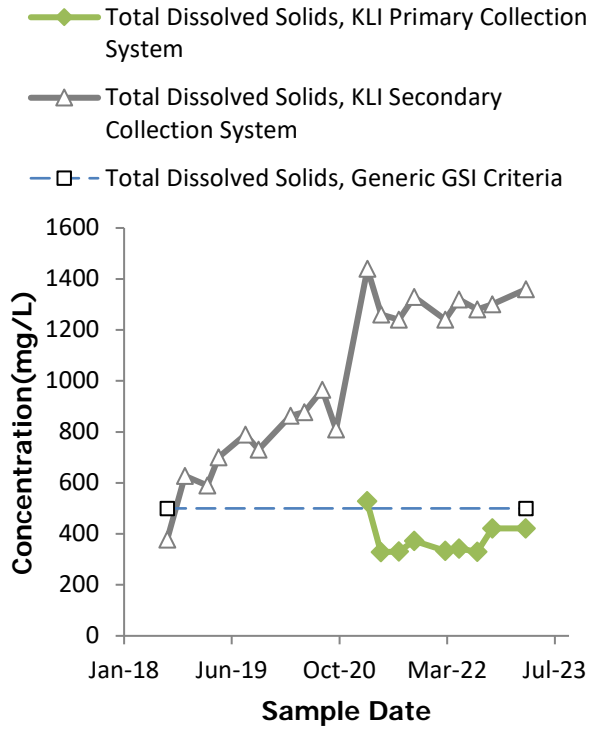
Water Quality Time Series



Water Quality Time Series



Water Quality Time Series

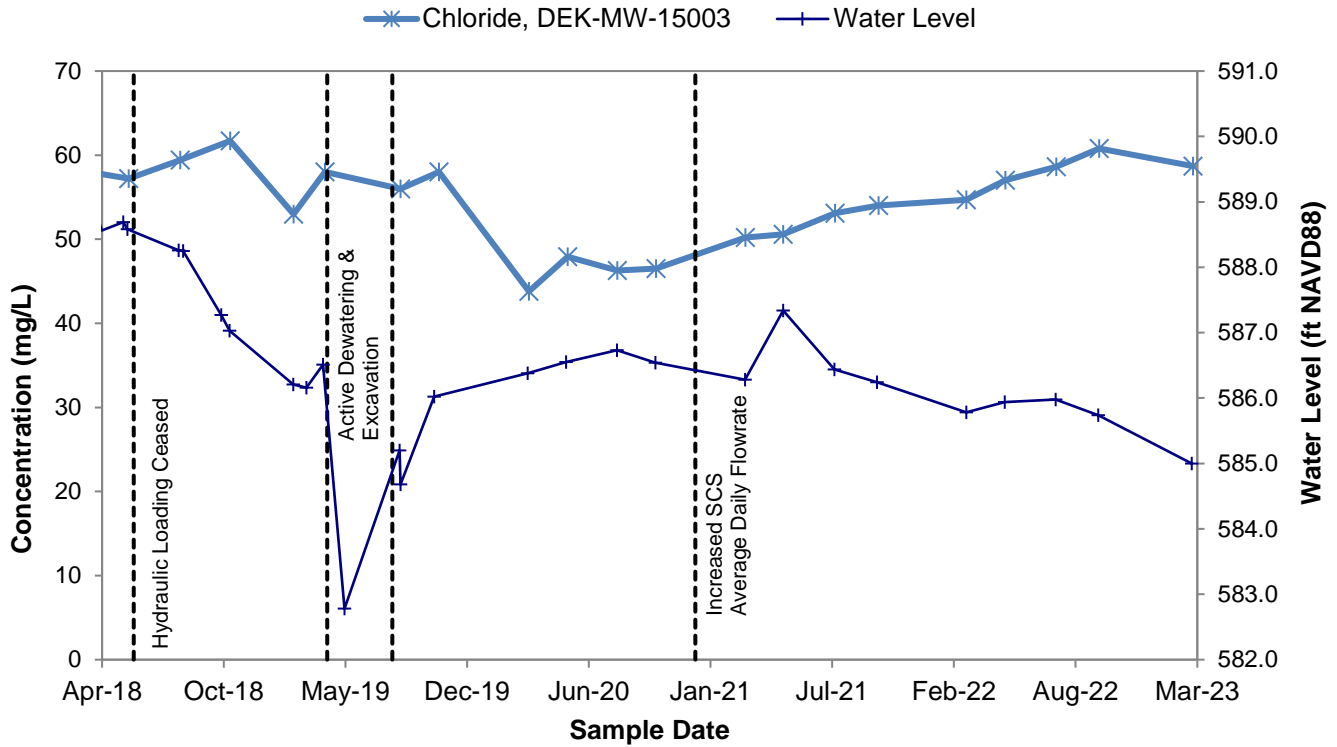


Appendix F

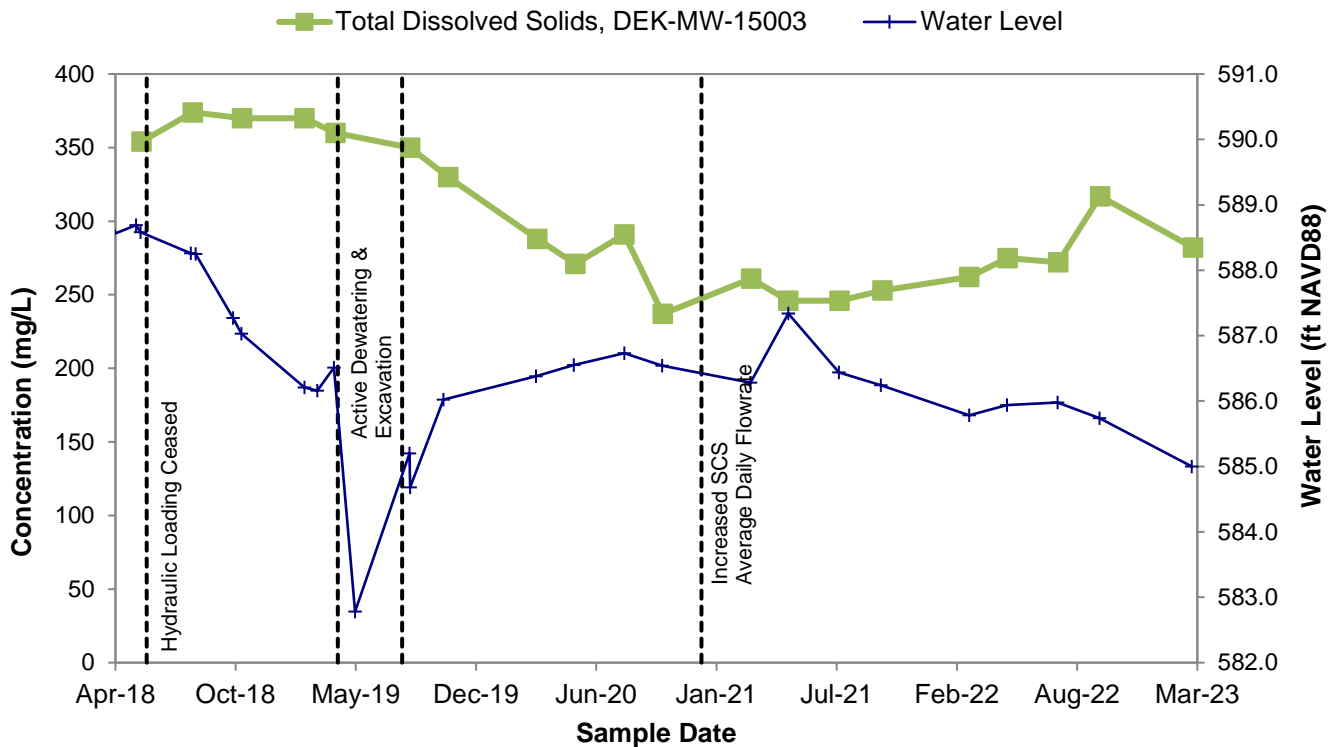
Alternate Source Demonstration

Alternate Source Demonstration Time Series

Chloride at DEK-MW-15003

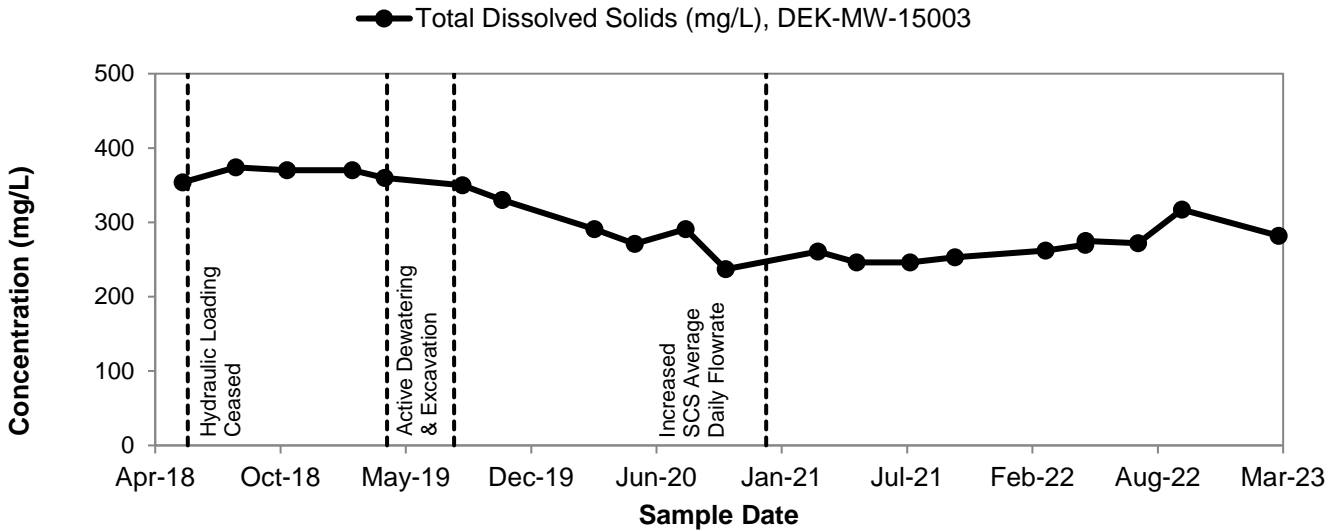
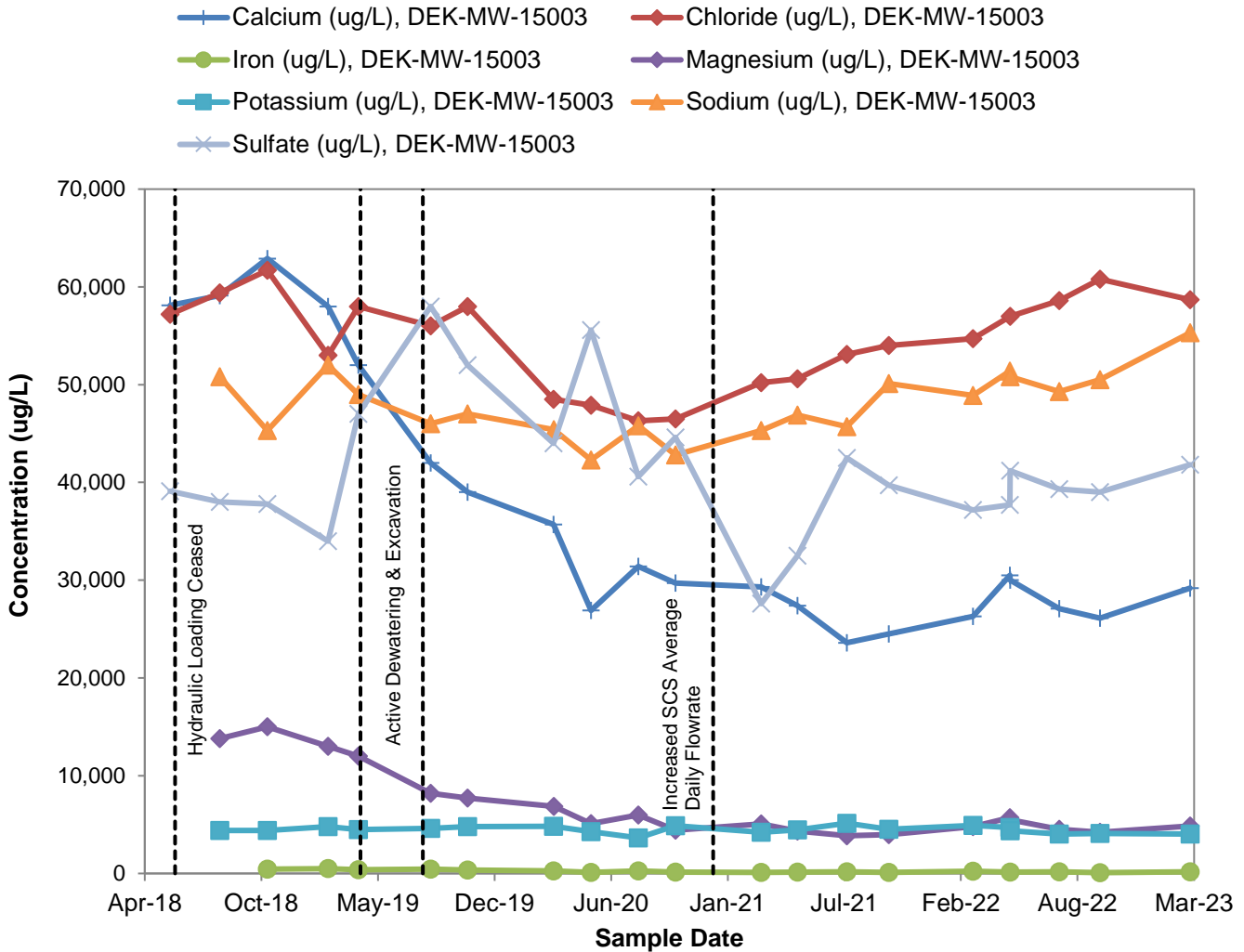


Total Dissolved Solids at DEK-MW-15003



Alternate Source Demonstration Time-Series

DEK-MW-15003





Second Quarter 2023 Hydrogeological Monitoring Report

DE Karn Lined Impoundment CCR Unit

Essexville, Michigan

July 2023

A handwritten signature in blue ink that reads "Darby Litz".

Darby Litz
Project Manager/Hydrogeologist

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

A handwritten signature in blue ink that reads "Andrew Whaley".

Andrew Whaley
Project Geologist

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APPENDICES

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1.0 Introduction

Pursuant to the Federal CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After Consumers Energy established the groundwater monitoring system and detection monitoring program pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 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 amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Second Quarter 2023 Karn Lined Impoundment 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 impoundment. 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, *Format for Solid Waste Disposal Facility Monitoring Submittals*, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (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 Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

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.

1. Monitoring of secondary collection system flow rates and water quality to detect leaks in the liner; and
2. Groundwater monitoring to determine if there are potential new releases from the Karn Lined Impoundment.

Based on sampling results for the second quarter 2023, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

1.3 Site Overview

The Karn Lined Impoundment is located within the DE Karn Power Plant site (Site) located north of the former JC Weadock Power Plant, east of the Saginaw River, south and west of Saginaw Bay (Figure 1). Two coal-fired power generating units (Karn Units 1 & 2) began generating electricity in 1958 and 1959, respectively. Karn Units 3 & 4, co-located with the coal-fired generating units, are oil- and natural gas-fueled. Two other areas of coal ash management within the Karn site are the former Karn Bottom Ash Pond that was closed by removal and the Karn Landfill that was certified closed and now in post-closure care.

1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. 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 (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 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 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. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

The Site is bound by several surface water features (Figures 1 and 2): the Saginaw River to the west, Saginaw Bay (Lake Huron) to the north and east, and a discharge channel to the south. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In the vicinity of the Karn Lined Impoundment, the shallow groundwater flow is generally radial, with a potentiometric high point near the unlined ditch north of the Karn Lined Impoundment and near DEK-MW-15003, flowing outward toward the surrounding surface water bodies.

2.0 Second Collection System Monitoring

Consumers Energy initiated secondary collection system flow monitoring to comply with the EGLE-approved HMP in December 2020. The SCS serves as a leak detection system and the SCS flow rate data is used to demonstrate compliance with Part 115. Consumers Energy continues to comply with the requirements for unmonitorable units under Rule 437 of the Part 115 Rules.

Increased average daily flow rates noted for the period from December 10, 2020 – January 6, 2021 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner in 2021, the daily average flow rates were reduced, and the three-month average dropped below the response action flow rate of 25 gallons per acre per day (GPAD). The average daily flow rate for April through June 2023 (three-month average) was calculated as 1.5 GPAD and continues to demonstrate that the daily average flow rate is below the threshold value of the response action flow rate of 25 GPAD. Trend evaluations for weekly and monthly average flow rates continue to support that no additional engineering or operational modifications are necessary, and Consumers continues to document this information in their operating record.

In response to the prior exceedance of the SCS Response Action Flow Rate, samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

- Primary Indicator Parameters: Section 11511a(3)(c) - Detection Monitoring Constituents
- Alternative Indicator Parameters: Section 11519b(2) - Assessment Monitoring Constituents
- Optional Analyses in support of Piper or Stiff diagrams

The KLI-PCS and KLI-SCS data were evaluated for comparison to groundwater quality and water chemistry and to also assess potential of hazard and mobility of constituents. A series of time-series plots are included in Appendix E to illustrate water quality data changes over time for the secondary collection system from the start of operation in June 2018 to present. This analysis demonstrates that each monitored constituent is generally present at concentrations less than the Groundwater Protection Standard (GWPS) established under 40 CFR 257.95(h) for the Karn Bottom Ash Pond or generic groundwater surface water interface (GSI) criteria adopted by the Department pursuant to Section 20120a, with the exception of total dissolved solids and chloride. A few notable observations:

- **Arsenic concentrations are higher in groundwater than the primary and secondary collection system:** Arsenic was detected in the primary collection system at a concentration of 1 ug/L and in the secondary collection system at a concentration of 1 ug/L in May 2023. As shown in Appendix E, the arsenic concentrations observed in the primary and secondary collections system have been consistently low. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the repaired liner areas, is 62 ug/L, which is consistent with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- **Vanadium is detected in the primary and secondary collection system and not in groundwater:** Vanadium is generally present in the primary collection system samples at higher concentrations (8 ug/L in May 2023) than the vanadium concentration observed in the secondary collection system (4 ug/L in May 2023) (Appendix E). Vanadium was not detected in the wells nearest the observed liner damage: OW-12 (<2 ug/L) or DEK-MW-18001 (<2 ug/L) providing additional evidence that a release has not adversely affected groundwater conditions.
- **Secondary Collection System chemistry has not appreciably changed:** The time series plots in Appendix E show relatively stable trends in chemistry for samples collected from the primary and secondary collection systems, except for total dissolved solids (TDS) and sulfate in the secondary collection system. TDS and sulfate concentrations in the primary collection system leachate is significantly lower in concentration than the concentration in the secondary collection system leachate, suggesting that the elevated TDS and sulfate is not likely from the primary collection system leachate. The TDS and sulfate concentrations in the secondary collection system are beginning to stabilize and are also more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.

Water quality data collected for this event are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored.

3.0 Groundwater Monitoring

3.1 Monitoring Well Network

In accordance with §257.91, Consumers Energy developed a groundwater monitoring system for the Karn Lined Impoundment prior to the initial receipt of waste in the CCR unit (TRC, 2018c). Given the radial groundwater flow direction and that constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the Karn Bottom Ash Pond, the groundwater monitoring system design incorporates an intrawell statistical approach for detection monitoring as described in the HMP and in accordance with the “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance” (USEPA, 2009). Five monitoring wells that are screened in the uppermost saturated unit were selected for the Karn Lined Impoundment HMP detection monitoring (DEK-MW-15003, DEK-MW-18001, OW-10, OW-11, and OW-12). Monitoring well locations are shown on Figure 2.

3.2 May 2023 Detection Monitoring Event

In accordance with the HMP, TRC conducted the second quarter 2023 monitoring event for the Karn Lined Impoundment between May 1st and 3rd, 2023. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the second quarter 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

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

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide further evaluation of groundwater chemistry. Analytical results from this event monitoring event are included in the attached laboratory reports (Appendix A).

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 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 B).

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. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater 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 one field blank, one equipment blank, one field duplicate (OW-12), and field matrix spike/matrix spike duplicate samples collected at DEK-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 data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during this groundwater monitoring event are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in May 2023 are generally within the range of 578 to 587 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the

process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in the vicinity of the former Karn Bottom Ash Pond in May 2023 demonstrate a reduction in groundwater elevation measurements by several feet when compared to the measurements collected prior to June 2018, when active loading was occurring to the bottom ash pond. Groundwater at the Site is locally influenced by incidental infiltration from precipitation over the uncovered acreage and the unlined low volume miscellaneous wastewater conveyance associated with the permitted NPDES discharge system, which is located just north of the Karn Lined Impoundment. Monitoring wells OW-11, OW-12, and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric “high”, as illustrated in Figure 3.

The average hydraulic gradient observed on May 1, 2023 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0050 ft/ft. The gradients were calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005, DEK-MW-15003/DEK-MW-15006, and OW-11/MW-08, as well as the monitoring well water elevation difference and distance between DEK-MW-18001 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same date as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.25 ft/day or 91 ft/year in May 2023 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

Due to the operational changes of the former bottom ash pond and the completion of the landfill capping activities in 2020, the gradient between the area of the Karn Bottom Ash Pond and Karn Lined Impoundment and the surrounding surface water bodies is flattening out as compared to previous quarters and is also attempting to reach a new equilibrium, as expected. The general flow direction relative to the Karn Lined Impoundment is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III/IV parameters that could potentially migrate from the Karn Lined Impoundment.

4.0 Data Evaluation

Based on sampling results for this event the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the second quarter 2023 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria and the generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017 and in accordance with the December 23, 2015 mixing zone determination.

4.1 Statistical Evaluation of Trends

Groundwater in the vicinity of the Karn Lined Impoundment has been affected by CCR management before commencement of operation (January 2019, TRC). Given that the constituents associated with CCR currently managed in the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, intrawell trend tests, in conjunction with KLI-SCS flow rates, will be utilized to assess whether a release has occurred from operation of the unit. The detection monitoring constituent concentrations will be analyzed using Mann-Kendall and Sen's Slope trend tests to determine if there is an upward trend that may indicate a release from the Karn Lined Impoundment. The data will be analyzed in the context of the Site hydrogeologic characteristics, and an assessment made as to whether the source of an upward trend, if identified, is from a possible release from the Karn Lined Impoundment, another on-site release, or on-site migration of nearby impact (i.e., former Karn Bottom Ash Pond).

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas™ Statistical Software (Sanitas™). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from July 2021 through May 2023 were analyzed using Mann-Kendall and Sen's Slope 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. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.

Data trends for detection monitoring constituents are generally stable (i.e., no trend) or declining for the majority of the monitoring well/constituent pairs with the following exceptions:

- The increasing trend in chloride and total dissolved solids concentrations continue to be observed in DEK-MW-15003.
- The increasing trend for pH continued to be observed in OW-11.

4.2 Detection Monitoring Data Discussion

Groundwater quality is generally consistent with previous monitoring events and the majority of the well/constituent pairs are exhibiting no trend or decreasing concentrations. Although increasing trends of detection monitoring (Appendix III) constituents exist, the groundwater conditions do not conclusively indicate a release from the unit, as discussed further in Section 4.3. The location of one of the identified liner damage locations was approximately 40-ft upgradient from monitoring well OW-12 and the second location was approximately 130-ft upgradient from monitoring well DEK-MW-18001. Both leaks have been repaired. Detection monitoring constituent concentrations at OW-12, located closest to the identified liner damage, exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The increasing trends at noted in section 4.1 will continue to be evaluated within context of changes in the site operational status.

4.3 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed below:

- pH in monitoring well OW-11; and
- Chloride and total dissolved solids in monitoring well DEK-MW-15003.

Although increasing trends of detection monitoring (Appendix III) constituents exist, as noted in Section 4.1, 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 F.

4.3.1 Timing of Changes in Concentrations

Time-series plots included in Appendix F illustrate that the change in chloride and TDS at DEK-MW-15003 is likely a result of changes in the groundwater flow regime or redox conditions as a result of the Bottom Ash Pond closure activities, rather than a result of a release from the unit.

- Chloride and TDS at DEK-MW-15003 initially decreased after the Bottom Ash Pond closure activities. In early 2020, chloride concentrations began to increase, followed by increases in TDS beginning in 2021. Both constituents appear to be approaching the concentrations observed pre-construction. Chloride is one of the components of TDS. Other components of TDS, such as calcium, iron, magnesium, potassium, sodium, and sulfate have remained relatively consistent from 2020 to present and the increases in TDS are correlated with the increases in chloride. The slight increase in chloride began before the noted leak in the Karn Lined Impoundment liner system was observed; therefore, the recent increase in concentrations is not due to a release from the unit.

4.3.2 Groundwater Flow Direction

OW-11 and DEK-MW-15003 are not located downgradient of either area of the noted liner damage, due to the position of the wells relative to the groundwater elevation high point, as shown in Figure 3. Furthermore, OW-11 has distinct chemistry as compared to the KLI-SCS data as shown in Table 3. Boron, which can be used as a conservative tracer, is approximately six times higher in OW-11 than what has been observed in the KLI-SCS samples. The pH observed at OW-11 is 2 standard units higher than what is observed in the KLI-SCS sample and higher than other nearby wells, which indicate a source other than the Karn Lined Impoundment is influencing chemistry at OW-11.

4.3.3 Leachate Chemistry

Analysis of the KLI-PCS and KLI-SCS data provide additional lines of evidence to support a source other than the unit is contributing to groundwater conditions.

- Arsenic concentrations are higher in groundwater than in the secondary collection system; therefore, arsenic present in groundwater does not appear to be a result of a release from the unit (Section 2.0).
- Vanadium is detected in the primary and secondary collection system and not in groundwater in the wells nearest the observed liner damage OW-12 or DEK-MW-18001 (<2 ug/L), providing additional evidence that a release has not adversely affected groundwater conditions.

5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in two wells in second quarter 2023, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the May 2023 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in fourth quarter 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored and recent data demonstrate that the daily average flow rate has been reduced to less than the threshold value of the Response Flow Rate of 25 gallons per acre per day after the documented repairs and response activities were completed in 2021. The third quarter monitoring event is scheduled for July 2023.

6.0 References

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Tables

Table 1
 Summary of Groundwater Elevation Data
 DE Karn Lined Impoundment – 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)
DEK Bottom Ash Pond					
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.35	584.52
DEK-MW-15005	589.72	Sand	572.3 to 567.3	9.90	579.82
DEK-MW-15006	589.24	Sand	573.0 to 568.0	9.44	579.80
DEK Bottom Ash Pond & Karn Lined Impoundment					
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.89	584.58
Karn Lined Impoundment					
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.90	585.84
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	7.08	584.50
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	22.30	585.60
OW-12	603.10	Silty Sand	584.2 to 579.2	17.14	585.96
DEK Nature and Extent					
DEK-MW-15004	611.04	Sand	576.6 to 571.6	28.25	582.79
MW-01	597.02	Sand	573.0 to 570.0	17.20	579.82
MW-03	597.30	Sand	569.8 to 566.8	17.58	579.72
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	9.44	580.00
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.68	581.10
MW-10	596.97	Sand	582.5 to 572.5	16.75	580.22
MW-12	598.60	Sand	583.9 to 573.9	18.63	579.97
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	14.55	579.82
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	16.14	579.66
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.81	582.18
MW-23	595.57	Ash/Sand	576.9 to 571.9	13.90	581.67
DEK Static Water Level					
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	17.50	579.84
MW-04	598.01	NR	569.5 to 564.5	18.30	579.71
MW-17	597.91	Sand	577.0 to 574.0	13.42	584.49
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.90	583.32
MW-19	597.28	NR	572.1 to 567.1	19.15	578.13
MW-20	632.75	Sand	582.3 to 579.3	52.67	580.08
MW-21	632.91	Sand	587.1 to 584.1	51.10	581.81
OW-01	631.33	NR	572.5 to 567.5	51.14	580.19
OW-02	598.01	Fly Ash	579.4 to 576.4	15.70	582.31
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	17.18	580.76
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	10.40	579.81
OW-05	593.53	Sand	576.9 to 571.9	15.00	578.53
OW-06	603.95	NR	580.9 to 575.9	17.20	586.75
OW-07	596.41	Ash	583.3 to 580.3	15.11	581.30
OW-08	593.93	NR	581.0 to 576.0	10.88	583.05
OW-09	593.45	NR	585.5 to 580.5	10.33	583.12
OW-13	588.52	NR	579.5 to 574.5	3.86	584.66
OW-15	587.75	NR	572.8 to 567.8	3.40	584.35

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.

NR: Not Recorded

Table 2
 Summary of Field Parameters
 DE Karn Lined Impoundment – 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)
Karn Lined Impoundment							
DEK-MW-15003	5/2/2023	1.43	-208.7	8.0	344	13.7	0.2
DEK-MW-18001	5/3/2023	0.19	-228.5	7.6	858	9.6	9.9
KLI-PCS	5/2/2023	11.90	-85.7	9.3	241	8.7	12
KLI-SCS	5/2/2023	6.73	487.2	6.8	1,534	10.4	0.5
OW-10	5/2/2023	1.63	-151.3	7.3	550	9.2	34
OW-11	5/2/2023	1.89	-184.0	9.7	271	10.1	1.6
OW-12	5/2/2023	2.00	-102.1	7.1	855	10.9	6.3
SW-DITCH	5/2/2023	9.70	-17.8	8.4	391	16.2	8.4

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 Lined Impoundment – Hydrogeological Monitoring Program
 Essexville, Michigan

		Sample Location: DEK-MW-15003 DEK-MW-18001 OW-10 OW-11 OW-12 KLI-PCS KLI-SCS SW-DITCH												
		Sample Date: 5/2/2023 5/3/2023 5/2/2023 5/2/2023 5/2/2023 5/2/2023 5/2/2023												
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Upgradient	Downgradient		Upgradient	Downgradient	Supplemental			
Appendix III⁽¹⁾														
Boron	ug/L	NC	500	500	4,000	701	931	998	3,400	1,340	593	603	33	
Calcium	mg/L	NC	NC	NC	500 ^{EE}	24.4	54.6	98.8	6.42	124	48.5	102	48	
Chloride	mg/L	250**	250 ^E	250 ^E	50	58.9	62.2	56.9	56.1	59.4	51.3	53.6	42.8	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,960	< 1,000	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250**	250^E	250^E	500 ^{EE}	50.2	148	8.28	17.6	265	114	496	26.1	
Total Dissolved Solids	mg/L	500**	500^E	500^E	500	285	575	517	224	820	337	1,400	281	
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5^E	6.5 - 8.5^E	6.5 - 9.0	8.0	7.6	7.3	9.7	7.1	9.3	6.8	8.4	
Appendix IV⁽¹⁾														
Antimony	ug/L	6	6.0	6.0	2.0	< 1.0	< 1.0	< 1.0	3	< 1.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	10	10	10	418	304	3	837	62	1	1	2	
Barium	ug/L	2,000	2,000	2,000	1,200	36	152	146	24	168	425	62	58	
Beryllium	ug/L	4	4.0	4.0	33	< 1.0	< 1.0	< 1.0	< 1.0	< 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	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	1	< 1.0	< 1.0	2	< 1.0	< 1.0	
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,960	< 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	< 1.0	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	170	350	440	20	20	26	< 10	44	< 10	< 10	< 10	
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Molybdenum	ug/L	NC	73	210	120	28	11	< 5	157	7	51	10	8	
Selenium	ug/L	50	50	50	5.0	1	1	2	5	1	2	4	1	
Thallium	ug/L	2	2.0	2.0	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
Additional MI Part 115⁽²⁾														
Iron	ug/L	300**	300^E	300^E	500,000 ^{EE}	89	875	3,660	90	8,580	176	29	422	
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1.0	< 1.0	2	1	< 1.0	1	2	10	
Nickel	ug/L	NC	100	100	120	< 2.0	< 2.0	3	2	3	< 2.0	4	3	
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Vanadium	ug/L	NC	4.5	62	27	< 2.0	< 2.0	3	743	< 2.0	8	4	2	
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 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.

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

NC - no criteria; -- - not analyzed.

* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020.

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

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO₃/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote (G) of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote (H). GSI criterion is protective for surface water used as a drinking water source as described in footnote (X). GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote (FF)

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

E - Criterion is the aesthetic drinking water value per footnote (E).

EE - Criterion is based on the total dissolved solids GSI value per footnote (EE).

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

Table 4
 Summary of Statistical Exceedances
 DE Karn Lined Impoundment – 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: Karn Lined Impoundment – WDS# 392503

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								

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



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

PROJECT:	CONSUMERS ENERGY COMPANY DE KARN AND JC WEADOCK POWER PLANTS ESSEXVILLE, MICHIGAN
TITLE:	SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	J. KRENZ
APPROVED BY:	D. LITZ
DATE:	JULY 2023
PROJ. NO.:	514404.0001
FILE:	514404_0001_001.mxd
FIGURE 1	

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
 Map Rotation: 0
 Plot Date: 7/20/2023 01:56:08 AM by ADAIR -- LAYOUT: ANSIBI(11"x17")
 Path: T:\1-PROJECTS\Consumers Energy\464095 DEKARN2-APRX\514404-SLM-002-2023Q3.mxd

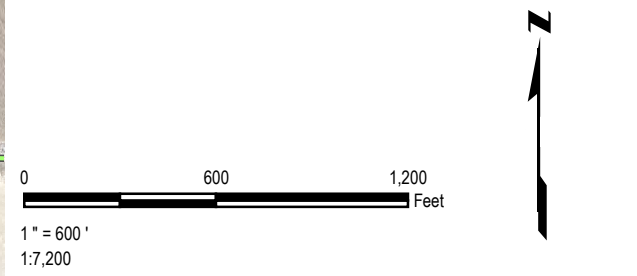


LEGEND

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL)
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- SECONDARY CONTAINMENT SUMP (KLI-SCS)
- PRIMARY CONTAINMENT SYSTEM SAMPLE (KLI-PCS)
- SURFACE WATER SAMPLE (SW-DITCH)
- SLURRY WALL (APPROXIMATE)
- LINED IMPOUNDMENT (COVENANT BOUNDARY)

NOTES

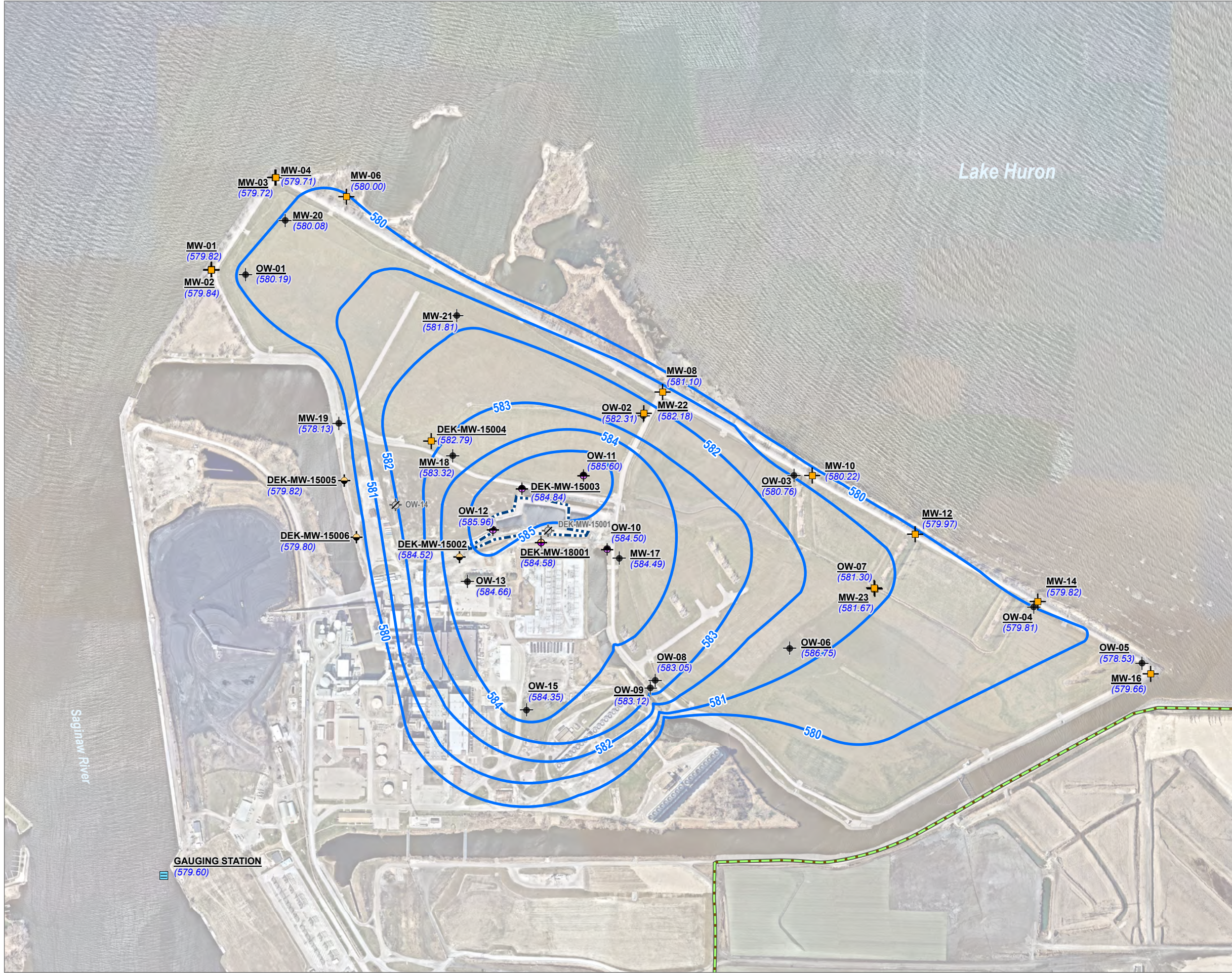
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02, MW-03/MW-04, OW-02/MW-22, AND OW-07/MW-23 AS THE WELLS ARE LOCATED WITHIN 15-FT OF EACH OTHER.



PROJECT:		CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE:		SITE LAYOUT MAP	
DRAWN BY:	A. ADAIR	PROJ NO.:	464095.0001
CHECKED BY:	J. KRENZ	FIGURE 2	
APPROVED BY:	D. LITZ		
DATE:	JULY 2022		
FILE NO.:		514404-SLM-002-2023Q3.mxd	

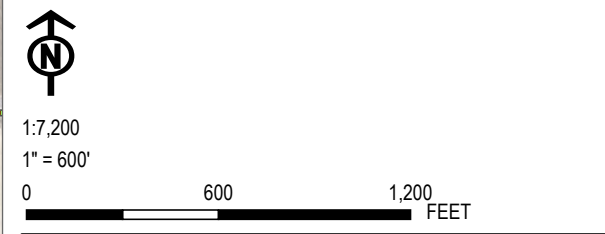
1540 Eisenhower Place
 Ann Arbor, MI 48108-3284
 Phone: 734.971.7080
 www.trccompanies.com

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
 - Saved By: A.ADAIR on 7/20/2023, 01:36:47 AM; File Path: T:\PROJECTS\Consumers_Energy\464095_DEKARN\5-APRX\464095_DEKARN.aprx; Layout Name: 514404-SCW-003-202302



- LEGEND**
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
 - DEK BOTTOM ASH POND MONITORING WELL
 - DEK LINED IMPOUNDMENT MONITORING WELL
 - DECOMMISSIONED MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - NATURE AND EXTENT WELL
 - SURFACE WATER GAUGING STATION
 - GROUNDWATER ELEVATION CONTOUR
 - SLURRY WALL (APPROXIMATE)
 - EXTENT OF GEOSYNTHETICS
 - (580.21) GROUNDWATER ELEVATION

- NOTES**
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02 AND MW-03/MW-04 AS THE WELLS ARE LOCATED WITHIN 3-FT OF EACH OTHER.
 5. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



PROJECT: CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE: SHALLOW GROUNDWATER CONTOUR MAP MAY 2023	
DRAWN BY: A. ADAIR	PROJ. NO.: 514404.0001
CHECKED BY: J. KRENZ	FIGURE 3
APPROVED BY: D. LITZ	
DATE: JULY 2023	
1540 EISENHOWER PLACE ANN ARBOR, MI 48108-3284 PHONE: 734.971.7080	
FILE:	464095_DEKARN.aprx

Appendix A

Laboratory Analytical Reports

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 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: 23-0402

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted in 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; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q2-2023 DEK Lined Impoundment
Date Received: 5/3/2023
Chemistry Project: 23-0402

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0402-01	DEK-MW-15003	Groundwater	05/02/2023 10:08	DEK Lined Impoundment
23-0402-02	OW-10	Groundwater	05/02/2023 12:15	DEK Lined Impoundment
23-0402-03	OW-11	Groundwater	05/02/2023 11:15	DEK Lined Impoundment
23-0402-04	OW-12	Groundwater	05/02/2023 13:55	DEK Lined Impoundment
23-0402-05	KLI-SCS	Groundwater	05/02/2023 12:50	DEK Lined Impoundment
23-0402-06	KLI-PCS	Groundwater	05/02/2023 13:10	DEK Lined Impoundment
23-0402-07	SW-DITCH	Groundwater	05/02/2023 14:20	DEK Lined Impoundment
23-0402-08	DUP-KLI	Groundwater	05/02/2023 00:00	DEK Lined Impoundment
23-0402-09	EB-KLI	Water	05/02/2023 14:30	DEK Lined Impoundment
23-0402-10	FB-KLI	Water	05/02/2023 11:15	DEK Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0402-01
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 10:08 AM

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

Aliquot #: 23-0402-01-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	418		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	36		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	701		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	24400		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	89		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	20		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	3950		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	55		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	28		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	4470		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	58000		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	119		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	58900		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0402-01
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 10:08 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	50200		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1570		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-01-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	285		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	71200		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	71200		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	230		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0402-02
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:15 PM

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

Aliquot #: 23-0402-02-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	3		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	146		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	998		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	98800		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	2		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	3660		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	26		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	18000		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	329		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	3		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	5700		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	2		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	61000		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	3		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	56900		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0402-02
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:15 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	8280		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3360		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-02-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	517		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-02-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	424000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	424000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-02-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	120		ug/L	20.0	05/05/2023	AB23-0504-03

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa Aliquot #: 23-0402-02-C08-A01 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Arsenic	2		ug/L	1.0	05/09/2023	AB23-0510-15
Barium	129		ug/L	5.0	05/09/2023	AB23-0510-15
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Boron	1040		ug/L	20.0	05/09/2023	AB23-0510-15
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-15
Calcium	97600		ug/L	1000.0	05/09/2023	AB23-0510-15
Chromium	3		ug/L	1.0	05/09/2023	AB23-0510-15
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-15
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Iron	3050		ug/L	20.0	05/09/2023	AB23-0510-15
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Lithium	25		ug/L	10.0	05/09/2023	AB23-0510-15
Magnesium	18100		ug/L	1000.0	05/09/2023	AB23-0510-15

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0402-02
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:15 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa

Aliquot #: 23-0402-02-C08-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Manganese	324		ug/L	5.0	05/09/2023	AB23-0510-15
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-15
Nickel	3		ug/L	2.0	05/09/2023	AB23-0510-15
Potassium	5490		ug/L	100.0	05/09/2023	AB23-0510-15
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-15
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-15
Sodium	59500		ug/L	1000.0	05/09/2023	AB23-0510-15
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-15
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-15
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-15

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0402-03
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 11:15 AM

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

Aliquot #: 23-0402-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	3		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	837		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	24		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	3400		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	6420		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	1		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	90		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	157		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	2		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	4460		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	5		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	62900		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	743		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	272		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	56100		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0402-03
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 11:15 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	2960		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	17600		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	12500		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-03-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	224		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-03-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	93900		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	15200		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	78800		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-03-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0402-04
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 01:55 PM

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

Aliquot #: 23-0402-04-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	62		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	168		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	1340		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	124000		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	8580		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	44		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	47400		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	271		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	7		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	3		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	8300		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	65700		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-04-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-04-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-04-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	59400		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0402-04
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 01:55 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-04-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	265000		ug/L	1000.0	05/06/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-04-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1110		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-04-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	820		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-04-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	323000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	323000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-04-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0402-05
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:50 PM

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

Aliquot #: 23-0402-05-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	1		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	62		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	603		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	102000		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	2		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	29		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	37800		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	10		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	4		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	3960		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	4		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	350000		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	4		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-05-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-05-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	1440		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-05-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	53600		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0402-05
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:50 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-05-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	496000		ug/L	1000.0	05/06/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-05-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-05-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-05-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	602000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	602000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-05-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0402-06
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 01:10 PM

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

Aliquot #: 23-0402-06-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	1		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	425		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	593		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	48500		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	2		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	1		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	176		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	10600		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	51		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	4890		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	2		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	35500		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	8		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-06-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-06-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	764		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	666		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-06-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	51300		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0402-06
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 01:10 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-06-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	114000		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-06-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-06-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	337		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-06-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	57600		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	57600		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-06-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0402-07
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 02:20 PM

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

Aliquot #: 23-0402-07-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	2		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	58		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	33		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	48000		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	10		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	422		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	1		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	15900		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	23		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	8		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	3		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	2050		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	28000		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	2		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-07-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-07-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	927		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-07-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	42800		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0402-07
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 02:20 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-07-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	26100		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-07-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	70		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-07-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	281		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-07-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	158000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	158000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-07-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0402-08
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:00 AM

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

Aliquot #: 23-0402-08-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	3		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	143		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	960		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	101000		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	2		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	3560		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	25		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	17600		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	313		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	3		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	5700		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	2		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	60500		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	3		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-08-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-08-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

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

Aliquot #: 23-0402-08-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	58900		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0402-08
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:00 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0402-08-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	5790		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0402-08-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3680		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0402-08-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	511		mg/L	10.0	05/03/2023	AB23-0503-07

Alkalinity by SM 2320B Aliquot #: 23-0402-08-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	424000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	424000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Carbonate	ND		ug/L	10000.0	05/05/2023	AB23-0505-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0402-08-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa Aliquot #: 23-0402-08-C08-A01 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Arsenic	2		ug/L	1.0	05/09/2023	AB23-0510-15
Barium	131		ug/L	5.0	05/09/2023	AB23-0510-15
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Boron	1020		ug/L	20.0	05/09/2023	AB23-0510-15
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-15
Calcium	97700		ug/L	1000.0	05/09/2023	AB23-0510-15
Chromium	2		ug/L	1.0	05/09/2023	AB23-0510-15
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-15
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Iron	3100		ug/L	20.0	05/09/2023	AB23-0510-15
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-15
Lithium	26		ug/L	10.0	05/09/2023	AB23-0510-15
Magnesium	18100		ug/L	1000.0	05/09/2023	AB23-0510-15

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0402-08
 Matrix: Groundwater

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa

Aliquot #: 23-0402-08-C08-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Manganese	323		ug/L	5.0	05/09/2023	AB23-0510-15
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-15
Nickel	2		ug/L	2.0	05/09/2023	AB23-0510-15
Potassium	5470		ug/L	100.0	05/09/2023	AB23-0510-15
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-15
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-15
Sodium	60200		ug/L	1000.0	05/09/2023	AB23-0510-15
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-15
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-15
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-15

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **EB-KLI**
 Lab Sample ID: 23-0402-09
 Matrix: Water

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 02:30 PM

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

Aliquot #: 23-0402-09-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	ND		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	ND		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	ND		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-09-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-09-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0402-09-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	05/12/2023	AB23-0512-02



Analytical Report

Report Date: 05/19/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **EB-KLI**
Lab Sample ID: 23-0402-09
Matrix: Water

Laboratory Project: **23-0402**
Collect Date: 05/02/2023
Collect Time: 02:30 PM

Sulfide, Total by SM 4500 S2D **Aliquot #: 23-0402-09-C04-A01** **Analyst: Merit**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **FB-KLI**
 Lab Sample ID: 23-0402-10
 Matrix: Water

Laboratory Project: **23-0402**
 Collect Date: 05/02/2023
 Collect Time: 11:15 AM

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

Aliquot #: 23-0402-10-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	ND		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	ND		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	ND		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	ND		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	ND		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	ND		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	ND		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0402-10-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0402-10-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/03/2023	AB23-0503-05
Nitrite	ND		ug/L	100.0	05/03/2023	AB23-0503-05

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0402-10-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	05/12/2023	AB23-0512-02



Analytical Report

Report Date: 05/19/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **FB-KLI**
Lab Sample ID: 23-0402-10
Matrix: Water

Laboratory Project: **23-0402**
Collect Date: 05/02/2023
Collect Time: 11:15 AM

Sulfide, Total by SM 4500 S2D

Aliquot #: 23-0402-10-C04-A01

Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0504-03



Count on Us®

Laboratory Services

A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/19/23

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0402

Inspection Date: 5.03.23

Inspection By: umo

Sample Origin/Project Name: Q2-2023 DEK lined impoundment

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: umo 5.03.23 3977 8026 0833 Shipping Form Attached: Yes No _____

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 2.3-5.8 Samples Received on Ice: Yes No _____

M&TE # and Expiration 27723 5.25.23

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

<u>Container Type</u>	<u>Water</u>	<u>Soil</u>	<u>Other</u>	<u>Broken</u>	<u>Leaking</u>
VOA (40mL or <u>60</u> mL)	<u>10</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>42</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
<u>250</u> 500 mL (plastic)	<u>8</u>	_____	_____	_____	_____
<u>umo 5.3.23</u> Other	_____	_____	_____	_____	_____

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page 1 of 1

SAMPLING SITE / CUSTOMER: Q2-2023 DEK Lined Impoundment			PROJECT NUMBER: 23-0402			SAP CC or WO#: REQUESTER: Harold Register			ANALYSIS REQUESTED (Attach List if More Space is Needed)						QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____																				
SAMPLING TEAM: <i>A. Whaley</i> <i>J. Krenz</i>			TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____						<table border="1" style="width: 100%; text-align: center;"> <tr> <td rowspan="2">Total Metals</td> <td rowspan="2">Anions - Nitrites</td> <td rowspan="2">Ammonia</td> <td rowspan="2">TDS</td> <td rowspan="2">Alkalinity</td> <td rowspan="2">Sulfide</td> <td rowspan="2">Dissolved Metals</td> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> </table>						Total Metals	Anions - Nitrites	Ammonia	TDS	Alkalinity	Sulfide	Dissolved Metals													REMARKS	
Total Metals	Anions - Nitrites	Ammonia	TDS	Alkalinity	Sulfide	Dissolved Metals																													
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			CONTAINERS																										
LAB SAMPLE ID			SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION					TOTAL #	PRESERVATIVE																							
			DATE	TIME								None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other																	
23-0402-01			5/2/23	1608	GW	DEK-MW-15003					7	4	1	1	1			x	x	x	x	x	x												
-02				1215	GW	OW-10					4	4	2	1	1			x	x	x	x	x	x	X											
-03				1115	GW	OW-11					7	4	1	1	1			x	x	x	x	x	x												
-04				1355	GW	OW-12					7	4	1	1	1			x	x	x	x	x	x												
-05				1250	W	KLI-SCS					7	4	1	1	1			x	x	x	x	x	x												
-06				1310	SW	KLI-PCS					7	4	1	1	1			x	x	x	x	x	x												
-07				1420	SW	SW-DITCH					7	4	1	1	1			x	x	x	x	x	x												
-08				—	GW	DUP-KLI					4	4	2	1	1			x	x	x	x	x	x	X											
-09				1430	W	EB-KLI					4	1	1	1	1			x	x	x			x												
-10				1115	W	FB-KLI					4	1	1	1	1			x	x	x			x												

RELINQUISHED BY: <i>[Signature]</i>		DATE/TIME: <i>5/2/23 1500</i>		RECEIVED BY: <i>Fed Ex</i>		COMMENTS:					
RELINQUISHED BY: <i>Fed Ex</i>		DATE/TIME: <i>05-03-23 10:20</i>		RECEIVED BY: <i>[Signature]</i>		Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>27723</u> Temperature: <u>2.3-5.8</u> °C Cal. Due Date: <u>5-25-23</u>					



Analytical Laboratory Report

Report ID: S48156.01(01)
Generated on 05/05/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S48156.01-S48156.10
Project: 23-0402 PR#23050668
Collected Date(s): 05/02/2023
Submitted Date/Time: 05/03/2023 16:41
Sampled by: Unknown
P.O. #: 4400114090

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
- Report Narrative (Page 2)
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- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S48156.01	23-0402-01 (DEK-MW-15003)	Groundwater	05/02/23 10:08
S48156.02	23-0402-02 (OW-10)	Groundwater	05/02/23 12:15
S48156.03	23-0402-03 (OW-11)	Groundwater	05/02/23 11:15
S48156.04	23-0402-04 (OW-12)	Groundwater	05/02/23 13:55
S48156.05	23-0402-05 (KLI-SCS)	Groundwater	05/02/23 12:50
S48156.06	23-0402-06 (KLI-PCS)	Groundwater	05/02/23 13:10
S48156.07	23-0402-07 (SW-DITCH)	Groundwater	05/02/23 14:20
S48156.08	23-0402-08 (DUP-KLI)	Groundwater	05/02/23 00:01
S48156.09	23-0402-09 (EB-KLI)	Groundwater	05/02/23 14:30
S48156.10	23-0402-10 (FB-KLI)	Groundwater	05/02/23 11:15



Analytical Laboratory Report

Lab Sample ID: S48156.01

Sample Tag: 23-0402-01 (DEK-MW-15003)

Collected Date/Time: 05/02/2023 10:08

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:24, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.23	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.02

Sample Tag: 23-0402-02 (OW-10)

Collected Date/Time: 05/02/2023 12:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:26, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.12	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.03

Sample Tag: 23-0402-03 (OW-11)

Collected Date/Time: 05/02/2023 11:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:28, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.04

Sample Tag: 23-0402-04 (OW-12)

Collected Date/Time: 05/02/2023 13:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:30, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.05

Sample Tag: 23-0402-05 (KLI-SCS)

Collected Date/Time: 05/02/2023 12:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:34, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.06

Sample Tag: 23-0402-06 (KLI-PCS)

Collected Date/Time: 05/02/2023 13:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:36, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.07

Sample Tag: 23-0402-07 (SW-DITCH)

Collected Date/Time: 05/02/2023 14:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:38, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.08

Sample Tag: 23-0402-08 (DUP-KLI)

Collected Date/Time: 05/02/2023 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:40, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.09

Sample Tag: 23-0402-09 (EB-KLI)

Collected Date/Time: 05/02/2023 14:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:42, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48156.10

Sample Tag: 23-0402-10 (FB-KLI)

Collected Date/Time: 05/02/2023 11:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	4.1	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 15:44, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	

Merit Laboratories Login Checklist

Lab Set ID:S48156

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Client:CONSUMERS (Consumers Energy Company)

Project: 23-0402 PR#23050668

Submitted:05/03/2023 16:41 Login User: MMC

Phone: D:517-788-5888 FAX:
Email:emil.blaj@cmsenergy.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.1 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S48156 Submitted: 05/03/2023 16:41
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0402 PR#23050668

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 05/04/2023 08:47 MMC
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S48156.01	125ml Plastic NaOH/Zn Acetate	>12			
S48156.02	125ml Plastic NaOH/Zn Acetate	>12			
S48156.03	125ml Plastic NaOH/Zn Acetate	>12			
S48156.04	125ml Plastic NaOH/Zn Acetate	>12			
S48156.05	125ml Plastic NaOH/Zn Acetate	>12			
S48156.06	125ml Plastic NaOH/Zn Acetate	>12			
S48156.07	125ml Plastic NaOH/Zn Acetate	>12			
S48156.08	125ml Plastic NaOH/Zn Acetate	>12			
S48156.09	125ml Plastic NaOH/Zn Acetate	>12			
S48156.10	125ml Plastic NaOH/Zn Acetate	>12			



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO				CHAIN OF CUSTODY RECORD				INVOICE TO	
CONTACT NAME <u>Emil Blaj</u>				CONTACT NAME <input checked="" type="checkbox"/> SAME					
COMPANY <u>Consumers Energy</u>				COMPANY					
ADDRESS <u>135 W. Trail Street</u>				ADDRESS					
CITY <u>Jackson</u>		STATE <u>MI</u>	ZIP CODE <u>49201</u>	CITY		STATE	ZIP CODE		
PHONE NO. <u>517-788-5888</u>	FAX NO. <u>517-788-2533</u>	P.O. NO. <u>44001140900</u>		PHONE NO.		E-MAIL ADDRESS			
E-MAIL ADDRESS <u>emil.blaj@cmsenergy.com</u>				QUOTE NO.					

PROJECT NO./NAME <u>23-0402 PR#23050668</u>			SAMPLER(S) - PLEASE PRINT/SIGN NAME <u>N/A</u>			ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)										Certifications <input type="checkbox"/> OHIO VAP <input type="checkbox"/> Drinking Water <input type="checkbox"/> DoD <input type="checkbox"/> NPDES Project Locations <input type="checkbox"/> Detroit <input type="checkbox"/> New York <input type="checkbox"/> Other _____ Special Instructions								
TURNAROUND TIME REQUIRED <input type="checkbox"/> 1 DAY <input type="checkbox"/> 2 DAYS <input type="checkbox"/> 3 DAYS <input checked="" type="checkbox"/> STANDARD <input type="checkbox"/> OTHER _____						Total Sulfide											preserved with NaOH/ZnAcetate							
DELIVERABLES REQUIRED <input type="checkbox"/> STD <input checked="" type="checkbox"/> LEVEL II <input type="checkbox"/> LEVEL III <input type="checkbox"/> LEVEL IV <input type="checkbox"/> EDD <input type="checkbox"/> OTHER _____																	"							
MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE						Total Sulfide											"							
# Containers & Preservatives NONE HCl HNO3 H2SO4 NaOH MeOH OTHER																	"							
MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO3	H2SO4	NaOH	MeOH	OTHER	Total Sulfide											
	DATE	TIME																						
<u>48156.01</u>	<u>05/02/23</u>	<u>1008</u>	<u>23-0169-01 (DEK-MW-15003)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.02</u>	<u>05/02/23</u>	<u>1215</u>	<u>23-0169-02 (OW-10)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.03</u>	<u>05/02/23</u>	<u>1115</u>	<u>23-0169-03 (OW-11)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.04</u>	<u>05/02/23</u>	<u>1355</u>	<u>23-0169-04 (OW-12)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.05</u>	<u>05/02/23</u>	<u>1250</u>	<u>23-0169-05 (KLI-SCS)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.06</u>	<u>05/02/23</u>	<u>1310</u>	<u>23-0169-06 (KLI-PCS)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.07</u>	<u>05/02/23</u>	<u>1420</u>	<u>23-0169-07 (SW-DITCH)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.08</u>	<u>05/02/23</u>	<u>-</u>	<u>23-0169-08 (DUP-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.09</u>	<u>05/02/23</u>	<u>1430</u>	<u>23-0169-09 (EB-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
<u>.10</u>	<u>05/02/23</u>	<u>1115</u>	<u>23-0169-10 (FB-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>											
			<u>EB 05-05-23</u>																					

RELINQUISHED BY: <u>CONSUMERS ENERGY</u> <input type="checkbox"/> Sampler DATE <u>05-03-23</u> TIME <u>1641</u>			RELINQUISHED BY: _____ DATE _____ TIME _____		
RECEIVED BY: <u>M. Calabro</u> DATE <u>5/3/23</u> TIME <u>1641</u>			RECEIVED BY: _____ DATE _____ TIME _____		
RELINQUISHED BY: _____ DATE _____ TIME _____			SEAL NO. _____	SEAL INTACT <input type="checkbox"/> YES <input type="checkbox"/> NO	INITIALS _____
RECEIVED BY: _____ DATE _____ TIME _____			SEAL NO. _____	SEAL INTACT <input type="checkbox"/> YES <input type="checkbox"/> NO	INITIALS _____
			NOTES: _____		TEMP. ON ARRIVAL <u>4.1</u>

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. 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: 23-0401R

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q2-2023 DEK Bottom Ash Pond & Lined Impoundment
Date Received: 5/4/2023
Chemistry Project: 23-0401

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0401-01	DEK-MW-18001	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment
23-0401-02	DEK-MW-18001 MS	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment
23-0401-03	DEK-MW-18001 MSD	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0401-01
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

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

Aliquot #: 23-0401-01-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	304		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	152		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	931		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	54600		ug/L	1000.0	05/09/2023	AB23-0510-13
Chromium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Cobalt	ND		ug/L	6.0	05/09/2023	AB23-0510-13
Copper	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Iron	875		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	20		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	10600		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	144		ug/L	5.0	05/09/2023	AB23-0510-13
Molybdenum	11		ug/L	5.0	05/09/2023	AB23-0510-13
Nickel	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Potassium	5960		ug/L	100.0	05/09/2023	AB23-0510-13
Selenium	1		ug/L	1.0	05/09/2023	AB23-0510-13
Silver	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Sodium	112000		ug/L	1000.0	05/09/2023	AB23-0510-13
Thallium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Vanadium	ND		ug/L	2.0	05/09/2023	AB23-0510-13
Zinc	12		ug/L	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0401-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0401-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	05/04/2023	AB23-0504-05
Nitrite	ND		ug/L	100.0	05/04/2023	AB23-0504-05

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

Aliquot #: 23-0401-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	62200		ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0401-01
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0401-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	05/05/2023	AB23-0505-06
Sulfate	148000		ug/L	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0401-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1740		ug/L	25.0	05/12/2023	AB23-0512-02

Total Dissolved Solids by SM 2540C Aliquot #: 23-0401-01-C04-A01 Analyst: LMO

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	575		mg/L	10.0	05/05/2023	AB23-0505-05

Alkalinity by SM 2320B Aliquot #: 23-0401-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	192000		ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Bicarbonate	192000		ug/L	10000.0	05/10/2023	AB23-0510-02
Alkalinity Carbonate	ND		ug/L	10000.0	05/10/2023	AB23-0510-02

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0401-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	05/05/2023	AB23-0505-10

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0401-02
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

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

Aliquot #: 23-0401-02-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	109		%	1.0	05/09/2023	AB23-0510-13
Arsenic	92		%	1.0	05/09/2023	AB23-0510-13
Barium	111		%	5.0	05/09/2023	AB23-0510-13
Beryllium	104		%	1.0	05/09/2023	AB23-0510-13
Boron	99		%	20.0	05/09/2023	AB23-0510-13
Cadmium	105		%	0.2	05/09/2023	AB23-0510-13
Calcium	101		%	1000.0	05/09/2023	AB23-0510-13
Chromium	91		%	1.0	05/09/2023	AB23-0510-13
Cobalt	96		%	6.0	05/09/2023	AB23-0510-13
Copper	94		%	1.0	05/09/2023	AB23-0510-13
Iron	110		%	20.0	05/09/2023	AB23-0510-13
Lead	99		%	1.0	05/09/2023	AB23-0510-13
Lithium	99		%	10.0	05/09/2023	AB23-0510-13
Magnesium	103		%	1000.0	05/09/2023	AB23-0510-13
Manganese	96		%	5.0	05/09/2023	AB23-0510-13
Molybdenum	114		%	5.0	05/09/2023	AB23-0510-13
Nickel	94		%	2.0	05/09/2023	AB23-0510-13
Potassium	100		%	100.0	05/09/2023	AB23-0510-13
Selenium	98		%	1.0	05/09/2023	AB23-0510-13
Silver	93.9		%	0.2	05/09/2023	AB23-0510-13
Sodium	105		%	1000.0	05/09/2023	AB23-0510-13
Thallium	99		%	2.0	05/09/2023	AB23-0510-13
Vanadium	99		%	2.0	05/09/2023	AB23-0510-13
Zinc	93		%	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0401-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	104		%	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0401-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	85		%	100.0	05/04/2023	AB23-0504-05
Nitrite	92		%	100.0	05/04/2023	AB23-0504-05

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

Aliquot #: 23-0401-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	99		%	1000.0	05/05/2023	AB23-0505-06

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0401-02
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0401-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	94		%	1000.0	05/05/2023	AB23-0505-06
Sulfate	102		%	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0401-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	102		%	25.0	05/12/2023	AB23-0512-02

Alkalinity by SM 2320B Aliquot #: 23-0401-02-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	97.9		%	10000.0	05/10/2023	AB23-0510-02

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0401-02-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	05/05/2023	AB23-0505-10

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0401-03
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

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

Aliquot #: 23-0401-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	110		%	1.0	05/09/2023	AB23-0510-13
Arsenic	104		%	1.0	05/09/2023	AB23-0510-13
Barium	112		%	5.0	05/09/2023	AB23-0510-13
Beryllium	106		%	1.0	05/09/2023	AB23-0510-13
Boron	98		%	20.0	05/09/2023	AB23-0510-13
Cadmium	106		%	0.2	05/09/2023	AB23-0510-13
Calcium	97.8		%	1000.0	05/09/2023	AB23-0510-13
Chromium	93		%	1.0	05/09/2023	AB23-0510-13
Cobalt	97		%	6.0	05/09/2023	AB23-0510-13
Copper	92		%	1.0	05/09/2023	AB23-0510-13
Iron	104		%	20.0	05/09/2023	AB23-0510-13
Lead	97		%	1.0	05/09/2023	AB23-0510-13
Lithium	98		%	10.0	05/09/2023	AB23-0510-13
Magnesium	101		%	1000.0	05/09/2023	AB23-0510-13
Manganese	97		%	5.0	05/09/2023	AB23-0510-13
Molybdenum	113		%	5.0	05/09/2023	AB23-0510-13
Nickel	94		%	2.0	05/09/2023	AB23-0510-13
Potassium	102		%	100.0	05/09/2023	AB23-0510-13
Selenium	97		%	1.0	05/09/2023	AB23-0510-13
Silver	96.3		%	0.2	05/09/2023	AB23-0510-13
Sodium	103		%	1000.0	05/09/2023	AB23-0510-13
Thallium	98		%	2.0	05/09/2023	AB23-0510-13
Vanadium	100		%	2.0	05/09/2023	AB23-0510-13
Zinc	94		%	10.0	05/09/2023	AB23-0510-13

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0401-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	108		%	0.2	05/11/2023	AB23-0511-02

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0401-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	86		%	100.0	05/04/2023	AB23-0504-05
Nitrite	93		%	100.0	05/04/2023	AB23-0504-05

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

Aliquot #: 23-0401-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	98		%	1000.0	05/05/2023	AB23-0505-06

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0401-03
 Matrix: Groundwater

Laboratory Project: **23-0401**
 Collect Date: 05/03/2023
 Collect Time: 06:40 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0401-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	93		%	1000.0	05/05/2023	AB23-0505-06
Sulfate	102		%	1000.0	05/05/2023	AB23-0505-06

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0401-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	101		%	25.0	05/12/2023	AB23-0512-02

Alkalinity by SM 2320B Aliquot #: 23-0401-03-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	101		%	10000.0	05/10/2023	AB23-0510-02

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0401-03-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	91		%	20.0	05/05/2023	AB23-0505-10

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0401

Inspection Date: 5.04.23 Inspection By: UMO

Sample Origin/Project Name: Q2-2023 Bottom Ash Pond + lined Impound

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 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 1.6-2.1 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 <u>60mL</u>)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>12</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
²⁵⁰ 500 mL (plastic) <u>UMO 5.4.23</u>	<u>1</u>	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

plt stop
lot # 205522
exp. 2.15.25

CONSUMERS
ENERGY

Chemistry Department
General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0401

Inspection Date: 5.04.23

Inspection By: UMO

Sample Origin/Project Name: Q2-2023 Bottom Ash Pond + lined Impound

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 _____ 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 1.6-2.1 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 <u>60mL</u>)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>12</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
²⁵⁰ 500 mL (plastic) <u>umo 5.4.23</u>	<u>1</u>	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

plt stup
lot # 205522
exp. 2.15.25



Analytical Laboratory Report

Report ID: S48227.01(01)
Generated on 05/08/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S48227.01-S48227.03
Project: 23-0401 PR#23050668
Collected Date(s): 05/03/2023
Submitted Date/Time: 05/04/2023 16:41
Sampled by: Unknown
P.O. #: 4400114090

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
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- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S48227.01	23-0401-01 (DEK-MW-18001)	Groundwater	05/03/23 06:40
S48227.02	23-0401-02 (DEK-MW-18001 Field MS)	Groundwater	05/03/23 06:40
S48227.03	23-0401-03 (DEK-MW-18001 Field MSD)	Groundwater	05/03/23 06:40



Analytical Laboratory Report

Lab Sample ID: S48227.01

Sample Tag: 23-0401-01 (DEK-MW-18001)

Collected Date/Time: 05/03/2023 06:40

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	3.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 16:26, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S48227.02

Sample Tag: 23-0401-02 (DEK-MW-18001 Field MS)

Collected Date/Time: 05/03/2023 06:40

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	3.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 16:30, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.183	0.02	0.005	mg/L	1	18496-25-8	1

1-* Sample spike @ 0.20 mg/L



Analytical Laboratory Report

Lab Sample ID: S48227.03

Sample Tag: 23-0401-03 (DEK-MW-18001 Field MSD)

Collected Date/Time: 05/03/2023 06:40

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	3.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 05/05/23 16:32, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.182	0.02	0.005	mg/L	1	18496-25-8	1

1-* Sample spike @ 0.20 mg/L

Merit Laboratories Login Checklist

Lab Set ID:S48227

Client:CONSUMERS (Consumers Energy Company)

Project: 23-0401 PR#23050668

Submitted:05/04/2023 16:41 Login User: MMC

Attention: Emil Blaj

Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 FAX:

Email:emil.blaj@cmsenergy.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 3.7
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S48227 Submitted: 05/04/2023 16:41
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0401 PR#23050668

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 05/05/2023 08:42 MMC
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S48227.01	125ml Plastic NaOH/Zn Acetate	>12			
S48227.02	125ml Plastic NaOH/Zn Acetate	>12			
S48227.03	125ml Plastic NaOH/Zn Acetate	>12			

Appendix B

Field Notes



PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Compliance
PROJECT NUMBER:	514404.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	5/1/2023 TO 5/5/2023
	15A23 Second Quarter Supplemental Sampling Event
PURPOSE OF FIELDWORK:	
	Jake Krenz, Javier Jasso, Andrew Whaley
WORK PERFORMED BY:	

Andrew Whaley 5/9/23
SIGNED DATE

Al King 5-10-23
CHECKED BY DATE



GENERAL NOTES

PROJECT NAME: CEC Kam BAP/LI: 2023 GW Comp	DATE: <u>5/2/23</u>	TIME ARRIVED: <u>0715</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ JK <u>AW</u>	TIME LEFT: <u>1600</u>

WEATHER		
TEMPERATURE: <u>36</u> °F	WIND: <u>18-23</u> MPH	VISIBILITY: <u>Cloudy-Rain</u>
WORK / SAMPLING PERFORMED		
<u>Sample KLI Locations DEK 15003, OW-10, OW-11, OW-12,</u>		
<u>KLI PCS, and SW Ditch</u>		
<u>Ship samples via Fed Ex</u>		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>None</u>	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>Darby Litz</u>	<u>TRC</u>	<u>PM - Updates</u>
<u>Caleb Batts</u>	<u>Consumers</u>	<u>Site Contact</u>

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>Groundwater</u>	<u>NM</u>	<u>Purge to Ground</u>

Author *5/14/23*
 SIGNED DATE

JL *5-10-23*
 CHECKED BY DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Compliance	MODEL: YSI PRO DSS	SAMPLER: AW <u>(JK)JJ</u>
PROJECT NO.:	514404.0001.0000	SERIAL #: <u>Rental</u>	DATE: <u>5-2-23</u>

PH CALIBRATION CHECK

pH 7 (LOT #): <u>368359</u> (EXP. DATE): <u>Feb/25</u>	pH 4 / 10 (LOT #): <u>3641176</u> (EXP. DATE): <u>Jan/25</u>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0643</u>
<u>7.00 / 7.00</u>	<u>4.00 / 4.00</u>	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <u>76C493</u> (EXP. DATE): <u>Mar/24</u>	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0640</u>
<u>1413 / 1413</u>	<u>21.2</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): <u>2K1600180</u> (EXP. DATE): <u>10-11-27</u>	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0646</u>
<u>231.2 / 231.2</u>	<u>21.2</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0649</u>
<u>11.23 / 11.23</u>	<u>20.1</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): (EXP. DATE): <u>DE</u>	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	<input type="checkbox"/> WITHIN RANGE	
<u>0.0 / 0.0</u>	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
	⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED Al King DATE 5-9-23

CHECKED BY h5 DATE 5/10/23



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn ^{DATE} 2023 GW Compliance	MODEL: Y61 PRO DSS ^{2015 Agilent 600}	SAMPLER: <u>AWJJ, JK</u>
PROJECT NO.: 514404.0001.0000	SERIAL #: <u>AA office</u>	DATE: <u>5/2/23</u>

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL. RANGE	TIME
(LOT #): <u>2G1834</u>	(EXP. DATE): <u>Sept 24</u>	(LOT #): <u>3GA799</u>	(EXP. DATE): <u>Jan 25</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			<input checked="" type="checkbox"/> WITHIN RANGE	<u>0748</u>
<u>7.06 / 7.06</u>	<u>4.00 / 4.00</u>			<input type="checkbox"/> WITHIN RANGE	
<u>/</u>	<u>/</u>			<input type="checkbox"/> WITHIN RANGE	
<u>/</u>	<u>/</u>			<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #): <u>2G11017</u>	(EXP. DATE): <u>Sept 23</u>	(°CELSIUS)		
POST-CAL. READING / STANDARD			<input checked="" type="checkbox"/> WITHIN RANGE	<u>0744</u>
<u>1116 / 1116</u>	<u>13.1</u>		<input type="checkbox"/> WITHIN RANGE	
<u>/</u>			<input type="checkbox"/> WITHIN RANGE	
<u>/</u>			<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <u>22D10028</u>	(°CELSIUS)		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0746</u>
<u>228.9 / 228.9</u>	<u>12.7</u>	<input type="checkbox"/> WITHIN RANGE	
<u>/</u>		<input type="checkbox"/> WITHIN RANGE	
<u>/</u>		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <u>22D10028</u>	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0744</u>
<u>10.26 / 10.26</u>	<u>13.0</u>	<input type="checkbox"/> WITHIN RANGE	
<u>/</u>		<input type="checkbox"/> WITHIN RANGE	
<u>/</u>		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <u>D1</u>	(EXP. DATE): <u>/</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0752</u>
<u>0.00 / 0.00</u>	<u>/</u>	<input type="checkbox"/> WITHIN RANGE	
<u>/</u>	<u>/</u>	<input type="checkbox"/> WITHIN RANGE	
<u>/</u>	<u>/</u>	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	

⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

Andrew W. Ludwig 5/14/23
SIGNED DATE

Al Rey 5-10-23
CHECKED BY DATE

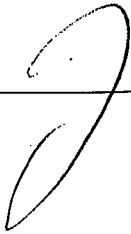



WATER LEVEL DATA

PROJECT NAME: CEC Karn LF: 2023 GW Compliance	DATE: 5/11/23
PROJECT NUMBER: 514404.0000.0000	AUTHOR: AW, JJ, JK

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
MW-01	1041	TOC	17.20	24.20	NA	NM
MW-02	1042	TOC	17.50	30.38	NA	NM
MW-03	1046	TOC	17.50	30.78	NA	NM
MW-04	1047	TOC	18.70	33.60	NA	NM
MW-06	1333	TOC	9.44	24.31	at then sampled	
MW-08	1119	TOC	17.68	24.81	NA	NM
MW-10	1134	TOC	16.25	24.85	NA	NM
MW-12	1205	TOC	18.63	23.85	NA	NM
MW-14	1228	TOC	14.51	19.33	NA	NM
MW-16	1246	TOC	16.14	21.30	NA	NM
MW-17	1325	TOC	13.48	24.34	NA	NM
MW-18	0951	TOC	25.90	39.65	NA	NM
MW-19	1001	TOC	19.15	30.0	NA	NM
MW-20	1020	TOC	52.67	72.00	NA	NM
MW-21	1008	TOC	51.10	60.98	NA	NM
MW-22	1127	TOC	16.81	29.59	NA	NM
MW-23	1157	TOC	13.98	15.10	NA	NM
OW-01	1015	TOC	51.14	64.00	NA	NM
OW-02	1124	TOC	19.20	21.95	NA	NM
OW-03	1133	TOC	17.18	28.78	NA	NM
OW-04	1226	TOC	10.60	16.20	NA	NM
OW-05	1244	TOC	15.00	19.00	NA	NM
OW-06	1320	TOC	17.20	24.80	NA	NM
OW-07	1200	TOC	15.11	23.91	NA	NM
OW-08	1313	TOC	10.88	17.90	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  5-10-23 DATE



WATER LEVEL DATA

PROJECT NAME: CEC Karn LF: 2023 GW Compliance	DATE: 5/1/23
PROJECT NUMBER: 514404.0000.0000	AUTHOR: Jake Krenz, Javier Jasso, And

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
OW-09	1310	TOC	10.33	12.77	NA	NM
OW-10	1320	TOC	7.00	17.91	NA	NM
OW-11	0948	TOC	22.30	25.47	NA	NM
OW-12	0934	TOC	17.14	23.21	NA	NM
OW-13	0905	TOC	38.4	14.38	NA	NM
OW-15	0901	TOC	3.40	14.75	NA	NM
EW-01	1136	TOC	13.65	DNM	NA	NM
EW-02	1145	TOC	15.25	11.1	NA	NM
EW-03	1203	TOC	14.60	11.1	NA	NM
EW-04	1213	TOC	14.45	11.1	NA	NM
EW-05	1230	TOC	14.00	11.1	NA	NM
EW-06	1240	TOC	12.65	11.1	NA	NM
PZ-01	1128	TOC	13.46	14.10	NA	NM
PZ-02	1130	TOC	15.30	23.25	NA	NM
PZ-03	1141	TOC	15.03	19.80	NA	NM
PZ-04	1148	TOC	15.84	20.91	NA	NM
PZ-05	1150	TOC	14.45	21.75	NA	NM
PZ-06	1207	TOC	15.10	20.35	NA	NM
PZ-07	1215	TOC	14.78	21.00	NA	NM
PZ-08	1217	TOC	14.10	20.94	NA	NM
PZ-09	1224	TOC	15.30	21.61	NA	NM
PZ-10	1235	TOC	11.14	17.74	NA	NM
PZ-11	1237	TOC	13.90	18.10	NA	NM

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED J 3/10/23 DATE

CHECKED JL King 5-10-23 DATE



WATER LEVEL DATA

PROJECT NAME: CEC Karn LF: 2023 GW Compliance	DATE: 5/1/23
PROJECT NUMBER: 514404.0000.0000	AUTHOR: Jake Krenz, Javier Jasso, And

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
DEK-MW-18001	0940		8.89	19.65		
DEK-MW-15002	0935		6.35	17.75		
DEK-MW-15003	0951		16.90	27.67		
DEK-MW-15004	0956		28.25	41.80		
DEK-MW-15005	0910		9.90	23.27		
DEK-MW-15006	0912		9.44	21.50		
DEK-MW-22001	0927		9.61	24.00		
DEK-MW-22002	0921		10.95	26.67		
DEK-MW-22003	0921		10.40	24.40		
DEK-MW-22004	0927		9.33	22.44		
DEK-MW-22005	0929		8.60	20.30		
DEK-MW-22006	0919		8.49	17.00		
TW-21-003	1029		18.12	26.20		
TW-21-002	1033		12.84	20.51		
TW-21-001	1036		12.70	17.59		
TW-21-0013	1048		22.90	36.30		
TW-21-0012	1052		20.00	22.70		
TW-21-0015	1053		20.21	36.17		
TW-21-0010	1054		20.04	54.75		
TW-21-0011	1103		21.40	27.55		
TW-21-0011I	1104		21.25	35.30		
TW-21-0011P	1105		21.48	52.30		
TW-21-0010	1108		20.54	28.00		
TW-21-009	1111		20.20	27.91		
TW-21-008	1251		13.90	17.59		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED:  5/1/23 DATE

CHECKED:  5-10-23 DATE



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: AW, JK, (D)	DATE: 5/4/23	BY: JK	DATE: 5-10-23
SAMPLE ID: <u>DFKMU18001</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>0610</u>	DATE: <u>5/3/23</u>	SAMPLE	TIME: <u>0640</u>	DATE: <u>5/3/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.64</u> SU	CONDUCTIVITY: <u>858</u> umhos/cm			
	ORP: <u>-228.5</u> mV	DO: <u>0.9</u> mg/L <u>858</u>			
DEPTH TO WATER: <u>8.84</u> T/ PVC		TURBIDITY: <u>9.9</u> NTU			
DEPTH TO BOTTOM: <u>19.61</u> T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>9.6</u> °C		OTHER:	
VOLUME REMOVED: <u>6</u> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>clear</u>		ODOR: <u>none</u>	
COLOR: <u>Brown</u> ODOR: <u>none</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0610	2.64	4.0	392	223	8.8	10.0	10.6	8.91	INITIAL
0615		7.57	863	-206.5	1.1	14.1	9.4	9.00	1
0620		7.61	861	-204.3	0.52	37	9.5	9.00	2
0625		7.63	858	-210.0	0.36	14.1	9.5	9.00	3
0630		7.64	857	-228.5	0.27	10.0	9.5	9.00	4
0635		7.64	858	-229.0	0.26	9.9	9.5	9.00	5
0640		7.64	858	-226.5	0.19	9.9	9.6	9.00	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	
6	125	glass	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	1L	PI	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
6	125	PI	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	3	125	PI	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	250	PI	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	125	PI	B	<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	125	PI	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>lab drop off</u>	DATE SHIPPED: <u>5-4-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE:	DATE SIGNED: <u>5/4/23</u>



WATER SAMPLE LOG

DAP/LT

PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AVV, JJ, JK DATE: 5/2/23	BY: SK DATE: 5-10-23

SAMPLE ID: DEK - MW - 15003	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> VVW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING TIME: 0938 DATE: 5/2/23	SAMPLE TIME: 1008 DATE: 5/2/23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 8.01 SU CONDUCTIVITY: 344.08 umhos/cm
DEPTH TO WATER: 16.97 T/ PVC	ORP: -208.7 mV DO: 1.93 mg/L
DEPTH TO BOTTOM: N/A T/ PVC	TURBIDITY: 0.24 NTU
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 13.65 °C OTHER: -
VOLUME REMOVED: 6.0 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: Clear ODOR: None
COLOR: Clear ODOR: None	FILTRATE (0.45 um) <input type="checkbox"/> YES <input type="checkbox"/> NO
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	FILTRATE COLOR: FILTRATE ODOR:
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP
COMMENTS: Transducer in well	

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)
0938	200	7.52	346.93	16.5	2.26	0.09	11.88	16.97	INITIAL
943	↓	7.60	349.21	-100.4	1.50	0.34	12.50	17.05	1.0
948	↓	7.66	341.77	-166.6	1.47	0.24	13.68	↓	2.0
953	↓	7.78	343.34	-186.8	1.45	0.13	13.87	↓	3.0
958	↓	7.95	341.88	-200.0	1.42	0.10	13.58	↓	4.0
1003	↓	7.98	342.53	-200.9	1.41	0.14	13.65	↓	5.0
1008	↓	8.01	344.08	-208.7	1.43	0.24	13.65	↓	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	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
4	60	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	12	125	Plastic	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					
2	250	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N					
2	250	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N					
2	125	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N					
2	125	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N					

SHIPPING METHOD: Fed EX	DATE SHIPPED: 5/2/23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: ALW	DATE SIGNED: 5/4/23



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AW JK, JJ</u> DATE: <u>5/2/23</u>	BY: <u>JK</u> DATE: <u>5-10-23</u>

SAMPLE ID: <u>OW-10</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1145</u>	DATE: <u>5/2/23</u>	SAMPLE	TIME: <u>1215</u>	DATE: <u>5/2/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.26</u> SU	CONDUCTIVITY: <u>549.80</u> umhos/cm	ORP: <u>-151.3</u> mV	DO: <u>1.63</u> mg/L	
DEPTH TO WATER: <u>7.02</u> T/ PVC	TURBIDITY: <u>34.12</u> NTU				
DEPTH TO BOTTOM: 14.45 T/ PVC <u>17.92</u>	<input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY				
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>9.16</u> °C	OTHER: <u>-</u>			
VOLUME REMOVED: <u>6.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>Clear-black specks</u>	ODOR: <u>None</u>			
COLOR: <u>Clear</u>	ODOR: <u>None</u>	FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: <u>Clear</u>	FILTRATE ODOR: <u>None</u>		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>RLI</u>	COMMENTS: <u>Black build up in bottom of well</u>		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1145	200	7.54	436.36	-40.0	2.86	6.48	8.93	7.02	INITIAL
1150	↓	7.29	474.15	-125.2	1.83	30.16	9.26	7.30	1.0
1155	↓	7.28	498.90	-143.3	1.63	29.91	8.96	7.60	2.0
1200	↓	7.27	536.41	-149.4	1.64	31.45	9.13	7.88	3.0
1205	↓	7.26	551.20	-155.8	1.63	32.85	9.17	8.02	4.0
1210	↓	7.26	557.11	-152.7	1.64	35.50	9.15	8.05	5.0
1215	↓	7.26	549.80	-151.3	1.63	34.12	9.16	8.05	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	
4	60	NDA	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	125	Plastic	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
2	250	Plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	125	Plastic	B	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
2	125	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	↓	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	↓	↓	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>Fed Ex</u>	DATE SHIPPED: <u>5/2/23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>AWJ</u>	DATE SIGNED: <u>5/2/23</u>



WATER SAMPLE LOG

RAP/LI

PROJECT NAME: CEC Karn <i>LP</i> 2023 GW Comp	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: <i>AW</i> JJ, JK	DATE: <i>5/2/23</i>
	BY: <i>JK</i>	DATE: <i>5-10-23</i>

SAMPLE ID: <i>OW-11</i>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <i>1050</i>	DATE: <i>5/2/23</i>	SAMPLE	TIME: <i>1115</i>	DATE: <i>5/2/23</i>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <i>9.65</i> SU	CONDUCTIVITY: <i>270.52</i> umhos/cm	ORP: <i>-184.0</i> mV	DO: <i>1.89</i> mg/L	
DEPTH TO WATER: <i>23.60</i> T/ PVC	TURBIDITY: <i>1.55</i> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <i>NM</i> T/ PVC	TEMPERATURE: <i>10.10</i> °C	OTHER: <i>-</i>			
WELL VOLUME: <i>NA</i> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <i>Clear</i>	ODOR: <i>None</i>			
VOLUME REMOVED: <i>5.0</i> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: <i>-</i> FILTRATE ODOR: <i>-</i>			
COLOR: <i>clear</i> ODOR: <i>None</i>	TURBIDITY <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP.			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	COMMENTS: <i>FD - HLI / Transducer</i>				

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)
<i>1050</i>	<i>200</i>	<i>9.57</i>	<i>276.51</i>	<i>-75.6</i>	<i>2.18</i>	<i>2.12</i>	<i>10.80</i>	<i>23.60</i>	INITIAL
<i>1055</i>	<i>↓</i>	<i>9.59</i>	<i>276.57</i>	<i>-110.8</i>	<i>2.00</i>	<i>1.26</i>	<i>10.41</i>	<i>23.80</i>	<i>1.0</i>
<i>1100</i>	<i>↓</i>	<i>9.64</i>	<i>270.33</i>	<i>-165.2</i>	<i>1.91</i>	<i>0.55</i>	<i>9.87</i>	<i>↑</i>	<i>2.0</i>
<i>1105</i>	<i>↓</i>	<i>9.64</i>	<i>270.89</i>	<i>-178.9</i>	<i>1.90</i>	<i>0.86</i>	<i>9.95</i>	<i>↓</i>	<i>3.0</i>
<i>1110</i>	<i>↓</i>	<i>9.65</i>	<i>272.21</i>	<i>-183.8</i>	<i>1.90</i>	<i>1.32</i>	<i>10.01</i>	<i>↓</i>	<i>4.0</i>
<i>1115</i>	<i>↓</i>	<i>9.65</i>	<i>270.52</i>	<i>-184.0</i>	<i>1.89</i>	<i>1.55</i>	<i>10.10</i>	<i>↓</i>	<i>5.0</i>

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
<i>2</i>	<i>60</i>	<i>VCA</i>	<i>A</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	<i>2</i>	<i>125</i>	<i>PLASTIC</i>	<i>D</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
<i>1</i>	<i>250</i>	<i>PLASTIC</i>	<i>A</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<i>2</i>	<i>125</i>	<i>↓</i>	<i>A</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<i>2</i>	<i>↓</i>	<i>↓</i>	<i>B</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<i>2</i>	<i>↓</i>	<i>↓</i>	<i>C</i>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <i>Fed EX</i>	DATE SHIPPED: <i>5/2/23</i>	AIRBILL NUMBER: <i>-</i>
COC NUMBER: <i>-</i>	SIGNATURE: <i>AW</i>	DATE SIGNED: <i>5/4/23</i>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW JK, JJ DATE: 5/2/23	BY: JIK DATE: 5-10-23

SAMPLE ID: <u>OW-12</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1255</u>	DATE: <u>5/2/23</u>	SAMPLE	TIME: <u>1355</u>	DATE: <u>5/2/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.14</u> SU	CONDUCTIVITY: <u>854.62</u> umhos/cm	ORP: <u>-102.1</u> mV	DO: <u>2.00</u> mg/L	
DEPTH TO WATER: <u>17.12</u> T/ PVC	TURBIDITY: <u>6.31</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>23.40</u> T/ PVC	WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>10.89</u> °C	OTHER: _____		
VOLUME REMOVED: <u>12.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>Clear</u>	ODOR: <u>None</u>			
COLOR: <u>Slight orange</u>	ODOR: <u>None</u>	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR: _____	FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-	COMMENTS: <u>ED - KLT</u>		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR ¹)
1255	200	7.18	784.97	-99.2	2.94	694.48	9.62	17.12	INITIAL
1300		7.16	811.84	-90.9	2.03	114.10	10.16	17.20	1.0
1305		7.15	827.98	-98.8	1.96	94.43	10.28		2.0
1310		7.15	833.19	-98.6	1.97	81.21	10.40		3.0
1315		7.15	838.11	-98.8	1.96	92.16	10.50		4.0
1320		7.15	842.20	-94.2	1.95	47.48	10.57		5.0
1325		7.15	847.10	-100.6	1.95	40.12	10.60		6.0
1330		7.14	848.16	-99.6	1.95	36.64	10.69		7.0
1335		7.14	847.57	-101.1	1.94	26.12	10.57		8.0
1340		7.14	846.09	-101.7	1.90	816.23	10.47		9.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 D.O.: +/- 0.3 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	60	VOA	A	<input type="checkbox"/> Y	<input type="checkbox"/> N	2	125	Plastic	D	<input type="checkbox"/> Y	<input type="checkbox"/> N
1	250	plastic	A	<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	125		A	<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	↓	↓	B	<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	↓	↓	C	<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>Fed Ex</u>	DATE SHIPPED: <u>5/2/23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>5/4/23</u>

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

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SAMPLING SITE / CUSTOMER: Q2-2023 DEK Bottom Ash Pond & Lined Impound.		PROJECT NUMBER: 23-0401		SAP CC or WO#: _____ REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)	
SAMPLING TEAM: Caleb Batts		TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER		email: _____ phone: _____		QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR.50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____	
SEND REPORT TO: Harold Register TRC		MATRIX CODES: GW = Groundwater WW = Wastewater W = Water / Aqueous Liquid S = Soil / General Solid O = Oil		CONTAINERS PRESERVATIVE		Antons Ammonia TDS Alkalinity Sulfide	
LAB SAMPLE ID 23-0401-01 ↓ -02 ↓ -03		FIELD SAMPLE ID / LOCATION DEK-MW-18001 DEK-MW-18001 MS DEK-MW-18001 MSD		TOTAL # None HNO ₃ H ₂ SO ₄ NaOH HCl MeOH Other		REMARKS	
DATE 5/3/17 11 1/11		TIME 6:40 6:40 6:40		MATRIX GW GW GW		Total Metals x x x	
RELINQUISHED BY:		DATE/TIME: 5/16/17 9:00		RECEIVED BY:		COMMENTS:	
RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:		Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: 65627723 Temperature: 1.6-2.1 °C Cal. Due Date: 5-25-23	

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Appendix C

Data Quality Reviews

Laboratory Data Quality Review Groundwater Monitoring Event May 2023 DE Karn Bottom Ash Pond and Lined Impoundment

A groundwater sample was collected by TRC for the May 2023 sampling event. The sample was analyzed for total metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analysis was subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0401R and S48227.01(01).

During the May 2023 sampling event, a groundwater sample was collected from the following well:

- DEK-MW-18001

The sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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, when collected. 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 and Merit. 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, ammonia, TDS, alkalinity, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of a detection or assessment monitoring program.
- Data are usable for the purposes of the detection or assessment monitoring program.
- When the data are evaluated through a detection or assessment monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- A field blank was not collected with this data set.
- An equipment blank was not collected with this data set.
- MS and MSD analyses were performed on sample DEK-MW-18001 for total metals, anions, ammonia, total alkalinity, and sulfide. 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, with the exception of sulfide, 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.

- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on the sample in this data set.

Laboratory Data Quality Review Groundwater/Surface Water Monitoring Event May 2023 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for total and/or dissolved metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analyses were subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0402 and S48156.01(01).

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

- OW-10
- OW-11
- OW-12
- DEK-MW-15003

During the May 2023 sampling event, the following water/surface water samples were collected:

- KLI-PCS
- KLI-SCS
- SW-DITCH

Each sample was analyzed for one or more of the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total & Dissolved Metals	SW-846 6020B
Total Mercury	7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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 and Merit. 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 and dissolved metals, total mercury, anions, alkalinity, TDS, ammonia, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One field blank (FB-KLI) and one equipment blank (EB-KLI) were collected with this data set. Target analytes were not detected in these blank samples.

- The field duplicate pair samples were DUP-KLI and OW-10; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits with the following exceptions:
 - Dissolved chromium was detected in the field duplicate pair at concentrations <5x the RL and the absolute difference was equal to the RL. Therefore, the positive results for dissolved chromium should be considered estimated in groundwater samples DUP-KLI and OW-10, as summarized in the attached table, Attachment A.
 - Sulfide was detected >5x the RL in sample OW-10 and was nondetect in DUP-KLI and the absolute difference was greater than the RL. Therefore, the positive and nondetect results for sulfide should be considered estimated in all groundwater samples in this data set, as summarized in the attached table, Attachment A.
 - The RPD for sulfate (35.4%) was > 30. Therefore, the positive results for sulfate 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/Surface Water Analytical Data
DE Karn Lined Impoundment
Erie, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
DUP-KLI	5/2/2023	Dissolved Chromium, Sulfate, and Sulfide	Field duplicate variability (relative percent difference or absolute difference above criteria); potential uncertainty exists.
OW-10	5/2/2023		
OW-11	5/2/2023	Sulfate and Sulfide	
OW-12	5/2/2023		
DEK-MW-15003	5/2/2023		

Appendix D

Statistical Analysis

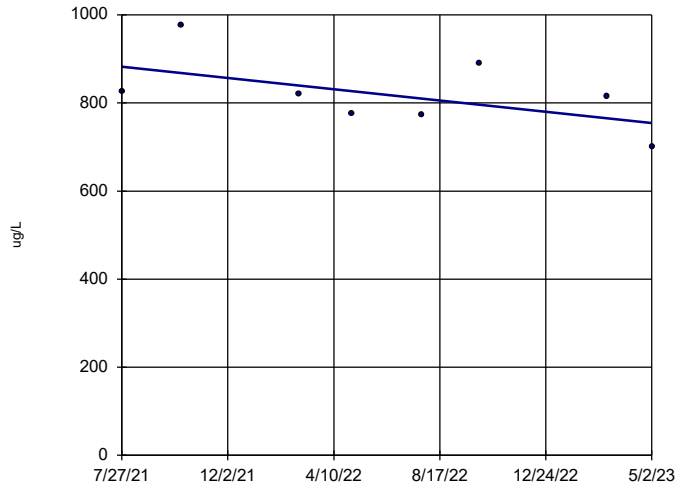
Appendix D
 Statistical Summary for DE Karn Lined Impoundment
 Second Quarter 2023
 Data from July 2021 to May 2023

Karn Lined Impoundment Wells						
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12
Boron	Trend	○	○	○	○	○
Calcium	Trend	○	↓	○	○	○
Chloride	Trend	↑ ^{ASD}	○	○	↓	○
Fluoride	Trend	○*	○*	○*	○	○*
Iron	Trend	○	↓*	○	○	○
pH	Trend	○	○	○	↑ ^{ASD}	○
Sulfate	Trend	○	○	○	↓	○
Total Dissolved Solids	Trend	↑ ^{ASD}	○	○	○	○

Notes:

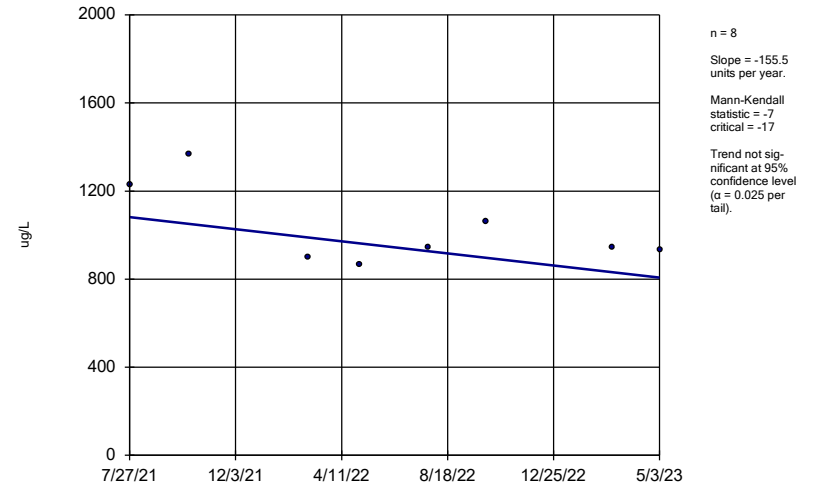
- * = Non-detect
- = No trend
- ↑ = Upward trend, continuous
- ↑* = Upward trend, new
- ↑ = Upward trend, confirmed
- ↓ = Downward trend, continuous
- ↓* = Downward trend, new
- ↑^{ASD} = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Karn Lined Impoundment CCR Unit, TRC, July 2023.)

Boron, Total DEK-MW-15003



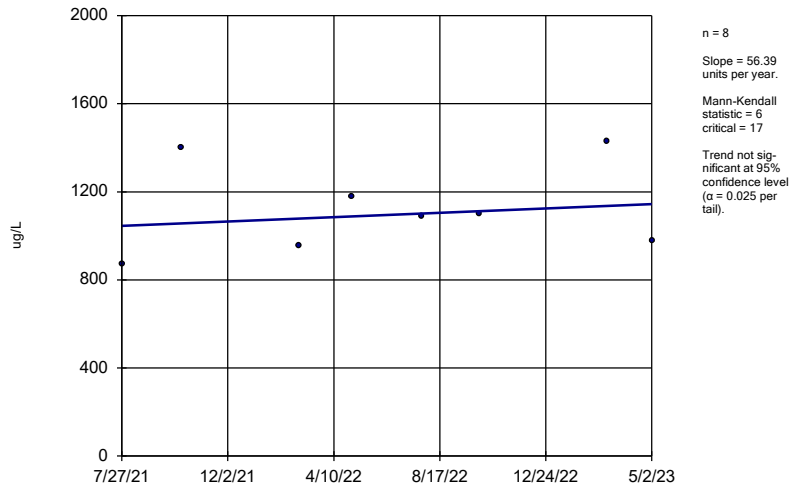
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Boron, Total DEK-MW-18001



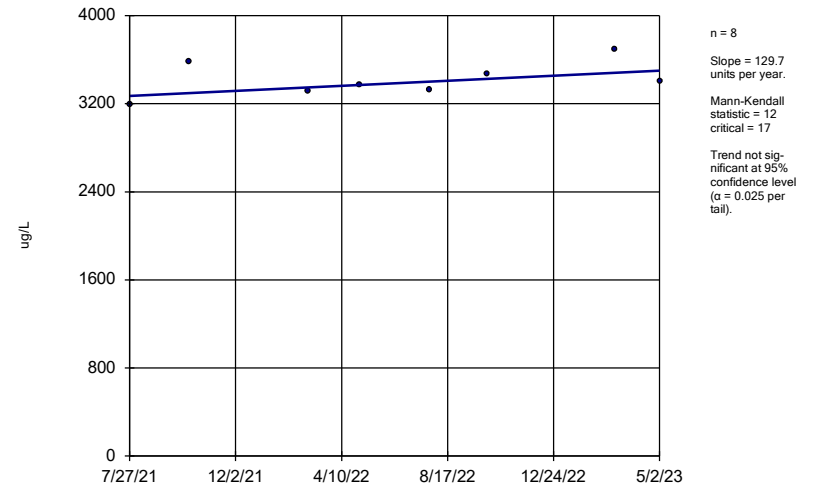
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Boron, Total OW-10



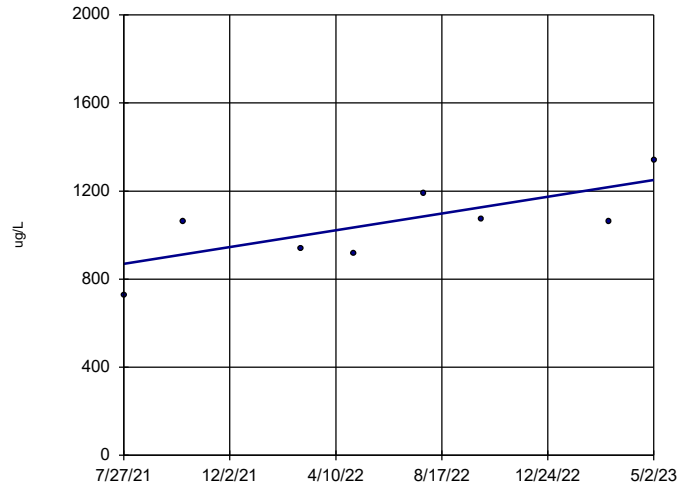
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Boron, Total OW-11



Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

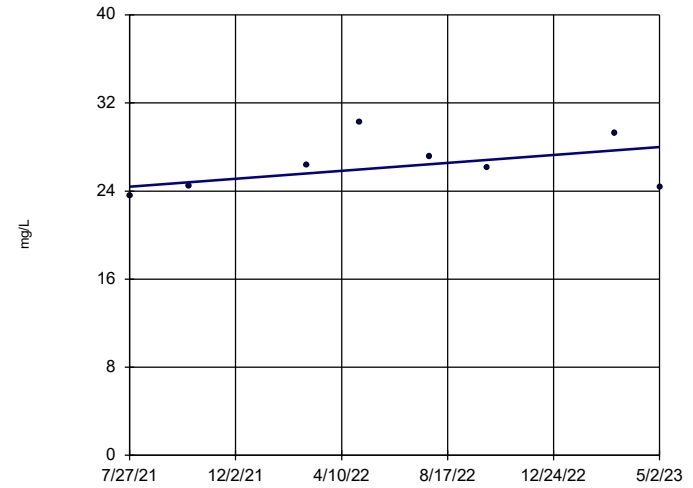
Boron, Total OW-12



n = 8
 Slope = 215.2
 units per year.
 Mann-Kendall
 statistic = 15
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

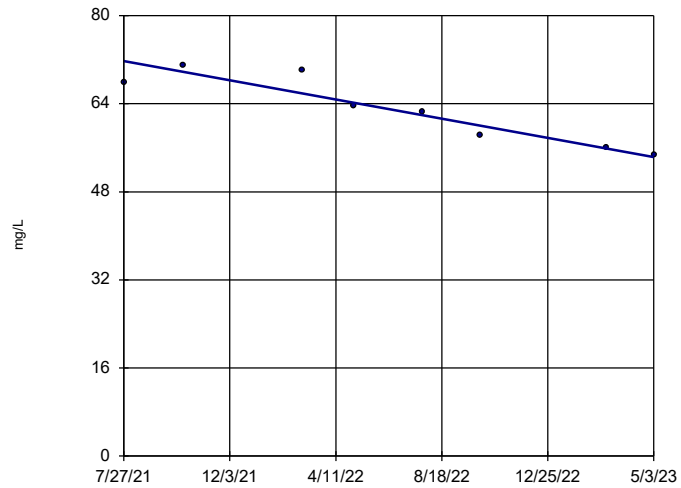
Calcium, Total DEK-MW-15003



n = 8
 Slope = 2.038
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

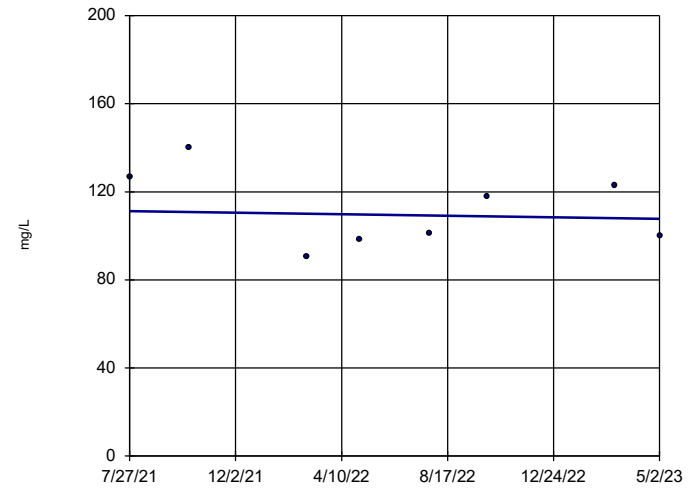
Calcium, Total DEK-MW-18001



n = 8
 Slope = -9.868
 units per year.
 Mann-Kendall
 statistic = -24
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

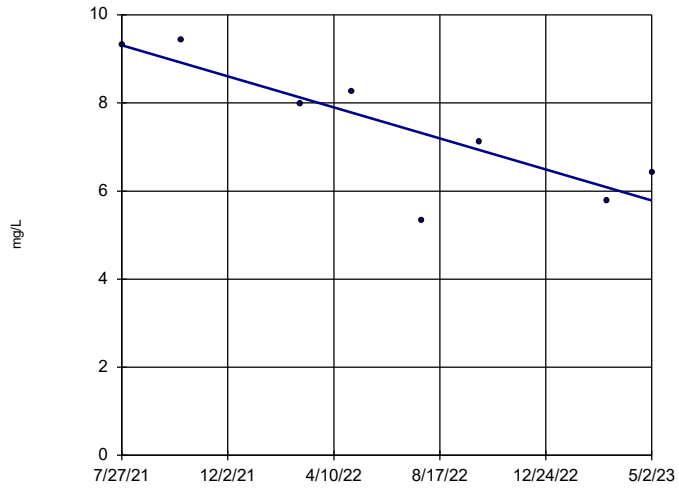
Calcium, Total OW-10



n = 8
 Slope = -1.956
 units per year.
 Mann-Kendall
 statistic = -2
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

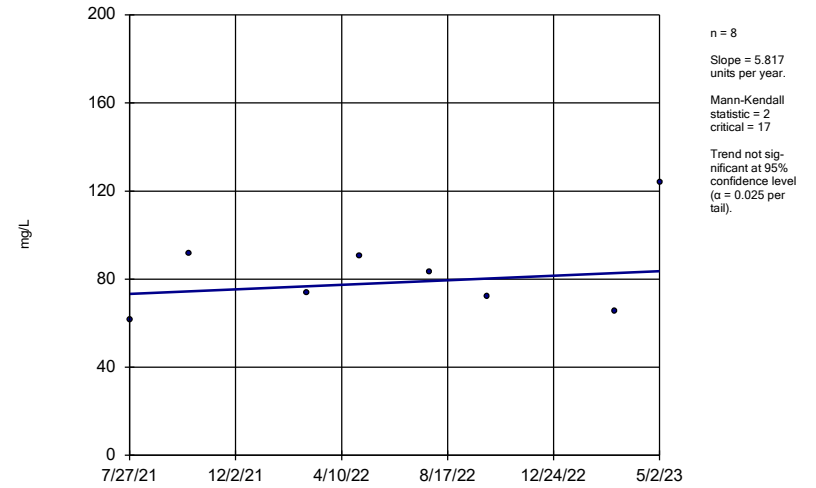
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Calcium, Total OW-11



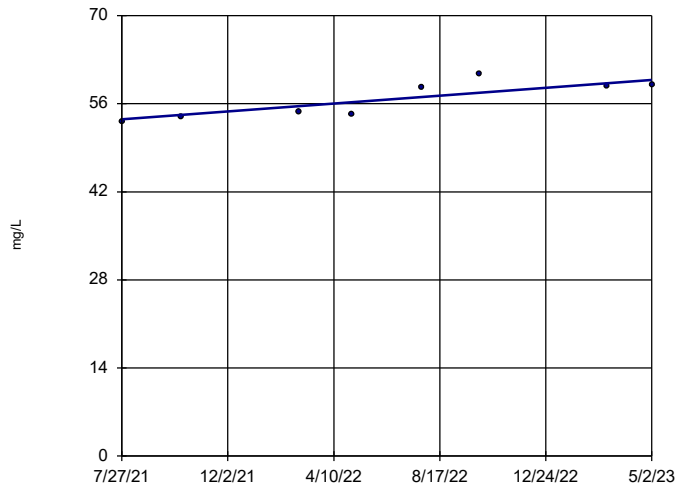
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Calcium, Total OW-12



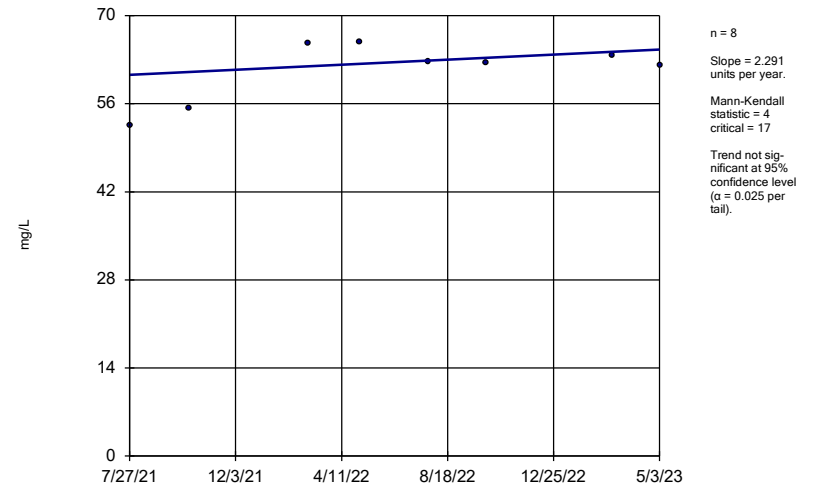
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Chloride DEK-MW-15003



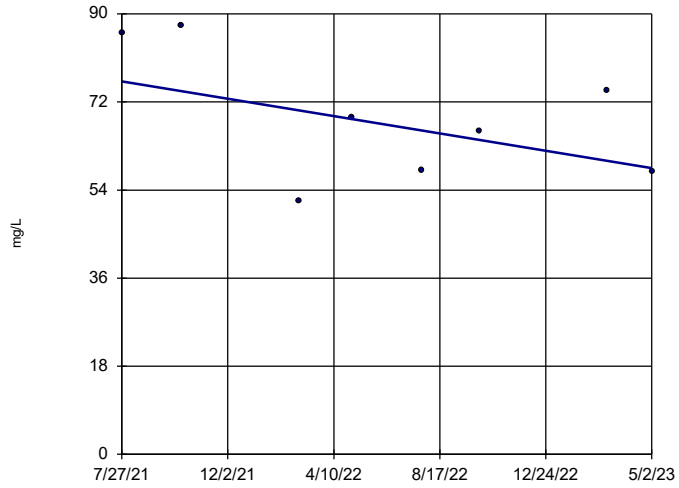
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Chloride DEK-MW-18001



Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

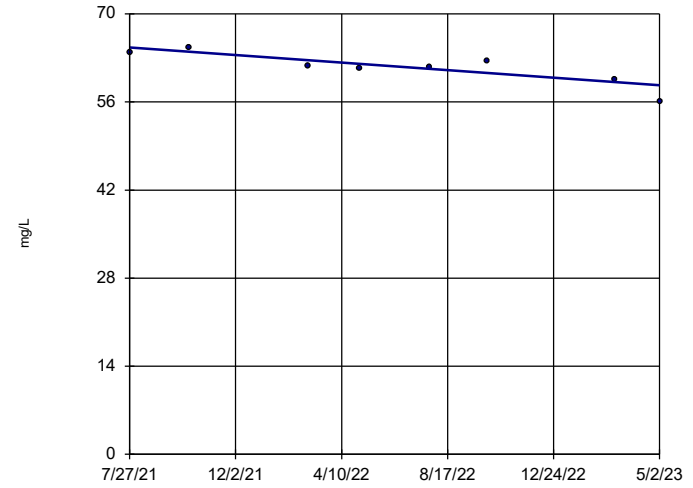
Chloride OW-10



n = 8
 Slope = -10.04
 units per year.
 Mann-Kendall
 statistic = -8
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

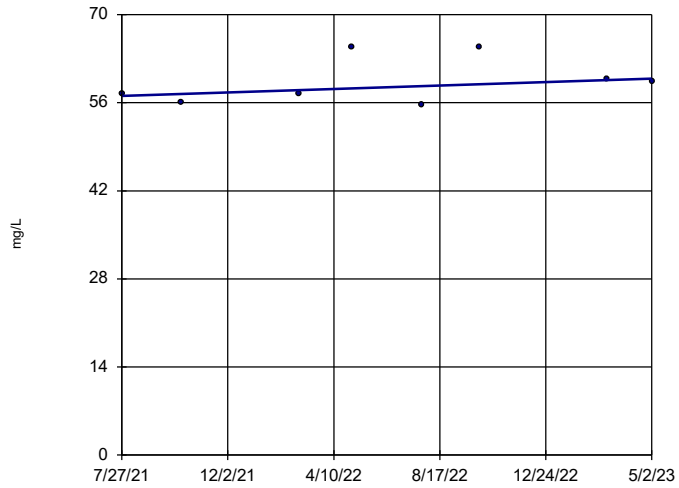
Chloride OW-11



n = 8
 Slope = -3.398
 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

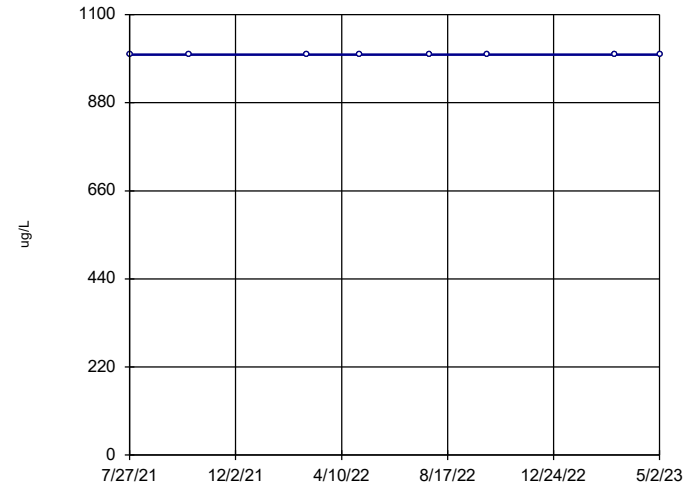
Chloride OW-12



n = 8
 Slope = 1.569
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

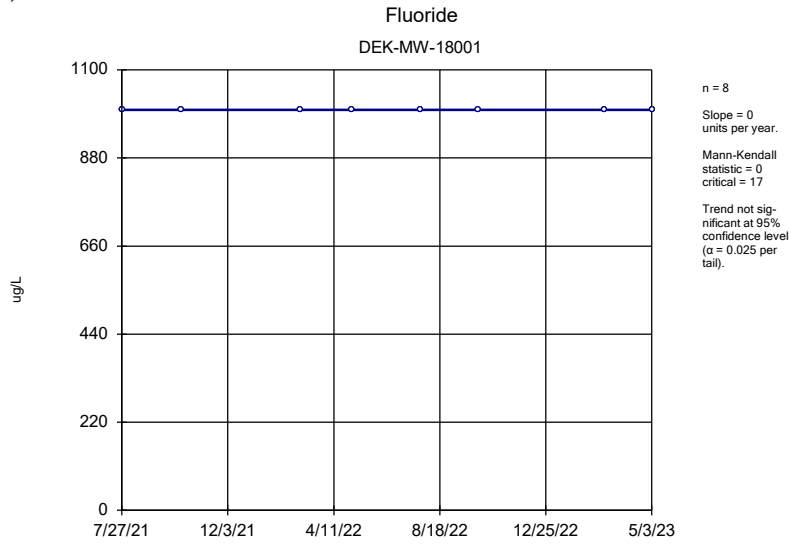
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Fluoride DEK-MW-15003

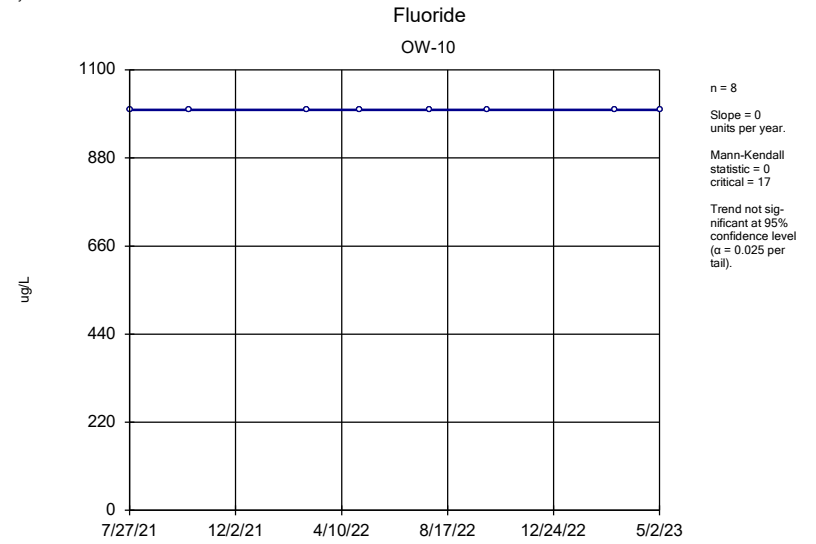


n = 8
 Slope = 0
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

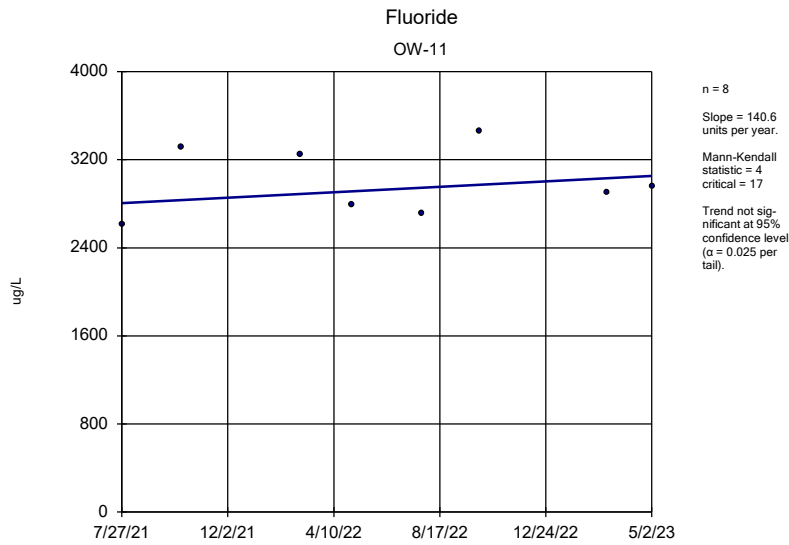
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2



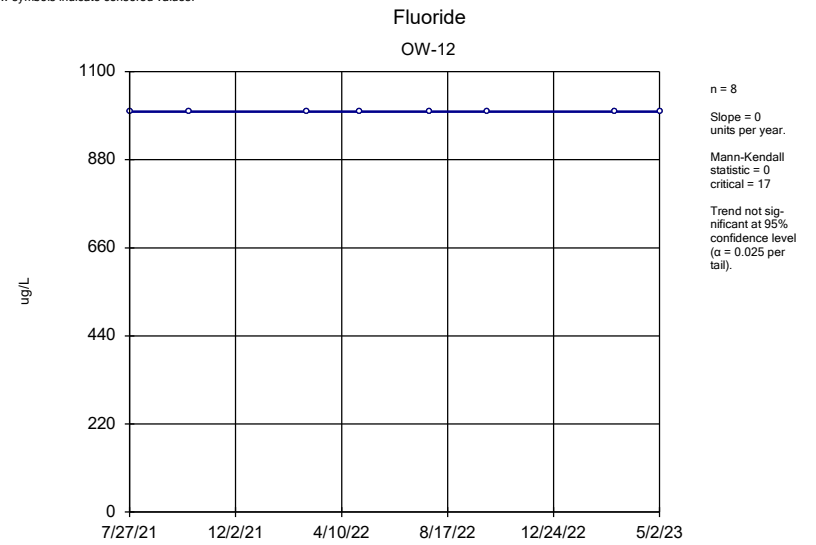
Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2



Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

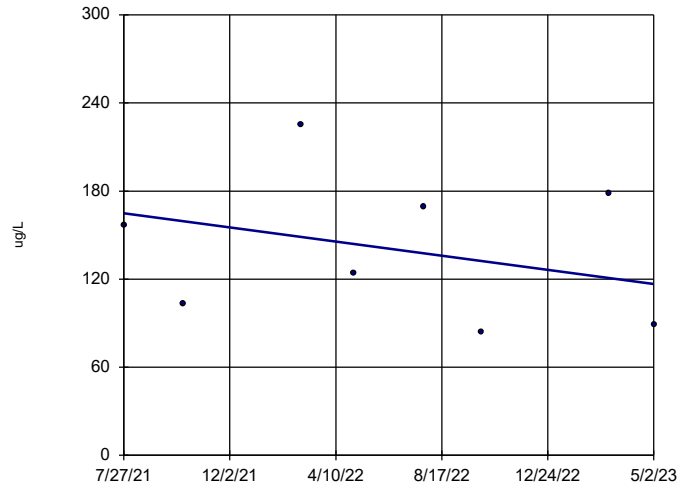


Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2



Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

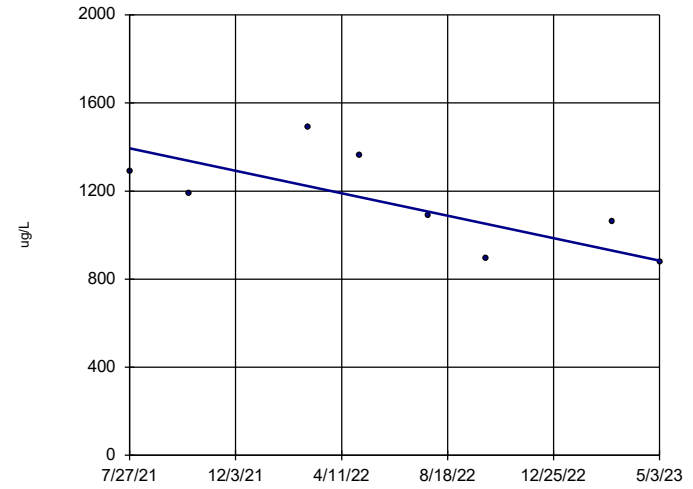
Iron, Total DEK-MW-15003



n = 8
 Slope = -27.38
 units per year.
 Mann-Kendall
 statistic = -4
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

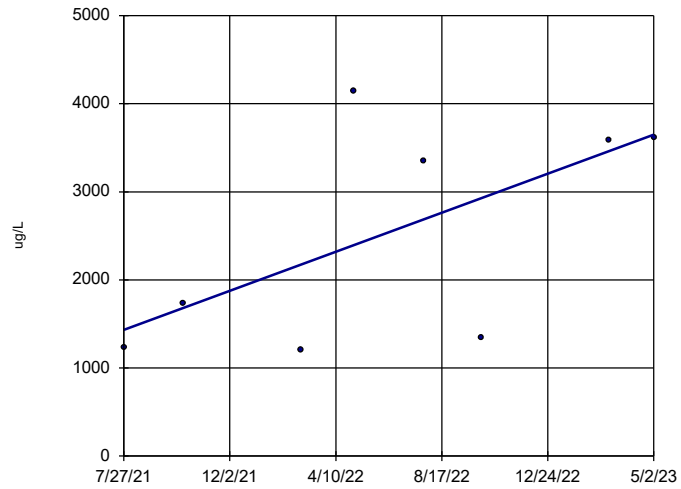
Iron, Total DEK-MW-18001



n = 8
 Slope = -288.9
 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

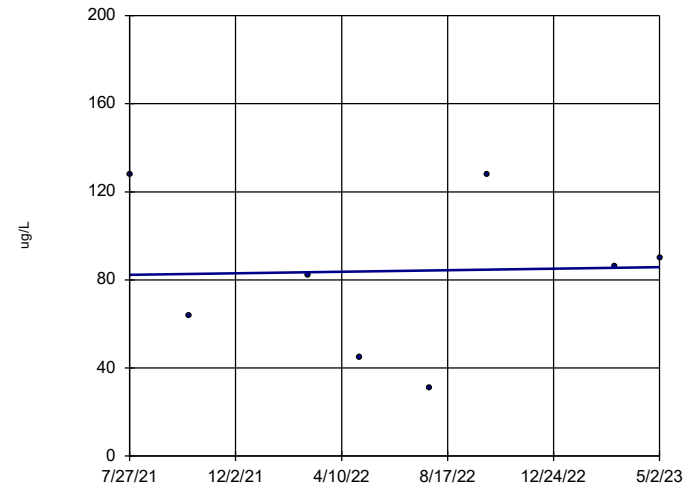
Iron, Total OW-10



n = 8
 Slope = 1256
 units per year.
 Mann-Kendall
 statistic = 12
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

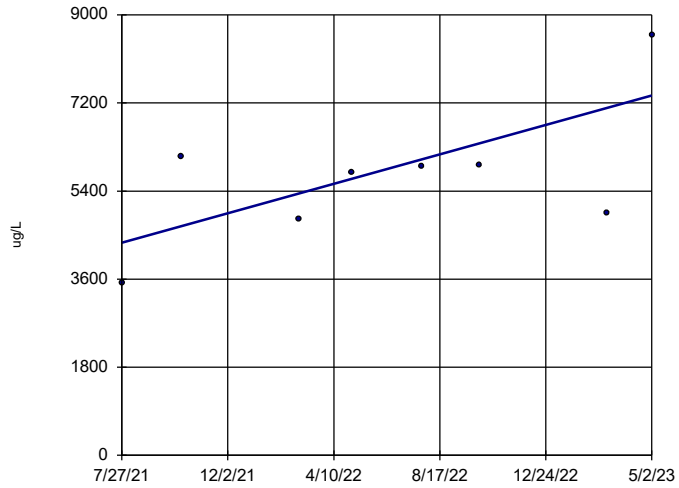
Iron, Total OW-11



n = 8
 Slope = 1.962
 units per year.
 Mann-Kendall
 statistic = 1
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

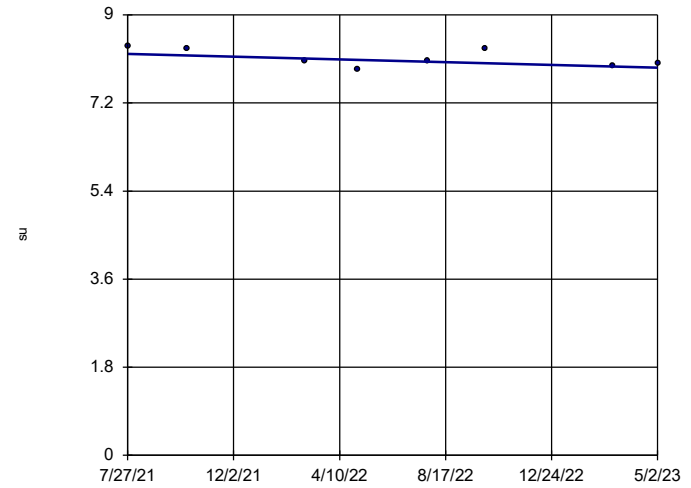
Iron, Total OW-12



n = 8
 Slope = 1705 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

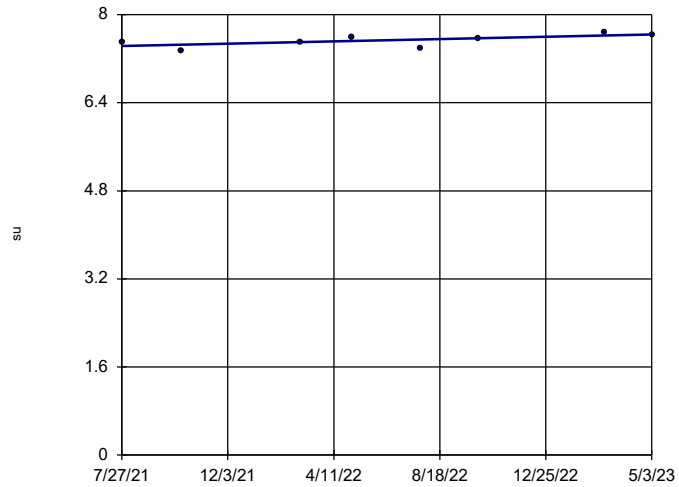
pH, Field DEK-MW-15003



n = 8
 Slope = -0.1606 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

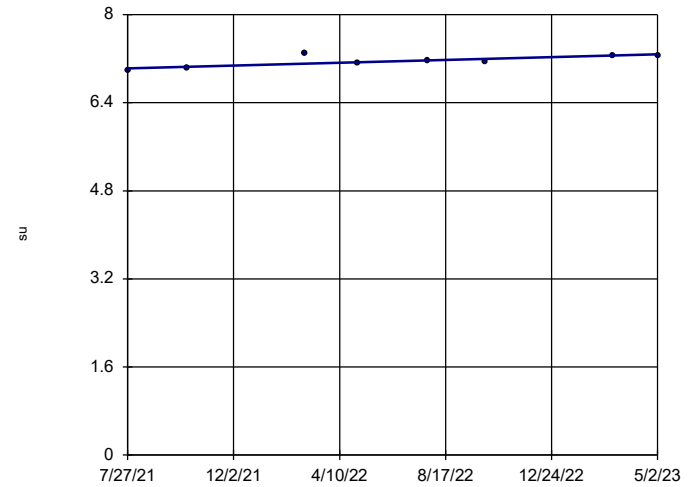
pH, Field DEK-MW-18001



n = 8
 Slope = 0.1175 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

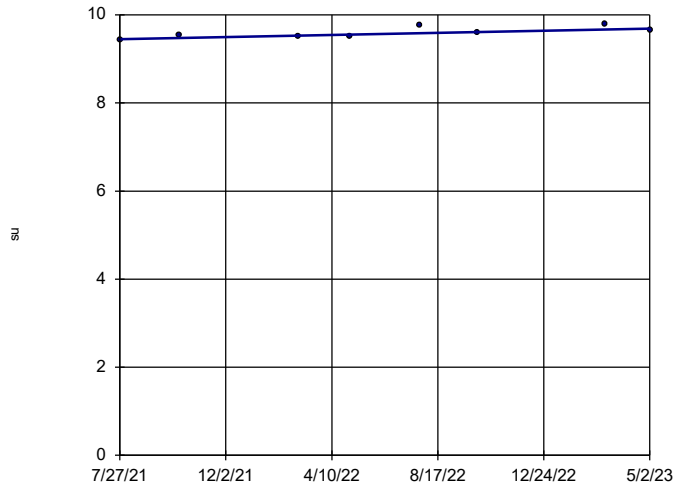
pH, Field OW-10



n = 8
 Slope = 0.1452 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 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

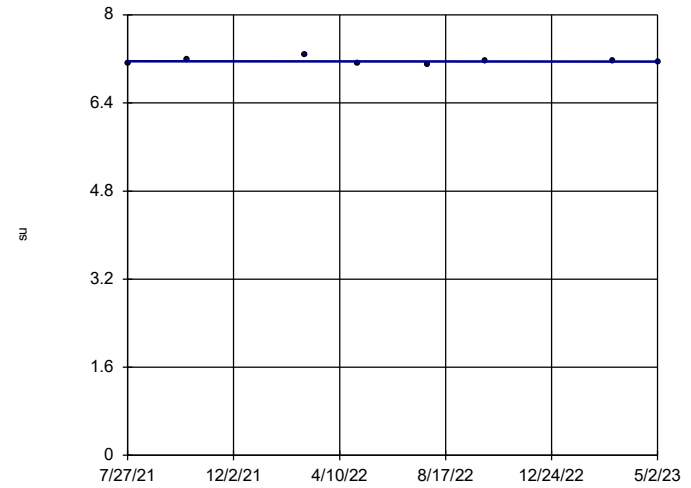
pH, Field OW-11



n = 8
 Slope = 0.1375
 units per year.
 Mann-Kendall
 statistic = 18
 critical = 17
 Increasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

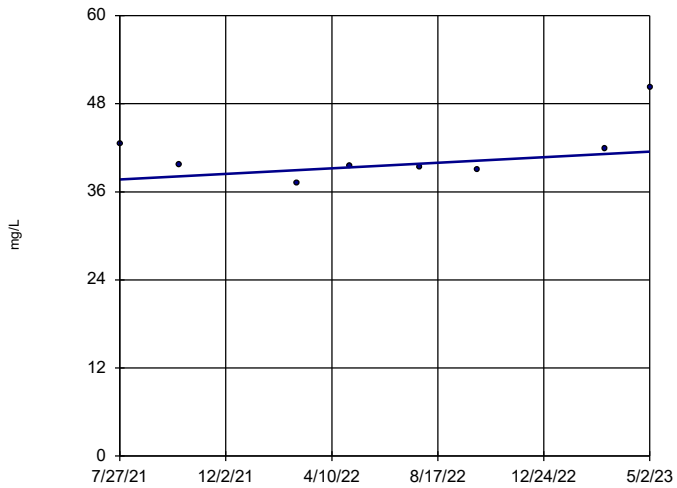
pH, Field OW-12



n = 8
 Slope = -0.00353
 units per year.
 Mann-Kendall
 statistic = -1
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

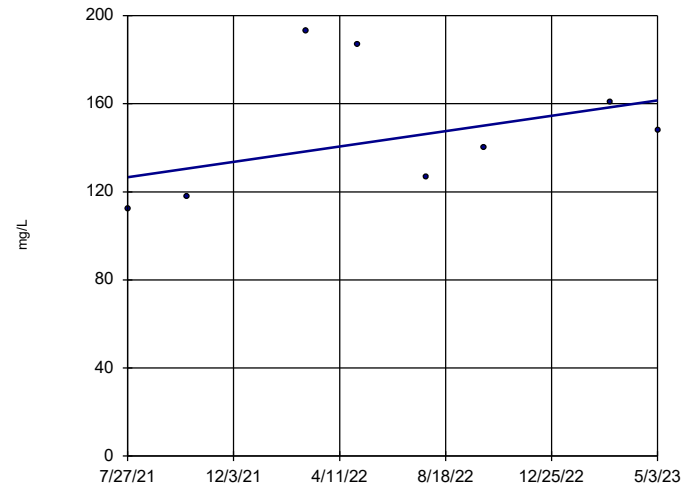
Sulfate DEK-MW-15003



n = 8
 Slope = 2.129
 units per year.
 Mann-Kendall
 statistic = 2
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

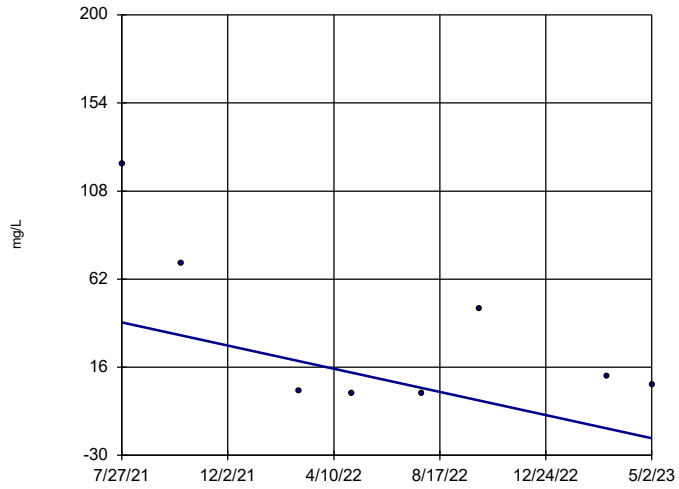
Sulfate DEK-MW-18001



n = 8
 Slope = 19.74
 units per year.
 Mann-Kendall
 statistic = 8
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

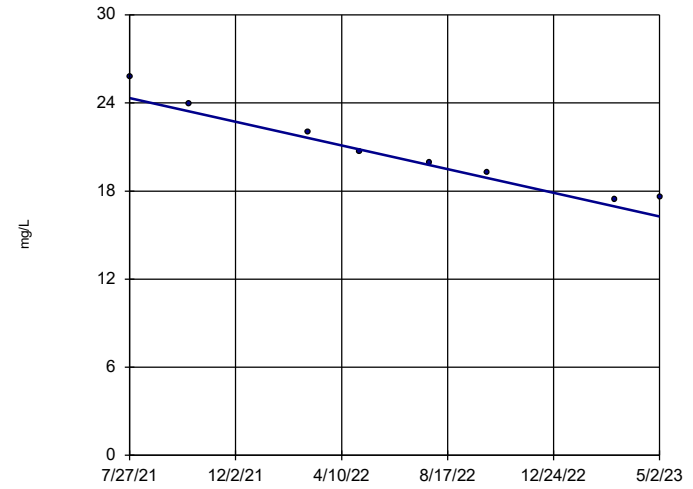
Sulfate OW-10



n = 8
 Slope = -34.31
 units per year.
 Mann-Kendall
 statistic = -8
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

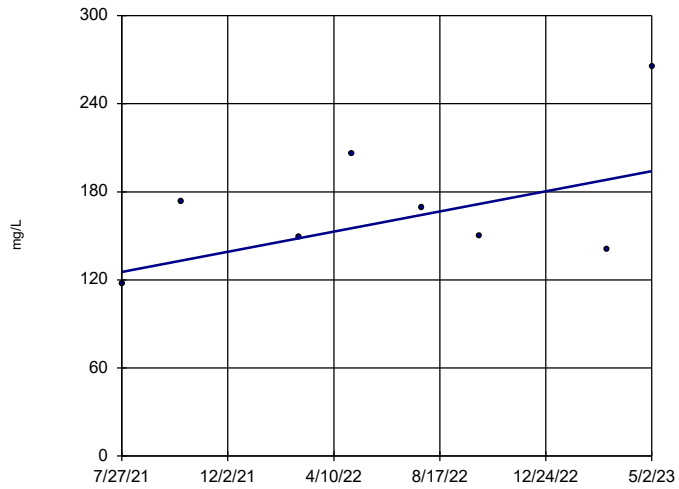
Sulfate OW-11



n = 8
 Slope = -4.565
 units per year.
 Mann-Kendall
 statistic = -26
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:32 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

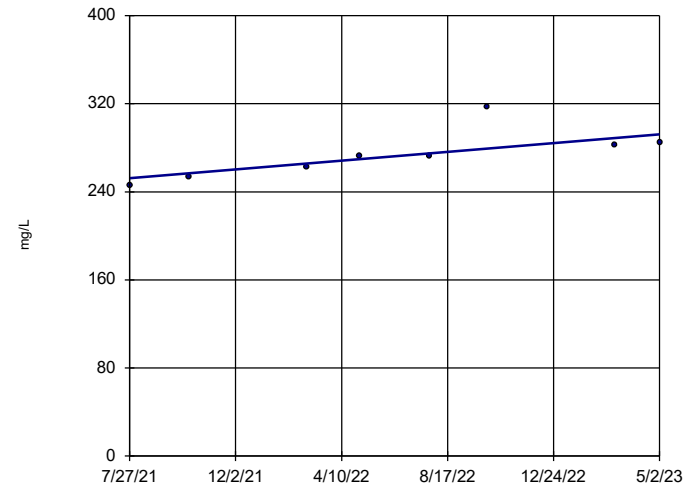
Sulfate OW-12



n = 8
 Slope = 38.95
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

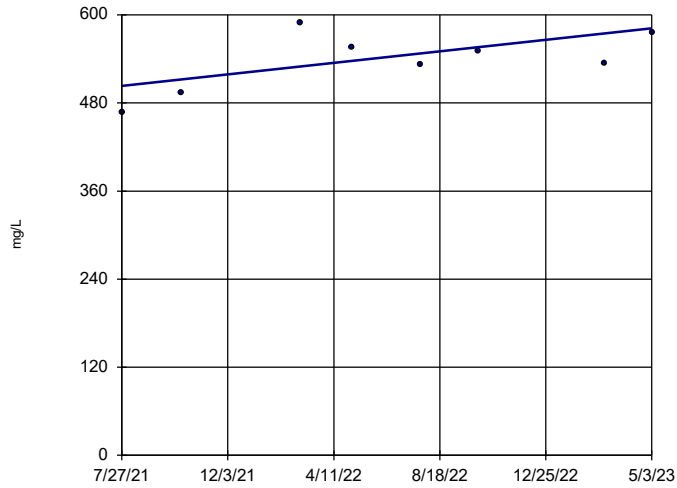
Total Dissolved Solids DEK-MW-15003



n = 8
 Slope = 22.56
 units per year.
 Mann-Kendall
 statistic = 22
 critical = 17
 Increasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

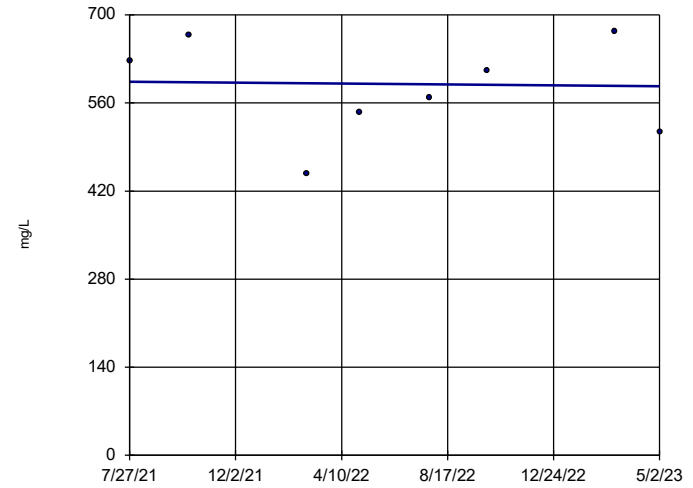
Total Dissolved Solids DEK-MW-18001



n = 8
 Slope = 44.55 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 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

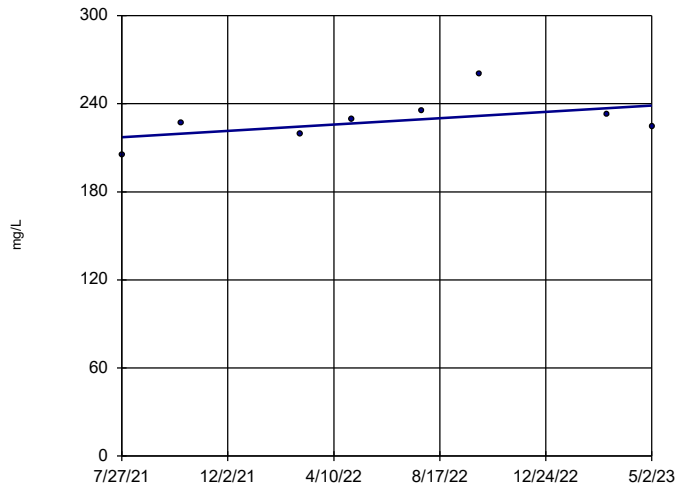
Total Dissolved Solids OW-10



n = 8
 Slope = -4.122 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 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

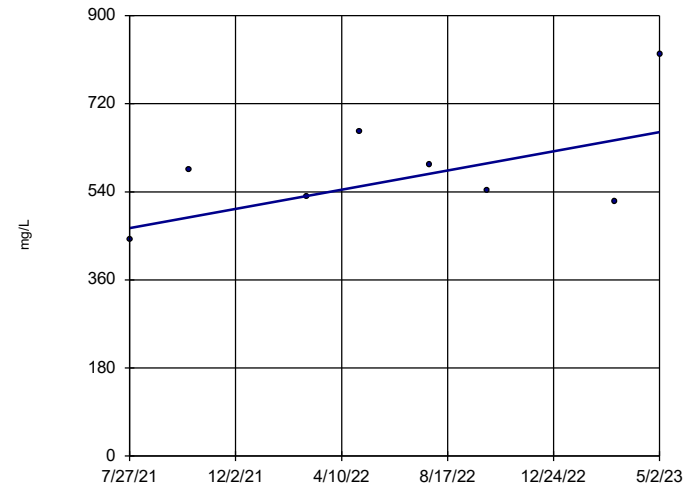
Total Dissolved Solids OW-11



n = 8
 Slope = 12.25 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 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Total Dissolved Solids OW-12



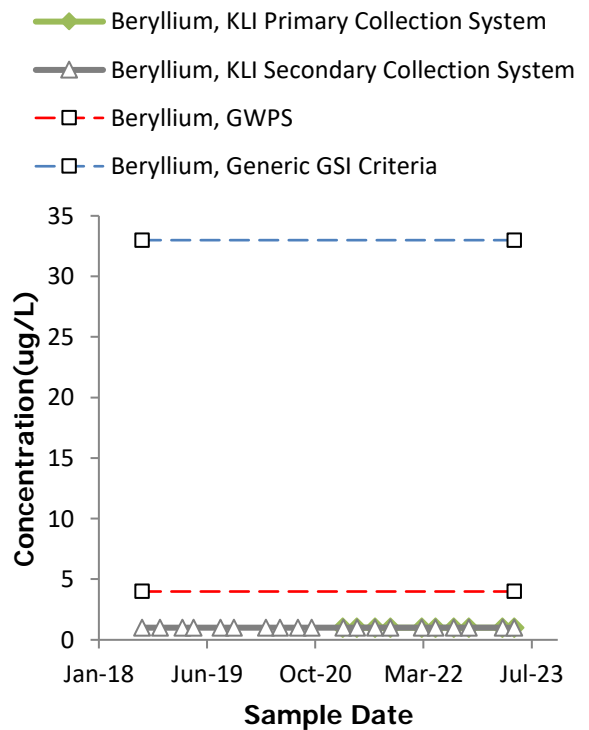
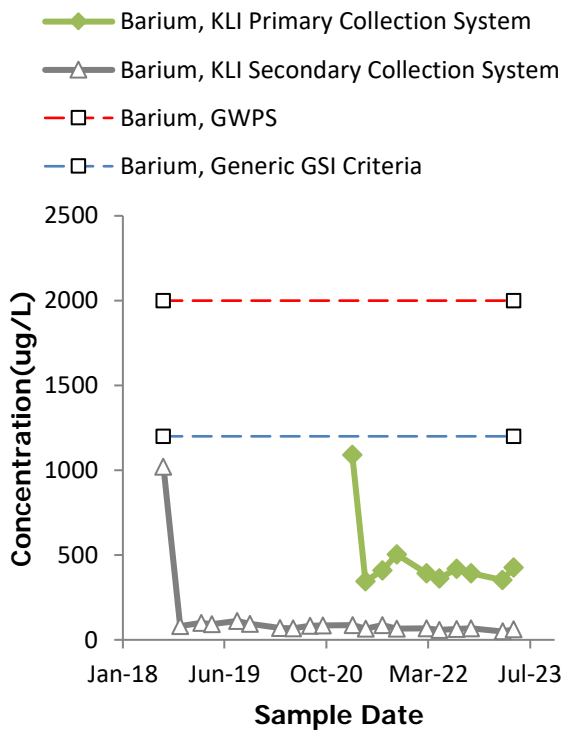
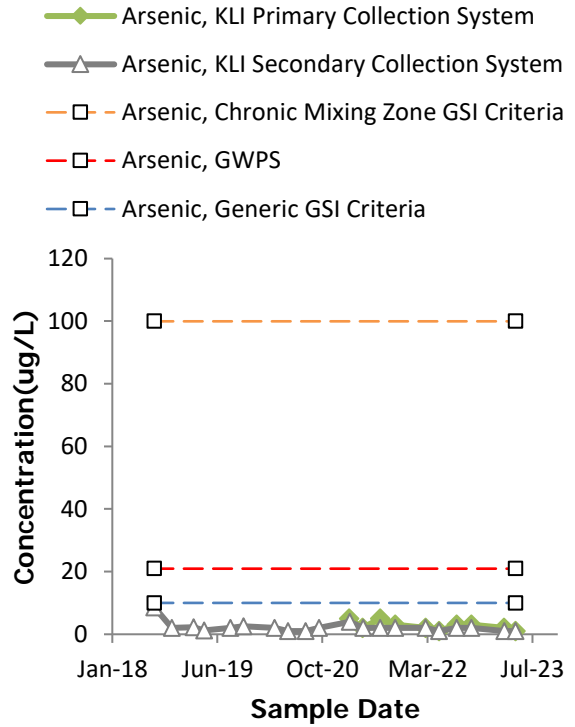
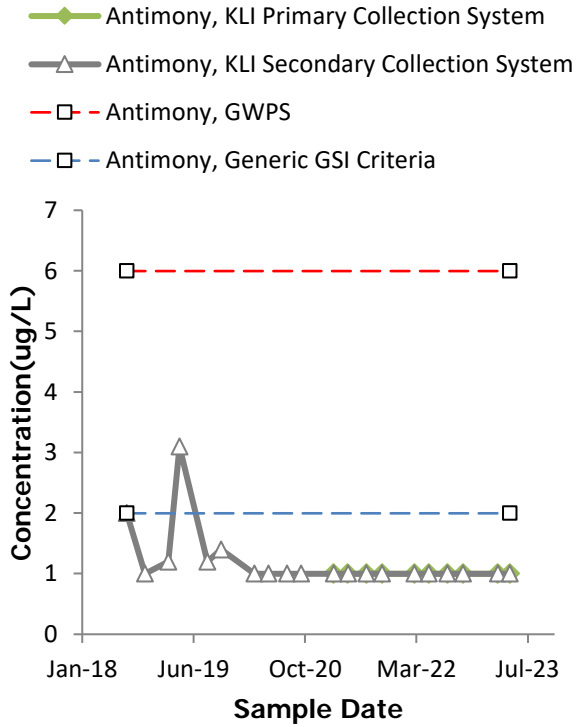
n = 8
 Slope = 110.9 units per year.
 Mann-Kendall statistic = 8
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 5/26/2023 11:33 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

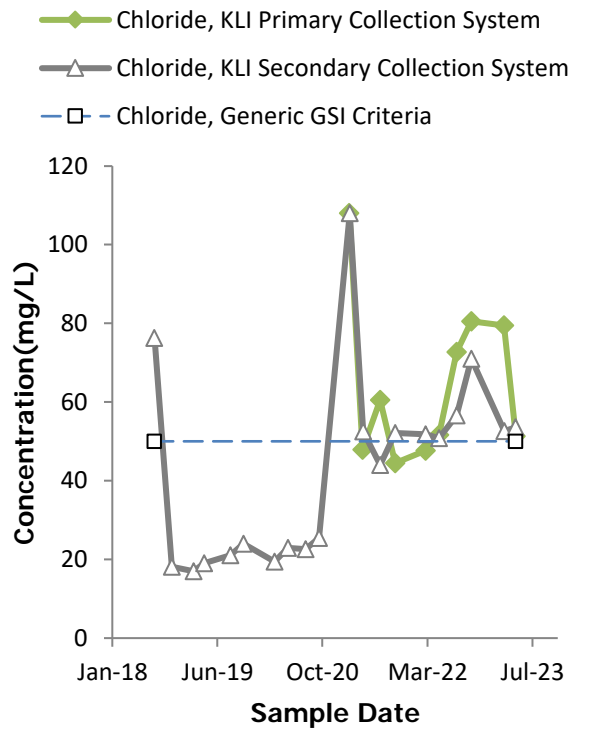
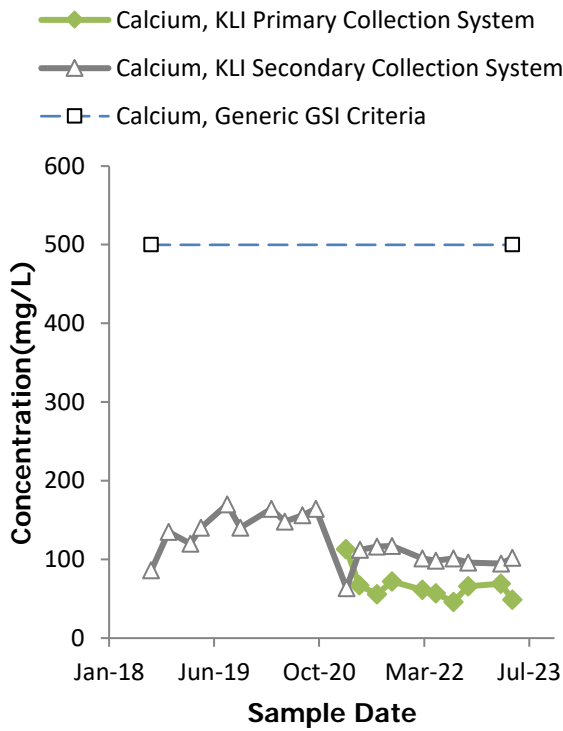
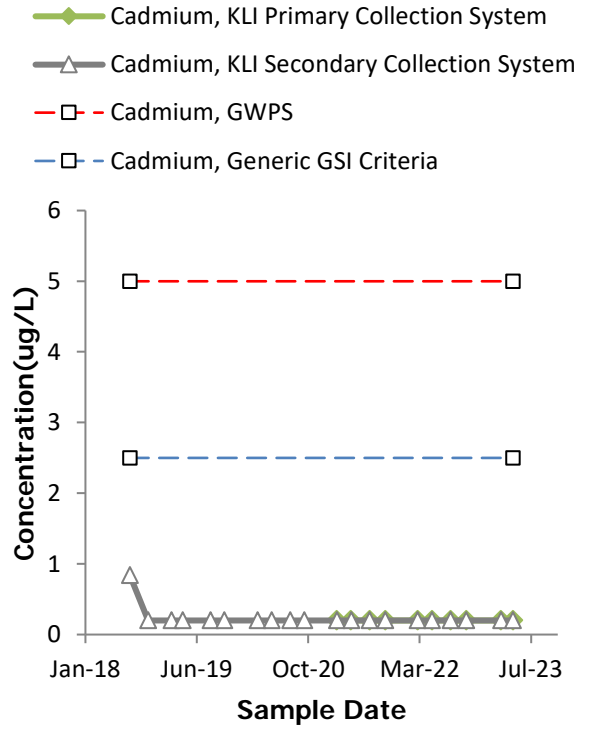
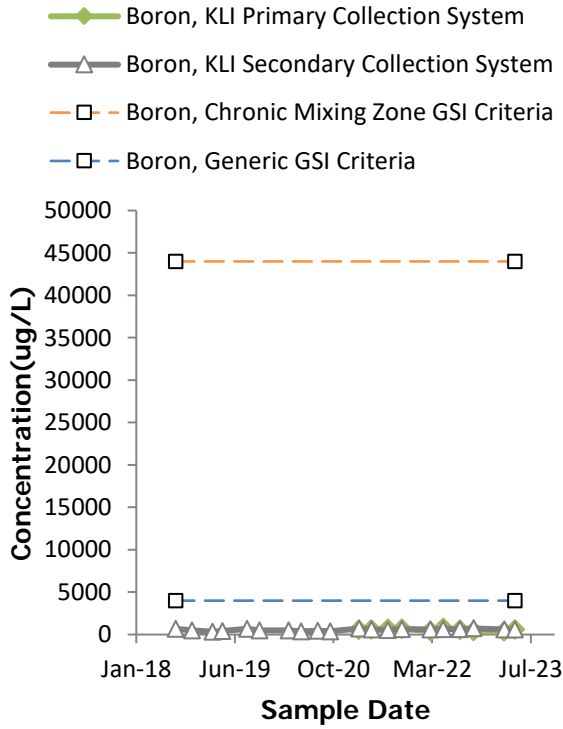
Appendix E

Secondary Leachate Collection System Monitoring

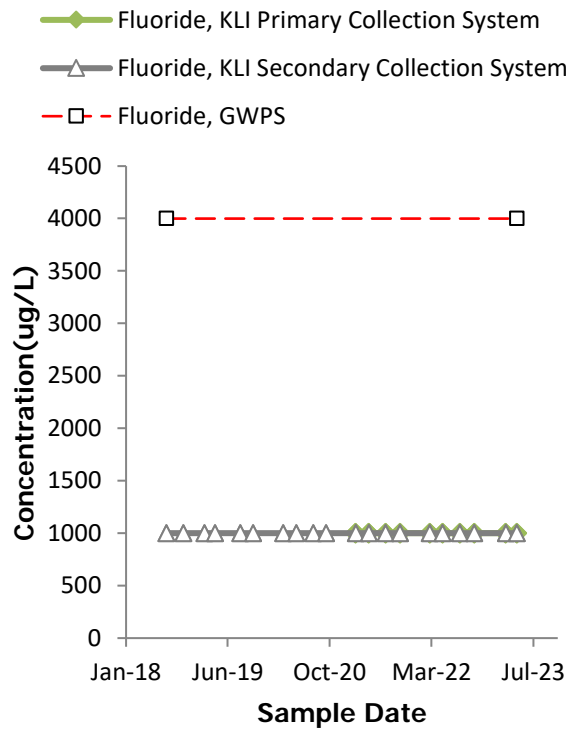
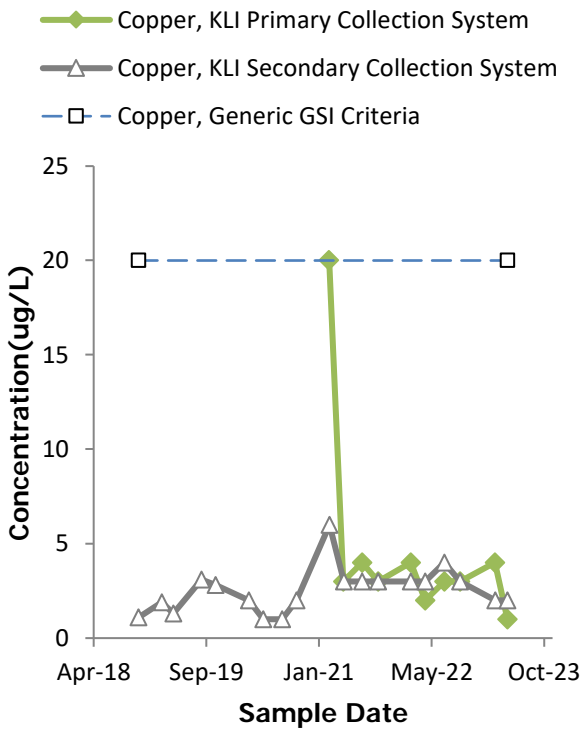
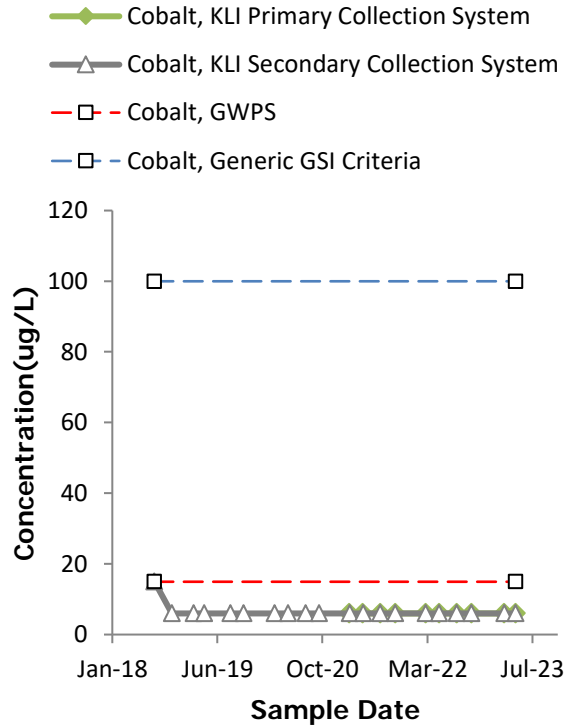
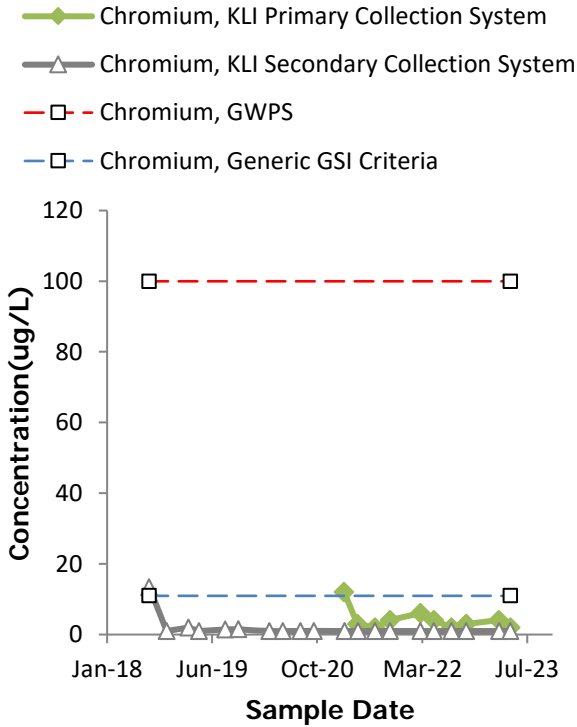
Water Quality Time Series



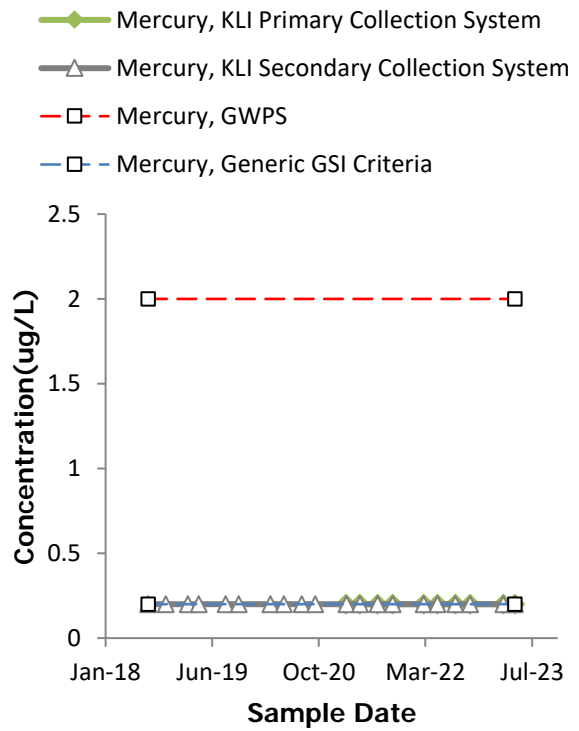
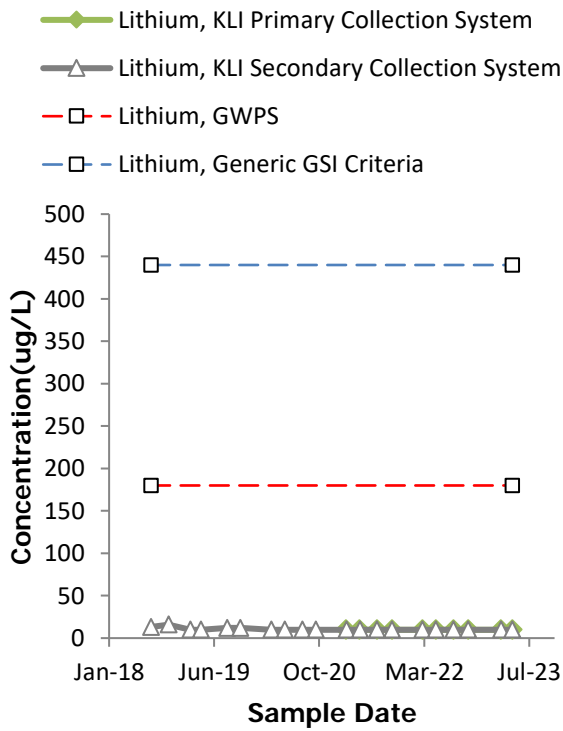
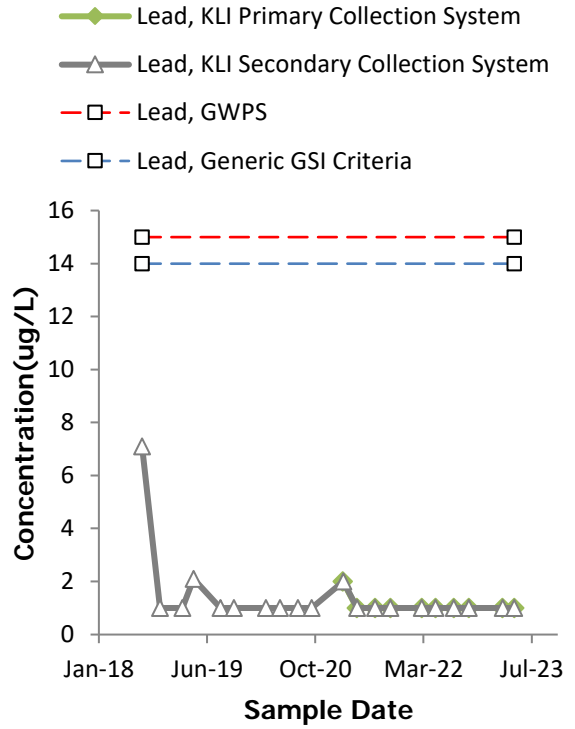
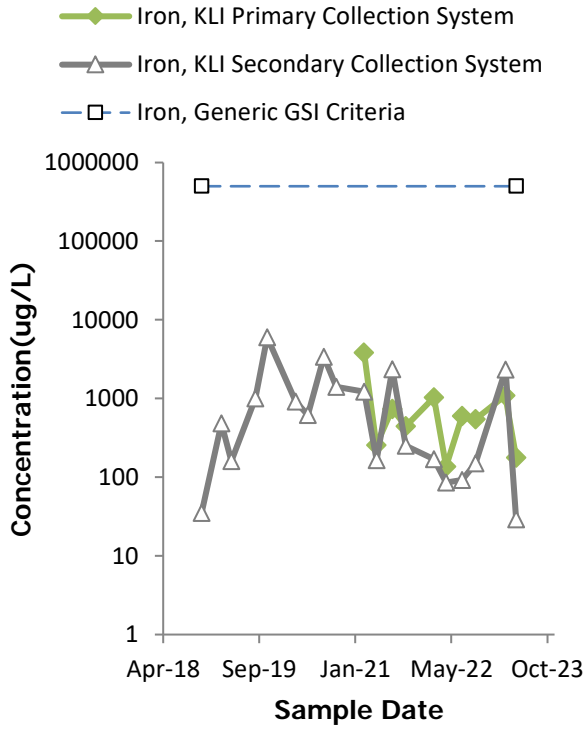
Water Quality Time Series



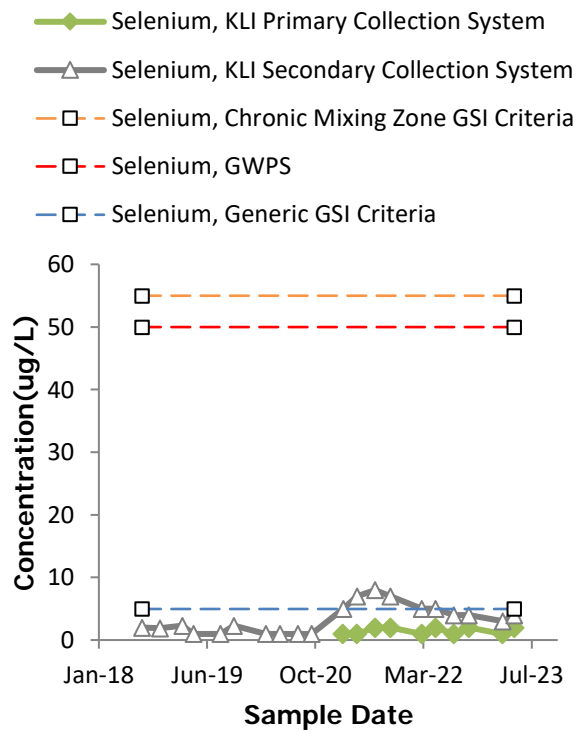
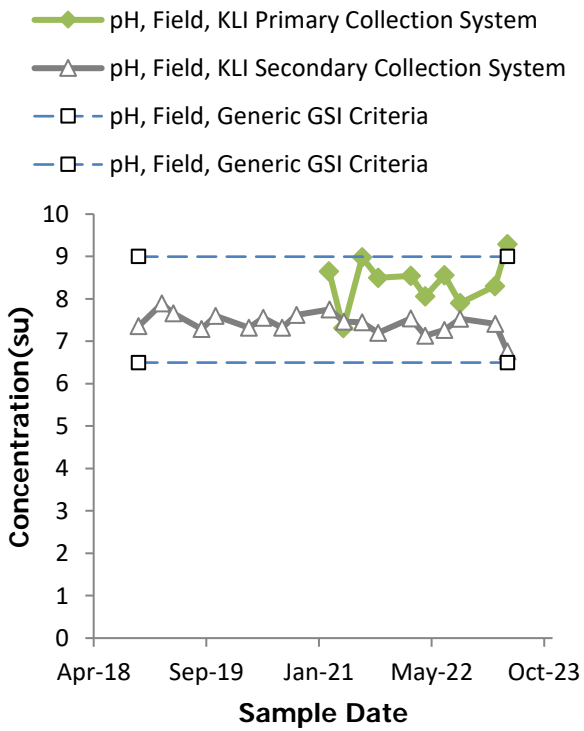
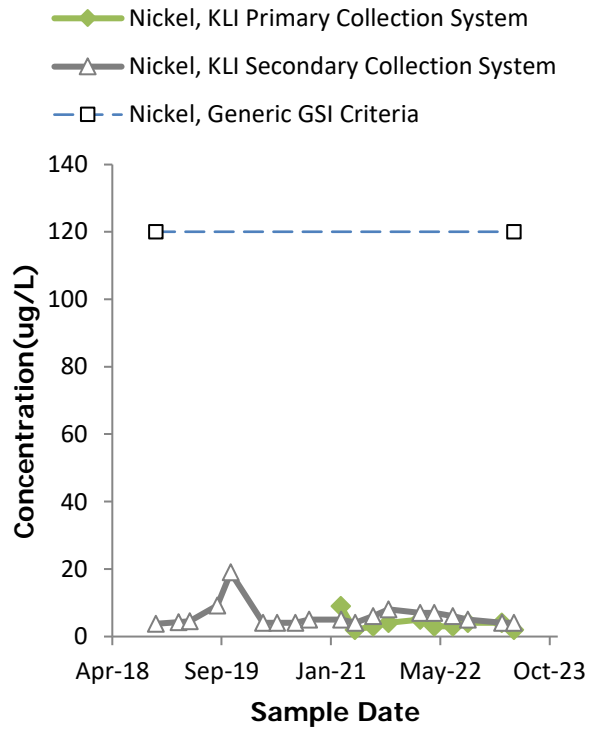
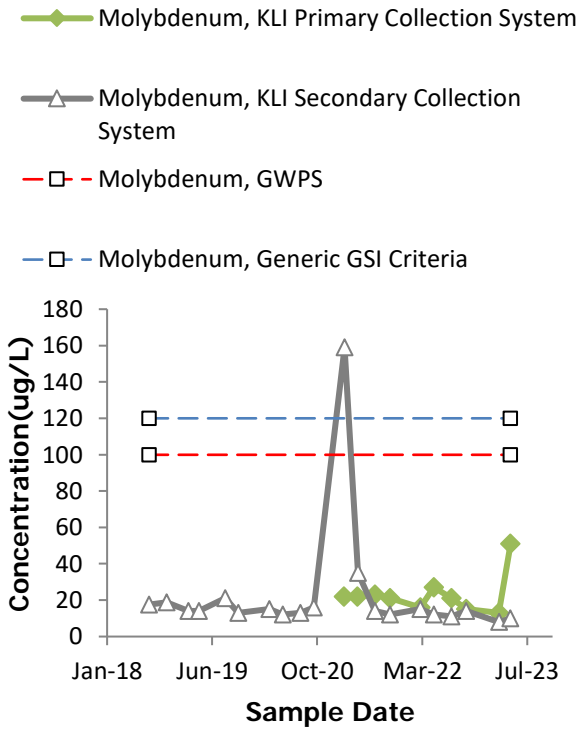
Water Quality Time Series



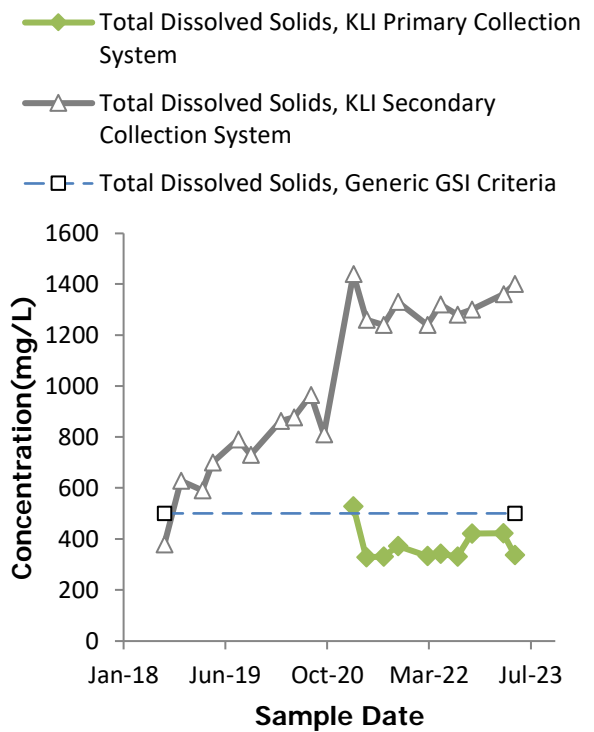
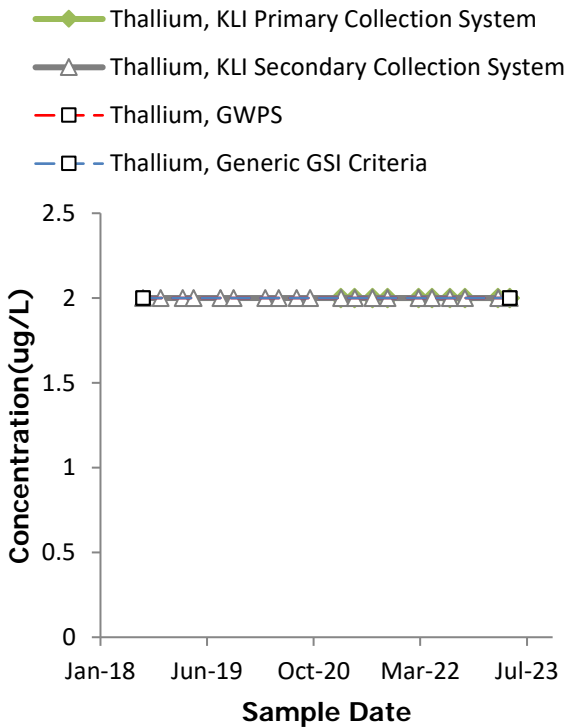
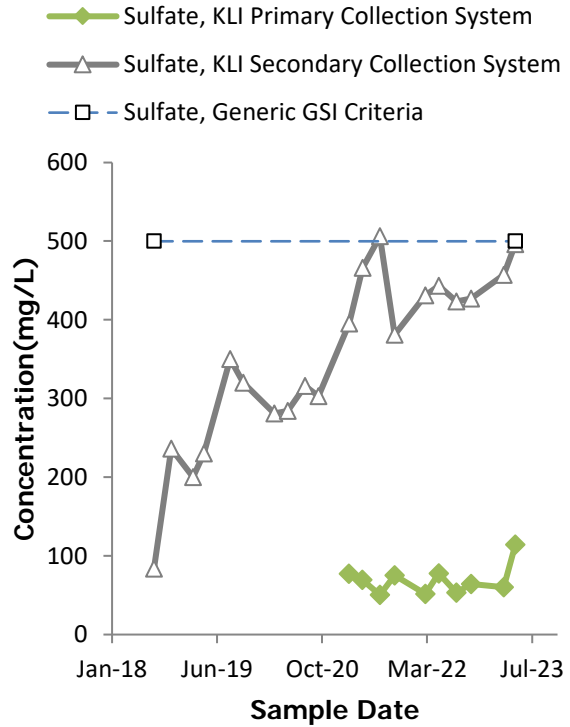
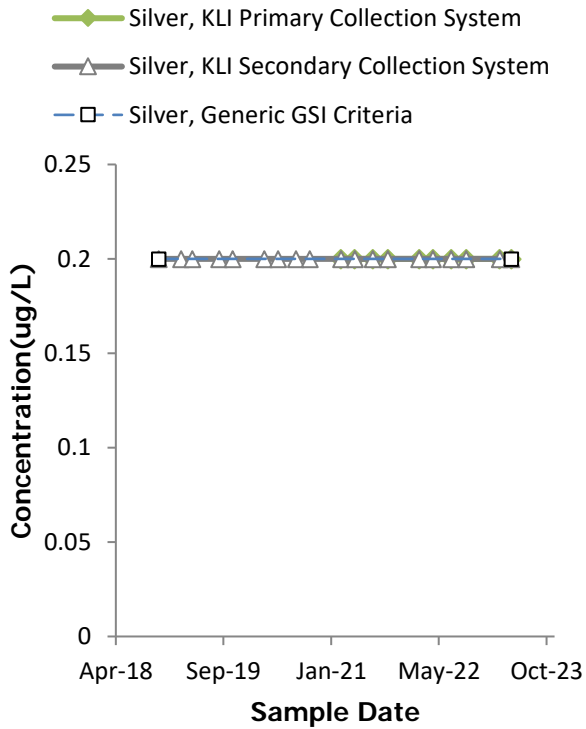
Water Quality Time Series



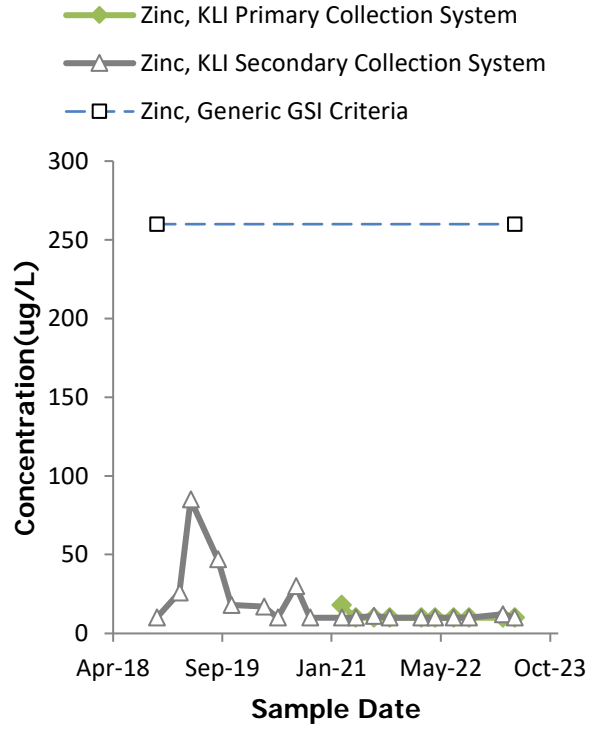
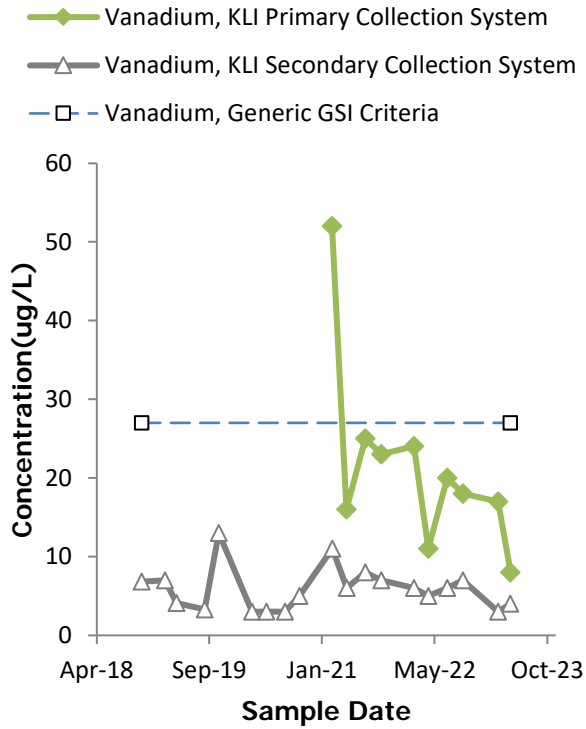
Water Quality Time Series



Water Quality Time Series



Water Quality Time Series



Appendix F

Alternate Source Demonstration

A CMS Energy Company

Date: July 21, 2023

To: Operating Record

From: Harold D. Register, Jr., P.E.

ADP

RE: Alternate Source Demonstration Professional Engineer Certification, §257.94(e)2
DE Karn Lined Impoundment 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 2022 Hydrogeological Monitoring Report for the DE Karn Lined Impoundment 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

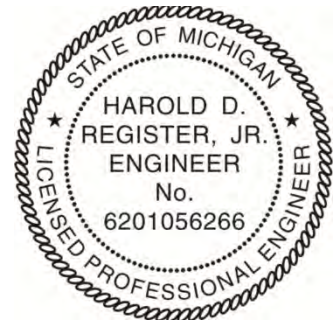
Date of Certification

Harold D. Register, Jr., P.E.

Name

6201056266

Professional Engineer Certification Number



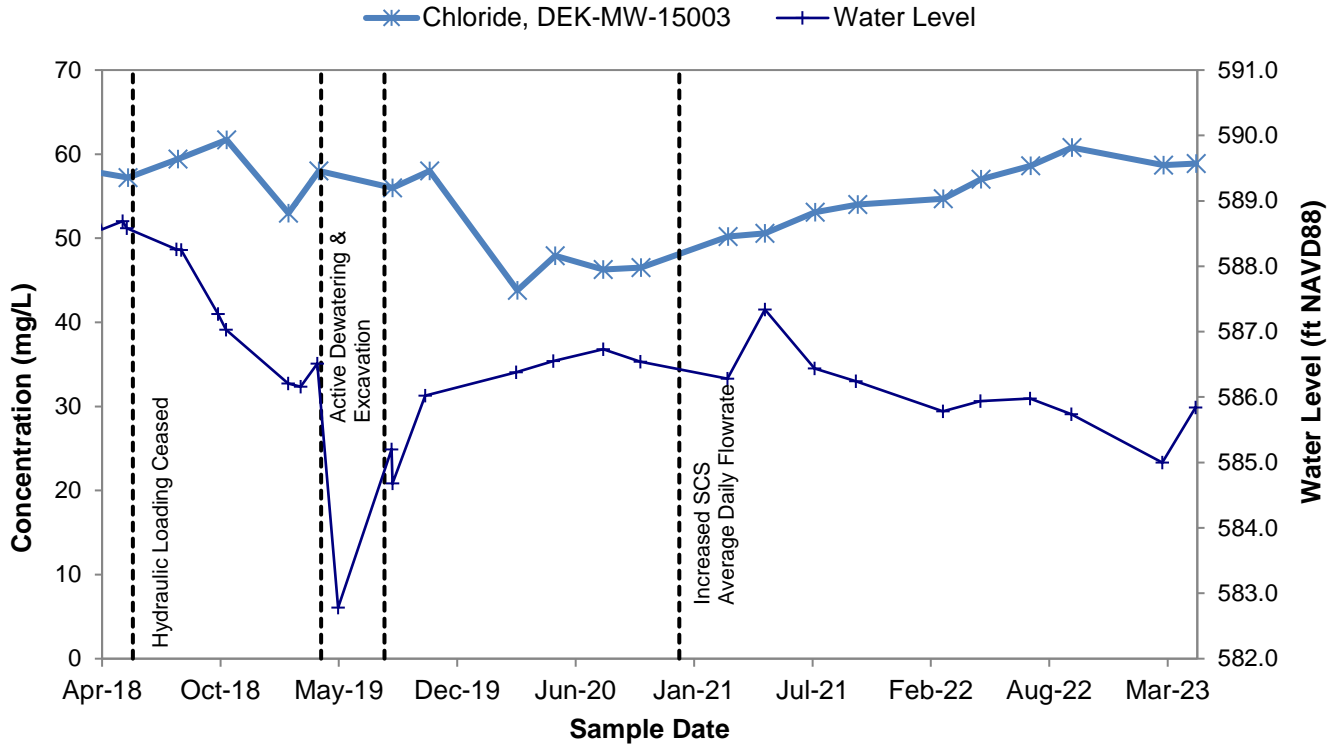
07/21/2023

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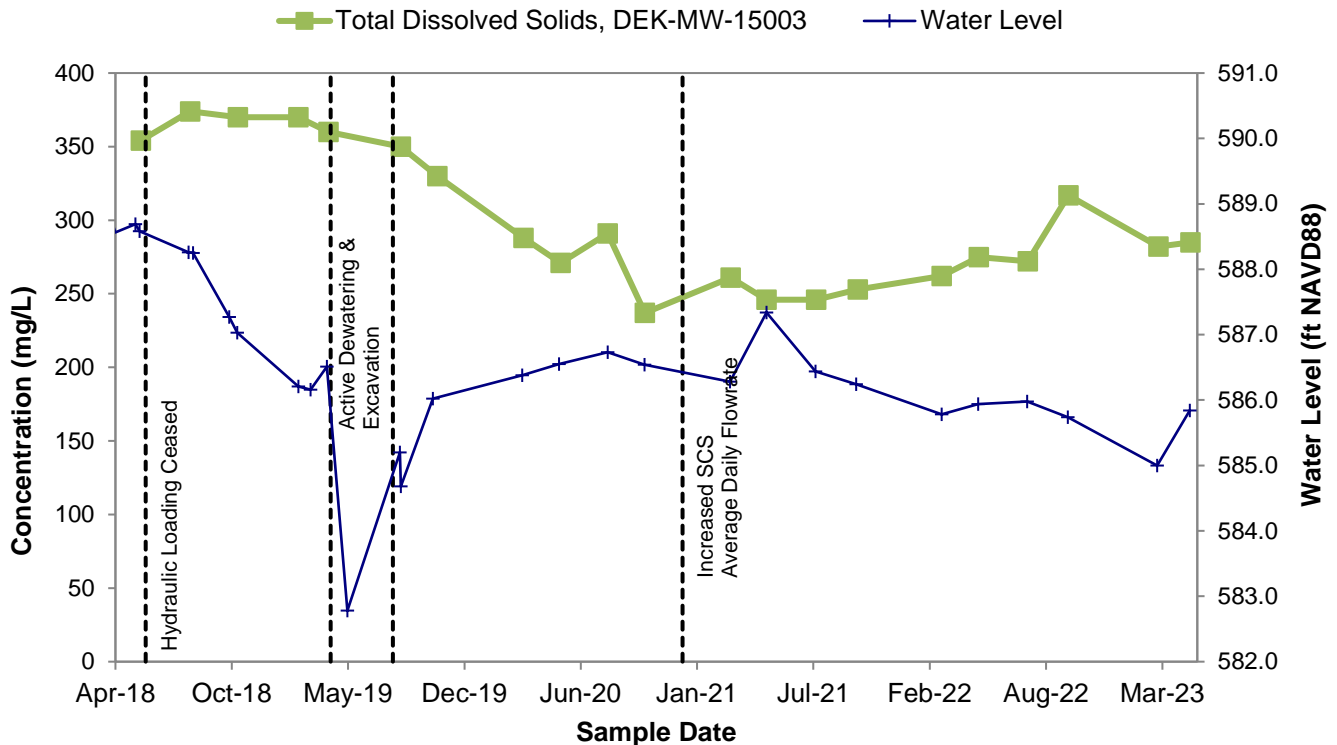
TRC (July 2023). Second Quarter 2023 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan

Alternate Source Demonstration Time Series

Chloride at DEK-MW-15003

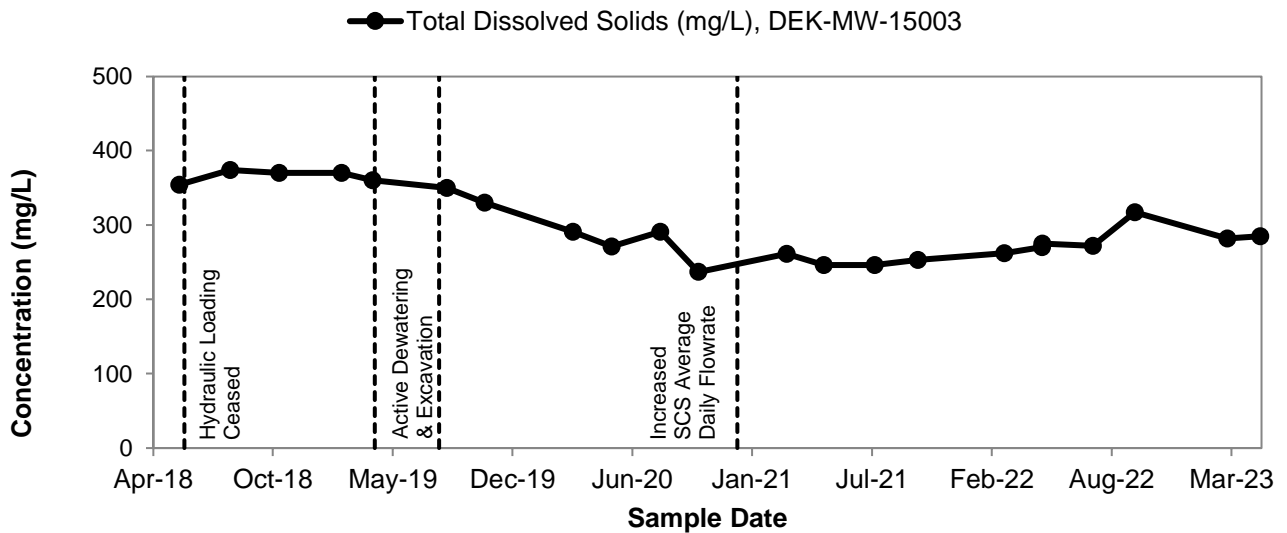
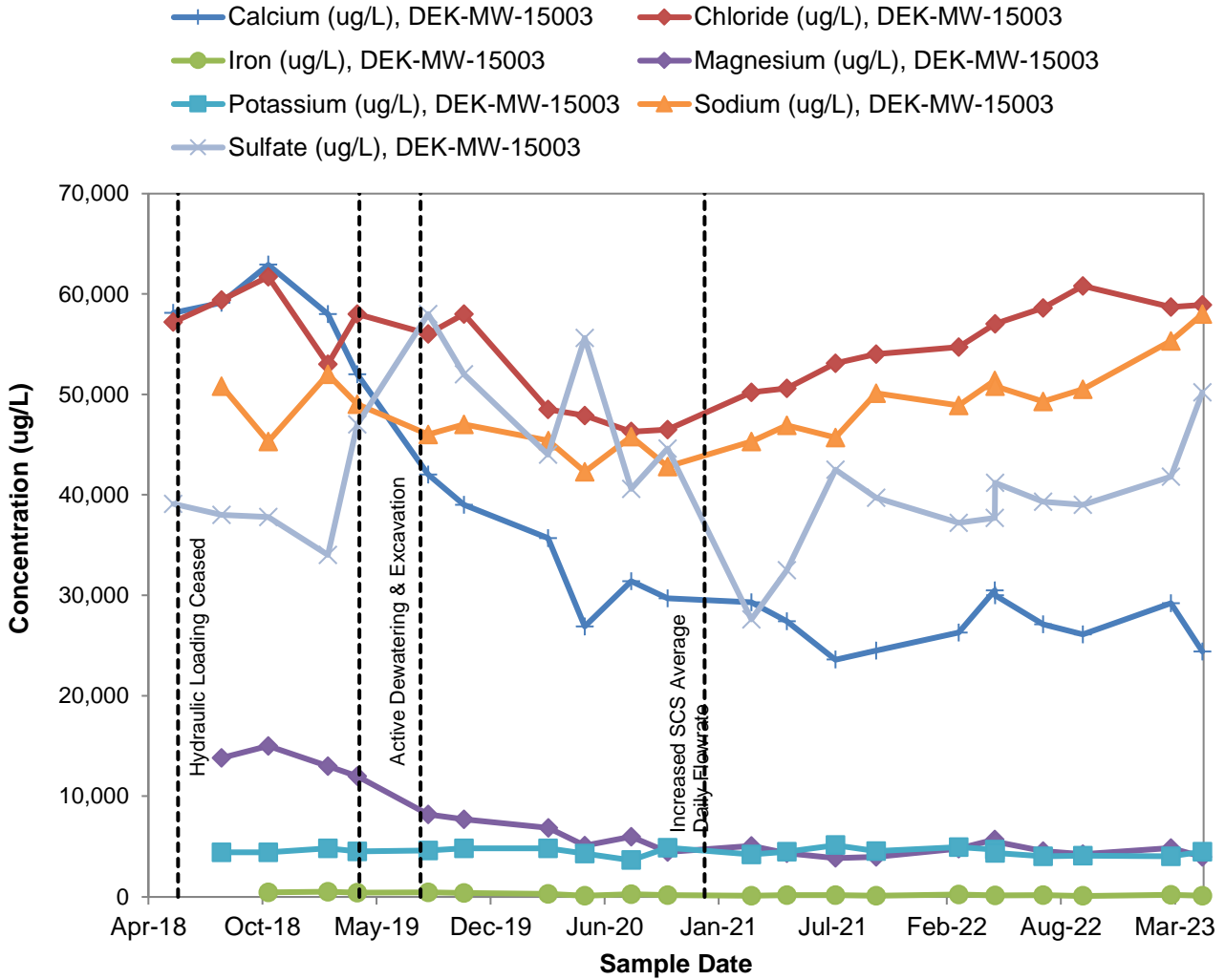


Total Dissolved Solids at DEK-MW-15003



Alternate Source Demonstration Time-Series

DEK-MW-15003





Third Quarter 2023 Hydrogeological Monitoring Report

DE Karn Lined Impoundment CCR Unit

Essexville, Michigan

October 2023

A handwritten signature in blue ink that reads "Darby Litz".

Darby Litz
Project Manager/Hydrogeologist

Prepared For:

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A handwritten signature in blue ink that reads "Andrew Whaley".

Andrew Whaley
Project Geologist

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1.0 Introduction

Pursuant to the Federal CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After Consumers Energy established the groundwater monitoring system and detection monitoring program pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 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 amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Third Quarter 2023 Karn Lined Impoundment 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 impoundment. 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, *Format for Solid Waste Disposal Facility Monitoring Submittals*, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (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 Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

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.

1. Monitoring of secondary collection system flow rates and water quality to detect leaks in the liner; and
2. Groundwater monitoring to determine if there are potential new releases from the Karn Lined Impoundment.

Based on sampling results for the third quarter 2023, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

1.3 Site Overview

The Karn Lined Impoundment is located within the DE Karn Power Plant site (Site) located north of the former JC Weadock Power Plant, east of the Saginaw River, south and west of Saginaw Bay (Figure 1). Two coal-fired power generating units (Karn Units 1 & 2) began generating electricity in 1958 and 1959, respectively. Consumers Energy permanently ceased the operation of the coal-fired boilers (DE Karn Units 1&2) at the Site in May 2023 and has commenced decommissioning activities for those electrical generating units. Karn Units 3 & 4, co-located with the coal-fired generating units, are oil- and natural gas-fueled. Two other areas of coal ash management within the Site are the former Karn Bottom Ash Pond that was closed by removal and the Karn Landfill that was certified closed and now in post-closure care.

The Karn Lined Impoundment was put into service in June 2018 to replace the former Karn Bottom Ash Pond that directly supported Karn 1&2 power generation operations. The Karn Lined Impoundment serves a twofold purpose for treatment pursuant to National Pollutant Discharge Elimination System (NPDES) Permit NO. MI0001678 and as a temporary storage for bottom ash prior to removal and disposal in the JC Weadock Solid Waste Disposal Area (Weadock Landfill) governed by Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021. On July 7, 2023, Consumers Energy submitted a Closure Work Plan to the EGLE that details a closure by removal of CCR in accordance with 257.102(c) of the self-implementing requirements of the CCR Rule. By reference, performance of this work would also satisfy state requirements pursuant to Section 11519b(9) of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.11501 et seq. EGLE provided written concurrence with the Closure Work Plan on October 25, 2023.

1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. 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 (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 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 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. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

The Site is bound by several surface water features (Figures 1 and 2): the Saginaw River to the west, Saginaw Bay (Lake Huron) to the north and east, and a discharge channel to the south. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In the vicinity of the Karn Lined Impoundment, the shallow groundwater flow is generally radial, with a potentiometric high point near the unlined ditch north of the Karn Lined Impoundment and near DEK-MW-15003, flowing outward toward the surrounding surface water bodies.

2.0 Second Collection System Monitoring

Consumers Energy initiated secondary collection system flow monitoring to comply with the EGLE-approved HMP in December 2020. The SCS serves as a leak detection system and the SCS flow rate data is used to demonstrate compliance with Part 115. Consumers Energy continues to comply with the requirements for unmonitorable units under Rule 437 of the Part 115 Rules.

Increased average daily flow rates noted for the period from December 10, 2020 – January 6, 2021 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner in 2021, the daily average flow rates were reduced, and the three-month average dropped below the response action flow rate of 25 gallons per acre per day (GPAD). The average daily flow rate for July through September 2023 (three-month average) was calculated as 7.5 GPAD and continues to demonstrate that the daily average flow rate is below the threshold value of the response action flow rate of 25 GPAD. Trend evaluations for weekly and monthly average flow rates continue to support that no additional engineering or operational modifications are necessary, and Consumers continues to document this information in their operating record.

In response to the prior exceedance of the SCS Response Action Flow Rate, samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

- Primary Indicator Parameters: Section 11511a(3)(c) - Detection Monitoring Constituents
- Alternative Indicator Parameters: Section 11519b(2) - Assessment Monitoring Constituents
- Optional Analyses in support of Piper or Stiff diagrams

The KLI-PCS and KLI-SCS data were evaluated for comparison to groundwater quality and water chemistry and to also assess potential of hazard and mobility of constituents. A series of time-series plots are included in Appendix E to illustrate water quality data changes over time for the secondary collection system from the start of operation in June 2018 to present. This analysis demonstrates that each monitored constituent is generally present in the secondary collection system (KLI-SCS) at concentrations less than the Groundwater Protection Standard (GWPS) established under 40 CFR 257.95(h) for the Karn Bottom Ash Pond or generic groundwater surface water interface (GSI) criteria adopted by the Department pursuant to Section 20120a, with the exception of total dissolved solids and chloride. Consumers notes that as decommissioning of the Karn Units 1&2 proceeds, temporary changes to the mix of the miscellaneous low-volume waste may occur, causing changes in the concentrations of detected constituents in the primary collection system (KLI-PCS) as compared to historical. A few notable observations:

- **Arsenic concentrations are higher in groundwater than the primary and secondary collection system:** Arsenic was detected in the primary collection system at a concentration of 1 ug/L and in the secondary collection system at a concentration of 1 ug/L in July 2023. As shown in Appendix E, the arsenic concentrations observed in the primary and secondary collections system have been consistently low. In contrast, the arsenic

concentration observed in OW-12, the monitoring well located closest to the repaired liner areas, is 114 ug/L, which is consistent with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- **Vanadium is detected in the primary and secondary collection system and not in groundwater:** Vanadium is present in the primary collection system (4 ug/L in July 2023) and in the secondary collection system (5 ug/L in July 2023) (Appendix E). Vanadium was not detected in the wells nearest the observed liner damage: OW-12 (<2 ug/L) or DEK-MW-18001 (<2 ug/L) providing additional evidence that a release has not adversely affected groundwater conditions.
- **Secondary Collection System chemistry has not appreciably changed:** The time series plots in Appendix E show relatively stable trends in chemistry for samples collected from the secondary collection system, except for total dissolved solids (TDS), and sulfate in the secondary collection system. TDS and sulfate concentrations in the primary collection system leachate is typically significantly lower in concentration than the concentration in the secondary collection system leachate, suggesting that the elevated TDS and sulfate is not likely from the primary collection system leachate. The TDS and sulfate concentrations in the secondary collection system are beginning to stabilize and are more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.

Water quality data collected for this event are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored.

3.0 Groundwater Monitoring

3.1 Monitoring Well Network

In accordance with §257.91, Consumers Energy developed a groundwater monitoring system for the Karn Lined Impoundment prior to the initial receipt of waste in the CCR unit (TRC, 2018c). Given the radial groundwater flow direction and that constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the Karn Bottom Ash Pond, the groundwater monitoring system design incorporates an intrawell statistical approach for detection monitoring as described in the HMP and in accordance with the “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance” (USEPA, 2009). Five monitoring wells that are screened in the uppermost saturated unit were selected for the Karn Lined Impoundment HMP detection monitoring (DEK-MW-15003, DEK-MW-18001, OW-10, OW-11, and OW-12). Monitoring well locations are shown on Figure 2.

3.2 July 2023 Detection Monitoring Event

In accordance with the HMP, TRC conducted the third quarter 2023 monitoring event for the Karn Lined Impoundment between July 24th and 26th, 2023. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the third quarter 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents		
Boron	Antimony	Fluoride	Thallium
Calcium	Arsenic	Lead	Vanadium
Chloride	Barium	Lithium	Zinc
Fluoride	Beryllium	Mercury	
Iron	Cadmium	Molybdenum	
pH	Chromium, total	Nickel	
Sulfate	Cobalt	Selenium	

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents	
Total Dissolved Solids (TDS)	Copper	Silver

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide further evaluation of groundwater chemistry. Analytical results from this event monitoring event are included in the attached laboratory reports (Appendix A).

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 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 B).

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. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater 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 one field blank, one equipment blank, one field duplicate (OW-10), and field matrix spike/matrix spike duplicate samples collected at DEK-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 data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during this groundwater monitoring event are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in July 2023 are generally within the range of 579 to 586 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface

water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in the vicinity of the former Karn Bottom Ash Pond in July 2023 demonstrate a reduction in groundwater elevation measurements by several feet when compared to the measurements collected prior to June 2018, when active loading was occurring to the bottom ash pond. Groundwater at the Site is locally influenced by incidental infiltration from precipitation over the uncovered acreage and the unlined low volume miscellaneous wastewater conveyance associated with the permitted NPDES discharge system, which is located just north of the Karn Lined Impoundment. Monitoring wells OW-11, OW-12, and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric “high”, as illustrated in Figure 3.

The average hydraulic gradient observed on July 24, 2023 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0046 ft/ft. The gradients were calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005, DEK-MW-15003/DEK-MW-15006, and OW-11/MW-08, as well as the monitoring well water elevation difference and distance between DEK-MW-18001 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same date as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.23 ft/day or 84 ft/year in July 2023 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

Due to the operational changes of the former bottom ash pond and the completion of the landfill capping activities in 2020, the gradient between the area of the Karn Bottom Ash Pond and Karn Lined Impoundment and the surrounding surface water bodies is flattening out as compared to previous quarters and is also attempting to reach a new equilibrium, as expected. The general flow direction relative to the Karn Lined Impoundment is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III/IV parameters that could potentially migrate from the Karn Lined Impoundment.

4.0 Data Evaluation

Based on sampling results for this event the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the third quarter 2023 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria and the generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017 and in accordance with the December 23, 2015 mixing zone determination.

4.1 Statistical Evaluation of Trends

Groundwater in the vicinity of the Karn Lined Impoundment has been affected by CCR management before commencement of operation (January 2019, TRC). Given that the constituents associated with CCR currently managed in the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, intrawell trend tests, in conjunction with KLI-SCS flow rates, will be utilized to assess whether a release has occurred from operation of the unit. The detection monitoring constituent concentrations will be analyzed using Mann-Kendall and Sen's Slope trend tests to determine if there is an upward trend that may indicate a release from the Karn Lined Impoundment. The data will be analyzed in the context of the Site hydrogeologic characteristics, and an assessment made as to whether the source of an upward trend, if identified, is from a possible release from the Karn Lined Impoundment, another on-site release, or on-site migration of nearby impact (i.e., former Karn Bottom Ash Pond).

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas™ Statistical Software (Sanitas™). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from July 2021 through July 2023 were analyzed using Mann-Kendall and Sen's Slope 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. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.

Data trends for detection monitoring constituents are generally stable (i.e., no trend) or declining for the majority of the monitoring well/constituent pairs with the following exceptions:

- The increasing trend in chloride concentrations continues to be observed in DEK-MW-15003.
- A new, unconfirmed increasing trend for pH is observed in DEK-MW-18001 this quarter.

4.2 Detection Monitoring Data Discussion

Groundwater quality is generally consistent with previous monitoring events and the majority of the well/constituent pairs are exhibiting no trend or decreasing concentrations. Although increasing trends of detection monitoring (Appendix III) constituents exist, the groundwater conditions do not conclusively indicate a release from the unit, as discussed further in Section 4.3. The location of one of the identified liner damage locations was approximately 40-ft upgradient from monitoring well OW-12 and the second location was approximately 130-ft upgradient from monitoring well DEK-MW-18001. Both leaks have been repaired. Detection monitoring constituent concentrations at OW-12, located closest to the identified liner damage, exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The increasing trends as noted in section 4.1 will continue to be evaluated within context of changes in the site operational status.

4.3 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed below:

- Chloride in monitoring well DEK-MW-15003.

Although increasing trends of detection monitoring (Appendix III) constituents exist, as noted in Section 4.1, 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 F.

4.3.1 Timing of Changes in Concentrations

Time-series plots included in Appendix F illustrate that the change in chloride and TDS at DEK-MW-15003 is likely a result of changes in the groundwater flow regime or redox conditions as a result of the Bottom Ash Pond closure activities, rather than a result of a release from the unit.

- Chloride and TDS at DEK-MW-15003 initially decreased after the Bottom Ash Pond closure activities. In early 2020, chloride concentrations began to increase, followed by increases in TDS beginning in 2021. Both constituents appear to be approaching the concentrations observed pre-construction. Chloride is one of the components of TDS. Other components of TDS, such as calcium, iron, magnesium, potassium, sodium, and sulfate have remained relatively consistent from 2020 to present and the increases in TDS are correlated with the increases in chloride. The slight increase in chloride began before the noted leak in the Karn Lined Impoundment liner system was observed; therefore, the recent increase in concentrations is not due to a release from the unit.

4.3.2 Leachate Chemistry

Analysis of the KLI-PCS and KLI-SCS data provide additional lines of evidence to support a source other than the unit is contributing to groundwater conditions.

- Arsenic concentrations are higher in groundwater than in the secondary collection system; therefore, arsenic present in groundwater does not appear to be a result of a release from the unit (Section 2.0).
- Vanadium is detected in the primary and secondary collection system and not in groundwater in the wells nearest the observed liner damage OW-12 or DEK-MW-18001 (<2 ug/L), providing additional evidence that a release has not adversely affected groundwater conditions.

5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in two wells in third quarter 2023, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the July 2023 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in fourth quarter 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored and recent data demonstrate that the daily average flow rate has been reduced to less than the threshold value of the Response Flow Rate of 25 gallons per acre per day after the documented repairs and response activities were completed in 2021. The fourth quarter monitoring event is scheduled for October 2023.

6.0 References

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

Tables

Table 1
 Summary of Groundwater Elevation Data
 DE Karn Lined Impoundment – 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)
DEK Bottom Ash Pond					
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.65	584.22
DEK-MW-15005	589.72	Sand	572.3 to 567.3	9.65	580.07
DEK-MW-15006	589.24	Sand	573.0 to 568.0	8.87	580.37
DEK Bottom Ash Pond & Karn Lined Impoundment					
DEK-MW-18001	593.47	Sand	579.2 to 574.2	9.05	584.42
Karn Lined Impoundment					
DEK-MW-15003	602.74	Sand	578.8 to 574.8	17.20	585.54
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	7.27	584.31
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	22.38	585.52
OW-12	603.10	Silty Sand	584.2 to 579.2	17.15	585.95
DEK Nature and Extent					
DEK-MW-15004	611.04	Sand	576.6 to 571.6	28.43	582.61
MW-01	597.02	Sand	573.0 to 570.0	16.89	580.13
MW-03	597.30	Sand	569.8 to 566.8	17.12	580.18
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	9.29	580.15
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	18.15	580.63
MW-10	596.97	Sand	582.5 to 572.5	16.68	580.29
MW-12	598.60	Sand	583.9 to 573.9	17.98	580.62
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	14.12	580.25
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	15.20	580.60
MW-22	598.99	Ash/Sand	571.4 to 568.4	17.13	581.86
MW-23	595.57	Ash/Sand	576.9 to 571.9	14.40	581.17
DEK Static Water Level					
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	17.24	580.10
MW-04	598.01	NR	569.5 to 564.5	17.88	580.13
MW-17	597.91	Sand	577.0 to 574.0	13.58	584.33
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	26.11	583.11
MW-19	597.28	NR	572.1 to 567.1	16.70	580.58
MW-20	632.75	Sand	582.3 to 579.3	52.90	579.85
MW-21	632.91	Sand	587.1 to 584.1	51.40	581.51
OW-01	631.33	NR	572.5 to 567.5	51.26	580.07
OW-02	598.01	Fly Ash	579.4 to 576.4	16.00	582.01
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	17.25	580.69
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	10.00	580.21
OW-05	593.53	Sand	576.9 to 571.9	13.18	580.35
OW-06	603.95	NR	580.9 to 575.9	22.45	581.50
OW-07	596.41	Ash	583.3 to 580.3	15.28	581.13
OW-08	593.93	NR	581.0 to 576.0	11.08	582.85
OW-09	593.45	NR	585.5 to 580.5	10.50	582.95
OW-13	588.52	NR	579.5 to 574.5	4.38	584.14
OW-15	587.75	NR	572.8 to 567.8	4.13	583.62

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.

NR: Not Recorded

Table 2
 Summary of Field Parameters
 DE Karn Lined Impoundment – 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)
Karn Lined Impoundment							
DEK-MW-15003	7/26/2023	1.76	-159.6	8.2	379	19.2	0.0
DEK-MW-18001	7/26/2023	2.09	-130.9	7.7	679	16.2	0.0
KLI-PCS	7/26/2023	8.12	38.8	8.3	1414	27.9	0.5
KLI-SCS	7/26/2023	6.65	4.8	7.3	1,835	22.6	0.3
OW-10	7/26/2023	1.90	-118	7.1	700	15.4	9.3
OW-11	7/26/2023	2.10	-95.4	9.7	297	15.0	0.2
OW-12	7/26/2023	2.00	-92.6	7.1	665	18.9	6.2
SW-DITCH	7/26/2023	13.27	49.5	8.8	538	27.9	3.5

Notes:

mg/L - milligram 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 Lined Impoundment – Hydrogeological Monitoring Program
 Essexville, Michigan

		Sample Location:				DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	KLI-PCS	KLI-SCS	SW-DITCH
		Sample Date:				7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Upgradient	Downgradient		Upgradient	Downgradient	Supplemental		
Appendix III⁽¹⁾													
Boron	ug/L	NC	500	500	4,000	678	988	1,010	3,100	818	559	626	69
Calcium	mg/L	NC	NC	NC	500 ^{EE}	24.1	55.5	113	5.8	66.5	159	103	54.1
Chloride	mg/L	250**	250 ^E	250 ^E	50	59	66.7	51.8	59.2	49.6	48.7	55.8	44.1
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	1,970	< 1,000	1,190	< 1,000	< 1,000
Sulfate	mg/L	250**	250 ^E	250 ^E	500 ^{EE}	49.5	139	29.1	18.5	151	668	464	31
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	261	548	560	216	510	1,090	1,400	325
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	8.2	7.7	7.1	9.7	7.1	8.3	7.3	8.8
Appendix IV⁽¹⁾													
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	2	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	441	333	2	778	114	1	1	3
Barium	ug/L	2,000	2,000	2,000	1,200	33	144	163	18	96	119	57	43
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.4	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	1,970	< 1,000	1,190	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	20	21	31	< 10	32	57	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	31	11	< 5	151	17	22	11	< 5
Selenium	ug/L	50	50	50	5.0	1	1	3	4	< 1	2	4	1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2	< 2	4	< 2	< 2
Additional MI Part 115⁽²⁾													
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	177	759	2,170	42	5,690	29	69	158
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1	< 1	2	< 1	< 1	3	3	2
Nickel	ug/L	NC	100	100	120	< 2	< 2	< 2	2	< 2	4	5	3
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	4	840	< 2	4	5	< 2
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 10	< 10	< 10	< 10	27	< 10

Notes:

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

SU - standard units; pH is a field parameter.

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

NC - no criteria; -- - not analyzed.

* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020.

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

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote (G) of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote (H). GSI criterion is protective for surface water used as a drinking water source as described in footnote (X). GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote (FF)

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

^E - Criterion is the aesthetic drinking water value per footnote (E).

^{EE} - Criterion is based on the total dissolved solids GSI value per footnote (EE).

(1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

Table 4
 Summary of Statistical Exceedances
 DE Karn Lined Impoundment – 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: Karn Lined Impoundment – WDS# 392503

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								

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.




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

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

TITLE:
SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	J. KRENZ
APPROVED BY:	D. LITZ
DATE:	OCTOBER 2023
PROJ. NO.:	514404.0001
FILE:	514404-SLM-001-2023Q3.mxd

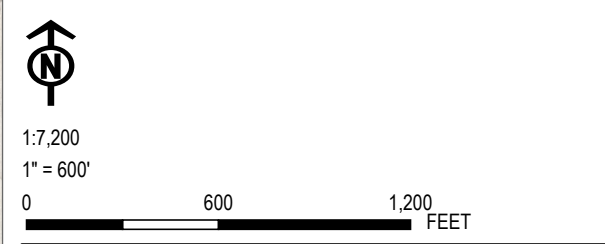
FIGURE 1

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl. Map Rotation: 0
 Saved By: A.ADAIR on 9/13/2023 11:38:33 AM. File Path: T:\PROJECTS\Consumers_Energy\464095_DEKARN\APRX\464095_DEKARN.aprx. Layout Name: 514404-SC-Wtry.fig.2



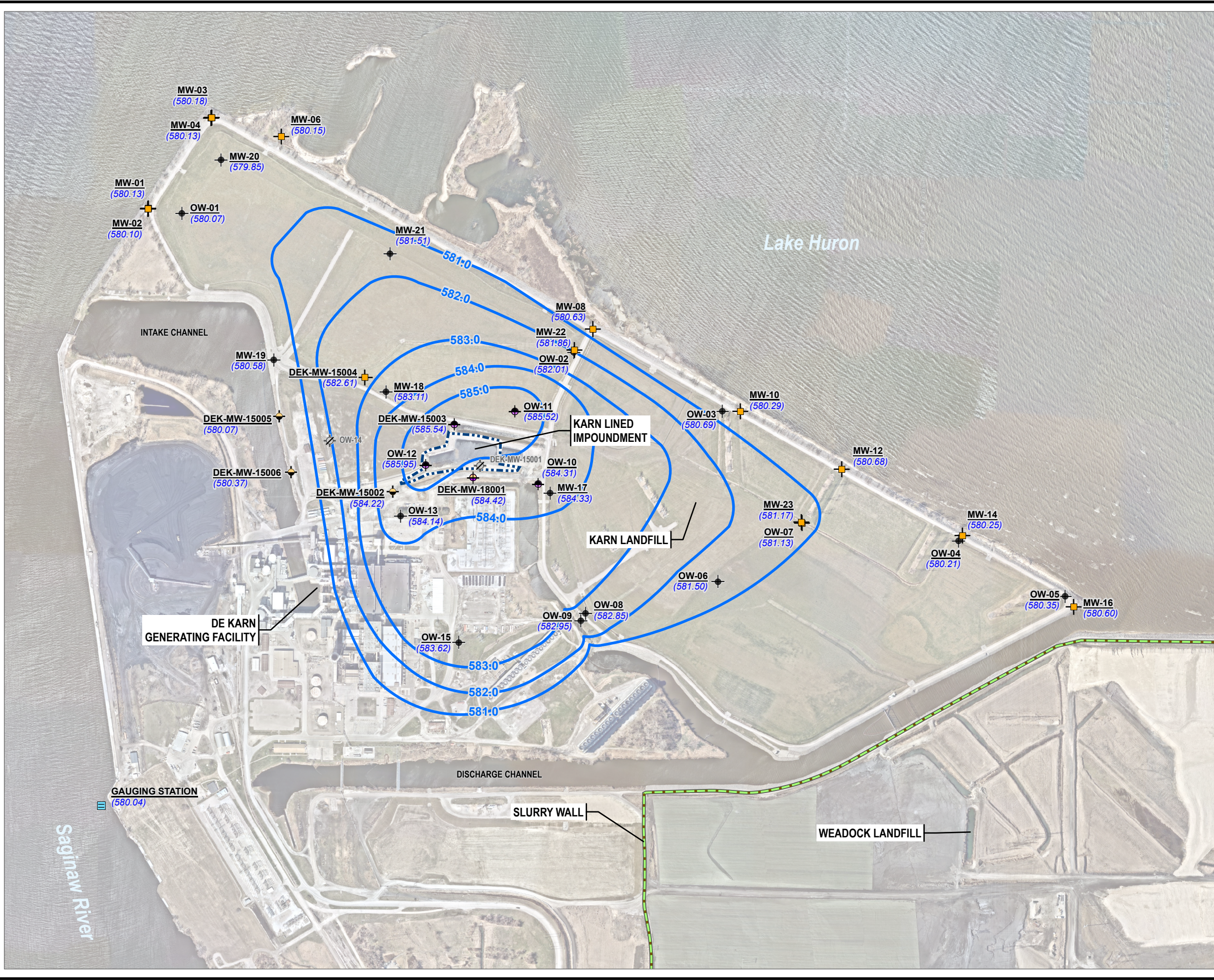
- LEGEND**
- DEK BOTTOM ASH POND MONITORING WELL
 - DEK LINED IMPOUNDMENT MONITORING WELL
 - DECOMMISSIONED MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - CE-SURFACE WATER GAUGING STATION
 - CE-NATURE AND EXTENT WELL
 - SECONDARY CONTAINMENT SUMP (KLI-SCS)
 - PRIMARY CONTAINMENT SYSTEM SAMPLE (KLI-PCS)
 - SURFACE WATER SAMPLE (SW-DITCH)
 - SLURRY WALL (APPROXIMATE)
 - EXTENT OF GEOSYNTHETICS

- NOTES**
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02 AND MW-03/MW-04 AS THE WELLS ARE LOCATED WITHIN 3-FT OF EACH OTHER.



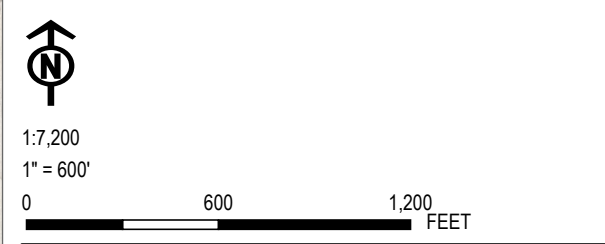
PROJECT: CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE: SITE LAYOUT MAP	
DRAWN BY: A. ADAIR	PROJ. NO.: 514404.0001
CHECKED BY: J. KRENZ	FIGURE 2
APPROVED BY: D. LITZ	
DATE: OCTOBER 2023	
1540 EISENHOWER PLACE ANN ARBOR, MI 48108-3284 PHONE: 734.971.7080	
FILE:	464095_DEKARN.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2119 Feet Intl. Map Rotation: 0
 Saved By: A.ADAIR on 9/13/2023 09:13:08 AM. File Path: T:\PROJECTS\Consumers_Energy\464095_DEKARN.aprx. Layout Name: 514404-SCW-003-202303



- LEGEND**
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
 - DEK BOTTOM ASH POND MONITORING WELL
 - DEK LINED IMPOUNDMENT MONITORING WELL
 - DECOMMISSIONED MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - NATURE AND EXTENT WELL
 - SURFACE WATER GAUGING STATION
 - GROUNDWATER ELEVATION CONTOUR
 - SLURRY WALL (APPROXIMATE)
 - EXTENT OF GEOSYNTHETICS
 - (580.21) GROUNDWATER ELEVATION

- NOTES**
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02 AND MW-03/MW-04 AS THE WELLS ARE LOCATED WITHIN 3-FT OF EACH OTHER.
 5. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



PROJECT: CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE: SHALLOW GROUNDWATER CONTOUR MAP JULY 2023	
DRAWN BY: A. ADAIR	PROJ. NO.: 514404.0001
CHECKED BY: J. KRENZ	FIGURE 3
APPROVED BY: D. LITZ	
DATE: OCTOBER 2023	
1540 EISENHOWER PLACE ANN ARBOR, MI 48108-3284 PHONE: 734.971.7080	
FILE:	464095_DEKARN.aprx

Appendix A

Laboratory Analytical Reports

To: JFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 11, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 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: 23-0719

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted in 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; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q3-2023 DEK Lined Impoundment
Date Received: 7/27/2023
Chemistry Project: 23-0719

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0719-01	DEK-MW-15003	Groundwater	07/26/2023 08:20	DEK Lined Impoundment
23-0719-02	OW-10	Groundwater	07/26/2023 09:52	DEK Lined Impoundment
23-0719-03	OW-11	Groundwater	07/26/2023 09:08	DEK Lined Impoundment
23-0719-04	OW-12	Groundwater	07/26/2023 10:43	DEK Lined Impoundment
23-0719-05	KLI-SCS	Groundwater	07/26/2023 11:15	DEK Lined Impoundment
23-0719-06	KLI-PCS	Groundwater	07/26/2023 11:31	DEK Lined Impoundment
23-0719-07	SW-DITCH	Groundwater	07/26/2023 11:55	DEK Lined Impoundment
23-0719-08	DUP-KLI	Groundwater	07/26/2023 00:00	DEK Lined Impoundment
23-0719-09	EB-KLI	Water	07/26/2023 12:05	DEK Lined Impoundment
23-0719-10	FB-KLI	Water	07/26/2023 10:43	DEK Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0719-01
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 08:20 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-01-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 #: 23-0719-01-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	441		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	33		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	678		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	24100		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	177		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	20		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	3910		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	58		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	31		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	4260		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	1		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	57700		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	59000		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0719-01
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 08:20 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	49500		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1880		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-01-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	261		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	50000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	50000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	200		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0719-02
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 09:52 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-02-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 #: 23-0719-02-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	2		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	163		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	1010		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	113000		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	2		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	2170		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	31		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	17700		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	206		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	5610		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	3		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	56200		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	4		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	51800		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0719-02
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 09:52 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	29100		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	2810		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-02-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	560		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-02-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	421000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	421000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-02-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	290		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0719-03
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 09:08 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-03-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 #: 23-0719-03-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	2		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	778		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	18		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	3100		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	5800		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	42		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	ND		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	151		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	2		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	4110		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	4		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	64400		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	840		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	222		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	59200		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0719-03
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 09:08 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	1970		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	18500		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	13400		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-03-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	216		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-03-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	94000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	15200		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	78800		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-03-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0719-04
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 10:43 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-04-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 #: 23-0719-04-C01-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	114		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	96		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	818		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	66500		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	5690		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	32		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	23400		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	144		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	17		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	5140		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	60200		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-04-C02-A01 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-04-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	49600		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0719-04
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 10:43 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-04-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	151000		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-04-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	599		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-04-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	510		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-04-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	193000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	193000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-04-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0719-05
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:15 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-05-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 #: 23-0719-05-C01-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	1		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	57		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	626		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	103000		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	3		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	69		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	ND		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	37200		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	8		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	11		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	5		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	3970		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	4		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	344000		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	5		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	27		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-05-C02-A01 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	1790		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-05-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	55800		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0719-05
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:15 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-05-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	464000		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-05-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-05-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-05-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	578000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	578000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-05-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0719-06
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:31 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-06-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 #: 23-0719-06-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	1		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	119		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	559		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	0.4		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	159000		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	3		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	29		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	57		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	42400		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	7		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	22		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	4		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	12200		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	2		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	78300		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	4		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	4		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-06-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-06-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	48700		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0719-06
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:31 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-06-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	1190		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	668000		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-06-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-06-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1090		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-06-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	45500		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	45500		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-06-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0719-07
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:55 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-07-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 #: 23-0719-07-C01-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	3		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	43		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	69		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	54100		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	2		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	158		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	ND		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	18300		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	102		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	3		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	3930		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	1		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	28000		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-07-C02-A01 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	2170		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	198		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-07-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	44100		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0719-07
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 11:55 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-07-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	31000		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-07-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	908		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-07-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	325		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-07-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	180000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	180000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-07-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0719-08
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-08-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 #: 23-0719-08-C01-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	2		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	165		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	983		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	113000		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	1		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	2		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	2140		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	30		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	16900		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	205		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	3		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	5880		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	3		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	54400		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	4		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-08-C02-A01 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0719-08-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	53100		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0719-08
 Matrix: Groundwater

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 12:00 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0719-08-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	26300		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0719-08-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3380		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0719-08-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	55		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0719-08-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	400000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	400000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0719-08-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	310		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **EB-KLI**
 Lab Sample ID: 23-0719-09
 Matrix: Water

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 12:05 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-09-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 #: 23-0719-09-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	ND		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	ND		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	ND		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	ND		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-09-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0719-09-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	08/07/2023	AB23-0807-01



Analytical Report

Report Date: 08/11/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **EB-KLI**
Lab Sample ID: 23-0719-09
Matrix: Water

Laboratory Project: **23-0719**
Collect Date: 07/26/2023
Collect Time: 12:05 PM

Sulfide, Total by SM 4500 S2D

Aliquot #: 23-0719-09-C04-A01

Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **FB-KLI**
 Lab Sample ID: 23-0719-10
 Matrix: Water

Laboratory Project: **23-0719**
 Collect Date: 07/26/2023
 Collect Time: 10:43 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0719-10-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 #: 23-0719-10-C01-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	ND		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	ND		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	ND		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	ND		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	ND		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	ND		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0719-10-C02-A01 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0719-10-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	08/07/2023	AB23-0807-01



Analytical Report

Report Date: 08/11/23

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **FB-KLI**
Lab Sample ID: 23-0719-10
Matrix: Water

Laboratory Project: **23-0719**
Collect Date: 07/26/2023
Collect Time: 10:43 AM

Sulfide, Total by SM 4500 S2D

Aliquot #: 23-0719-10-C04-A01

Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0719

Inspection Date: 7-27-23 Inspection By: CLE/TMR

Sample Origin/Project Name: Q3-2023 DEK LI

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 2.8-6.0C 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)	<u>16</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>40</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
<u>250</u> 500 mL (plastic)	<u>8</u>	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

PH 0.3
FSP 13-640-511
lot: 205572
exp: 2-15-25



Analytical Laboratory Report

Report ID: S51522.01(01)
Generated on 07/28/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S51522.01-S51522.10
Project: 23-0719 PR#23071027
Collected Date(s): 07/26/2023
Submitted Date/Time: 07/27/2023 16:48
Sampled by: Unknown
P.O. #: 4400114090

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
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- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:2017	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S51522.01	23-0719-01 (DEK-MW-15003)	Groundwater	07/26/23 08:20
S51522.02	23-0719-02 (OW-10)	Groundwater	07/26/23 09:52
S51522.03	23-0719-03 (OW-11)	Groundwater	07/26/23 09:08
S51522.04	23-0719-04 (OW-12)	Groundwater	07/26/23 10:43
S51522.05	23-0719-05 (KLI-SCS)	Groundwater	07/26/23 11:15
S51522.06	23-0719-06 (KLI-PCS)	Groundwater	07/26/23 11:31
S51522.07	23-0719-07 (SW-DITCH)	Groundwater	07/26/23 11:55
S51522.08	23-0719-08 (DUP-KLI)	Groundwater	07/26/23 00:01
S51522.09	23-0719-09 (EB-KLI)	Groundwater	07/26/23 12:05
S51522.10	23-0719-10 (FB-KLI)	Groundwater	07/26/23 10:43



Analytical Laboratory Report

Lab Sample ID: S51522.01

Sample Tag: 23-0719-01 (DEK-MW-15003)

Collected Date/Time: 07/26/2023 08:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:41, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.20	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.02

Sample Tag: 23-0719-02 (OW-10)

Collected Date/Time: 07/26/2023 09:52

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:43, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.29	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.03

Sample Tag: 23-0719-03 (OW-11)

Collected Date/Time: 07/26/2023 09:08

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:45, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.04

Sample Tag: 23-0719-04 (OW-12)

Collected Date/Time: 07/26/2023 10:43

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:49, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.05

Sample Tag: 23-0719-05 (KLI-SCS)

Collected Date/Time: 07/26/2023 11:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:51, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.06

Sample Tag: 23-0719-06 (KLI-PCS)

Collected Date/Time: 07/26/2023 11:31

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:53, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.07

Sample Tag: 23-0719-07 (SW-DITCH)

Collected Date/Time: 07/26/2023 11:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:55, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.08

Sample Tag: 23-0719-08 (DUP-KLI)

Collected Date/Time: 07/26/2023 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:57, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.31	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.09

Sample Tag: 23-0719-09 (EB-KLI)

Collected Date/Time: 07/26/2023 12:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:59, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51522.10

Sample Tag: 23-0719-10 (FB-KLI)

Collected Date/Time: 07/26/2023 10:43

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 11:01, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	

Merit Laboratories Login Checklist

Lab Set ID:S51522

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Client:CONSUMERS (Consumers Energy Company)

Project: 23-0719 PR#23071027

Submitted:07/27/2023 16:48 Login User: PFD

Phone: D:517-788-5888 FAX:
Email:emil.blaj@cmsenergy.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 5.7 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S51522 Submitted: 07/27/2023 16:48
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0719 PR#23071027

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 07/27/2023 17:03 PFD
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S51522.01	125ml Plastic NaOH/Zn Acetate	>12			
S51522.02	125ml Plastic NaOH/Zn Acetate	>12			
S51522.03	125ml Plastic NaOH/Zn Acetate	>12			
S51522.04	125ml Plastic NaOH/Zn Acetate	>12			
S51522.05	125ml Plastic NaOH/Zn Acetate	>12			
S51522.06	125ml Plastic NaOH/Zn Acetate	>12			
S51522.07	125ml Plastic NaOH/Zn Acetate	>12			
S51522.08	125ml Plastic NaOH/Zn Acetate	>12			
S51522.09	125ml Plastic NaOH/Zn Acetate	>12			
S51522.10	125ml Plastic NaOH/Zn Acetate	>12			



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO **CHAIN OF CUSTODY RECORD** **INVOICE TO**

CONTACT NAME Emil Blaj
 COMPANY Consumers Energy
 ADDRESS 135 W. Trail Street
 CITY Jackson STATE MI ZIP CODE 49201
 PHONE NO. 517-788-5888 FAX NO. 517-788-2533 P.O. NO. 44001140900
 E-MAIL ADDRESS emil.blaj@cmsenergy.com QUOTE NO.

CONTACT NAME SAME
 COMPANY
 ADDRESS
 CITY STATE ZIP CODE
 PHONE NO. E-MAIL ADDRESS

PROJECT NO./NAME 23-0719 PR#23071027 SAMPLER(S) - PLEASE PRINT/SIGN NAME N/A

TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER

DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE
 # Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	Total Sulfide	Certifications		Project Locations		Special Instructions
	DATE	TIME												<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES	
5152201	07/26/23	0820	23-0719-01 (DEK-MW-15003)	GW	1					1			✓					preserved with NaOH/ZnAcetate
.02	07/26/23	0952	23-0719-02 (OW-10)	GW	1					1			✓					"
.03	07/26/23	0908	23-0719-03 (OW-11)	GW	1					1			✓					"
.04	07/26/23	1043	23-0719-04 (OW-12)	GW	1					1			✓					"
.05	07/26/23	1115	23-0719-05 (KLI-SCS)	GW	1					1			✓					"
.06	07/26/23	1131	23-0719-06 (KLI-PCS)	GW	1					1			✓					"
.07	07/26/23	1155	23-0719-07 (SW-DITCH)	GW	1					1			✓					"
.08	07/26/23	-	23-0719-08 (DUP-KLI)	GW	1					1			✓					"
.09	07/26/23	1205	23-0719-09 (EB-KLI)	GW	1					1			✓					"
.10	07/26/23	1043	23-0719-10 (FB-KLI)	GW	1					1			✓					"

RELINQUISHED BY: SIGNATURE/ORGANIZATION *J. Consumers Energy* Sampler DATE 07-27-23 TIME 1648
 RECEIVED BY: SIGNATURE/ORGANIZATION *Katw* DATE 7/27/23 TIME 1048

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME

SEAL NO. SEAL INTACT INITIALS NOTES: TEMP. ON ARRIVAL
 YES NO
 SEAL NO. SEAL INTACT INITIALS
 YES NO

S.7

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

To: JFirlit, Karn/Weadock

From: EBlaj, T-258

Date: August 11, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. 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: 23-0718

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q3-2023 DEK Bottom Ash Pond & Lined Impoundment
Date Received: 7/27/2023
Chemistry Project: 23-0718

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0718-01	DEK-MW-18001	Groundwater	07/26/2023 12:30	DEK Bottom Ash Pond & Lined Impoundment
23-0718-02	DEK-MW-18001 MS	Groundwater	07/26/2023 12:30	DEK Bottom Ash Pond & Lined Impoundment
23-0718-03	DEK-MW-18001 MSD	Groundwater	07/26/2023 12:30	DEK Bottom Ash Pond & Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0718-01
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0718-01-C01-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	07/31/2023	AB23-0731-03

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

Aliquot #: 23-0718-01-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Arsenic	333		ug/L	1.0	08/02/2023	AB23-0802-04
Barium	144		ug/L	5.0	08/02/2023	AB23-0802-04
Beryllium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Boron	988		ug/L	20.0	08/02/2023	AB23-0802-04
Cadmium	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Calcium	55500		ug/L	1000.0	08/02/2023	AB23-0802-04
Chromium	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Cobalt	ND		ug/L	6.0	08/02/2023	AB23-0802-04
Copper	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Iron	759		ug/L	20.0	08/02/2023	AB23-0802-04
Lead	ND		ug/L	1.0	08/02/2023	AB23-0802-04
Lithium	21		ug/L	10.0	08/02/2023	AB23-0802-04
Magnesium	10500		ug/L	1000.0	08/02/2023	AB23-0802-04
Manganese	139		ug/L	5.0	08/02/2023	AB23-0802-04
Molybdenum	11		ug/L	5.0	08/02/2023	AB23-0802-04
Nickel	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Potassium	5140		ug/L	100.0	08/02/2023	AB23-0802-04
Selenium	1		ug/L	1.0	08/02/2023	AB23-0802-04
Silver	ND		ug/L	0.2	08/02/2023	AB23-0802-04
Sodium	115000		ug/L	1000.0	08/02/2023	AB23-0802-04
Thallium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Vanadium	ND		ug/L	2.0	08/02/2023	AB23-0802-04
Zinc	ND		ug/L	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0718-01-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	07/27/2023	AB23-0727-05
Nitrite	ND		ug/L	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0718-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	66700		ug/L	1000.0	07/29/2023	AB23-0728-16

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0718-01
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0718-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	07/29/2023	AB23-0728-16
Sulfate	139000		ug/L	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0718-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	2240		ug/L	25.0	08/07/2023	AB23-0807-01

Total Dissolved Solids by SM 2540C Aliquot #: 23-0718-01-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	548		mg/L	10.0	07/28/2023	AB23-0728-08

Alkalinity by SM 2320B Aliquot #: 23-0718-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	202000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Bicarbonate	202000		ug/L	10000.0	08/02/2023	AB23-0802-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0718-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0718-02
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0718-02-C01-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	110		%	0.2	07/31/2023	AB23-0731-03

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

Aliquot #: 23-0718-02-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	110		%	1.0	08/02/2023	AB23-0802-04
Arsenic	100		%	1.0	08/02/2023	AB23-0802-04
Barium	101		%	5.0	08/02/2023	AB23-0802-04
Beryllium	100		%	1.0	08/02/2023	AB23-0802-04
Boron	98		%	20.0	08/02/2023	AB23-0802-04
Cadmium	101		%	0.2	08/02/2023	AB23-0802-04
Calcium	97.9		%	1000.0	08/02/2023	AB23-0802-04
Chromium	98		%	1.0	08/02/2023	AB23-0802-04
Cobalt	98		%	6.0	08/02/2023	AB23-0802-04
Copper	92		%	1.0	08/02/2023	AB23-0802-04
Iron	88		%	20.0	08/02/2023	AB23-0802-04
Lead	95		%	1.0	08/02/2023	AB23-0802-04
Lithium	102		%	10.0	08/02/2023	AB23-0802-04
Magnesium	103		%	1000.0	08/02/2023	AB23-0802-04
Manganese	95		%	5.0	08/02/2023	AB23-0802-04
Molybdenum	112		%	5.0	08/02/2023	AB23-0802-04
Nickel	93		%	2.0	08/02/2023	AB23-0802-04
Potassium	105		%	100.0	08/02/2023	AB23-0802-04
Selenium	100		%	1.0	08/02/2023	AB23-0802-04
Silver	96.7		%	0.2	08/02/2023	AB23-0802-04
Sodium	103		%	1000.0	08/02/2023	AB23-0802-04
Thallium	94		%	2.0	08/02/2023	AB23-0802-04
Vanadium	102		%	2.0	08/02/2023	AB23-0802-04
Zinc	96		%	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0718-02-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	93		%	100.0	07/27/2023	AB23-0727-05
Nitrite	94		%	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0718-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	116		%	1000.0	07/29/2023	AB23-0728-16

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0718-02
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0718-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	85		%	1000.0	07/29/2023	AB23-0728-16
Sulfate	99		%	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0718-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	99		%	25.0	08/07/2023	AB23-0807-01

Alkalinity by SM 2320B Aliquot #: 23-0718-02-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	94.8		%	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0718-02-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	07/28/2023	AB23-0728-14

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0718-03
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0718-03-C01-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	112		%	0.2	07/31/2023	AB23-0731-03

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

Aliquot #: 23-0718-03-C01-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	105		%	1.0	08/02/2023	AB23-0802-04
Arsenic	90		%	1.0	08/02/2023	AB23-0802-04
Barium	99		%	5.0	08/02/2023	AB23-0802-04
Beryllium	96		%	1.0	08/02/2023	AB23-0802-04
Boron	101		%	20.0	08/02/2023	AB23-0802-04
Cadmium	100		%	0.2	08/02/2023	AB23-0802-04
Calcium	99.2		%	1000.0	08/02/2023	AB23-0802-04
Chromium	97		%	1.0	08/02/2023	AB23-0802-04
Cobalt	93		%	6.0	08/02/2023	AB23-0802-04
Copper	88		%	1.0	08/02/2023	AB23-0802-04
Iron	86		%	20.0	08/02/2023	AB23-0802-04
Lead	99		%	1.0	08/02/2023	AB23-0802-04
Lithium	99		%	10.0	08/02/2023	AB23-0802-04
Magnesium	101		%	1000.0	08/02/2023	AB23-0802-04
Manganese	93		%	5.0	08/02/2023	AB23-0802-04
Molybdenum	111		%	5.0	08/02/2023	AB23-0802-04
Nickel	91		%	2.0	08/02/2023	AB23-0802-04
Potassium	102		%	100.0	08/02/2023	AB23-0802-04
Selenium	95		%	1.0	08/02/2023	AB23-0802-04
Silver	96.9		%	0.2	08/02/2023	AB23-0802-04
Sodium	105		%	1000.0	08/02/2023	AB23-0802-04
Thallium	96		%	2.0	08/02/2023	AB23-0802-04
Vanadium	100		%	2.0	08/02/2023	AB23-0802-04
Zinc	92		%	10.0	08/02/2023	AB23-0802-04

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0718-03-C02-A01

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	93		%	100.0	07/27/2023	AB23-0727-05
Nitrite	94		%	100.0	07/27/2023	AB23-0727-05

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

Aliquot #: 23-0718-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	115		%	1000.0	07/29/2023	AB23-0728-16

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0718-03
 Matrix: Groundwater

Laboratory Project: **23-0718**
 Collect Date: 07/26/2023
 Collect Time: 12:30 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0718-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	84		%	1000.0	07/29/2023	AB23-0728-16
Sulfate	102		%	1000.0	07/29/2023	AB23-0728-16

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0718-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	100		%	25.0	08/07/2023	AB23-0807-01

Alkalinity by SM 2320B Aliquot #: 23-0718-03-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	102		%	10000.0	08/02/2023	AB23-0802-03

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0718-03-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	07/28/2023	AB23-0728-14



Analytical Report

Report Date: 08/11/23

Laboratory Services
A CENTURY OF EXCELLENCE

Data Qualifiers	Exception Summary
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No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0718

Inspection Date: 7-27-23 Inspection By: CLE/TMP

Sample Origin/Project Name: Q3-2023 DEK BAP + LI

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 5.4-5.9°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 <u>60mL</u>)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>12</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
<u>750</u> 500 mL (plastic)	<u>1</u>	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

PH 0.3
FSP 13-6105-11
lot: 205522
EXP: 2-15-25



Analytical Laboratory Report

Report ID: S51521.01(01)
Generated on 07/28/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S51521.01-S51521.03
Project: 23-0718 PR#23071027
Collected Date(s): 07/26/2023
Submitted Date/Time: 07/27/2023 16:48
Sampled by: Unknown
P.O. #: 4400114090

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:2017	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S51521.01	23-0718-01 (DEK-MW-18001)	Groundwater	07/26/23 12:30
S51521.02	23-0718-02 (DEK-MW-18001 Field MS)	Groundwater	07/26/23 12:30
S51521.03	23-0718-03 (DEK-MW-18001 Field MSD)	Groundwater	07/26/23 12:30



Analytical Laboratory Report

Lab Sample ID: S51521.01

Sample Tag: 23-0718-01 (DEK-MW-18001)

Collected Date/Time: 07/26/2023 12:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:21, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S51521.02

Sample Tag: 23-0718-02 (DEK-MW-18001 Field MS)

Collected Date/Time: 07/26/2023 12:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:25, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.183	0.02	0.005	mg/L	1	18496-25-8	1

1-* Sample spiked @ 0.20 mg/L



Analytical Laboratory Report

Lab Sample ID: S51521.03

Sample Tag: 23-0718-03 (DEK-MW-18001 Field MSD)

Collected Date/Time: 07/26/2023 12:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	5.7	IR

Inorganics

Method: SM4500-S2 D, Run Date: 07/28/23 10:27, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.184	0.02	0.005	mg/L	1	18496-25-8	1

1-* Sample spiked @ 0.20 mg/L

Merit Laboratories Login Checklist

Lab Set ID:S51521

Client:CONSUMERS (Consumers Energy Company)

Project: 23-0718 PR#23071027

Submitted:07/27/2023 16:48 Login User: PFD

Attention: Emil Blaj

Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 FAX:

Email:emil.blaj@cmsenergy.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.7
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S51521 Submitted: 07/27/2023 16:48
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0718 PR#23071027

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 07/27/2023 17:07 PFD
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S51521.01	125ml Plastic NaOH/Zn Acetate	>12			
S51521.02	125ml Plastic NaOH/Zn Acetate	>12			
S51521.03	125ml Plastic NaOH/Zn Acetate	>12			



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO **CHAIN OF CUSTODY RECORD** **INVOICE TO**

CONTACT NAME Emil Blaj
 COMPANY Consumers Energy
 ADDRESS 135 W. Trail Street
 CITY Jackson STATE MI ZIP CODE 49201
 PHONE NO. 517-788-5888 FAX NO. 517-788-2533 P.O. NO. 4400114090
 E-MAIL ADDRESS emil.blaj@cmsenergy.com QUOTE NO.

CONTACT NAME SAME
 COMPANY
 ADDRESS
 CITY STATE ZIP CODE
 PHONE NO. E-MAIL ADDRESS

PROJECT NO./NAME 23-0718 PR#23071027 SAMPLER(S) - PLEASE PRINT/SIGN NAME N/A
 TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives							Total Sulfide	Special Instructions
	DATE	TIME				NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER		
<u>51521.01</u>	<u>07/26/23</u>	<u>1230</u>	<u>23-0718-01 (DEK-MW-18001)</u>	<u>GW</u>	<u>1</u>						<u>1</u>		<input checked="" type="checkbox"/>	<u>preserved with NaOH/ZnAcetate</u>
<u>02</u>	<u>07/26/23</u>	<u>1230</u>	<u>23-0718-02 (DEK-MW-18001 Field MS)</u>	<u>GW</u>	<u>1</u>						<u>1</u>		<input checked="" type="checkbox"/>	<u>"</u>
<u>03</u>	<u>07/26/23</u>	<u>1230</u>	<u>23-0718-03 (DEK-MW-18001 Field MSD)</u>	<u>GW</u>	<u>1</u>						<u>1</u>		<input checked="" type="checkbox"/>	<u>"</u>
														<u>Please spike MS/MSD and report spike concentration and/or rec.</u>

RELINQUISHED BY: Consumers Energy Sampler DATE 07-27-23 TIME 1648
 RECEIVED BY: [Signature] DATE 7/27/23 TIME 1648
 RELINQUISHED BY: DATE TIME
 RECEIVED BY: DATE TIME

RELINQUISHED BY: DATE TIME
 RECEIVED BY: DATE TIME
 SEAL NO. SEAL INTACT INITIALS NOTES: TEMP. ON ARRIVAL 5.7
 YES NO
 SEAL NO. SEAL INTACT INITIALS
 YES NO

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Appendix B Field Notes



PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Compliance
PROJECT NUMBER:	514404.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	7/24/2023 TO 7/26/2023
PURPOSE OF FIELDWORK:	Third Quarter Supplemental Sampling Event
WORK PERFORMED BY:	Jake Krenz, Javier Jasso, Andrew Whaley

JL 8/11/23
SIGNED DATE

JL 8-1-23
CHECKED BY DATE



GENERAL NOTES

PROJECT NAME: CEC Kam BAP/LI: 2023 GW Comp	DATE: <u>7/24/23</u>	TIME ARRIVED: <u>0800</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ <u>(JK)</u> AW	TIME LEFT: <u>1500</u>

WEATHER		
TEMPERATURE: <u>65-80</u> °F	WIND: <u>0-5</u> MPH	VISIBILITY: <u>clear</u>
WORK / SAMPLING PERFORMED		
<u>collected samples from MW-15008 and MW-15019, and DUP-Backgrounds</u>		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<i>(diagonal line)</i>	<i>(diagonal line)</i>

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
Galeb Batts → <u>Peter Madziar</u>	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	Purge to Ground

Al Ky 8/1/23
 SIGNED DATE

~~*Al Ky* 8/1/23~~
 CHECKED BY *Andrew Wheeler* DATE 8/4/23



GENERAL NOTES

PROJECT NAME: CEC Kern BAP/LI: 2023 GW Comp	DATE: <u>7/26/23</u>	TIME ARRIVED: <u>0650</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ JK <u>AW</u>	TIME LEFT: <u>1400</u>

WEATHER		
TEMPERATURE: <u>70-84</u> °F	WIND: <u>0-5</u> MPH	VISIBILITY: <u>Hazy - Cloudy</u>
WORK / SAMPLING PERFORMED		
<u>Calibrate meter</u>		
<u>Sample Kern Lined Impoundment wells, DEK MW 15003,</u>		
<u>OW 10 OW11, OW12, KLI SCS, KLI PCS, KLI SW ditch</u>		
<u>Sample DEK MW - 18001</u>		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>None</u>	<u>—</u>

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>Darby Litz</u>	<u>TRC</u>	<u>PM - Updates</u>
<u>Caleb Batte</u>	<u>Consumers</u>	<u>Site Contact</u>
<u>Peter M.</u>		

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>Groundwater</u>	<u>NM</u>	<u>Purge to Ground</u>

[Signature] 7/26/23
 SIGNED DATE

[Signature] 8-1-23
 CHECKED BY DATE



EQUIPMENT SUMMARY

PROJECT NAME: CEC Karn BAP/LI: 2023 GW	SAMPLER NAME: Jake Krenz, Javier Jasso, Andrew Whale
PROJECT NO.: 514404.0001.0000	

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 FILTRATION DEVICE	FILTER TYPE AND SIZE
DEDICATED POLY TUBING	<input checked="" type="checkbox"/> LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

GROUND
 DRUM
 POTW
 POLYTANK
 OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
SIGNED _____ DATE <u>8/11/23</u>	CHECKED BY _____ DATE <u>8/14/23</u>



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	MODEL: YSI PRO DSS	SAMPLER: AW, JKJJ
PROJECT NO.: 514404.0001.0000	SERIAL #: Ann Arbor	DATE: 7/24/23

PH CALIBRATION CHECK

pH 7 (LOT #): 36C914 (EXP. DATE): Mar/24/25	pH 4 / 10 (LOT #): 36C916 (EXP. DATE): Mar/25	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.01 / 7.01	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	1233
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 36E040 (EXP. DATE): May/24	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
1360 / 1360	23.1	<input checked="" type="checkbox"/> WITHIN RANGE	1228
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 226100750 (EXP. DATE): 7-20-27	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
223.7 / 227.7	25.5	<input checked="" type="checkbox"/> WITHIN RANGE	1236
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
8.2 / 8.2	23.8	<input checked="" type="checkbox"/> WITHIN RANGE	1240
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): DE (EXP. DATE):	(LOT #): A7102 (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
0.0 / 0.0	10.0 / 9.81	<input type="checkbox"/> WITHIN RANGE	1236
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED fl Ky 8/11/23 DATE

CHECKED BY adrian w. harty 8/14/23 DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	MODEL: <i>InSite 600</i>	SAMPLER: <i>JK, JJ</i>
PROJECT NO.: 514404.0001.0000	SERIAL #: <i>OFFICE</i>	DATE: <i>7/26/23</i>

PH CALIBRATION CHECK

pH 7 (LOT #): <i>366914</i> (EXP. DATE): <i>Mar 25</i>	pH 7 10 (LOT #): <i>366916</i> (EXP. DATE): <i>Mar 25</i>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>7.00 / 7.00</i>	<i>4.00 / 14.00</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0720</i>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <i>GE040</i> (EXP. DATE): <i>May 24</i>	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<i>139.6 / 139.6</i>	<i>24.92</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0725</i>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): <i>22K100180</i> (EXP. DATE): <i>04 27</i>	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<i>230.0 / 230.0</i>	<i>24.37</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0730</i>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
<i>8.26 / 8.26</i>	<i>23.47</i>	<input checked="" type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <i>A3097</i> (EXP. DATE): <i>Apr 25</i>	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>100 / 100</i>	/	<input checked="" type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
	⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

Carlin W. ...
 SIGNED _____ DATE *7/26/23*

JL King
 CHECKED BY _____ DATE *8-1-23*



WATER LEVEL DATA

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	DATE: 7/24/23
PROJECT NUMBER: 514404.0001.0000	AUTHOR: Jake Krenz, Javier Jasso, And

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
DE Karn Bottom Ash Pond						
DEK-MW-15002	0935		6.6'	15.20		
DEK-MW-15004	1010		28.43	41.74		
DEK-MW-15005	0930		9.45	22.30		
DEK-MW-15006	0932		0.07	21.53		
DE Karn Bottom Ash Pond and Lined Impoundment						
DEK-MW-18001	0934		9.05	19.70		
DEK-MW-15003	1011		17.20	27.84		
Karn Lined Impoundment						
OW-10	1335		7.27	17.91		
OW-11	1009		22.38	24.47		
OW-12	0948		17.15	23.41		
Background						
MW-15002	0801		7.15	16.86		
MW-15008	0830		4.63	11.40		
MW-15016	0856		4.63	8.10		
MW-15019	0846		5.56	16.67		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED DATE 8/1/23

CHECKED DATE 8-1-23



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-15002		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER	
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER			
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER			
PURGING	TIME: 0730	DATE: 7-26-23	SAMPLE
	TIME: 0852	DATE: 7-26-23	
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: 6.61 SU	CONDUCTIVITY: 5346 umhos/cm
		ORP: -56.8 mV	DO: 0.8 mg/L
DEPTH TO WATER: 7.17 T/ PVC		TURBIDITY: 5.37 NTU	
DEPTH TO BOTTOM: 16.80 T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 15.5 °C OTHER: _____	
VOLUME REMOVED: 16 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: clear ODOR: none	
COLOR: clear ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: _____ FILTRATE ODOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____	
COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
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
6817	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	500 mL	Plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	125 mL	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	125 mL	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: lab drop off	DATE SHIPPED: 7-27-23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <i>[Signature]</i>	DATE SIGNED: 8-1-23



WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Cd	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW <u>JK/JJ</u> DATE: <u>7-26-23</u>	BY: <u>ACU</u> DATE: <u>8/1/23</u>

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: *JK*

DATE SIGNED: 8-1-23



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>JKJJ</u> DATE: <u>7-26-23</u>	BY: <u>ACJ</u> DATE: <u>8/1/23</u>

SAMPLE ID: <u>DEK-MW-15002</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1000</u>	DATE: <u>7-26-23</u>	SAMPLE	TIME: <u>1027</u>	DATE: <u>7-26-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>7.37</u> SU	CONDUCTIVITY: <u>914</u> umhos/cm	
			ORP: <u>-101.4</u> mV	DO: <u>0.8</u> mg/L	
DEPTH TO WATER: <u>6.74</u> T/ PVC			TURBIDITY: <u>5.66</u> NTU		
DEPTH TO BOTTOM: <u>6.9</u> T/ PVC <u>NM</u>			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.5</u> °C OTHER: _____		
VOLUME REMOVED: <u>5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u> ODOR: <u>none</u>		
COLOR: <u>clear</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>DEK-BAP</u>		
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)
1002	200	7.49	894	-51.6	1.4	6.09	15.9	6.98	INITIAL
1007	200	7.36	922	-82.3	1.0	5.94	14.9	6.98	1
1012	200	7.37	919	-85.2	0.9	5.58	14.7	6.98	2
1017	200	7.37	912	-92.3	0.9	5.47	14.7	6.98	3
1022	200	7.37	917	-97.3	0.9	5.62	14.4	6.98	4
1027	200	7.37	914	-101.4	0.8	5.66	14.5	6.98	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	250mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	4	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
2	125mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>Lab Drop off</u>	DATE SHIPPED: <u>7-27-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-1-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>JK</u> JJ	DATE: <u>7-26-23</u> BY: <u>ACW</u> DATE: <u>8/1/23</u>

SAMPLE ID: <u>DEK-mw-15005</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1136</u>	DATE: <u>7-26-23</u>	SAMPLE	TIME: <u>1203</u>	DATE: <u>7-26-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.49</u> SU		CONDUCTIVITY: <u>991</u> umhos/cm		
DEPTH TO WATER: <u>9.62</u> T/ PVC	ORP: <u>-136.9</u> mV		DO: <u>0.8</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	TURBIDITY: <u>5.15</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>13.9</u> °C		OTHER: _____		
VOLUME REMOVED: <u>5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>		ODOR: <u>none</u>		
COLOR: <u>clear</u>	ODOR: _____		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1138	200	7.63	837	-120.1	1.6	5.65	13.7	9.86	INITIAL
1143	200	7.58	888	-136.2	1.0	5.81	13.7	9.86	1
1148	200	7.55	956	-141.4	0.9	6.98	14.1	9.86	2
1153	200	7.54	969	-140.2	0.9	5.18 5.18	13.9	9.86	3
1158	200	7.51	984	-138.2	0.9	4.51	13.9	9.86	4
1203	200	7.49	991	-136.9	0.8 0.8	5.15	13.9	9.86	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	250ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60ml	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	125ml	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>lab drop off</u>	DATE SHIPPED: <u>7-27-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-1-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW <u>JKJJ</u> DATE: <u>7-26-23</u>	BY: <u>AW</u> DATE: <u>8/1/23</u>

SAMPLE ID: <u>DEK-MW-15006</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1048</u>	DATE: <u>7-26-23</u>	SAMPLE	TIME: <u>1120</u>	DATE: <u>7-26-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>7.68</u> SU CONDUCTIVITY: <u>983</u> umhos/cm		
DEPTH TO WATER: <u>9.11</u> T/ PVC			ORP: <u>-148.9</u> mV DO: <u>0.8</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC			TURBIDITY: <u>5.32</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>6</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.5</u> °C OTHER: _____		
COLOR: <u>clear</u> ODOR: <u>none</u>			COLOR: <u>clear</u> ODOR: <u>none</u>		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS: <u>FB-DEK-BAP collected</u>					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1050	200	7.84	967	-81.7	3.1	7.19	15.4	9.23	INITIAL
1055	200	7.67	953	-118.0	1.1	5.37	14.5	9.23	1
1100	200	7.68	969	-126.8	1.0	5.72	14.7	9.23	2
1105	200	7.70	968	-136.3	0.9	5.67	14.5	9.23	3
1110	200	7.69	926	-142.3	0.9	5.64	14.7	9.23	4
1115	200	7.69	927	-146.7	0.8	5.26	14.5	9.23	5
1120	200	7.68	983	-148.9	0.8	5.32	14.5	9.23	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	250mL	plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
1	125mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>lab drop off</u>	DATE SHIPPED: <u>7-27-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-1-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AW</u> JK, JJ DATE: <u>7/26/23</u>	BY: <u>JK</u> DATE: <u>8-1-23</u>

SAMPLE ID: <u>OW-10</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0932</u>	DATE: <u>7/26/23</u>	SAMPLE	TIME: <u>0952</u>	DATE: <u>7/26/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.06</u> SU	CONDUCTIVITY: <u>699.54</u> umhos/cm	ORP: <u>-118.0</u> mV	DO: <u>1.90</u> mg/L	
DEPTH TO WATER: <u>7.25</u> T/ PVC	TURBIDITY: <u>9.29</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: <u>17.91</u> T/ PVC	WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>15.40</u> °C	OTHER: <u>-</u>		
VOLUME REMOVED: <u>4.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>Clear</u>	ODOR: <u>None</u>	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
COLOR: <u>Clear</u>	ODOR: <u>None</u>	FILTRATE COLOR: _____	FILTRATE ODOR: _____		
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>KLI</u>		
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)
932	200	7.06	691.97	-76.7	2.45	17.49	16.69	7.25	INITIAL
937	↓	7.06	677.44	-81.0	1.92	10.08	15.57	↓	1.0
942	↓	7.04	692.61	-110.2	1.72	9.19	15.59	↓	2.0
947	↓	7.05	697.40	-114.3	1.84	8.51	15.51	↓	3.0
952	↓	7.06	699.54	-115.0	1.90	9.29	15.40	↓	4.0
957									

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	60	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	250	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
2	125	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>Drop off</u>	DATE SHIPPED: <u>7/27/23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>7/26/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>W, JK, JJ</u> DATE: <u>7/26/23</u>	BY: <u>JK</u> DATE: <u>8-1-23</u>

SAMPLE ID: <u>OW-11</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0848</u>	DATE: <u>7/26/23</u>	SAMPLE	TIME: <u>0908</u>	DATE: <u>7/26/23</u>
PURGE <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP METHOD: <input type="checkbox"/> BAILER			PH: <u>9.70</u> SU CONDUCTIVITY: <u>296.89</u> umhos/cm		
DEPTH TO WATER: <u>22.23</u> T/ PVC			ORP: <u>-95.4</u> mV DO: <u>2.10</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC <u>Transfer</u>			TURBIDITY: <u>0.15</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>4.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.95</u> °C OTHER: <u>-</u>		
COLOR: <u>Clear</u> ODOR: <u>NONE</u>			COLOR: <u>Clear</u> ODOR: <u>NONE</u>		
TURBIDITY <input checked="" type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR)
<u>848</u>	<u>200</u>	<u>9.14</u>	<u>321.77</u>	<u>-23.9</u>	<u>3.00</u>	<u>45.62</u>	<u>16.03</u>	<u>22.23</u>	INITIAL
<u>853</u>	↓	<u>9.35</u>	<u>311.16</u>	<u>-57.9</u>	<u>2.30</u>	<u>23.94</u>	<u>14.88</u>	<u>23.20</u>	<u>1.0</u>
<u>858</u>	↓	<u>9.64</u>	<u>302.32</u>	<u>-85.6</u>	<u>2.20</u>	<u>4.08</u>	<u>15.01</u>	↓	<u>2.0</u>
<u>903</u>	↓	<u>9.70</u>	<u>297.67</u>	<u>-92.8</u>	<u>2.12</u>	<u>0.29</u>	<u>14.92</u>	↓	<u>3.0</u>
<u>908</u>	↓	<u>9.70</u>	<u>296.89</u>	<u>-95.4</u>	<u>2.10</u>	<u>0.15</u>	<u>14.95</u>	↓	<u>4.0</u>

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	
<u>2</u>	<u>60</u>	<u>VOA</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>1</u>	<u>250</u>	<u>Plastic</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
<u>1</u>	<u>125</u>	<u>Plastic</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	↓	↓	<u>B</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	↓	↓	<u>C</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	↓	↓	<u>D</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>DROP OFF</u>	DATE SHIPPED: <u>7/27/23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>7/26/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AW</u> , JK, JJ DATE: <u>7/26/23</u>	BY: <u>JK</u> DATE: <u>8-1-23</u>

SAMPLE ID: <u>4 OW-12</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1028</u>	DATE: <u>7/26/23</u>	SAMPLE	TIME: <u>1043</u>	DATE: <u>7/26/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.12</u> SU		CONDUCTIVITY: <u>665.37</u> umhos/cm		
DEPTH TO WATER: <u>17.12</u> T/ PVC	ORP: <u>-92.6</u> mV		DO: <u>2.00</u> mg/L		
DEPTH TO BOTTOM: <u>23.46</u> T/ PVC	TURBIDITY: <u>6.20</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>18.93</u> °C		OTHER: <u>—</u>		
VOLUME REMOVED: <u>3.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>Clear</u>		ODOR: <u>None</u>		
COLOR: <u>Slight gray</u>	ODOR: <u>None</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	FILTRATE COLOR: <u>—</u>		FILTRATE ODOR: <u>—</u>		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		COMMENTS: <u>FB- kL1</u>		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR $\frac{1}{8}$)
1028	200	7.19	677.41	-96.1	3.07	46.03	20.79	17.12	INITIAL
1023	↓	7.18	654.95	-95.2	2.25	4.39	19.22	↓	1.0
1038	↓	7.15	654.12	-93.6	2.07	7.18	18.98	↓	2.0
1043	↓	7.12	665.37	-92.6	2.00	6.20	18.93	↓	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	
2	60	VQA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	250 Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
2	125	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N				<input type="checkbox"/> Y <input type="checkbox"/> N		
2	125	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N				<input type="checkbox"/> Y <input type="checkbox"/> N		
2	125	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N				<input type="checkbox"/> Y <input type="checkbox"/> N		
2	125	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N				<input type="checkbox"/> Y <input type="checkbox"/> N		

SHIPPING METHOD: <u>DROP OFF</u>	DATE SHIPPED: <u>7/27/23</u>	AIRBILL NUMBER: <u>—</u>
COC NUMBER: <u>—</u>	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>7/26/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AW/JK, JJ</u> DATE: <u>7/26/23</u>	BY: <u>JK</u> DATE: <u>8-1-23</u>

SAMPLE ID: <u>DFK MW-15003</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0745</u>	DATE: <u>7/26/23</u>	SAMPLE	TIME: <u>0820</u>	DATE: <u>7/26/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>8.17</u> SU CONDUCTIVITY: <u>378.67</u> umhos/cm		
DEPTH TO WATER: <u>17.0'</u> T/ PVC			ORP: <u>-159.6</u> mV DO: <u>1.76</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC (<u>Transducer</u>)			TURBIDITY: <u>0.00</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>4.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>19.22</u> °C OTHER: <u>—</u>		
COLOR: <u>Clear</u> ODOR: <u>None</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: <u>—</u> FILTRATE ODOR: <u>—</u>		
COMMENTS:			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- <u>—</u>		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
<u>0745</u>	<u>200</u>	<u>6.67</u>	<u>402.28</u>	<u>190.4</u>	<u>3.83</u>	<u>2.48</u>	<u>20.97</u>	<u>17.10</u>	INITIAL
<u>750</u>	<u>100</u>	<u>7.97</u>	<u>363.81</u>	<u>112.1</u>	<u>2.03</u>	<u>1.97</u>	<u>18.95</u>	<u>19.20</u>	<u>1.0</u>
<u>755</u>	<u>↓</u>	<u>8.04</u>	<u>365.22</u>	<u>-104.9</u>	<u>1.75</u>	<u>0.00</u>	<u>18.74</u>	<u>18.90</u>	<u>2.0-1.5</u>
<u>800</u>	<u>↓</u>	<u>8.07</u>	<u>367.66</u>	<u>-129.6</u>	<u>1.86</u>	<u>0.60</u>	<u>18.94</u>	<u>18.72</u>	<u>3.0-2.0</u>
<u>805</u>	<u>↓</u>	<u>8.15</u>	<u>371.75</u>	<u>-148.7</u>	<u>1.85</u>	<u>0.20</u>	<u>19.20</u>	<u>18.50</u>	<u>2.5</u>
<u>810</u>	<u>↓</u>	<u>8.17</u>	<u>375.20</u>	<u>-158.7</u>	<u>1.79</u>	<u>0.10</u>	<u>19.21</u>	<u>18.50</u>	<u>3.0</u>
<u>815</u>	<u>↓</u>	<u>8.17</u>	<u>378.19</u>	<u>-161.2</u>	<u>1.76</u>	<u>0.00</u>	<u>19.23</u>	<u>18.50</u>	<u>3.5</u>
<u>820</u>	<u>↓</u>	<u>8.17</u>	<u>378.67</u>	<u>-159.6</u>	<u>1.76</u>	<u>0.00</u>	<u>19.22</u>	<u>18.50</u>	<u>4.0</u>

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	
<u>2</u>	<u>60</u>	<u>VOA</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>1</u>	<u>250</u>	<u>Plastic</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
<u>1</u>	<u>125</u>	<u>Plastic</u>	<u>A</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	<u>↓</u>	<u>↓</u>	<u>B</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	<u>↓</u>	<u>↓</u>	<u>C</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
<u>1</u>	<u>↓</u>	<u>↓</u>	<u>D</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>Drop off</u>	DATE SHIPPED: <u>7/27/23</u>	AIRBILL NUMBER: <u>—</u>
COC NUMBER: <u>—</u>	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>7/26/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AWJK, JJ</u> DATE: <u>7/26/23</u>	BY: <u>JK</u> DATE: <u>8-1-23</u>

SAMPLE ID: <u>DEK MW-18001</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1215</u>	DATE: <u>7/26/23</u>	SAMPLE	TIME: <u>1230</u>	DATE: <u>7/26/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>7.70</u> SU	CONDUCTIVITY: <u>678.94</u> umhos/cm	
			ORP: <u>-130.9</u> mV	DO: <u>2.09</u> mg/L	
DEPTH TO WATER: <u>9.04</u> T/ PVC			TURBIDITY: <u>0.00</u> NTU		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC <u>Transducer</u>			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>16.15</u> °C OTHER: <u>-</u>		
VOLUME REMOVED: <u>3.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>Clear</u> ODOR: <u>None</u>		
COLOR: <u>Clear</u> ODOR: <u>None</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR @)
1215	200	7.73	712.38	-131.7	2.36	0.27	19.21	9.04	INITIAL
1220	↓	7.72	695.71	-132.9	2.10	0.00	17.93	↓	1.0
1225	↓	7.70	679.28	-131.4	2.12	0.00	16.32	↓	2.0
1230	↓	7.70	678.94	-130.9	2.09	0.00	16.15	↓	3.0

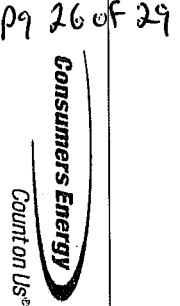
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

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		
6	600	VDA	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N		1	250	Plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	
3	125	Plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input type="checkbox"/> N	
3	↓	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input type="checkbox"/> N	
3	↓	↓	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input type="checkbox"/> N	
3	↓	↓	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input type="checkbox"/> N	

SHIPPING METHOD: <u>Drop off</u>	DATE SHIPPED: <u>7/27/23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>7/26/23</u>

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER:
23-2023 DEK Lined Impoundment

PROJECT NUMBER:
23-0719

SAP CC or WO#:
REQUESTER: Harold Register

ANALYSIS REQUESTED
(Attach List if More Space is Needed)

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

SAMPLING TEAM:
A. Whaley

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

email: _____ phone: _____

SEND REPORT TO: Caleb Batts

COPY TO: Harold Register

TRC

LAB SAMPLE ID

SAMPLE COLLECTION DATE TIME MATRIX

FIELD SAMPLE ID / LOCATION

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

23-0719-01

7/26/23 0820

GW

DEK-MW-15003

7 4 1 1 1 1

-02

0952

GW

OW-10

7 4 1 1 1 1

-03

0905

GW

OW-11

7 4 1 1 1 1

-04

1013

GW

OW-12

7 4 1 1 1 1

-05

1115

W

KLI-SCS

7 4 1 1 1 1

-06

1131

SW

KLI-PCS

7 4 1 1 1 1

-07

1155

SW

SW-DITCH

7 4 1 1 1 1

-08

—

GW

DUP-KLI

7 4 1 1 1 1

-09

1205

W

EB-KLI

4 1 1 1 1 1

-10

1613

W

FB-KLI

4 1 1 1 1 1

ELINQUISHED BY: _____ DATE/TIME: _____ RECEIVED BY: _____

ELINQUISHED BY: *[Signature]* DATE/TIME: 7/27/23 0820 RECEIVED BY: *[Signature]*

23-0719-Page 27 of 45

Received on Ice? Yes No M&TE #: 05402

Temperature: 2.8-6.0°C Cal. Due Date: 5-23-24

CHAIN OF CUSTODY



Count on Us[®]

CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER:

23-2023 DEK Bottom Ash Pond & Lined Impound

PROJECT NUMBER:

23-0718

SAP CC or WO#:

REQUESTER: Harold Register

ANALYSIS REQUESTED

(Attach List if More Space is Needed)

QA REQUIREMENT:

- NPDES
- TNI
- ISO 17025
- 10 CFR 50 APP. B
- INTERNAL INFO
- OTHER _____

SAMPLING TEAM: A. Whaley

TURNAROUND TIME REQUIRED:

- 24 HR
- 48 HR
- 3 DAYS
- STANDARD
- OTHER _____

SEND REPORT TO: Caleb Batts

email:

phone:

COPY TO: Harold Register

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

CONTAINERS

TOTAL #	None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other
7	4	1	1	1			
6	3	1	1	1			
6	3	1	1	1			

- Total Metals
- Anions
- Ammonia
- TDS
- Alkalinity
- Sulfide

REMARKS

LAB SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS							Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	REMARKS
					None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other							
23-0718-01	7/26/23	1230	GW	DEK-MW-18001	4	1	1	1										
-02		1230	GW	DEK-MW-18001 MS	3	1	1	1										
-03		1236	GW	DEK-MW-18001 MSD	3	1	1	1										

ELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

COMMENTS:

ELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

Received on Ice? Yes No

Temperature: 5.4-5.9 °C

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:
23-2023 DEK Bottom Ash Pond Wells

PROJECT NUMBER:
23-0717

SAP CC or WO#: _____
REQUESTER: Harold Register

ANALYSIS REQUESTED
(Attach List if More Space is Needed)

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

SAMPLING TEAM: Caleb Batts

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

SEND REPORT TO: Caleb Batts

email: _____ phone: _____

COPY TO: Harold Register

MATRIX CODES:
GW = Groundwater
W/W = Wastewater
W = Water / Aqueous Liquid
S = Soil / General Solid
O = Oil

OX = Other
SL = Sludge
A = Air
WP = Wipe
WT = General Waste

CONTAINERS
None
HNO₃
H₂SO₄
NaOH
HCl
MeOH
Other

REMARKS

LAB SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOCATION	TOTAL #	PRESERVATIVE							Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	REMARKS
						None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other							
23-0717-01	7-26-23	1027	GW	DEK-MW-15002	7	4	1	1	1										
-02		1203	GW	DEK-MW-15005	7	4	1	1	1										
-03		1120	GW	DEK-MW-15006	7	4	1	1	1										
-04		→	GW	DUP-DEK-BAP-01	7	4	1	1	1										
-05		1120	W	FB-DEK-BAP	4	1	1	1	1										
-06		1220	W	EB-DEK-BAP	4	1	1	1	1										

ELINQUISHED BY: _____

DATE/TIME: _____

RECEIVED BY: _____

COMMENTS:

ELINQUISHED BY: _____

DATE/TIME: _____

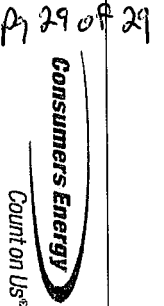
RECEIVED BY: _____

COMMENTS:

Received on Ice? Yes No
Temperature: 4.6 - 5.7C

M&TE #: 015702
Cal. Due Date: 5-23-24

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY - LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER:
23-2023 JCW-DEK Background Wells

PROJECT NUMBER:
23-0721

SAP CC or WO#:
REQUESTER: Harold Register

ANALYSIS REQUESTED
(Attach List if More Space is Needed)

SAMPLING TEAM:

TURNAROUND TIME REQUIRED:
 24 HR 48 HR 3 DAYS STANDARD OTHER

SEND REPORT TO:

Caleb Batts

email: _____ phone: _____

COPY TO:

Harold Register

MATRIX CODES:
 GW = Groundwater
 W/W = Wastewater
 W = Water / Aqueous Liquid
 S = Soil / General Solid
 O = Oil

OX = Other
 SL = Sludge
 A = Air
 WP = Wipe
 WT = General Waste

CONTAINERS
 Total Metals
 Anions
 TDS

LAB SAMPLE ID

DATE TIME MATRIX

FIELD SAMPLE ID / LOCATION

TOTAL #
 None
 HNO₃
 H₂SO₄
 NaOH
 HCl
 MeOH
 Other

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

23-0721-01

7-26-23 0852 GW

MW-15002

3 2 1

x x x

23-0721-02

7-24-23 1323 GW

MW-15008

3 2 1

x x x

23-0721-03

7-26-23 0933 GW

MW-15016

3 2 1

x x x

23-0721-04

7-24-23 1405 GW

MW-15019

3 2 1

x x x

23-0721-05

7-24-23 — GW

DUP-Background

3 2 1

x x x

23-0721-06

7-26-23 0933 W

FB-Background

1

x

ELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

RECEIVED BY:

COMMENTS:

ELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

RECEIVED BY:

COMMENTS:

Received on Ice? Yes No

Temperature: **2.8-3.6** °C

M&TE #: **015402**

Cal. Due Date: **5-23-24**

Appendix C

Data Quality Reviews

Laboratory Data Quality Review Groundwater Monitoring Event July 2023 DE Karn Bottom Ash Pond

Groundwater samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analyses were subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0717 and S51520.01(01).

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

- DEK-MW-15002
- DEK-MW-15005
- DEK-MW-15006

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, and Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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 and Merit. 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, TDS, ammonia, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters 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

- One field blank (FB-DEK-BAP) and one equipment blank (EB-DEK-BAP) were collected with this data set. Total metals, nitrate, nitrite, ammonia, and sulfide were not detected in these blanks.
- The field duplicate pair samples were DUP-DEK-BAP-01 with DEK-MW-15002; relative percent differences (RPDs) between the parent and duplicate sample 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/Surface Water Monitoring Event July 2023 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the July 2023 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analyses were subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0719 and S51522.01(01).

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

- OW-10
- OW-11
- OW-12
- DEK-MW-15003

During the July 2023 sampling event, the following water/surface water samples were collected:

- KLI-PCS
- KLI-SCS
- SW-DITCH

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B
Total Mercury	SW-846 7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D

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 and Merit. 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, total mercury, anions, alkalinity, TDS, ammonia, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One field blank (FB-KLI) and one equipment blank (EB-KLI) were collected with this data set. Target analytes were not detected in these blank samples.

- The field duplicate pair samples were DUP-KLI and OW-10; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits with the following exception:
 - The RPD for TDS (164.2%) was > 30. Therefore, the positive results for TDS 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/Surface Water Analytical Data
DE Karn Lined Impoundment
Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
DEK-MW-15003	7/26/2023	Total Dissolved Solids	Field duplicate variability (relative percent difference above criteria); potential uncertainty exists. Observed TDS concentrations were generally consistent with historical results and deemed usable for the purposes of the detection monitoring program.
OW-10	7/26/2023		
OW-11	7/26/2023		
OW-12	7/26/2023		
DUP-KLI	7/26/2023		

Appendix D

Statistical Analysis

Appendix D
 Statistical Summary for DE Karn Lined Impoundment
 Third Quarter 2023
 Data from October 2021 to July 2023

Karn Lined Impoundment Wells						
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12
Boron	Trend	↓*	○	○	○	○
Calcium	Trend	○	↓	○	○	○
Chloride	Trend	↑ ^{ASD}	○	○	↓	○
Fluoride	Trend	○*	○*	○*	○	○*
Iron	Trend	○	↓	○	○	○
pH	Trend	○	↑*	○	○	○
Sulfate	Trend	○	○	○	↓	○
Total Dissolved Solids	Trend	○	○	○	○	○

Notes:

○* = Non-detect

○ = No trend

↑ = Upward trend, continuous

↑* = Upward trend, new

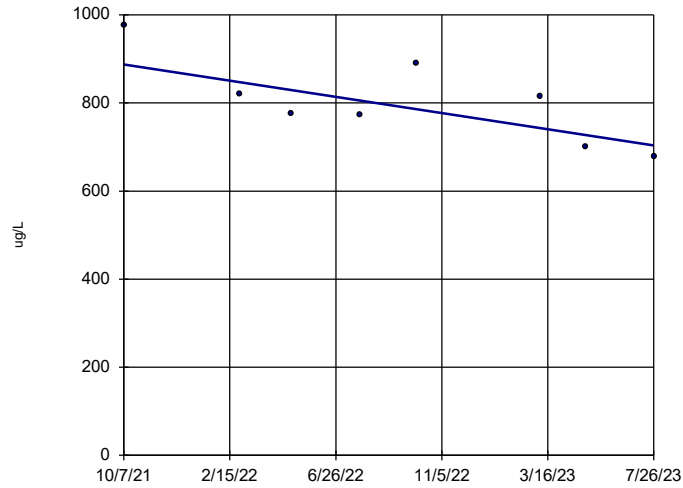
↑ = Upward trend, confirmed

↓ = Downward trend, continuous

↓* = Downward trend, new

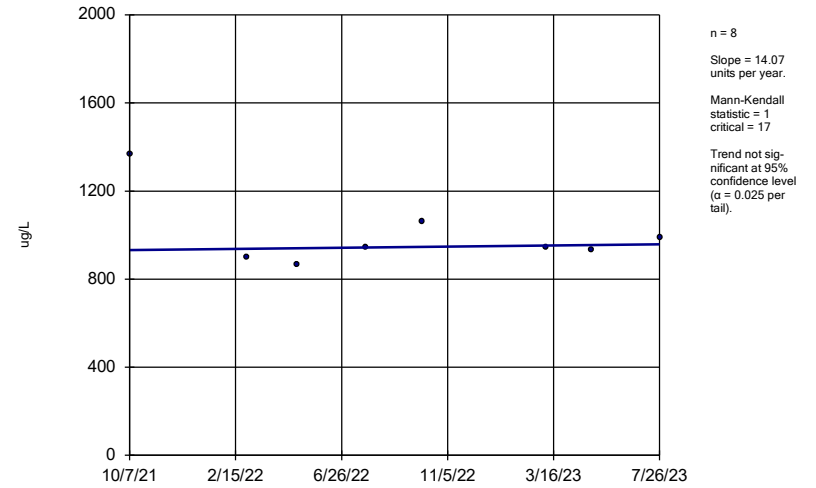
↑^{ASD} = Alternate Source Demonstration (Second Quarter 2023 Hydrogeological Monitoring Report for the Karn Lined Impoundment CCR Unit, TRC, July 2023.)

Boron, Total DEK-MW-15003



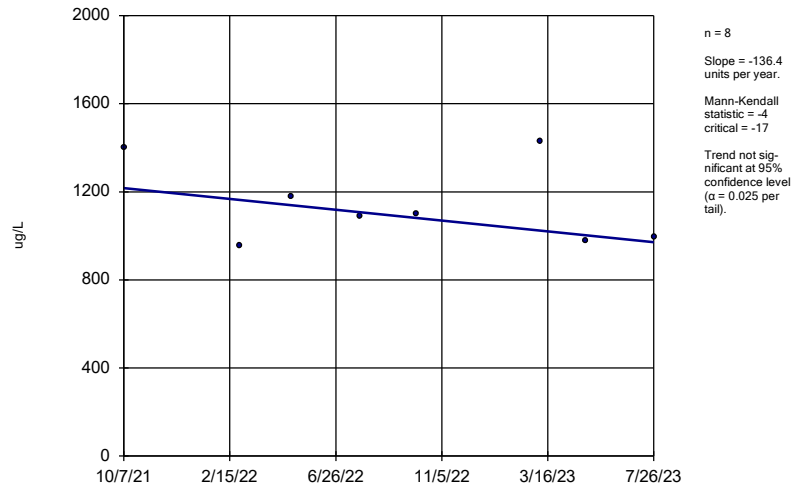
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

Boron, Total DEK-MW-18001



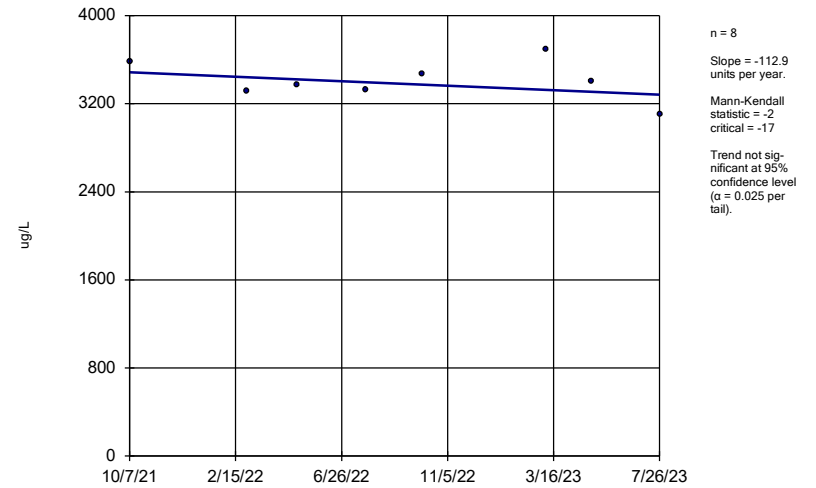
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

Boron, Total OW-10



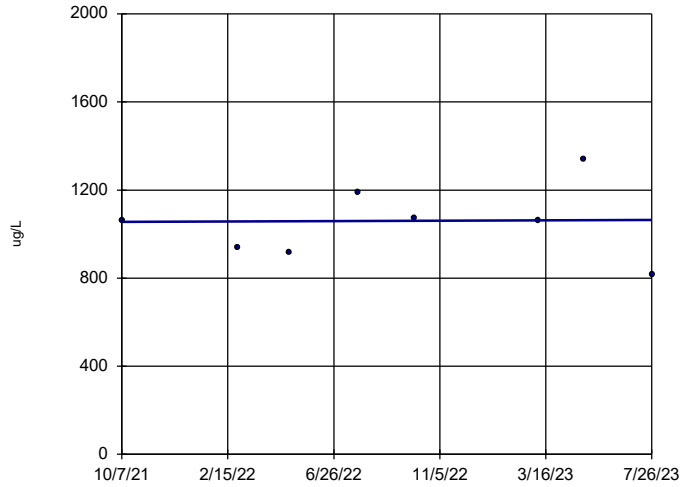
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Boron, Total OW-11



Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

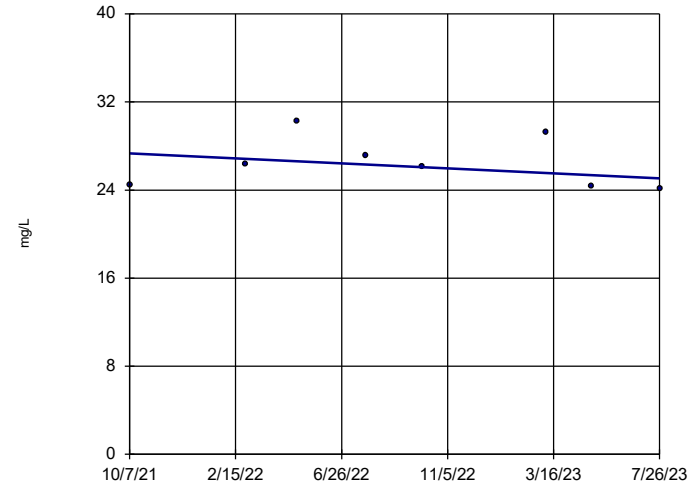
Boron, Total OW-12



n = 8
 Slope = 5.041
 units per year.
 Mann-Kendall
 statistic = 1
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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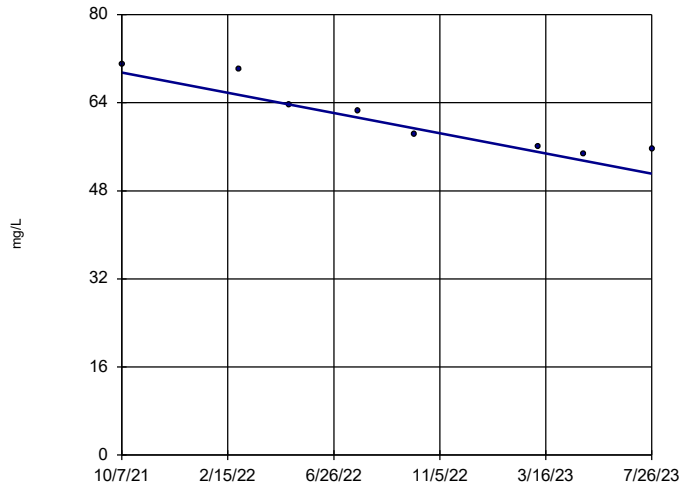
Calcium, Total DEK-MW-15003



n = 8
 Slope = -1.264
 units per year.
 Mann-Kendall
 statistic = -8
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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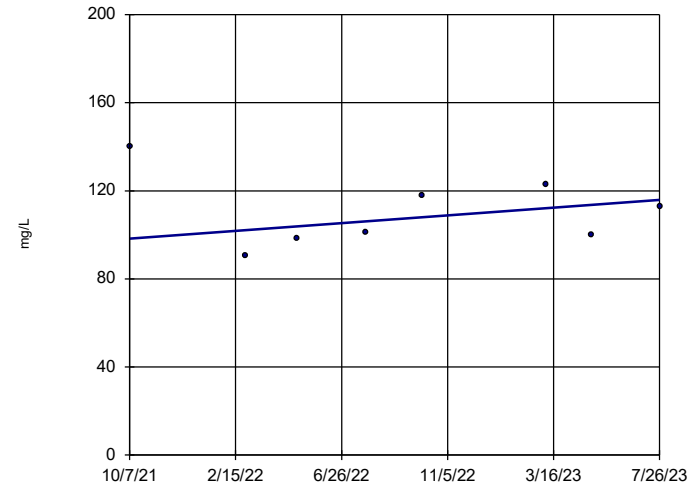
Calcium, Total DEK-MW-18001



n = 8
 Slope = -10.2
 units per year.
 Mann-Kendall
 statistic = -26
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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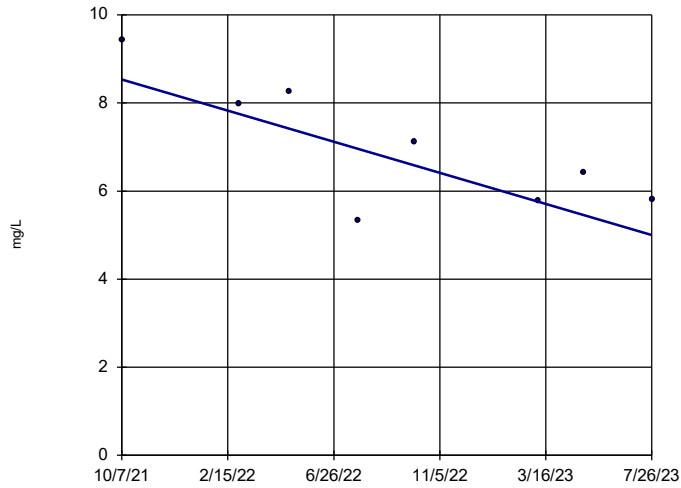
Calcium, Total OW-10



n = 8
 Slope = 9.789
 units per year.
 Mann-Kendall
 statistic = 4
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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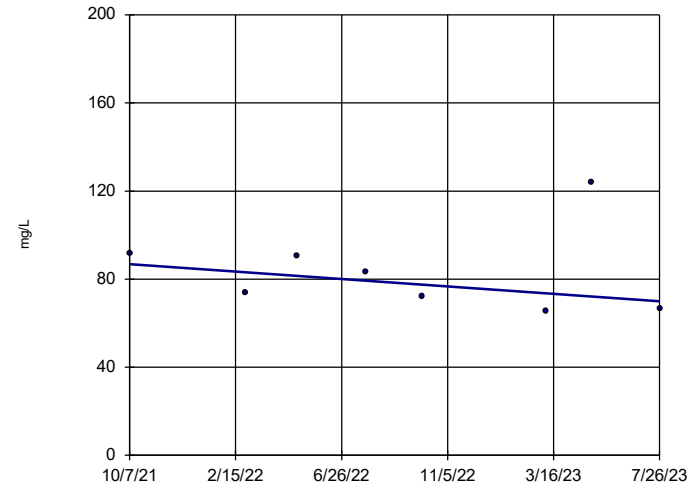
Calcium, Total OW-11



n = 8
 Slope = -1.963
 units per year.
 Mann-Kendall
 statistic = -14
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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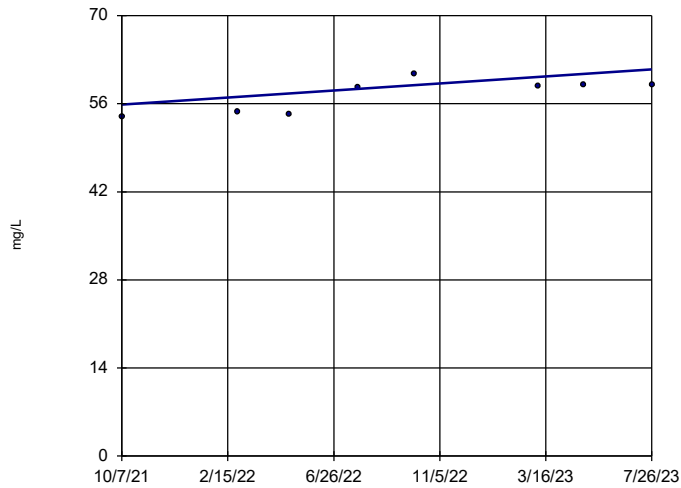
Calcium, Total OW-12



n = 8
 Slope = -9.356
 units per year.
 Mann-Kendall
 statistic = -10
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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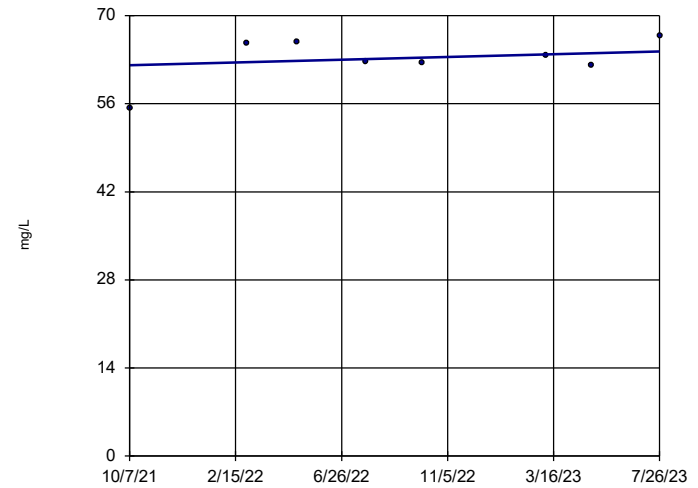
Chloride DEK-MW-15003



n = 8
 Slope = 3.093
 units per year.
 Mann-Kendall
 statistic = 20
 critical = 17
 Increasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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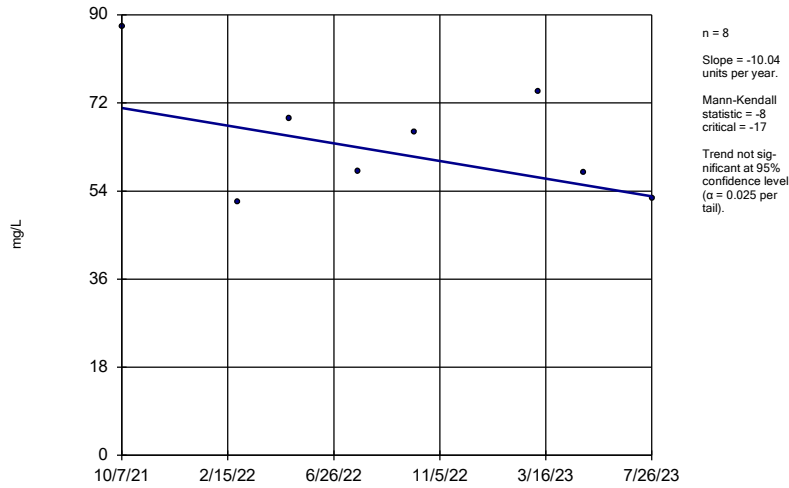
Chloride DEK-MW-18001



n = 8
 Slope = 1.207
 units per year.
 Mann-Kendall
 statistic = 4
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

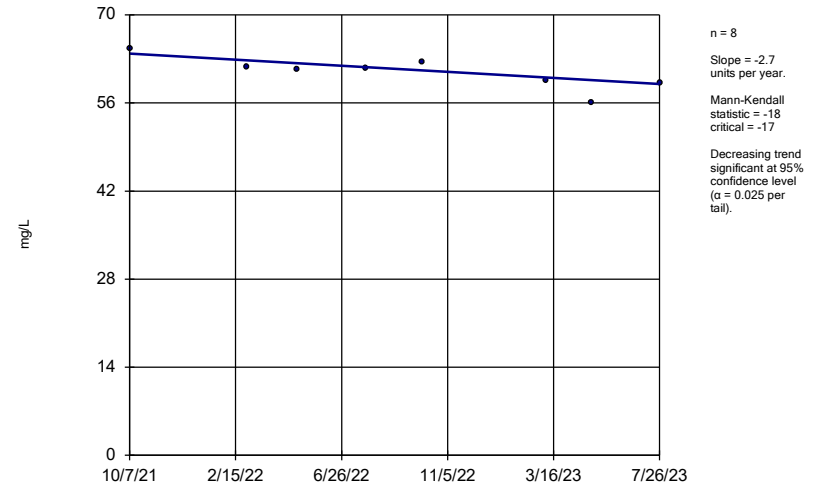
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Chloride OW-10



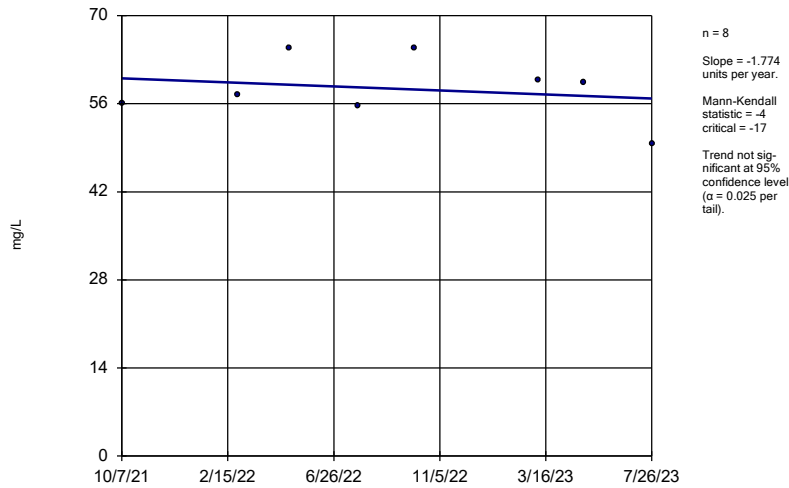
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Chloride OW-11



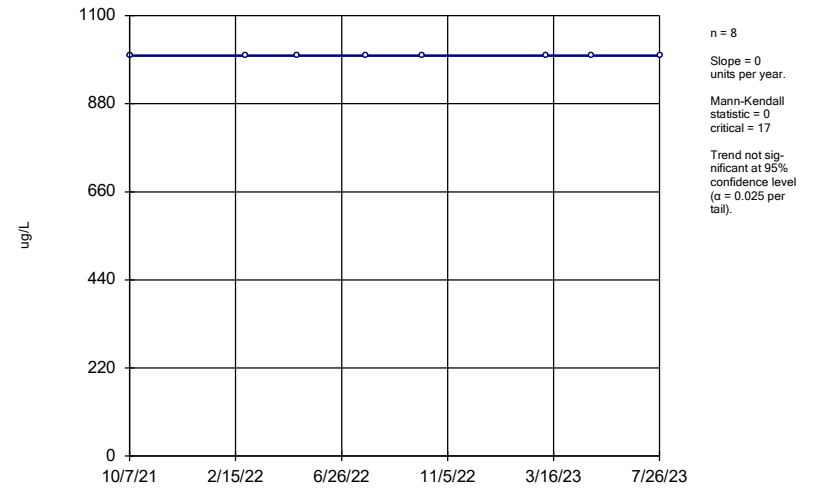
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Chloride OW-12

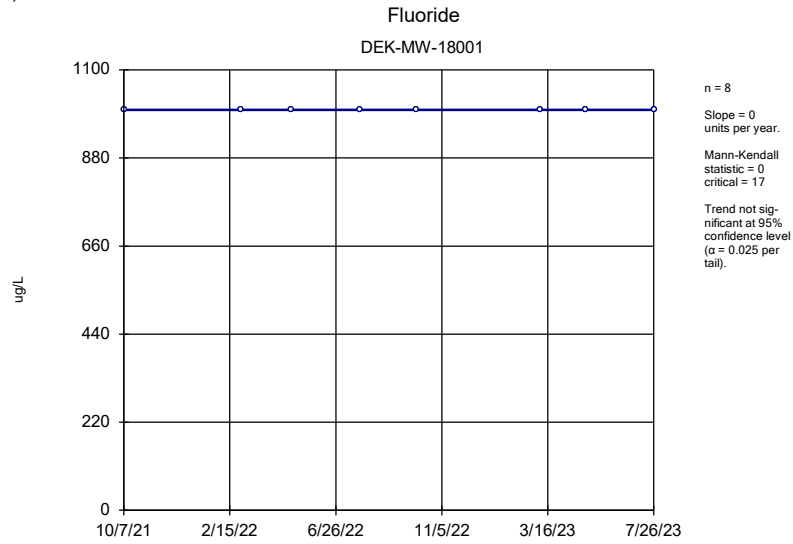


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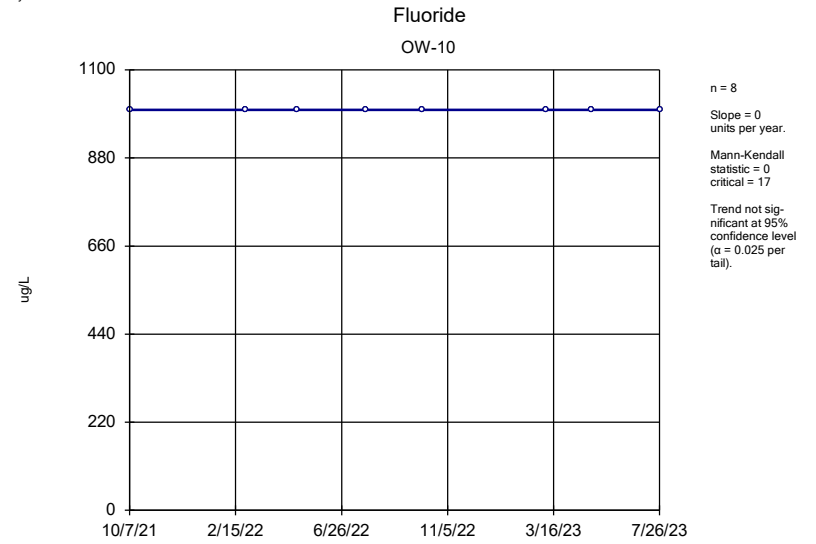
Fluoride DEK-MW-15003



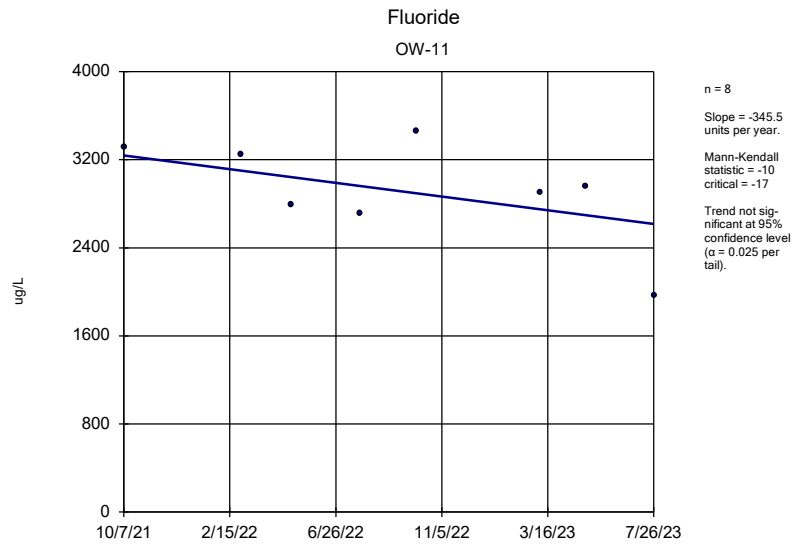
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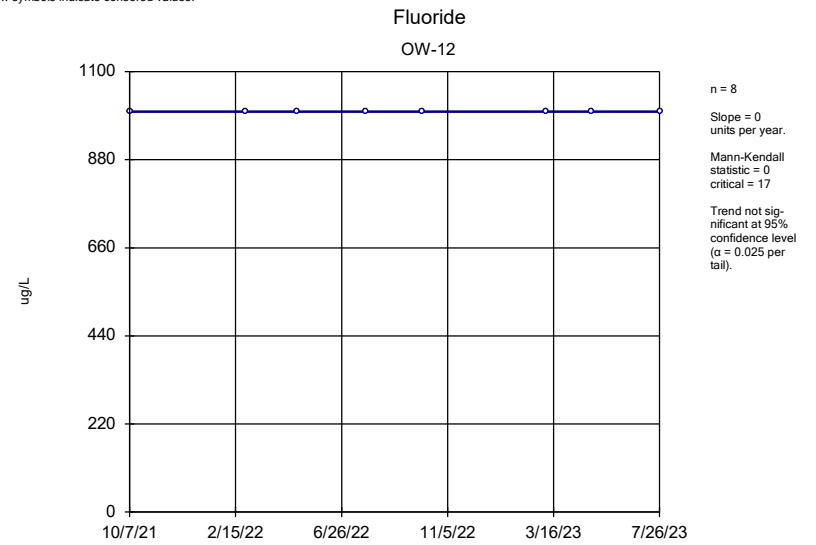
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Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3



Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

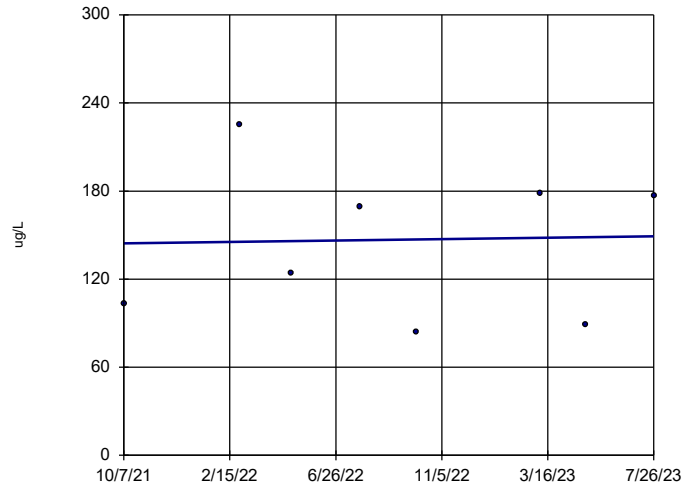


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Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

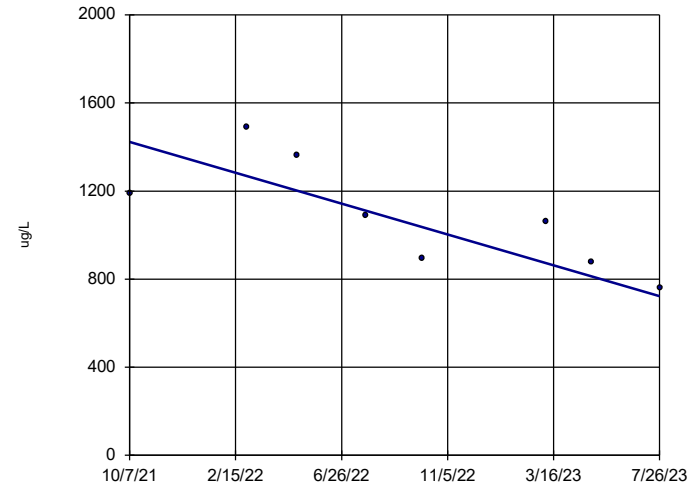
Iron, Total DEK-MW-15003



n = 8
 Slope = 2.696
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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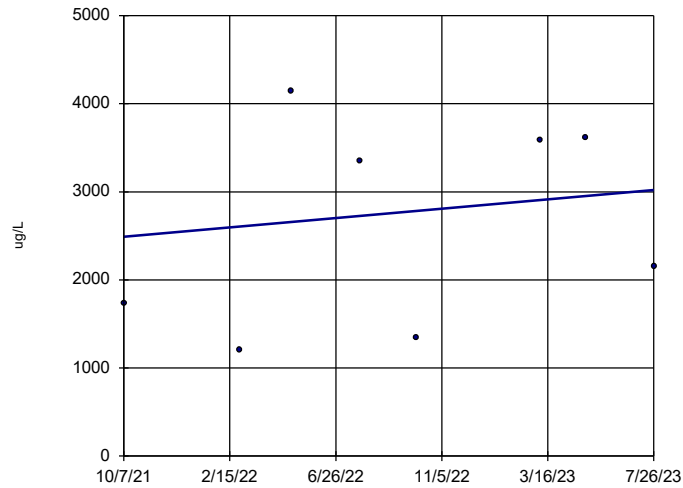
Iron, Total DEK-MW-18001



n = 8
 Slope = -389.3
 units per year.
 Mann-Kendall
 statistic = -.22
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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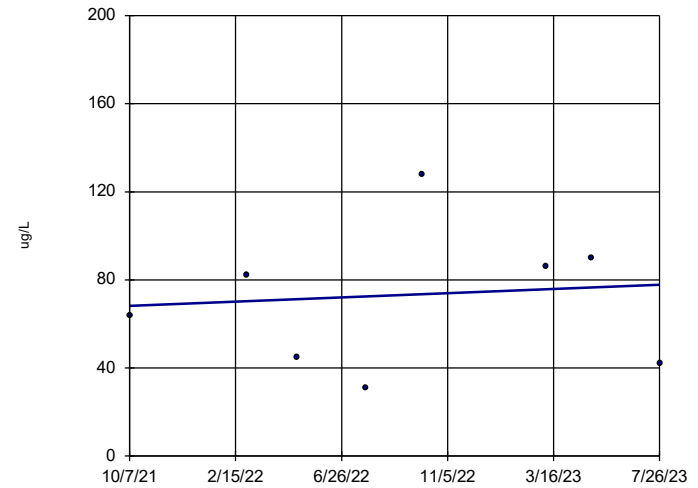
Iron, Total OW-10



n = 8
 Slope = 295
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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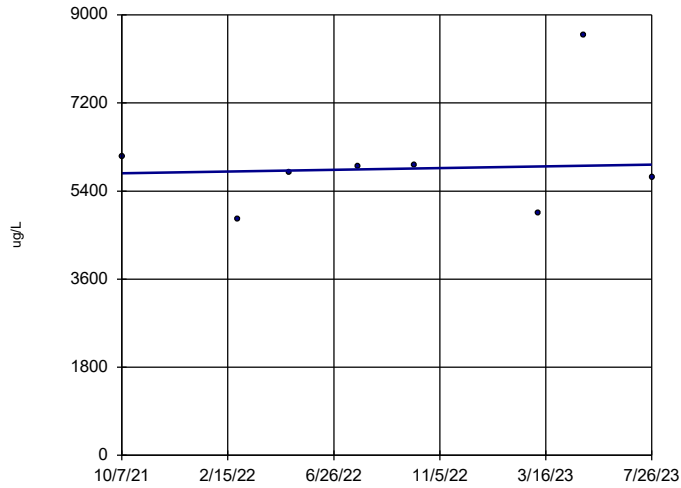
Iron, Total OW-11



n = 8
 Slope = 5.382
 units per year.
 Mann-Kendall
 statistic = 2
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
 Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q3

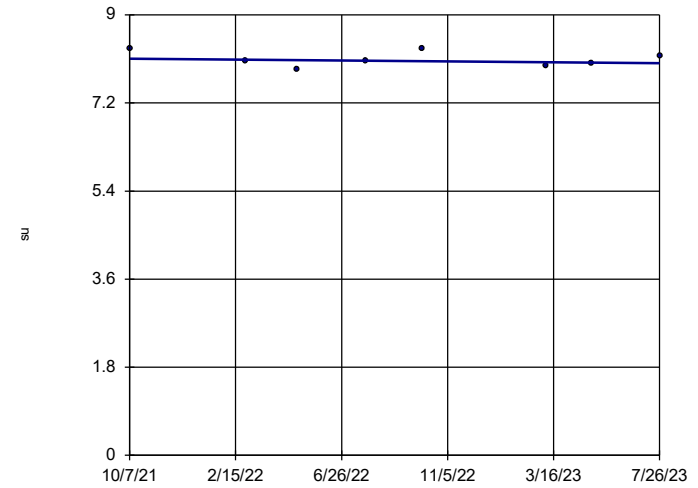
Iron, Total
OW-12



n = 8
Slope = 97.82 units per year.
Mann-Kendall statistic = 2
critical = 17
Trend not significant at 95% confidence level (α = 0.025 per tail).

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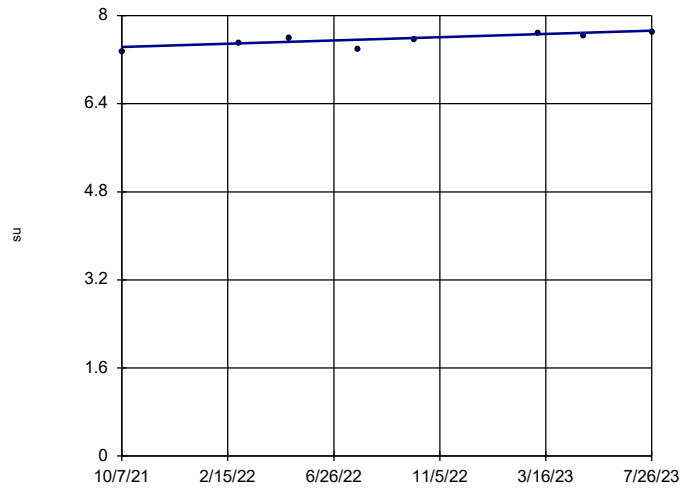
pH, Field
DEK-MW-15003



n = 8
Slope = -0.05025 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 11:30 AM
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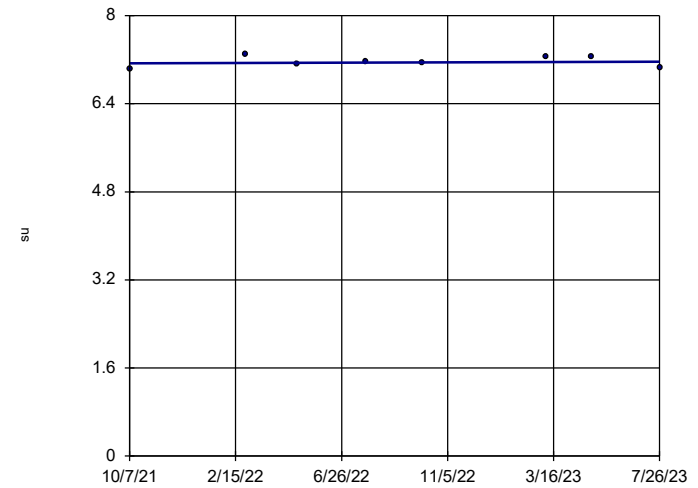
pH, Field
DEK-MW-18001



n = 8
Slope = 0.164 units per year.
Mann-Kendall statistic = 20
critical = 17
Increasing trend significant at 95% confidence level (α = 0.025 per tail).

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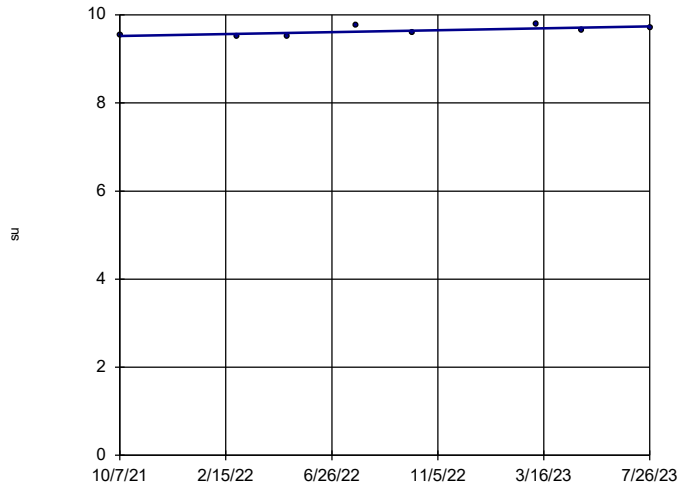
pH, Field
OW-10



n = 8
Slope = 0.01741 units per year.
Mann-Kendall statistic = 3
critical = 17
Trend not significant at 95% confidence level (α = 0.025 per tail).

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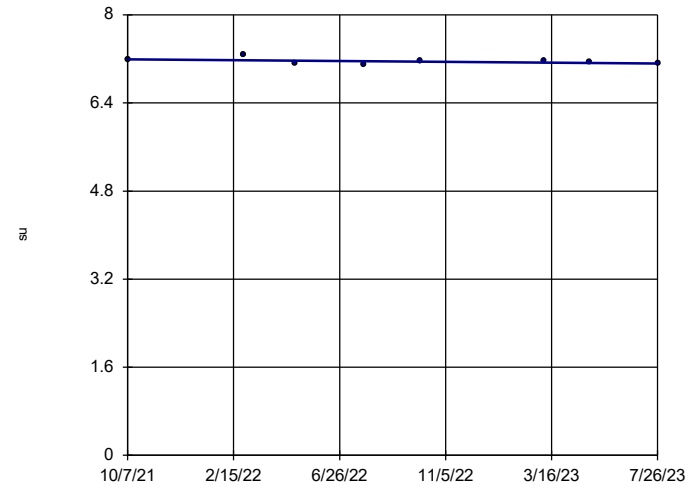
pH, Field OW-11



n = 8
 Slope = 0.1198
 units per year.
 Mann-Kendall
 statistic = 14
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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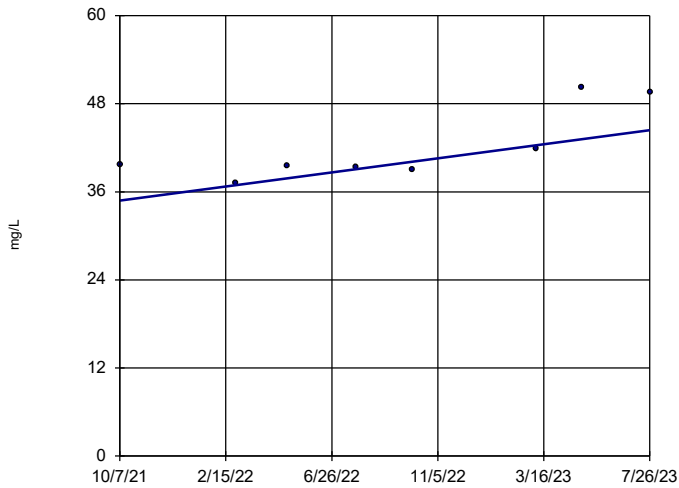
pH, Field OW-12



n = 8
 Slope = -0.04274
 units per year.
 Mann-Kendall
 statistic = -10
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:30 AM
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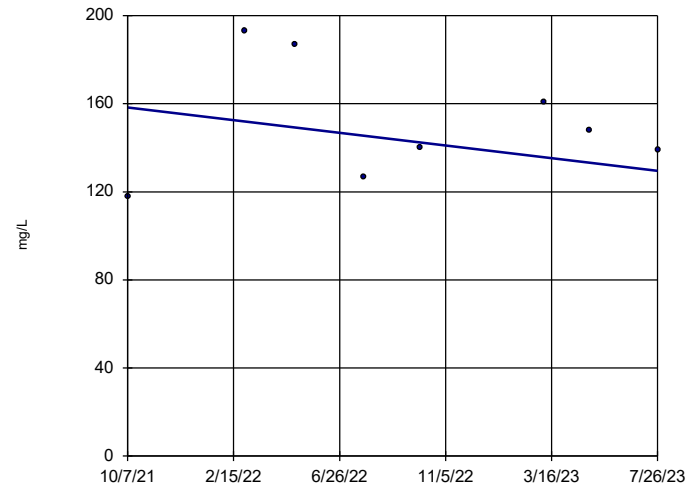
Sulfate DEK-MW-15003



n = 8
 Slope = 5.312
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 Mann-Kendall
 statistic = 12
 critical = 17
 Trend not sig-
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 confidence level
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 tail).

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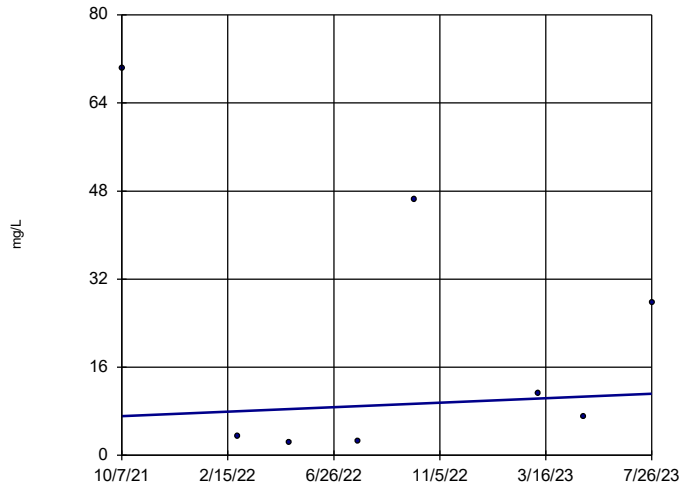
Sulfate DEK-MW-18001



n = 8
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 units per year.
 Mann-Kendall
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 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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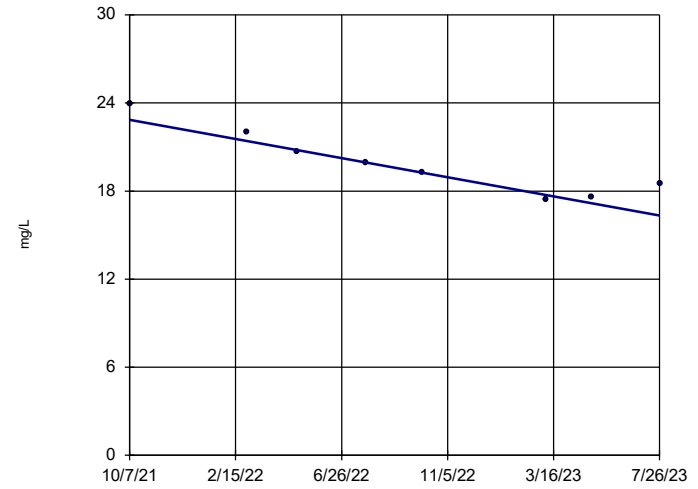
Sulfate
OW-10



n = 8
Slope = 2.263
units per year.
Mann-Kendall
statistic = 2
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:31 AM
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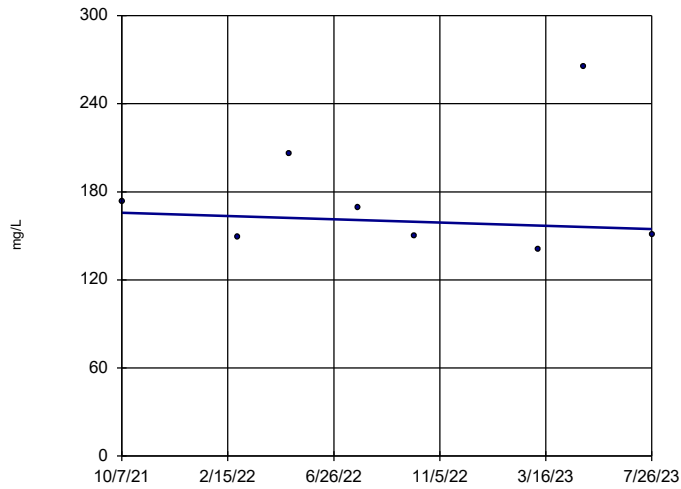
Sulfate
OW-11



n = 8
Slope = -3.619
units per year.
Mann-Kendall
statistic = -22
critical = -17
Decreasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

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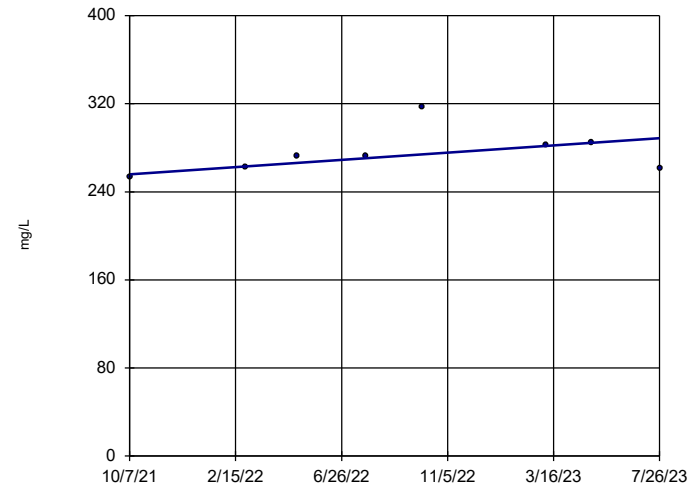
Sulfate
OW-12



n = 8
Slope = -6.102
units per year.
Mann-Kendall
statistic = -2
critical = -17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

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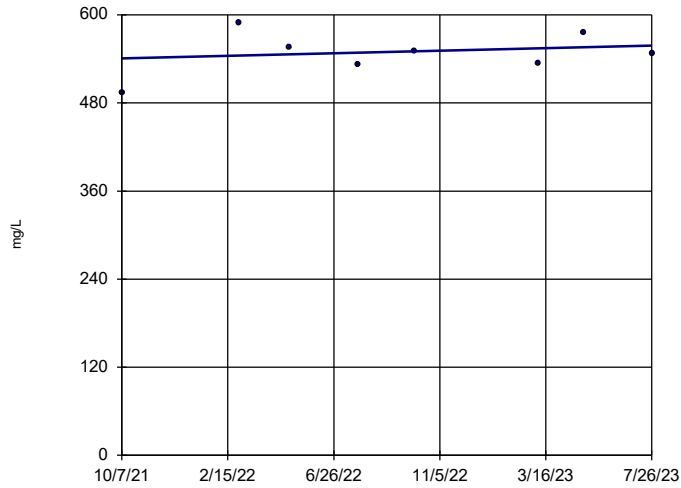
Total Dissolved Solids
DEK-MW-15003



n = 8
Slope = 18.26
units per year.
Mann-Kendall
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critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

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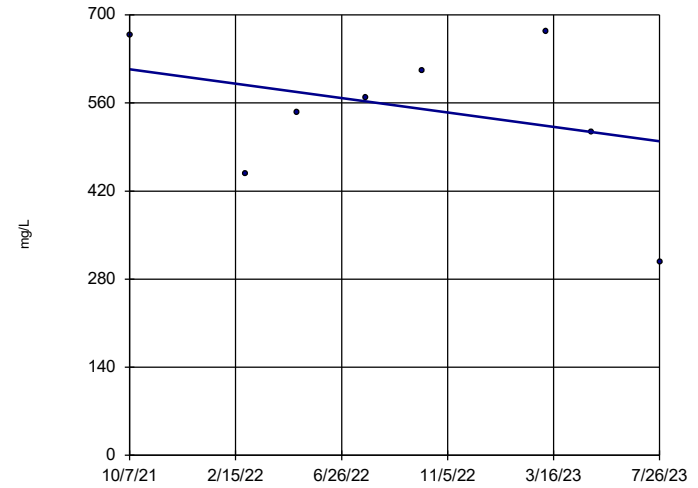
Total Dissolved Solids DEK-MW-18001



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 Mann-Kendall
 statistic = 2
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:31 AM
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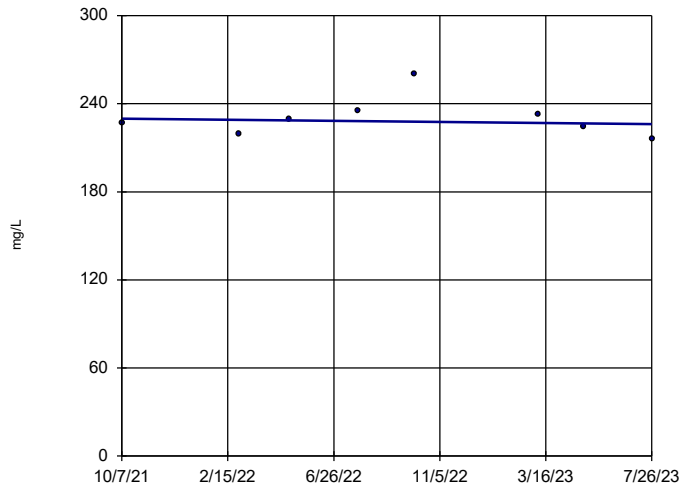
Total Dissolved Solids OW-10



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 Slope = -63.43
 units per year.
 Mann-Kendall
 statistic = -4
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 9/5/2023 11:31 AM
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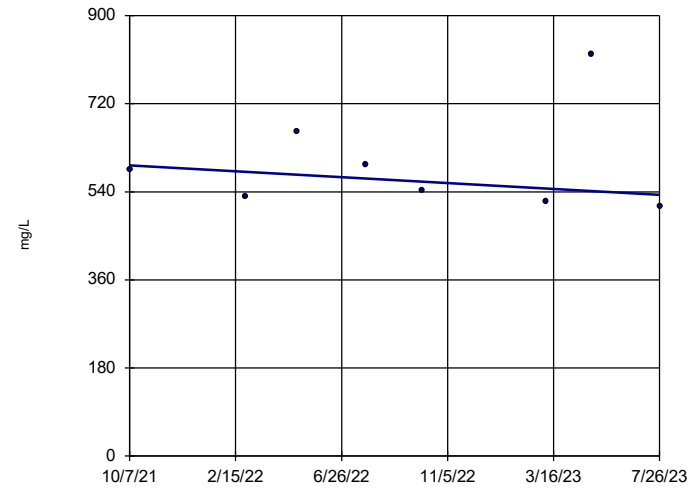
Total Dissolved Solids OW-11



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 Slope = -2.027
 units per year.
 Mann-Kendall
 statistic = -2
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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Total Dissolved Solids OW-12



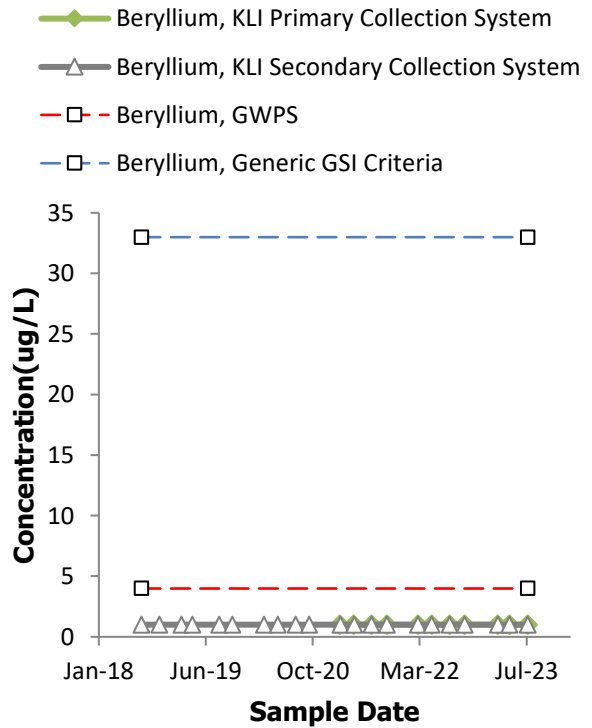
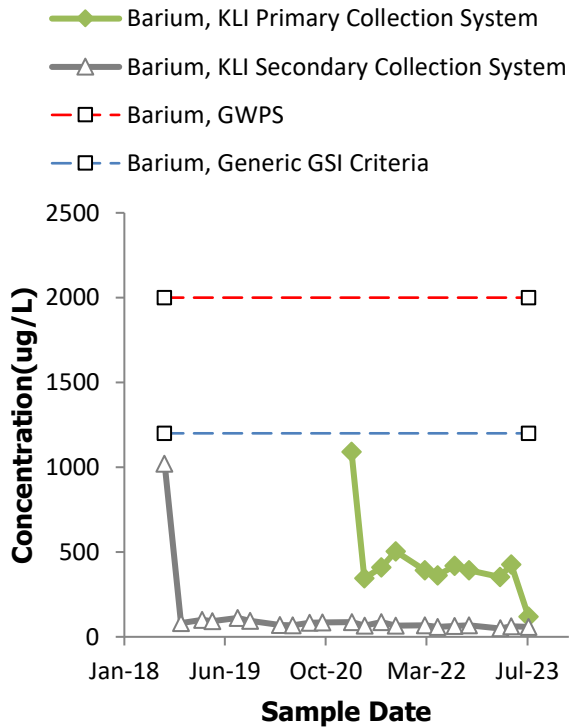
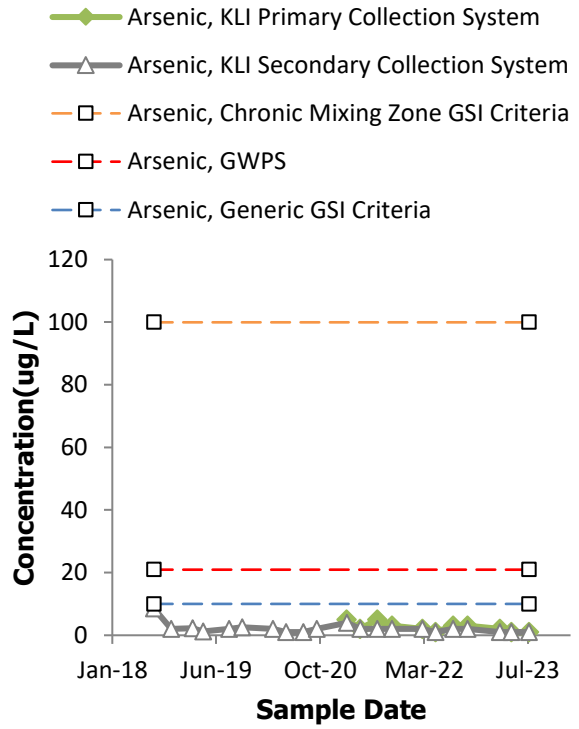
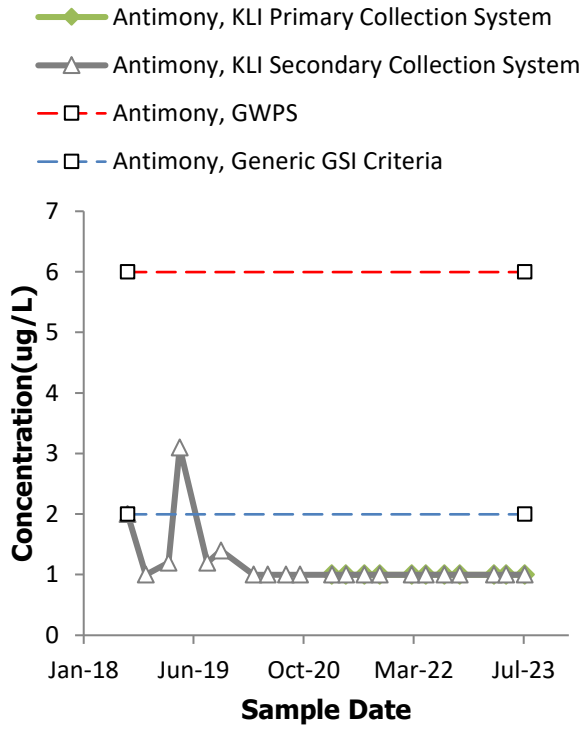
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 units per year.
 Mann-Kendall
 statistic = -6
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

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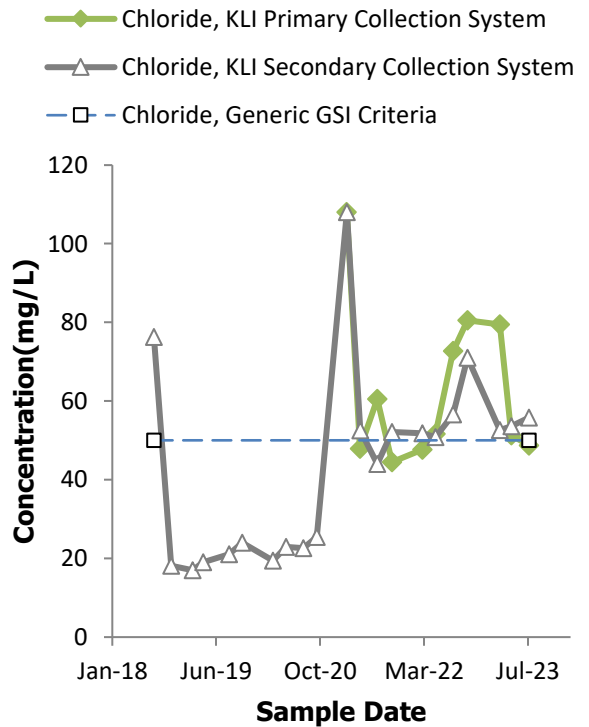
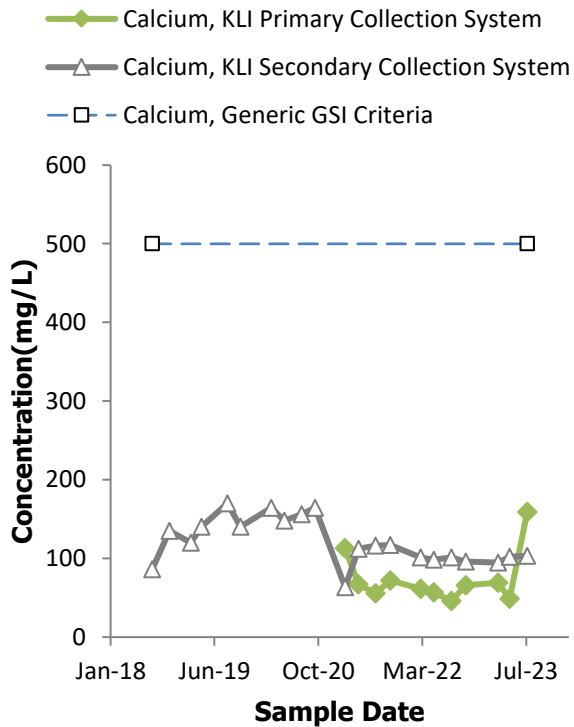
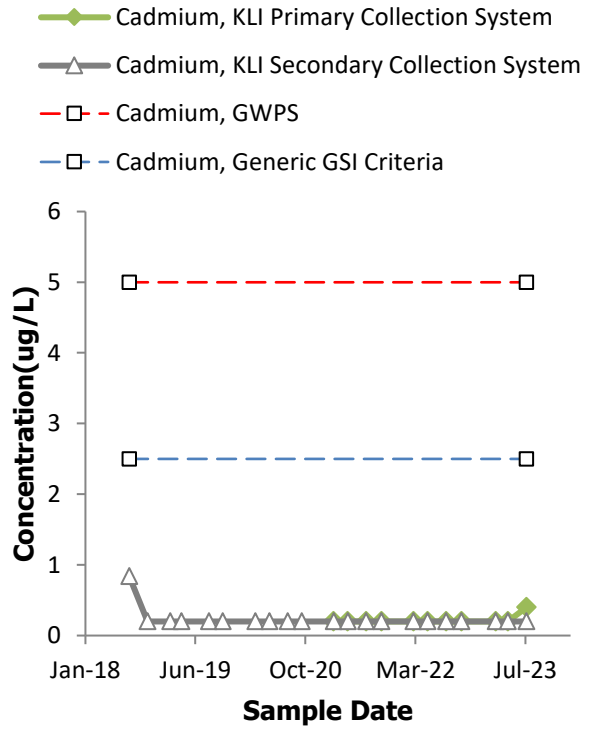
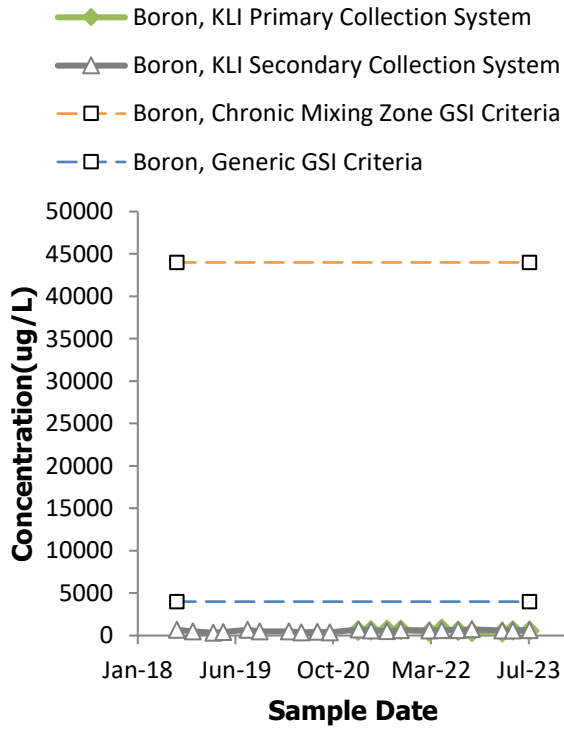
Appendix E

Secondary Leachate Collection System Monitoring

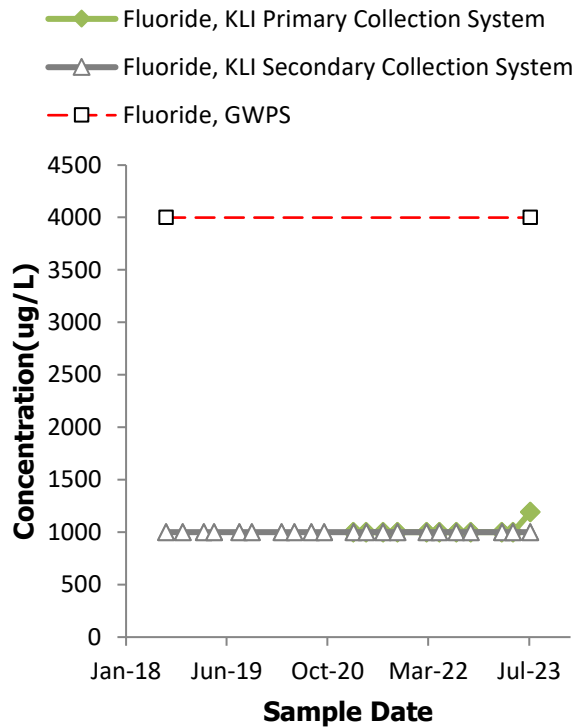
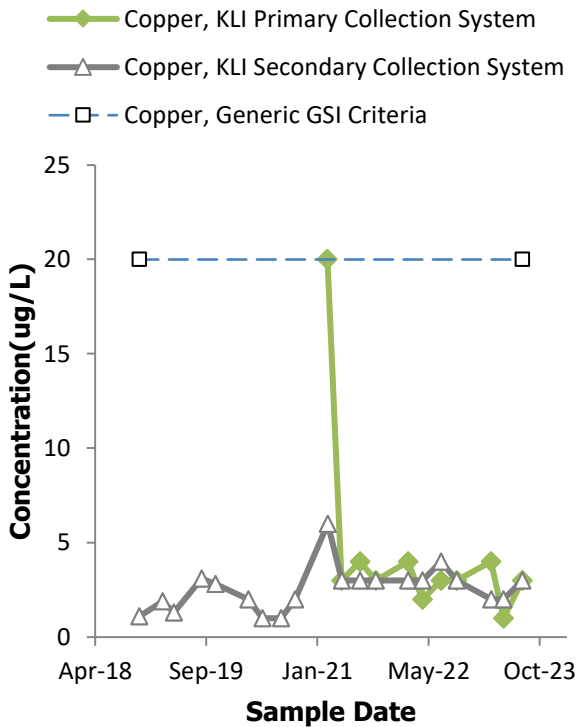
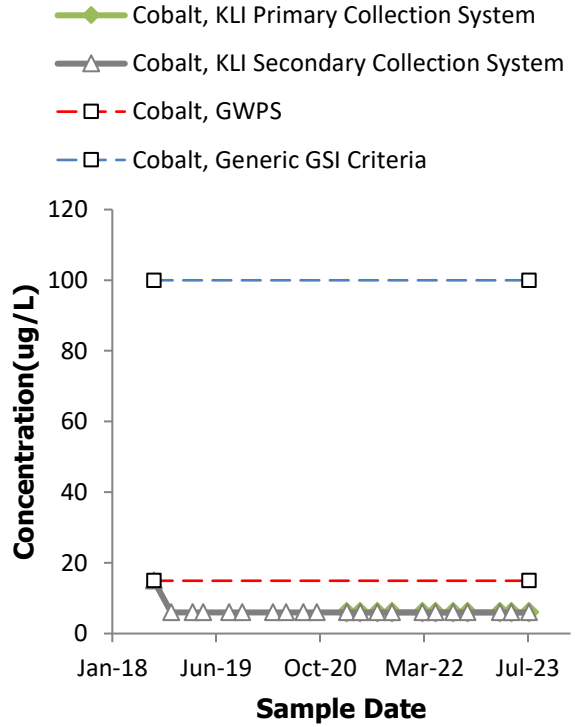
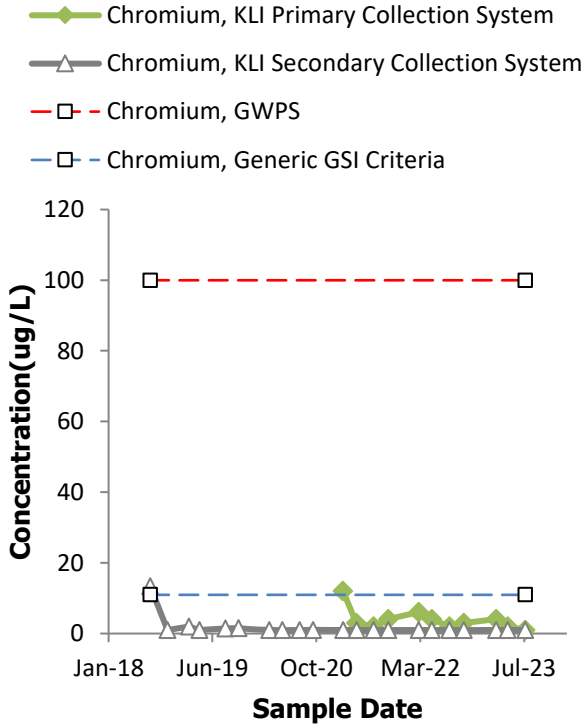
Water Quality Time Series



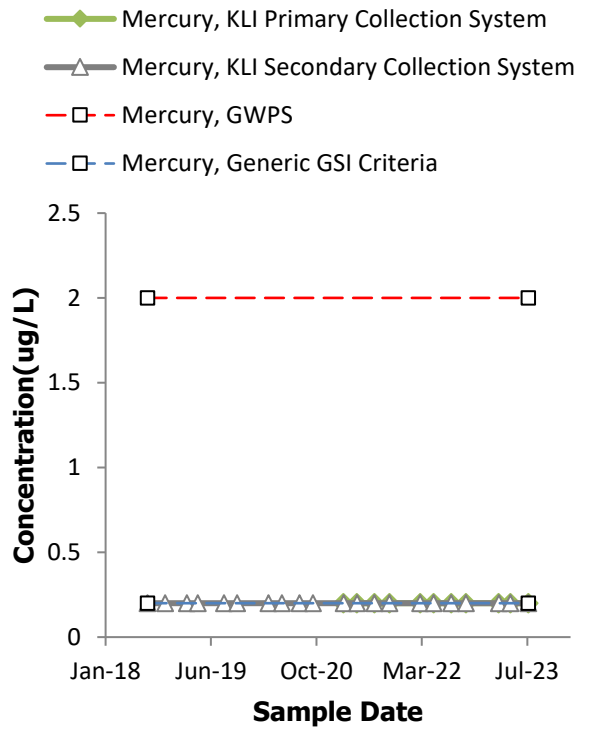
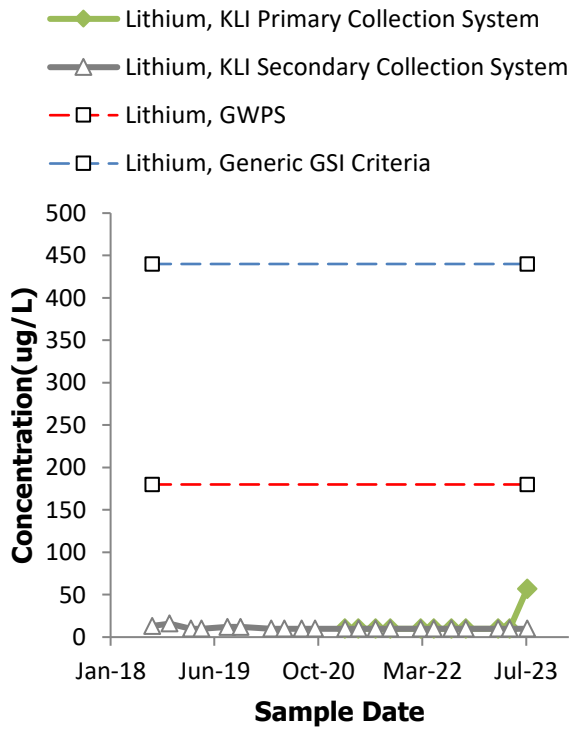
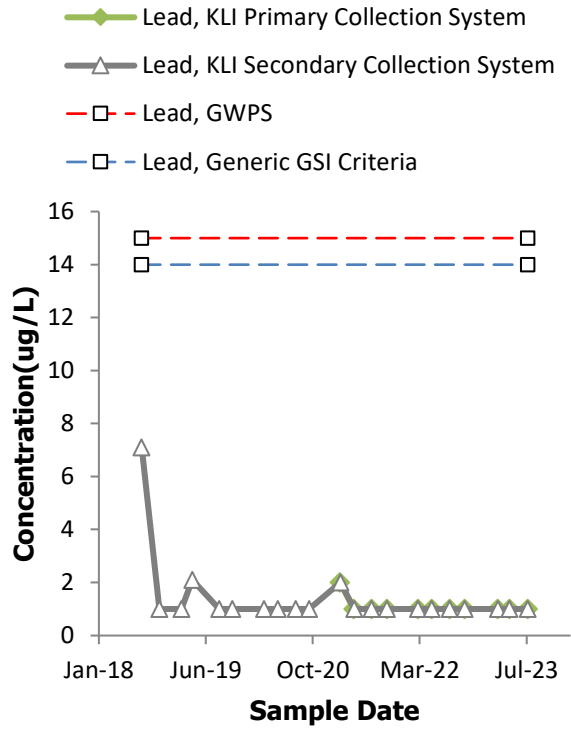
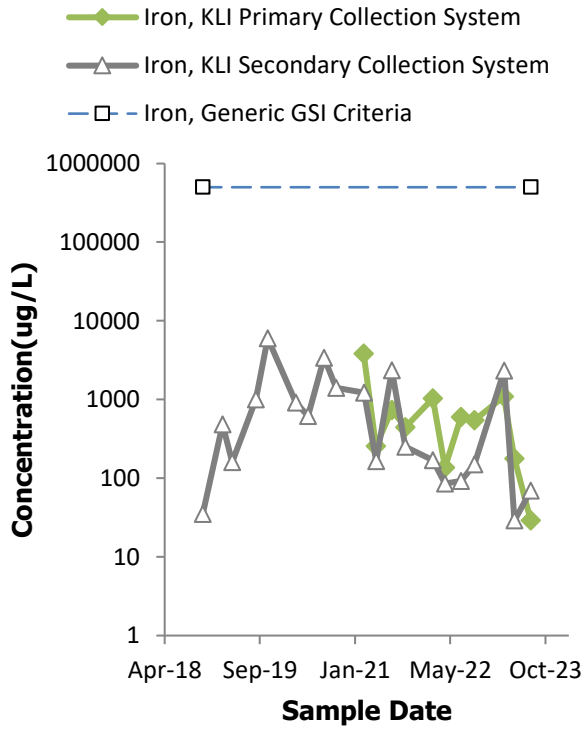
Water Quality Time Series



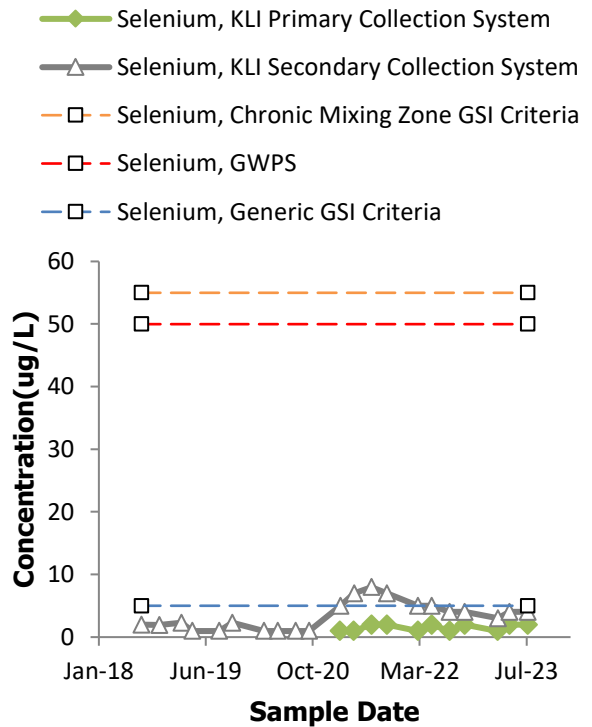
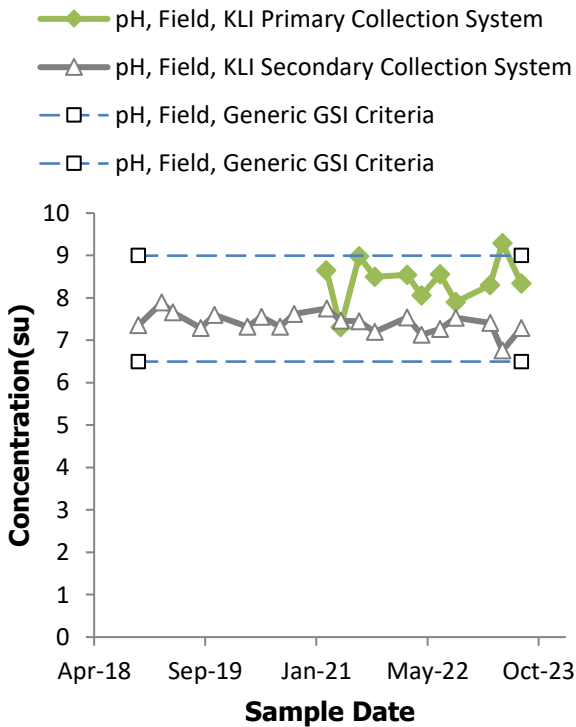
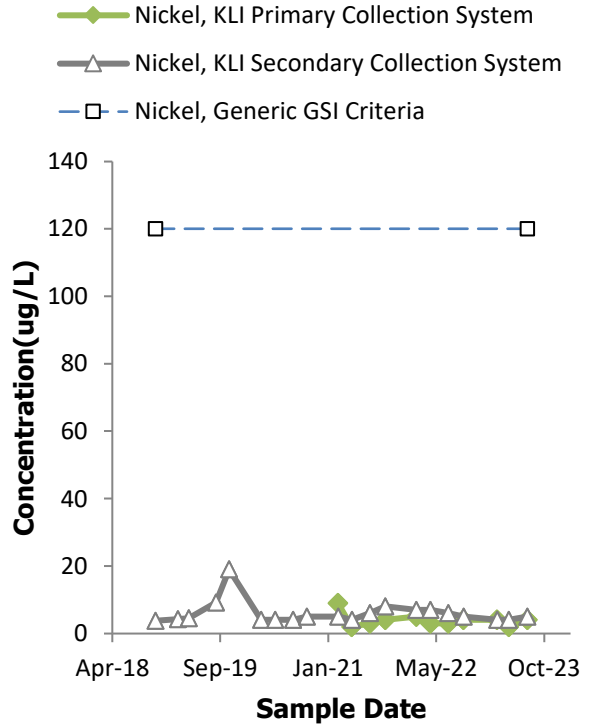
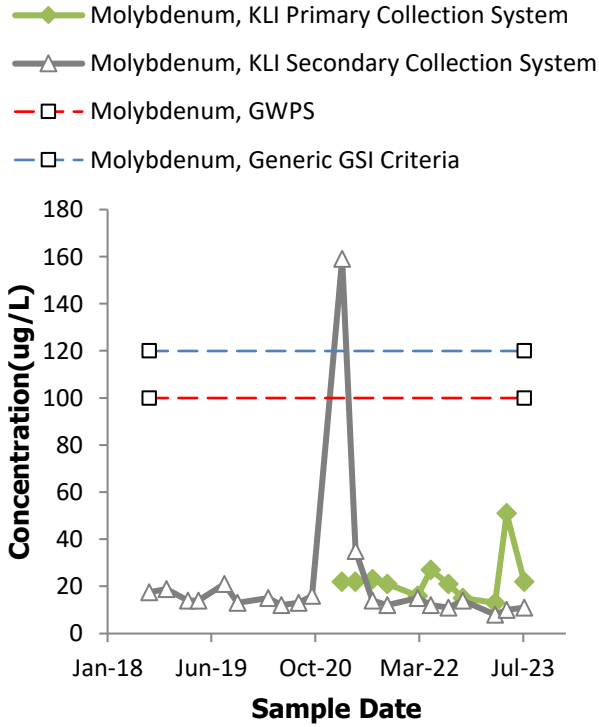
Water Quality Time Series



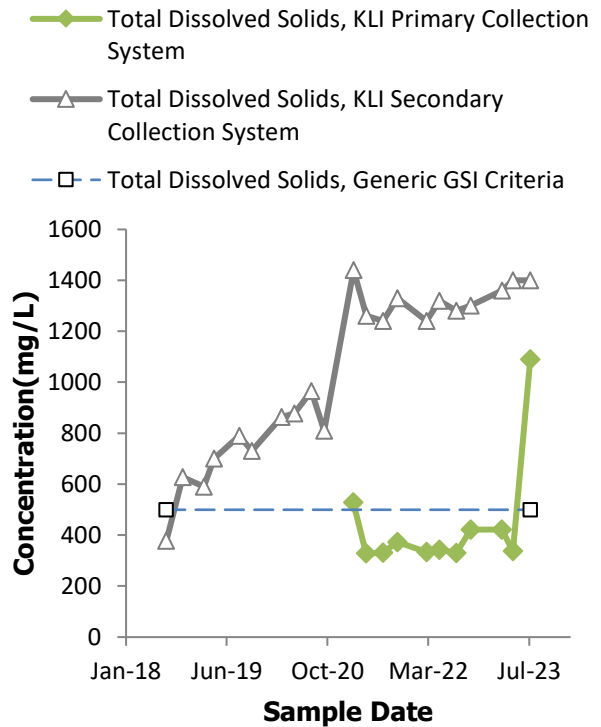
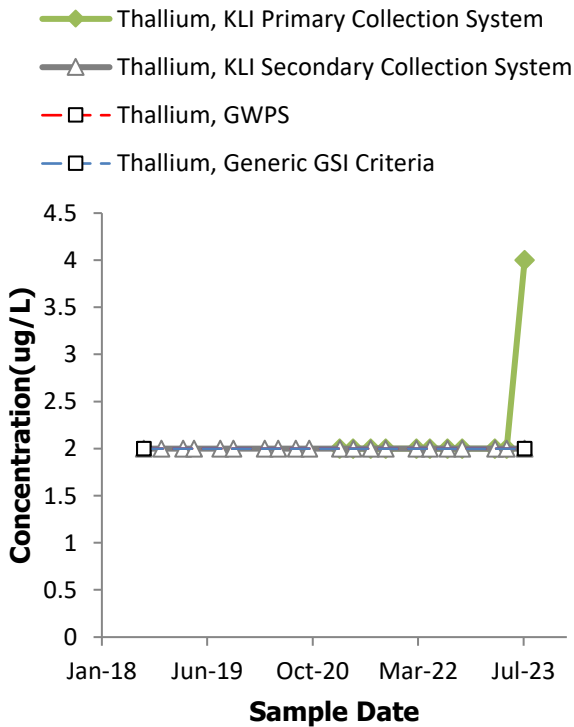
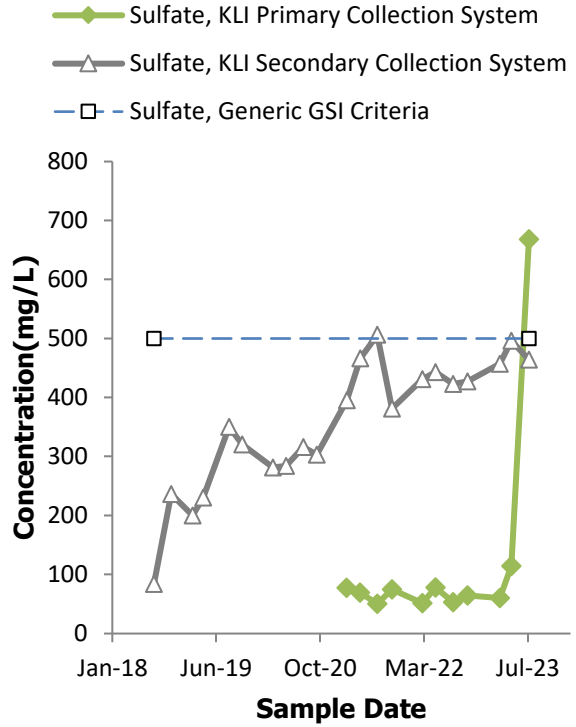
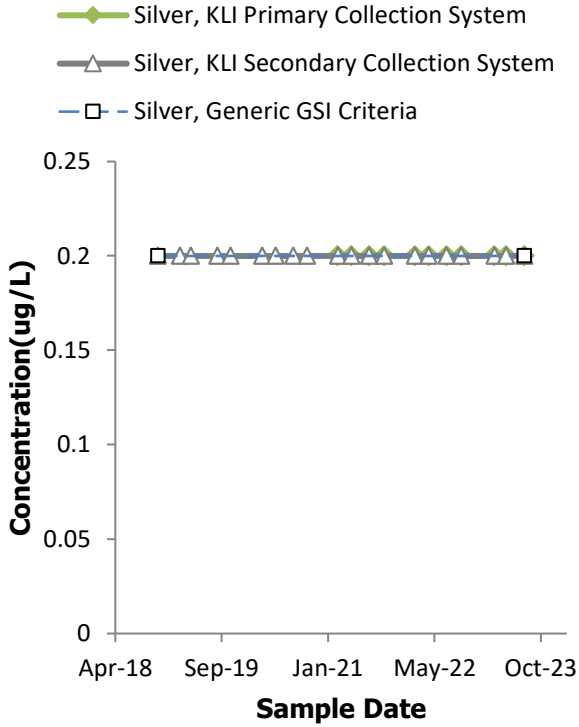
Water Quality Time Series



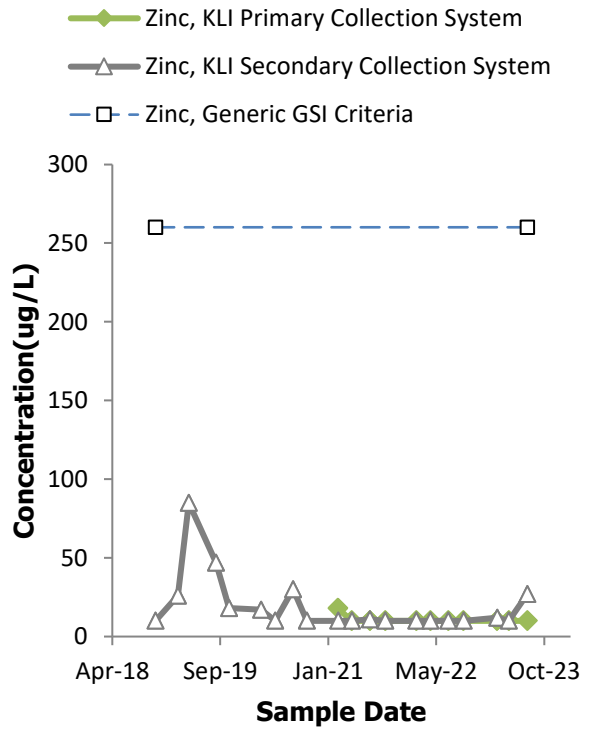
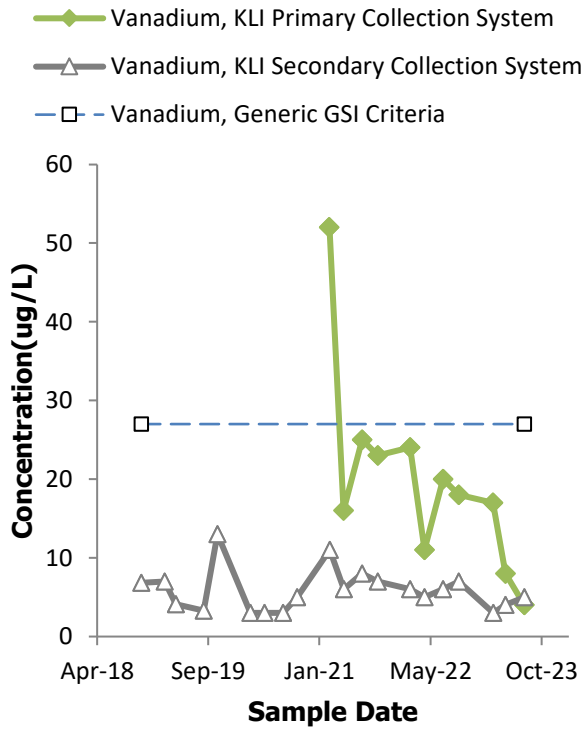
Water Quality Time Series



Water Quality Time Series



Water Quality Time Series

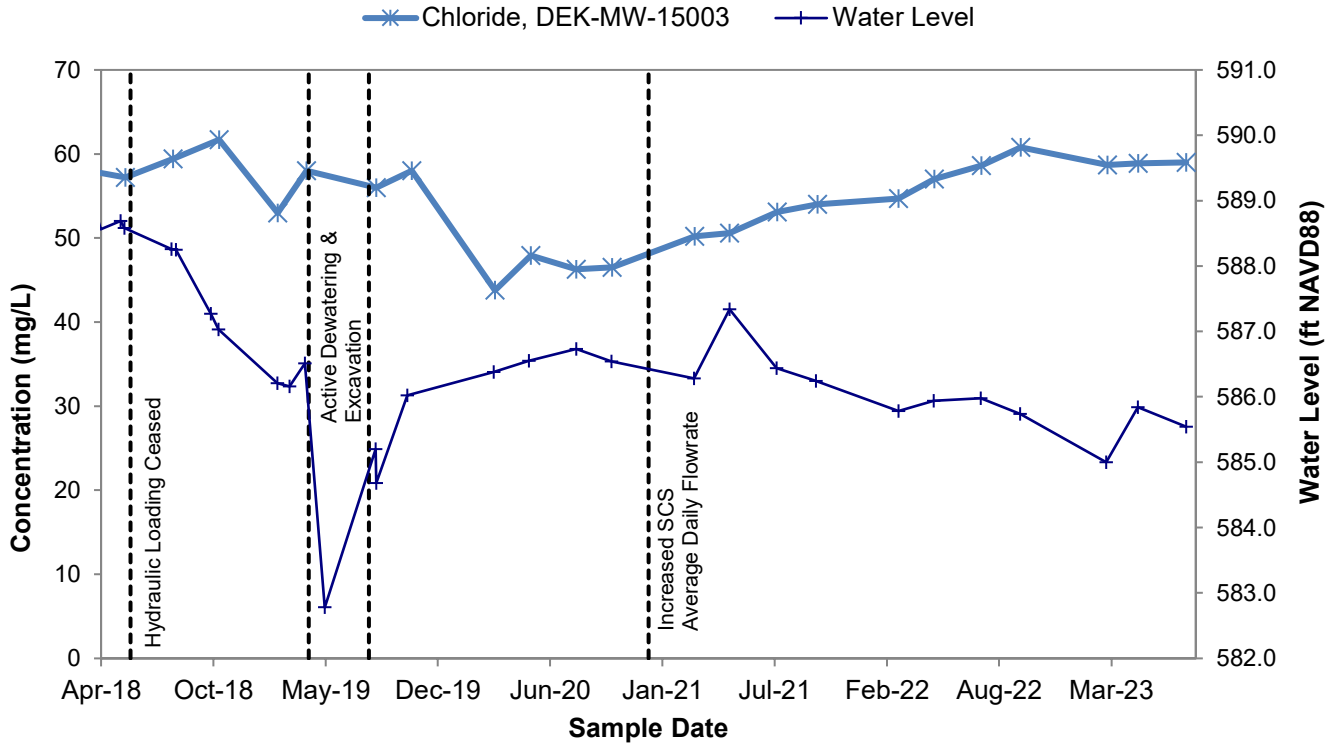


Appendix F

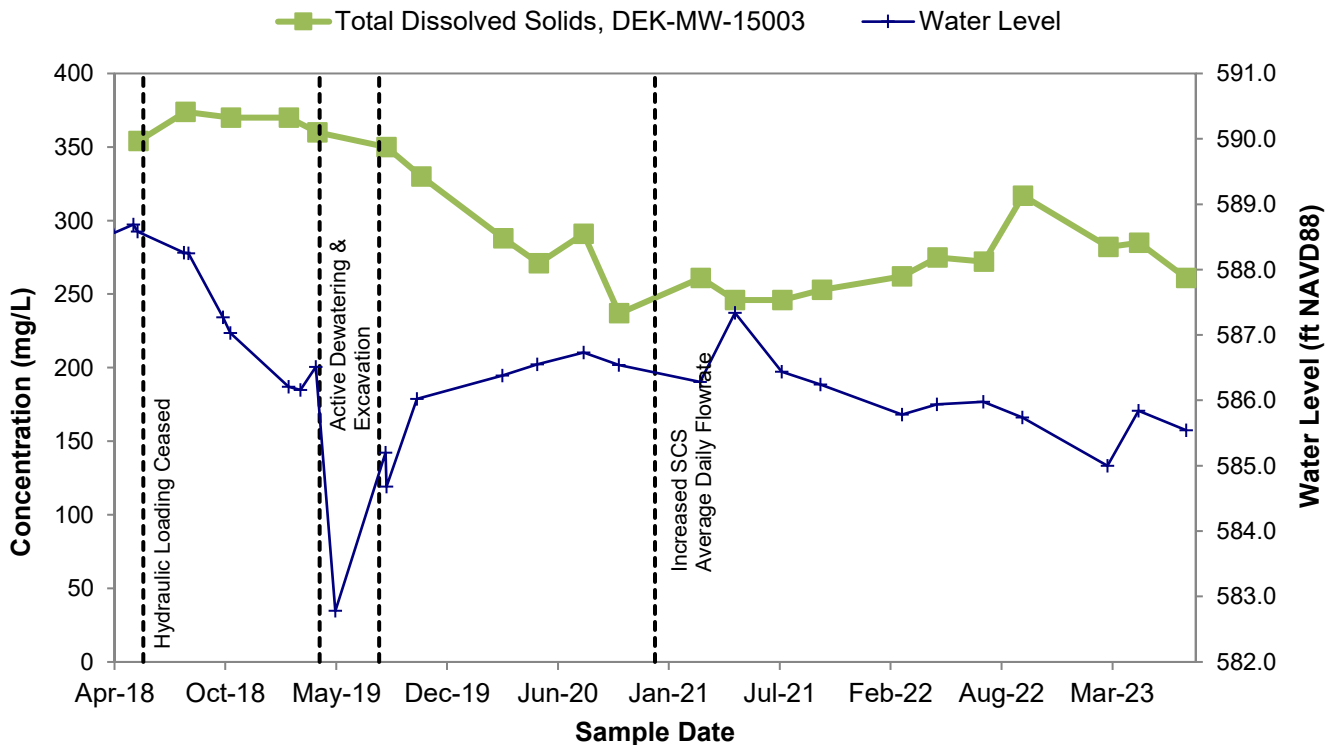
Alternate Source Demonstration

Alternate Source Demonstration Time Series

Chloride at DEK-MW-15003

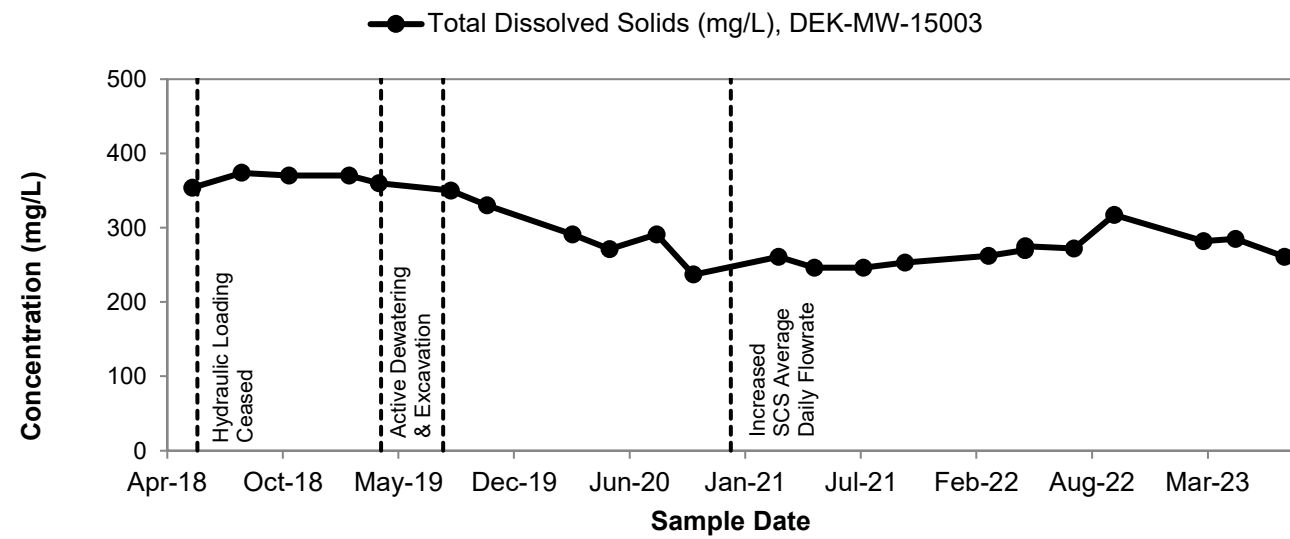
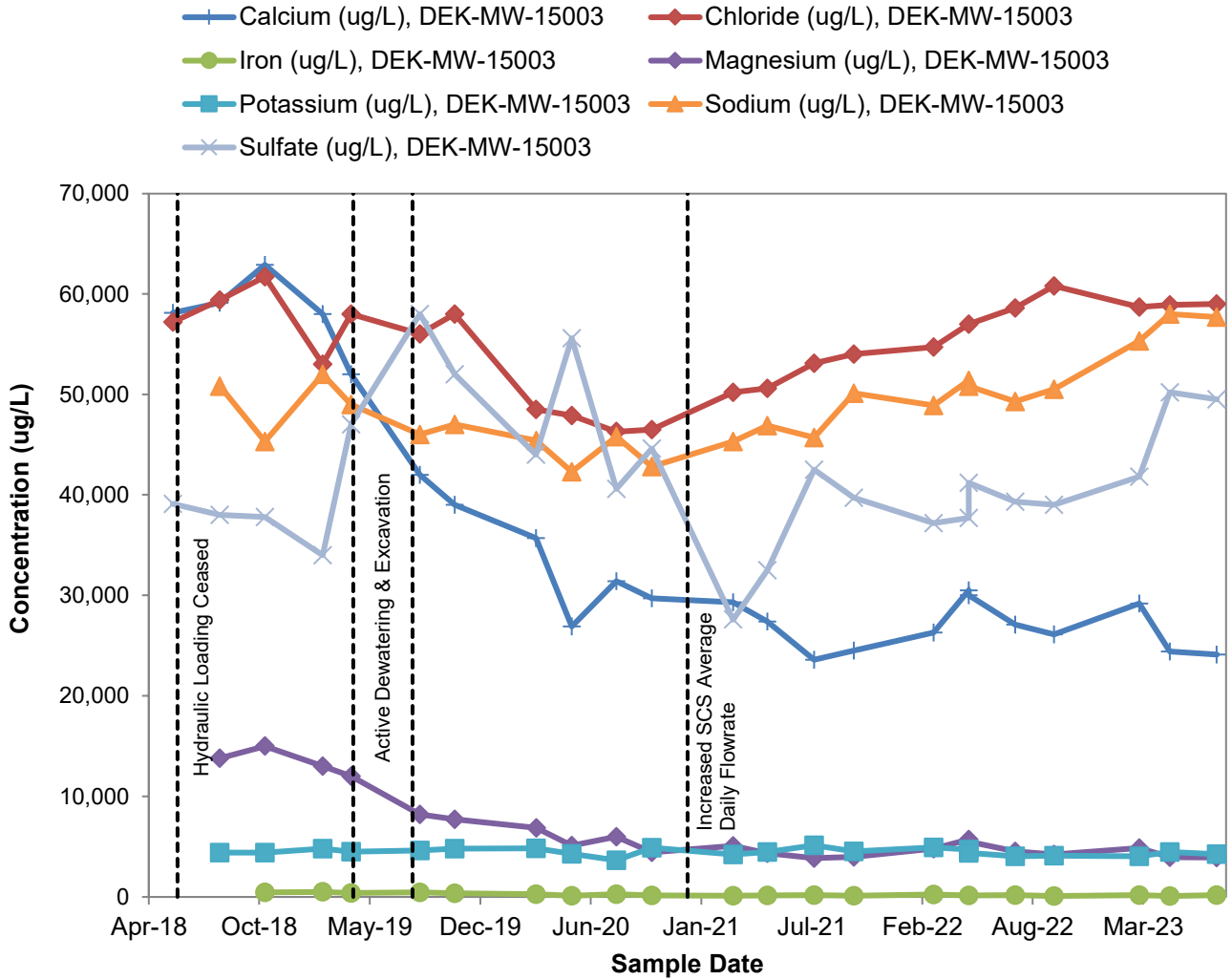


Total Dissolved Solids at DEK-MW-15003



Alternate Source Demonstration Time-Series

DEK-MW-15003





Fourth Quarter 2023 Hydrogeological Monitoring Report

DE Karn Lined Impoundment CCR Unit

Essexville, Michigan

January 2024

A handwritten signature in blue ink that reads "Darby Litz".

Darby Litz
Project Manager/Hydrogeologist

Prepared For:

Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

A handwritten signature in blue ink that reads "Andrew Whaley".

Andrew Whaley
Project Geologist

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APPENDICES

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Appendix E	Secondary Leachate Collection System Monitoring

1.0 Introduction

Pursuant to the Federal CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After Consumers Energy established the groundwater monitoring system and detection monitoring program pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 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 amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Fourth Quarter 2023 Karn Lined Impoundment 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 impoundment. 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, *Format for Solid Waste Disposal Facility Monitoring Submittals*, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (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 Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

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.

1. Monitoring of secondary collection system flow rates and water quality to detect leaks in the liner; and
2. Groundwater monitoring to determine if there are potential new releases from the Karn Lined Impoundment.

Based on sampling results for the fourth quarter 2023, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

1.3 Site Overview

The Karn Lined Impoundment is located within the DE Karn Power Plant site (Site) located north of the former JC Weadock Power Plant, east of the Saginaw River, south and west of Saginaw Bay (Figure 1). Two coal-fired power generating units (Karn Units 1 & 2) began generating electricity in 1958 and 1959, respectively. Consumers Energy permanently ceased the operation of the coal-fired boilers (DE Karn Units 1&2) at the Site in May 2023 and has commenced decommissioning activities for those electrical generating units. Karn Units 3 & 4, co-located with the coal-fired generating units, are oil- and natural gas-fueled. Two other areas of coal ash management within the Site are the former Karn Bottom Ash Pond that was closed by removal and the Karn Landfill that was certified closed and now in post-closure care.

The Karn Lined Impoundment was put into service in June 2018 to replace the former Karn Bottom Ash Pond that directly supported Karn 1&2 power generation operations. The Karn Lined Impoundment serves a twofold purpose for treatment pursuant to National Pollutant Discharge Elimination System (NPDES) Permit NO. MI0001678 and as a temporary storage for bottom ash prior to removal and disposal in the JC Weadock Solid Waste Disposal Area (Weadock Landfill) governed by Solid Waste Disposal Area Operating License No. 9640 issued on March 11, 2021. On July 7, 2023, Consumers Energy submitted a Closure Work Plan to the EGLE that details a closure by removal of CCR in accordance with 257.102(c) of the self-implementing requirements of the CCR Rule. By reference, performance of this work would also satisfy state requirements pursuant to Section 11519b(9) of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.11501 et seq. EGLE provided written concurrence with the Closure Work Plan on October 25, 2023.

1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. 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 (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 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 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. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

The Site is bound by several surface water features (Figures 1 and 2): the Saginaw River to the west, Saginaw Bay (Lake Huron) to the north and east, and a discharge channel to the south. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In the vicinity of the Karn Lined Impoundment, the shallow groundwater flow is generally radial, with a potentiometric high point near the unlined ditch north of the Karn Lined Impoundment and near DEK-MW-15003, flowing outward toward the surrounding surface water bodies.

2.0 Second Collection System Monitoring

Consumers Energy initiated secondary collection system flow monitoring to comply with the EGLE-approved HMP in December 2020. The SCS serves as a leak detection system and the SCS flow rate data is used to demonstrate compliance with Part 115. Consumers Energy continues to comply with the requirements for unmonitorable units under Rule 437 of the Part 115 Rules.

Increased average daily flow rates noted for the period from December 10, 2020 – January 6, 2021 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner in 2021, the daily average flow rates were reduced, and the three-month average dropped below the response action flow rate of 25 gallons per acre per day (GPAD). The average daily flow rate for October through December 2023 (three-month average) was calculated as 1.5 GPAD and continues to demonstrate that the daily average flow rate is below the threshold value of the response action flow rate of 25 GPAD. Trend evaluations for weekly and monthly average flow rates continue to support that no additional engineering or operational modifications are necessary, and Consumers continues to document this information in their operating record.

In response to the prior exceedance of the SCS Response Action Flow Rate, samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

- Primary Indicator Parameters: Section 11511a(3)(c) - Detection Monitoring Constituents
- Alternative Indicator Parameters: Section 11519b(2) - Assessment Monitoring Constituents
- Optional Analyses in support of Piper or Stiff diagrams

The KLI-PCS and KLI-SCS data were evaluated for comparison to groundwater quality and water chemistry and to also assess potential of hazard and mobility of constituents. A series of time-series plots are included in Appendix E to illustrate water quality data changes over time for the secondary collection system from the start of operation in June 2018 to present. This analysis demonstrates that each monitored constituent is generally present in the secondary collection system (KLI-SCS) at concentrations less than the Groundwater Protection Standard (GWPS) established under 40 CFR 257.95(h) for the Karn Bottom Ash Pond or generic groundwater surface water interface (GSI) criteria adopted by the Department pursuant to Section 20120a, with the exception of total dissolved solids and chloride. Consumers notes that as decommissioning of the Karn Units 1&2 proceeds, temporary changes to the mix of the miscellaneous low-volume waste may occur, causing changes in the concentrations of detected constituents in the primary collection system (KLI-PCS) as compared to historical. A few notable observations:

- **Arsenic concentrations are higher in groundwater than the primary and secondary collection system:** Arsenic was detected in the primary collection system at a concentration of 3 ug/L and in the secondary collection system at a concentration of 1 ug/L in October 2023. As shown in Appendix E, the arsenic concentrations observed in the

primary and secondary collections system have been consistently low. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the repaired liner areas, is 112 ug/L, which is consistent with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- **Vanadium is detected in the primary and secondary collection system and not in groundwater:** Vanadium is present in the primary collection system (6 ug/L in October 2023) and in the secondary collection system (4 ug/L in October 2023) (Appendix E). Vanadium was not detected in the wells nearest the observed liner damage: OW-12 (<2 ug/L) or DEK-MW-18001 (<2 ug/L) providing additional evidence that a release has not adversely affected groundwater conditions.
- **Secondary Collection System chemistry has not appreciably changed:** The time series plots in Appendix E show relatively stable trends in chemistry for samples collected from the secondary collection system, except for total dissolved solids (TDS), and sulfate in the secondary collection system. The TDS and sulfate concentrations in the secondary collection system are more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products. TDS and sulfate concentrations in KLI-SCS increased between 2018 and 2021 and have since begun to stabilize.

Water quality data collected for this event are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored.

3.0 Groundwater Monitoring

3.1 Monitoring Well Network

In accordance with §257.91, Consumers Energy developed a groundwater monitoring system for the Karn Lined Impoundment prior to the initial receipt of waste in the CCR unit (TRC, 2018c). Given the radial groundwater flow direction and that constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the Karn Bottom Ash Pond, the groundwater monitoring system design incorporates an intrawell statistical approach for detection monitoring as described in the HMP and in accordance with the “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance” (USEPA, 2009). Five monitoring wells that are screened in the uppermost saturated unit were selected for the Karn Lined Impoundment HMP detection monitoring (DEK-MW-15003, DEK-MW-18001, OW-10, OW-11, and OW-12). Monitoring well locations are shown on Figure 2.

3.2 October 2023 Detection Monitoring Event

In accordance with the HMP, TRC conducted the fourth quarter 2023 monitoring event for the Karn Lined Impoundment between October 2 and 4, 2023. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the fourth quarter 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

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

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents	
Total Dissolved Solids (TDS)	Copper	Silver

Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide further evaluation of groundwater chemistry. Analytical results from this event monitoring event are included in the attached laboratory reports (Appendix A).

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 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 B).

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. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater 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 one field blank, one equipment blank, one field duplicate (OW-12), and field matrix spike/matrix spike duplicate samples collected at DEK-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 data were found to be complete and usable for the purposes of the HMP program.

The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during this groundwater monitoring event are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in October 2023 are generally within the range of 579 to 586 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at

equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in the vicinity of the former Karn Bottom Ash Pond in October 2023 demonstrate a reduction in groundwater elevation measurements by several feet when compared to the measurements collected prior to June 2018, when active loading was occurring to the bottom ash pond. Groundwater at the Site is locally influenced by incidental infiltration from precipitation over the uncovered acreage and the unlined low volume miscellaneous wastewater conveyance associated with the permitted NPDES discharge system, which is located just north of the Karn Lined Impoundment. Monitoring wells OW-11, OW-12, and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric “high”, as illustrated in Figure 3.

The average hydraulic gradient observed on October 2, 2023 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0049 ft/ft. The gradients were calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005, DEK-MW-15003/DEK-MW-15006, and OW-11/MW-08, as well as the monitoring well water elevation difference and distance between DEK-MW-18001 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same date as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.24 ft/day or 88 ft/year in October 2023 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

Due to the operational changes of the former bottom ash pond and the completion of the landfill capping activities in 2020, the gradient between the area of the Karn Bottom Ash Pond and Karn Lined Impoundment and the surrounding surface water bodies is flattening out as compared to previous quarters and is also attempting to reach a new equilibrium, as expected. The general flow direction relative to the Karn Lined Impoundment is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III/IV parameters that could potentially migrate from the Karn Lined Impoundment.

4.0 Data Evaluation

Based on sampling results for this event the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the fourth quarter 2023 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria and the generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017 and in accordance with the December 23, 2015 mixing zone determination.

4.1 Statistical Evaluation of Trends

Groundwater in the vicinity of the Karn Lined Impoundment has been affected by CCR management before commencement of operation (January 2019, TRC). Given that the constituents associated with CCR currently managed in the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, intrawell trend tests, in conjunction with KLI-SCS flow rates, will be utilized to assess whether a release has occurred from operation of the unit. The detection monitoring constituent concentrations will be analyzed using Mann-Kendall and Sen's Slope trend tests to determine if there is an upward trend that may indicate a release from the Karn Lined Impoundment. The data will be analyzed in the context of the Site hydrogeologic characteristics, and an assessment made as to whether the source of an upward trend, if identified, is from a possible release from the Karn Lined Impoundment, another on-site release, or on-site migration of nearby impact (i.e., former Karn Bottom Ash Pond).

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas™ Statistical Software (Sanitas™). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from February 2022 through October 2023 were analyzed using Mann-Kendall and Sen's Slope 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. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.

Data trends for detection monitoring constituents are generally stable (i.e., no trend) or declining for the majority of the monitoring well/constituent pairs with the following exceptions:

- The increasing trend in chloride concentrations in DEK-MW-15003 did not continue to be observed this quarter.
- The new, unconfirmed increasing trend for pH observed in Q3 2023 at DEK-MW-18001 did not continue to be observed this quarter.
- A new, unconfirmed increasing trend for sulfate is observed in DEK-MW-15003.

4.2 Detection Monitoring Data Discussion

Groundwater quality is generally consistent with previous monitoring events and the majority of the well/constituent pairs are exhibiting no trend or decreasing concentrations. Although increasing trends of detection monitoring (Appendix III) constituents exist, the groundwater conditions do not conclusively indicate a release from the unit, as discussed further in Section 4.3. The location of one of the identified liner damage locations was approximately 40-ft upgradient from monitoring well OW-12 and the second location was approximately 130-ft upgradient from monitoring well DEK-MW-18001. Both leaks have been repaired. Detection monitoring constituent concentrations at OW-12, located closest to the identified liner damage, exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The increasing trends as noted in section 4.1 will continue to be evaluated within context of changes in the site operational status.

4.3 Alternate Source Demonstration

At this time, Consumers Energy is not asserting an Alternate Source Demonstration (ASD) for any Statistically Significant Increases (SSI) from this reporting period

4.3.1 Leachate Chemistry

Analysis of the KLI-PCS and KLI-SCS data provide additional lines of evidence to support a source other than the unit is contributing to groundwater conditions.

- Arsenic concentrations are higher in groundwater than in the secondary collection system; therefore, arsenic present in groundwater does not appear to be a result of a release from the unit (Section 2.0).
- Vanadium is detected in the primary and secondary collection system and not in groundwater in the wells nearest the observed liner damage OW-12 or DEK-MW-18001 (<2 ug/L), providing additional evidence that a release has not adversely affected groundwater conditions.

5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. There are no confirmed increasing trends for detection monitoring constituents; therefore, no SSIs over background limits were identified at the Karn Lined Impoundment during the October 2023 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in fourth quarter 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored and recent data demonstrate that the daily average flow rate has been reduced to less than the threshold value of the Response Flow Rate of 25 gallons per acre per day after the documented repairs and response activities were completed in 2021. The first quarter monitoring event is scheduled for March 2024.

6.0 References

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- TRC. 2020. Karn Lined Impoundment Hydrogeological Monitoring Plan for the DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company. November.
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- USEPA. 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435). July.

Tables

Table 1
 Summary of Groundwater Elevation Data
 DE Karn Lined Impoundment – 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)
DEK Bottom Ash Pond					
DEK-MW-15002	590.87	Sand	578.3 to 575.3	7.25	583.62
DEK-MW-15005	589.72	Sand	572.3 to 567.3	10.00	579.72
DEK-MW-15006	589.24	Sand	573.0 to 568.0	9.48	579.76
DEK Bottom Ash Pond & Karn Lined Impoundment					
DEK-MW-18001	593.47	Sand	579.2 to 574.2	9.30	584.17
Karn Lined Impoundment					
DEK-MW-15003	602.74	Sand	578.8 to 574.8	17.31	585.43
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	7.72	583.86
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	22.68	585.22
OW-12	603.10	Silty Sand	584.2 to 579.2	17.48	585.62
DEK Nature and Extent					
DEK-MW-15004	611.04	Sand	576.6 to 571.6	28.50	582.54
MW-01	597.02	Sand	573.0 to 570.0	17.43	579.59
MW-03	597.30	Sand	569.8 to 566.8	17.64	579.66
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	9.93	579.51
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	18.43	580.35
MW-10	596.97	Sand	582.5 to 572.5	17.10	579.87
MW-12	598.60	Sand	583.9 to 573.9	18.88	579.72
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	14.75	579.62
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	16.20	579.60
MW-22	598.99	Ash/Sand	571.4 to 568.4	17.32	581.67
MW-23	595.57	Ash/Sand	576.9 to 571.9	14.41	581.16
DEK Static Water Level					
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	17.75	579.59
MW-04	598.01	NR	569.5 to 564.5	18.40	579.61
MW-17	597.91	Sand	577.0 to 574.0	13.83	584.08
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	26.18	583.04
MW-19	597.28	NR	572.1 to 567.1	17.31	579.97
MW-20	632.75	Sand	582.3 to 579.3	53.08	579.67
MW-21	632.91	Sand	587.1 to 584.1	51.22	581.69
OW-01	631.33	NR	572.5 to 567.5	51.73	579.60
OW-02	598.01	Fly Ash	579.4 to 576.4	14.20	583.81
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	17.60	580.34
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	10.58	579.63
OW-05	593.53	Sand	576.9 to 571.9	13.61	579.92
OW-06	603.95	NR	580.9 to 575.9	22.50	581.45
OW-07	596.41	Ash	583.3 to 580.3	15.34	581.07
OW-08	593.93	NR	581.0 to 576.0	11.25	582.68
OW-09	593.45	NR	585.5 to 580.5	10.68	582.77
OW-13	588.52	NR	579.5 to 574.5	5.00	583.52
OW-15	587.75	NR	572.8 to 567.8	4.97	582.78

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.

NR: Not Recorded

Table 2
 Summary of Field Parameters
 DE Karn Lined Impoundment – 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)
DE Karn Lined Impoundment							
DEK-MW-15003	10/4/2023	0.50	-152.1	8.2	458	20.2	5.2
DEK-MW-18001	10/4/2023	0.38	-96.0	7.4	870	14.4	2.4
KLI-PCS	10/4/2023	7.70	134.0	8.5	2,525	22.3	9.9
KLI-SCS	10/4/2023	4.60	53.8	7.4	1,919	18.8	6.6
OW-10	10/4/2023	0.20	-153.6	7.2	836	15.0	18.9
OW-11	10/4/2023	1.10	-23.2	9.8	343	15.4	5.8
OW-12	10/4/2023	0.30	-133.3	7.2	893	17.6	6.5
SW-DITCH	10/4/2023	6.80	160.0	7.8	686	20.9	7.9

Notes:

mg/L - milligram 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 Lined Impoundment – Hydrogeological Monitoring Program
 Essexville, Michigan

		Sample Location:				DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	KLI-PCS	KLI-SCS	SW-DITCH
		Sample Date:				10/4/2023	10/4/2023	10/4/2023	10/4/2023	10/4/2023	10/4/2023	10/4/2023	10/4/2023
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Upgradient	Downgradient		Upgradient	Downgradient	Supplemental		
Appendix III⁽¹⁾													
Boron	ug/L	NC	500	500	4,000	716	987	1,200	3,410	1,040	2,230	601	83
Calcium	mg/L	NC	NC	NC	500 ^{EE}	25	52.5	105	7.8	89	544	106	49.4
Chloride	mg/L	250**	250 ^E	250 ^E	50	58.7	69.4	73.2	57.1	56.8	50.8	55.7	71.2
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,620	< 1,000	6,150	< 1,000	< 1,000
Sulfate	mg/L	250**	250 ^E	250 ^E	500 ^{EE}	52.4	158	2.66	17.9	197	1,550	489	32.1
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	284	551	580	208	646	2,450	1,390	442
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	8.2	7.4	7.2	9.8	7.2	8.5	7.4	7.8
Appendix IV⁽¹⁾													
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	435	398	2	907	112	3	1	3
Barium	ug/L	2,000	2,000	2,000	1,200	41	155	176	25	130	106	58	58
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,620	< 1,000	6,150	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	21	19	29	< 10	34	13	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	27	9	< 5	138	14	203	9	< 5
Radium-226	pCi/L	NC	NC	NC	NC	< 0.129	0.148	< 0.192	< 0.137	0.259	--	--	--
Radium-228	pCi/L	NC	NC	NC	NC	< 0.522	< 0.581	< 0.745	< 0.496	< 0.488	--	--	--
Radium-226/228	pCi/L	5	NC	NC	NC	0.526	< 0.581	< 0.745	< 0.496	0.600	--	--	--
Selenium	ug/L	50	50	50	5.0	< 1	< 1	2	3	< 1	5	4	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 115⁽²⁾													
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	139	720	1,640	52	7,750	191	107	104
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1	< 1	2	< 1	< 1	3	2	2
Nickel	ug/L	NC	100	100	120	< 2	< 2	2	< 2	< 2	5	3	2
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	4	334	< 2	6	4	< 2
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 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) additional detection monitoring constituent (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

Table 4
 Summary of Statistical Exceedances
 DE Karn Lined Impoundment – Hydrogeological Monitoring Program
 Essexville, Michigan

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

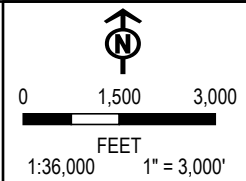
Data is in (X) ug/L or () mg/L unless otherwise stated

Facility: Karn Lined Impoundment – WDS# 392503

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								

Figures

COORDINATE SYSTEM: NAD 1983 STATEPLANE MICHIGAN SOUTH FIPS 2113 FEET. MAP ROTATION: 0
 - SAVED BY: ADAIR ON 12/19/2023, 14:12:11 PM. - FILE PATH: T:\PROJECTS\CONSUMERS ENERGY\464095 DEKARN\2-APPX\464095 DEKARN.APRX. LAYOUT NAME: 514404-TOPO-K01-2023Q4



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

TITLE: **SITE LOCATION MAP**

DRAWN BY:	A. ADAIR	PROJ. NO.:	514404.0001
CHECKED BY:	A. WHALEY	FIGURE 1	
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2024		



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

BASE MAP: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

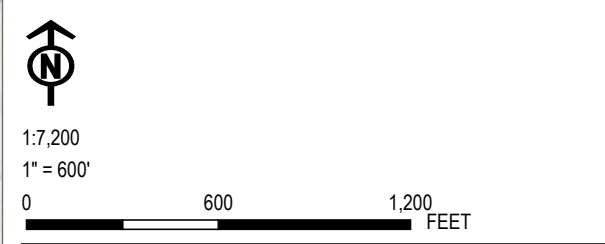
FILE: 464095_DEKARN

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2119 Feet Intl. Map Rotation: 0
 Saved By: A.ADAIR on 1/22/2024, 08:56:23 AM. File Path: T:\PROJECTS\Consumers_Energy\464095_DEKARN\2-APRX\464095_DEKARN.aprx. Layout Name: 514404-SLM-02-202304



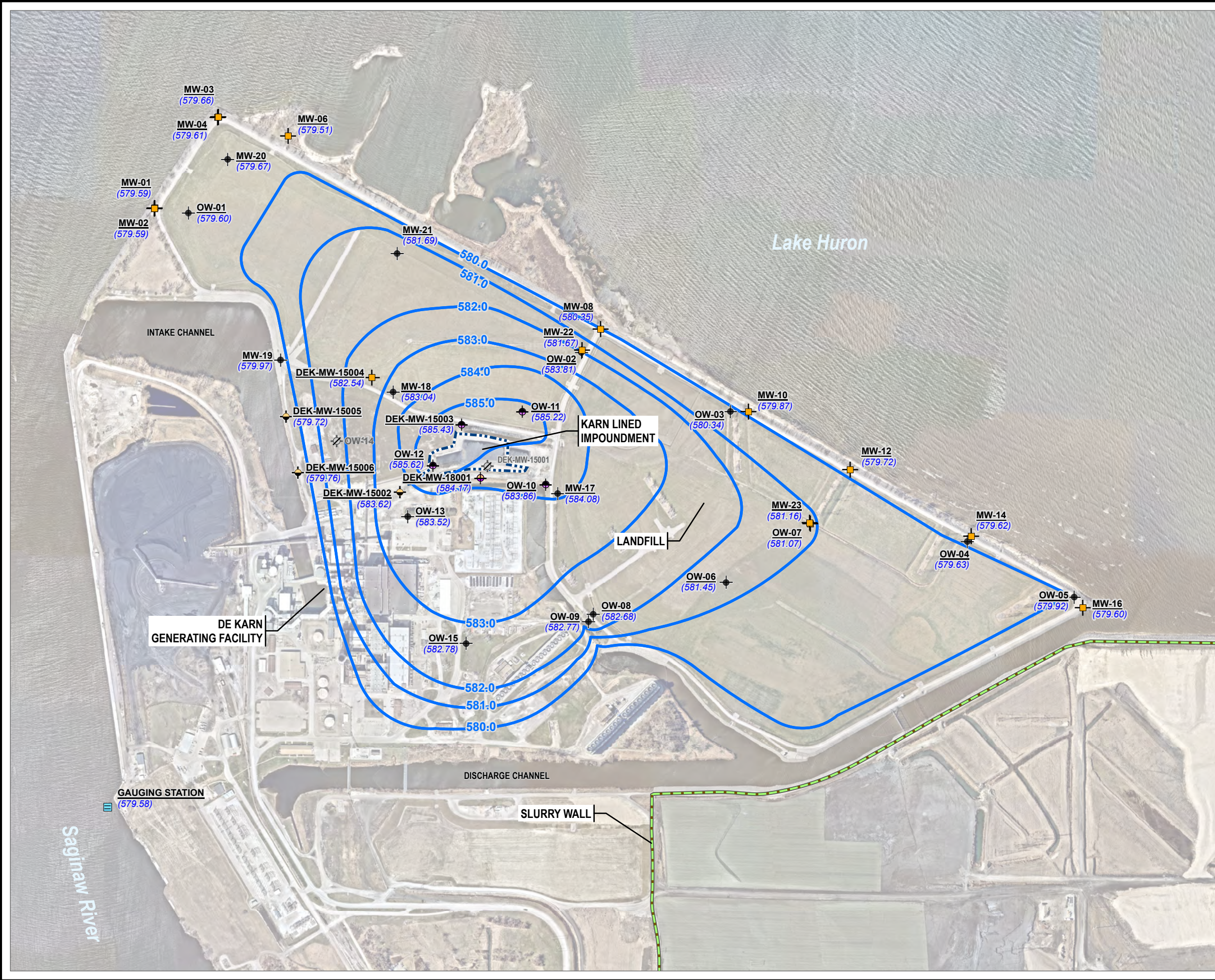
- LEGEND**
- DEK BOTTOM ASH POND MONITORING WELL
 - DEK LINED IMPOUNDMENT MONITORING WELL
 - DECOMMISSIONED MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - CE-SURFACE WATER GAUGING STATION
 - CE-NATURE AND EXTENT WELL
 - SECONDARY CONTAINMENT SUMP (KLI-SCS)
 - PRIMARY CONTAINMENT SYSTEM SAMPLE (KLI-PCS)
 - SURFACE WATER SAMPLE (SW-DITCH)
 - SLURRY WALL (APPROXIMATE)
 - EXTENT OF GEOSYNTHETICS

- NOTES**
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02 AND MW-03/MW-04 AS THE WELLS ARE LOCATED WITHIN 3-FT OF EACH OTHER.



PROJECT: CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE: SITE LAYOUT MAP	
DRAWN BY: A. ADAIR	PROJ. NO.: 514404.0001
CHECKED BY: A. WHALEY	FIGURE 2
APPROVED BY: D. LITZ	
DATE: JANUARY 2024	
1540 EISENHOWER PLACE ANN ARBOR, MI 48108-3284 PHONE: 734.971.7080	
FILE: 464095_DEKARN.aprx	

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2119 Feet Intl. Map Rotation: 0
 Saved By: A.ADAIR on 1/22/2023, 09:38:23 AM. File Path: T:\PROJECTS\Consumers_Energy\464095_DEKARN.aprx. Layout Name: 514404_SGWM03-202304



- LEGEND**
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
 - DEK BOTTOM ASH POND MONITORING WELL
 - DEK LINED IMPOUNDMENT MONITORING WELL
 - DECOMMISSIONED MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - NATURE AND EXTENT WELL
 - SURFACE WATER GAUGING STATION
 - EXTENT OF GEOSYNTHETICS
 - SLURRY WALL (APPROXIMATE)
 - GROUNDWATER ELEVATION CONTOUR (1' INTERVAL, DASHED WHERE INFERRED)
 - (580.21) GROUNDWATER ELEVATION (FEET)
 - (NM) NOT MEASURED
 - (NU) NOT USED

- NOTES**
1. BASE MAP IMAGERY FROM NEARMAP, (5/4/2022).
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02 AND MW-03/MW-04 AS THE WELLS ARE LOCATED WITHIN 3-FT OF EACH OTHER.
 5. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1:7,200
 1" = 600'

PROJECT: CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE: SHALLOW GROUNDWATER CONTOUR MAP OCTOBER 2023	
DRAWN BY: A. ADAIR	PROJ. NO.: 514404.0001
CHECKED BY: J. KRENZ	FIGURE 3
APPROVED BY: D. LITZ	
DATE: JANUARY 2024	
1540 EISENHOWER PLACE ANN ARBOR, MI 48108-3284 PHONE: 734.971.7080	
FILE: 464095_DEKARN.aprx	

Appendix A

Laboratory Analytical Reports

To: JFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 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: 23-0931R

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Samples for Total & Dissolved Organic Carbon have been subcontracted to Brighton Analytical LLC and the results are listed under the analyst initials “BAL”. The original reports from both labs are attached. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted in 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; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q4-2023 DEK Lined Impoundment
Date Received: 10/5/2023
Chemistry Project: 23-0931

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0931-01	DEK-MW-15003	Groundwater	10/04/2023 13:47	DEK Lined Impoundment
23-0931-02	OW-10	Groundwater	10/04/2023 14:57	DEK Lined Impoundment
23-0931-03	OW-11	Groundwater	10/04/2023 12:24	DEK Lined Impoundment
23-0931-04	OW-12	Groundwater	10/04/2023 15:44	DEK Lined Impoundment
23-0931-05	KLI-SCS	Groundwater	10/04/2023 11:10	DEK Lined Impoundment
23-0931-06	KLI-PCS	Surface Water	10/04/2023 10:55	DEK Lined Impoundment
23-0931-07	SW-DITCH	Surface Water	10/04/2023 10:34	DEK Lined Impoundment
23-0931-08	DUP-KLI	Groundwater	10/04/2023 00:00	DEK Lined Impoundment
23-0931-09	EB-KLI	Water	10/04/2023 16:08	DEK Lined Impoundment
23-0931-10	FB-KLI	Water	10/04/2023 14:57	DEK Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 23-0931-01
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 01:47 PM

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

Aliquot #: 23-0931-01-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	435		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	41		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	716		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	25000		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	139		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	21		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	3820		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	67		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	27		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	3710		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	51100		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 #: 23-0931-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-01-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	223		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	58700		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **DEK-MW-15003**
Lab Sample ID: 23-0931-01
Matrix: Groundwater

Laboratory Project: **23-0931**
Collect Date: 10/04/2023
Collect Time: 01:47 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	52400		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1830		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-01-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	284		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	83400		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	83400		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	180		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-01-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	3000		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-01-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	3500		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0931-02
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 02:57 PM

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

Aliquot #: 23-0931-02-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	176		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	1200		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	105000		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	2		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	1640		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	29		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	18300		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	242		ug/L	5.0	10/10/2023	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	4820		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	2		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	65500		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	4		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 #: 23-0931-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-02-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	73200		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0931-02
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 02:57 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	2660		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	5340		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-02-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	580		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-02-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	440000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	440000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-02-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	200		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-02-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	7900		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-02-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	8200		ug/L	1000.0	10/10/2023	AB23-1015-02

Mercury by EPA 7470A, Dissolved Aliquot #: 23-0931-02-C10-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/13/2023	AB23-1013-08

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa Aliquot #: 23-0931-02-C10-A02 Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/13/2023	AB23-1014-01

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 23-0931-02
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 02:57 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Diss Metals Expa

Aliquot #: 23-0931-02-C10-A02

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Arsenic	2		ug/L	1.0	10/13/2023	AB23-1014-01
Barium	145		ug/L	5.0	10/13/2023	AB23-1014-01
Beryllium	ND		ug/L	1.0	10/13/2023	AB23-1014-01
Boron	1280		ug/L	20.0	10/13/2023	AB23-1014-01
Cadmium	ND		ug/L	0.2	10/13/2023	AB23-1014-01
Calcium	115000		ug/L	1000.0	10/13/2023	AB23-1014-01
Chromium	ND		ug/L	1.0	10/13/2023	AB23-1014-01
Cobalt	ND		ug/L	6.0	10/13/2023	AB23-1014-01
Copper	ND		ug/L	1.0	10/13/2023	AB23-1014-01
Iron	1410		ug/L	20.0	10/13/2023	AB23-1014-01
Lead	ND		ug/L	1.0	10/13/2023	AB23-1014-01
Lithium	29		ug/L	10.0	10/13/2023	AB23-1014-01
Magnesium	18700		ug/L	1000.0	10/13/2023	AB23-1014-01
Manganese	237		ug/L	5.0	10/13/2023	AB23-1014-01
Molybdenum	ND		ug/L	5.0	10/13/2023	AB23-1014-01
Nickel	ND		ug/L	2.0	10/13/2023	AB23-1014-01
Potassium	5060		ug/L	100.0	10/13/2023	AB23-1014-01
Selenium	1		ug/L	1.0	10/13/2023	AB23-1014-01
Silver	ND		ug/L	0.2	10/13/2023	AB23-1014-01
Sodium	67300		ug/L	1000.0	10/13/2023	AB23-1014-01
Thallium	ND		ug/L	2.0	10/13/2023	AB23-1014-01
Vanadium	ND		ug/L	2.0	10/13/2023	AB23-1014-01
Zinc	ND		ug/L	10.0	10/13/2023	AB23-1014-01

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0931-03
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 12:24 PM

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

Aliquot #: 23-0931-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	1		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	907		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	25		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	3410		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	7800		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	52		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
Manganese	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	138		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	4070		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	3		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	60500		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	334		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 #: 23-0931-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-03-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	57100		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 23-0931-03
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 12:24 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	2620		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	17900		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	12000		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-03-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	208		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-03-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	95500		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	16700		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	78800		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-03-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-03-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	6200		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-03-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	7600		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0931-04
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 03:44 PM

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

Aliquot #: 23-0931-04-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	112		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	130		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	1040		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	89000		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	7750		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	34		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	30700		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	206		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	14		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	6210		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	53400		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 #: 23-0931-04-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-04-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-04-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	56800		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 23-0931-04
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 03:44 PM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-04-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	197000		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-04-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	698		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-04-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	646		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-04-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	249000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	249000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-04-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-04-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	1600		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-04-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	2800		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0931-05
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 11:10 AM

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

Aliquot #: 23-0931-05-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	1		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	58		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	601		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	106000		ug/L	1000.0	12/13/2023	AB23-1010-09R
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	2		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	107		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	36300		ug/L	1000.0	12/13/2023	AB23-1010-09R
Manganese	10		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	9		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	3		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	1860		ug/L	100.0	12/13/2023	AB23-1010-09R
Selenium	4		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	381000		ug/L	1000.0	12/13/2023	AB23-1010-09R
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	4		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	10		ug/L	10.0	10/10/2023	AB23-1010-09

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0931-05-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-05-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	1680		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-05-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	55700		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 23-0931-05
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 11:10 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-05-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	489000		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-05-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-05-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1390		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-05-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	573000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	573000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-05-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-05-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	2700		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-05-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	1800		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0931-06
 Matrix: Surface Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 10:55 AM

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

Aliquot #: 23-0931-06-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	3		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	106		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	2230		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	0.3		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	544000		ug/L	1000.0	12/13/2023	AB23-1010-09R
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	3		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	191		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	13		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19100		ug/L	1000.0	12/13/2023	AB23-1010-09R
Manganese	7		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	203		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	5		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	25800		ug/L	100.0	12/13/2023	AB23-1010-09R
Selenium	5		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	117000		ug/L	1000.0	12/13/2023	AB23-1010-09R
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	6		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 #: 23-0931-06-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-06-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-06-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	50800		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-PCS**
 Lab Sample ID: 23-0931-06
 Matrix: Surface Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 10:55 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-06-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	6150		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	1550000		ug/L	1000.0	10/14/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-06-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	10/12/2023	AB23-1012-05

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-06-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	2450		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-06-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	54600		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	54600		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-06-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-06-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4800		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-06-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	5900		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0931-07
 Matrix: Surface Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 10:34 AM

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

Aliquot #: 23-0931-07-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	3		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	58		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	83		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	49400		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	2		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	104		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	17800		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	186		ug/L	5.0	10/10/2023	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	2760		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	38200		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 #: 23-0931-07-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-07-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	399		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-07-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	71200		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **SW-DITCH**
 Lab Sample ID: 23-0931-07
 Matrix: Surface Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 10:34 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-07-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	32100		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-07-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	475		ug/L	25.0	10/12/2023	AB23-1012-05

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-07-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	442		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-07-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	209000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	209000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-07-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-07-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	6200		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-07-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	7200		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0931-08
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 12:00 AM

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

Aliquot #: 23-0931-08-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	116		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	130		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	991		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	87400		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	7630		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	33		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	31200		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	185		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	14		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	2		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	5250		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	53800		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 #: 23-0931-08-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-08-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0931-08-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	57000		ug/L	1000.0	10/12/2023	AB23-1011-03

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-KLI**
 Lab Sample ID: 23-0931-08
 Matrix: Groundwater

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 12:00 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0931-08-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	198000		ug/L	1000.0	10/12/2023	AB23-1011-03

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0931-08-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	637		ug/L	25.0	10/12/2023	AB23-1012-05

Total Dissolved Solids by SM 2540C Aliquot #: 23-0931-08-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	674		mg/L	10.0	10/05/2023	AB23-1006-05

Alkalinity by SM 2320B Aliquot #: 23-0931-08-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	253000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Bicarbonate	253000		ug/L	10000.0	10/10/2023	AB23-1010-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/10/2023	AB23-1010-08

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-08-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-08-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	1600		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-08-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	1800		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **EB-KLI**
 Lab Sample ID: 23-0931-09
 Matrix: Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 04:08 PM

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

Aliquot #: 23-0931-09-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
Manganese	ND		ug/L	5.0	10/10/2023	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 #: 23-0931-09-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-09-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0931-09-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	10/12/2023	AB23-1012-05



Analytical Report

Report Date: 10/20/23
12/14/23R

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **EB-KLI**
Lab Sample ID: 23-0931-09
Matrix: Water

Laboratory Project: **23-0931**
Collect Date: 10/04/2023
Collect Time: 04:08 PM

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-09-C04-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-09-C05-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	ND		ug/L	1000.0	10/11/2023	AB23-1015-01R

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-09-C06-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	ND		ug/L	1000.0	10/11/2023	AB23-1015-02R

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **FB-KLI**
 Lab Sample ID: 23-0931-10
 Matrix: Water

Laboratory Project: **23-0931**
 Collect Date: 10/04/2023
 Collect Time: 02:57 PM

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

Aliquot #: 23-0931-10-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
Manganese	ND		ug/L	5.0	10/10/2023	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 #: 23-0931-10-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0931-10-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL

Aliquot #: 23-0931-10-C03-A01

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	ND		ug/L	25.0	10/12/2023	AB23-1012-05



Analytical Report

Report Date: 10/20/23
12/14/23R

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **FB-KLI**
Lab Sample ID: 23-0931-10
Matrix: Water

Laboratory Project: **23-0931**
Collect Date: 10/04/2023
Collect Time: 02:57 PM

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0931-10-C04-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-10-C05-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	ND		ug/L	1000.0	10/11/2023	AB23-1015-01R

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0931-10-C06-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	ND		ug/L	1000.0	10/11/2023	AB23-1015-02R

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0931

Inspection Date: 10.05.23 Inspection By: LMO

Sample Origin/Project Name: Q4-2023 DEK Lineal Impoundment

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 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 2.7-3.5 °C Samples Received on Ice: Yes No _____

M&TE # and Expiration LS028157 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)	<u>16</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>41</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	<u>8</u>	_____	_____	_____	_____
Other <u>40mL</u>	<u>20</u>	_____	_____	_____	_____

amber Borosilicate vial

pH strip lot #: 205522 exp. 2.15.25

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page ____ of ____

SAMPLING SITE - CUSTOMER: Q1-2023 DEK Lined Impoundment			PROJECT NUMBER: 23-0931		SAP CC or WO#: REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)										QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____							
SAMPLING TEAM:			TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____																					
SEND REPORT TO: Joseph Firlit			email:		phone:																			
COPY TO: Harold Register			MATRIX CODES GW - Groundwater OX - Other WW - Wastewater SL - Sludge W - Water / Aqueous Liquid A - Air S - Soil / General Solid WP - Wipe O - Oil WT - General Waste		CONTAINERS																			
TRC																								
LAB SAMPLE ID	SAMPLE COLLECTION		MATRIX	FIELD SAMPLE ID / LOCATION		TOTAL #	PRESERVATIVE																	
	DATE	TIME					None	HNO ₃	H ₂ SO ₄	NaOH	HCl	MeOH	Other	Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	Total Organic Carbon	Dissolved Organic Carbon	Dissolved Metals	REMARKS	
23-0931-01	10-4-23	1347	GW	DEK-MW-15003	9	4	1	1	1	2														
-02	10-4-23	1457	GW	OW-10	10	4	2	1	1	2														X
-03	10-4-23	1229	GW	OW-11	9	4	1	1	1	2														
-04	10-4-23	1544	GW	OW-12	9	4	1	1	1	2														
-05	10-4-23	1110	W	KLI-SCS	9	4	1	1	1	2														
-06	10-4-23	1055	SW	KLI-PCS	9	4	1	1	1	2														
-07	10-4-23	1034	SW	SW-DITCH	9	4	1	1	1	2														
-08	10-4-23	—	GW	DUP-KLI	9	4	1	1	1	2														
-09	10-4-23	1608	W	EB-KLI	6	1	1	1	1	2														
-10	10-4-23	1457	W	FB-KLI	6	1	1	1	1	2														

RELINQUISHED BY:		DATE/TIME: 10-5-23/0730		RECEIVED BY:		COMMENTS:	
RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:		Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&T# <u>LS028757</u> Temperature: <u>2.7-3.5</u> °C Cal Due Date: <u>11-15-23</u>	

December 07, 2023

Consumers Energy Company
135 W. Trail St.
Jackson, MI 49201

Subject: Q4-2023 DEK Lined Impoundment
23-0931

Dear : Mr. Blaj

Thank you for making Brighton Analytical, L.L.C. your laboratory of choice. Attached are the results for the samples submitted on 10/06/2023 for the above mentioned project. NELAP/TNI Accredited Analysis and EGLE Drinking Water Certified Analysis will be identified in their respective reporting formats. Hard copies can be supplied at your request for a fee of \$20.00 per copy.

The invoice for this project will be emailed separately. If you have any questions concerning the data or invoice, please don't hesitate to contact our office. We welcome your comments and suggestions to improve our quality systems. Please reference Brighton Analytical, L.L.C. Project ID 92713 when calling or emailing. We thank you for this opportunity to partner with you on this project and hope to work with you again in the future.

Sincerely,
Brighton Analytical, L.L.C.



Brighton Analytical LLC
 2105 Pless Drive
 Brighton, Michigan 48114
 Phone: (810)229-7575 (810)229-8650
 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03410** Project Number: **23-0931**

Sample ID: **23-0931-01 DEK-MW-15003**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
------------	--------	-------	----	------------------	---------	---------------

Organic Analysis

Dissolved Organic Carbon	3500	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	3000	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03411** Project Number: **23-0931**

Sample ID: **23-0931-02 OW-10**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
Organic Analysis						
Dissolved Organic Carbon	8200	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	7900	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03412** Project Number: **23-0931**

Sample ID: **23-0931-03 OW-11**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
Organic Analysis						
Dissolved Organic Carbon	7600	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	6200	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03413** Project Number: **23-0931**

Sample ID: **23-0931-04 OW-12**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
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Organic Analysis

Dissolved Organic Carbon	2800	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	1600	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713**

Project Name: **Q4-2023 DEK Lined Impoundment**

BA Sample ID: **CU03414**

Project Number: **23-0931**

Sample ID: **23-0931-05 KLI-SCS**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
------------	--------	-------	----	------------------	---------	---------------

Organic Analysis

Dissolved Organic Carbon	1800	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	2700	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03415** Project Number: **23-0931**

Sample ID: **23-0931-06 KLI-PCS**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
------------	--------	-------	----	------------------	---------	---------------

Organic Analysis

Dissolved Organic Carbon	5900	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	4800	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03416** Project Number: **23-0931**

Sample ID: **23-0931-07 SW-DITCH**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
------------	--------	-------	----	------------------	---------	---------------

Organic Analysis

Dissolved Organic Carbon	7200	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	6200	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03417** Project Number: **23-0931**

Sample ID: **23-0931-08 DUP-KLI**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
Organic Analysis						
Dissolved Organic Carbon	1800	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	1600	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03418** Project Number: **23-0931**

Sample ID: **23-0931-09 EB-KLI**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
Organic Analysis						
Dissolved Organic Carbon	Not detected	ug/L	1000	SM5310B	RG	10/11/2023
Total Organic Carbon	Not detected	ug/L	1000	SM5310B	RG	10/11/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



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 Phone: (810)229-7575 (810)229-8650
 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 12/07/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92713** Project Name: **Q4-2023 DEK Lined Impoundment**
 BA Sample ID: **CU03419** Project Number: **23-0931**

Sample ID: **23-0931-10 FB-KLI**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
------------	--------	-------	----	------------------	---------	---------------

Organic Analysis

Dissolved Organic Carbon	Not detected	ug/L	1000	SM5310B	RG	10/11/2023
Total Organic Carbon	Not detected	ug/L	1000	SM5310B	RG	10/11/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 12/7/2023



BRIGHTON ANALYTICAL, LLC

QUALITY ASSURANCE/QUALITY
CONTROL

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: TOC

Analysis Date: 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY					
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03405	TV=10000	ND	94/95	80 - 120	ND
MISCELLANEOUS					
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03405	9400	9500	1.10	≤ 20	
MISCELLANEOUS					
	Standard ID #	%Recoveries			
Independent Secondary Reference Material:	WP-337	99			
Method Standard (Lab. Control Spike):	#3046.8	90			

COMMENTS: _____

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: DOC

Analysis Date: 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY

Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03405	TV=10000	ND	95/95	80 - 120	ND

Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)
CU03405	13400	13400	0.00	≤ 20

MISCELLANEOUS

	Standard ID #	% Recoveries
Independent Secondary Reference Material:	WP-337	99
Method Standard (Lab. Control Spike):	#3046.8	90

COMMENTS: _____

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: DOC

Analysis Date: 10/11/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY					
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03422	TV=10000	4400	93/95	80 - 120	ND
MISCELLANEOUS					
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03422	13700	13900	1.40	≤20	
MISCELLANEOUS					
	Standard ID #	%Recoveries			
Independent Secondary Reference Material:	WP-337	101			
Method Standard (Lab. Control Spike):	#3046.8	98			

COMMENTS: _____

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: TOC

Analysis Date: 10/11/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY					
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03422	TV=10000	4000	92/89	80 - 120	ND
MISCELLANEOUS					
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03422	13200	12900	2.30	≤ 20	
MISCELLANEOUS					
	Standard ID #	%Recoveries			
Independent Secondary Reference Material:	WP-337	101			
Method Standard (Lab. Control Spike):	#3046.8	98			

COMMENTS: _____



Analytical Laboratory Report

Report ID: S54196.01(01)
Generated on 10/09/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S54196.01-S54196.10
Project: 23-0931 PR#23101280
Collected Date(s): 10/04/2023
Submitted Date/Time: 10/06/2023 08:15
Sampled by: Unknown
P.O. #: 44001140900

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
- Report Narrative (Page 2)
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- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

All accreditations/certifications held by this laboratory are listed on page 3. Not all accreditations/certifications are applicable to this report.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Accreditations

Authority	Accreditation ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:2017	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S54196.01	23-0931-01 (DEK-MW-15003)	Groundwater	10/04/23 13:47
S54196.02	23-0931-02 (OW-10)	Groundwater	10/04/23 14:57
S54196.03	23-0931-03 (OW-11)	Groundwater	10/04/23 12:29
S54196.04	23-0931-04 (OW-12)	Groundwater	10/04/23 15:44
S54196.05	23-0931-05 (KLI-SCS)	Groundwater	10/04/23 11:10
S54196.06	23-0931-06 (KLI-PCS)	Groundwater	10/04/23 10:55
S54196.07	23-0931-07 (SW-DITCH)	Groundwater	10/04/23 10:34
S54196.08	23-0931-08 (DUP-KLI)	Groundwater	10/04/23 00:01
S54196.09	23-0931-09 (EB-KLI)	Groundwater	10/04/23 16:08
S54196.10	23-0931-10 (FB-KLI)	Groundwater	10/04/23 14:51



Analytical Laboratory Report

Lab Sample ID: S54196.01

Sample Tag: 23-0931-01 (DEK-MW-15003)

Collected Date/Time: 10/04/2023 13:47

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:18, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.18	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.02

Sample Tag: 23-0931-02 (OW-10)

Collected Date/Time: 10/04/2023 14:57

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:20, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.20	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.03

Sample Tag: 23-0931-03 (OW-11)

Collected Date/Time: 10/04/2023 12:29

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:22, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.04

Sample Tag: 23-0931-04 (OW-12)

Collected Date/Time: 10/04/2023 15:44

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:24, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.05

Sample Tag: 23-0931-05 (KLI-SCS)

Collected Date/Time: 10/04/2023 11:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:26, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.06

Sample Tag: 23-0931-06 (KLI-PCS)

Collected Date/Time: 10/04/2023 10:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:28, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.07

Sample Tag: 23-0931-07 (SW-DITCH)

Collected Date/Time: 10/04/2023 10:34

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:30, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.08

Sample Tag: 23-0931-08 (DUP-KLI)

Collected Date/Time: 10/04/2023 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:34, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.09

Sample Tag: 23-0931-09 (EB-KLI)

Collected Date/Time: 10/04/2023 16:08

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:36, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54196.10

Sample Tag: 23-0931-10 (FB-KLI)

Collected Date/Time: 10/04/2023 14:51

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:38, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	

Merit Laboratories Login Checklist

Lab Set ID:S54196

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Client:CONSUMERS (Consumers Energy Company)

Project: 23-0931 PR#23101280

Submitted: 10/06/2023 08:15 Login User: MMC

Phone: D:517-788-5888 FAX:
Email:emil.blaj@cmsenergy.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 6.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S54196 Submitted: 10/06/2023 08:15
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0931 PR#23101280

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 10/06/2023 09:41 MMC
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S54196.01	125ml Plastic NaOH/Zn Acetate	>12			
S54196.02	125ml Plastic NaOH/Zn Acetate	>12			
S54196.03	125ml Plastic NaOH/Zn Acetate	>12			
S54196.04	125ml Plastic NaOH/Zn Acetate	>12			
S54196.05	125ml Plastic NaOH/Zn Acetate	>12			
S54196.06	125ml Plastic NaOH/Zn Acetate	>12			
S54196.07	125ml Plastic NaOH/Zn Acetate	>12			
S54196.08	125ml Plastic NaOH/Zn Acetate	>12			
S54196.09	125ml Plastic NaOH/Zn Acetate	>12			
S54196.10	125ml Plastic NaOH/Zn Acetate	>12			



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Emil Blaj
 COMPANY Consumers Energy
 ADDRESS 135 W. Trail Street
 CITY Jackson STATE MI ZIP CODE 49201
 PHONE NO. 517-788-5888 FAX NO. 517-788-2533 P.O. NO. 44001140900
 E-MAIL ADDRESS emil.blaj@cmsenergy.com QUOTE NO.

CONTACT NAME SAME
 COMPANY
 ADDRESS
 CITY STATE ZIP CODE
 PHONE NO. E-MAIL ADDRESS

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME 23-0931 PR#23101280 SAMPLER(S) - PLEASE PRINT/SIGN NAME N/A
 TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 CODE: SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	Total Sulfide	Certifications		Project Locations		Special Instructions
	DATE	TIME												<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES	
<u>54196.01</u>	<u>10/04/23</u>	<u>1347</u>	<u>23-0931-01 (DEK-MW-15003)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>preserved with NaOH/ZnAcetate</u>
<u>.02</u>	<u>10/04/23</u>	<u>1457</u>	<u>23-0931-02 (OW-10)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.03</u>	<u>10/04/23</u>	<u>1229</u>	<u>23-0931-03 (OW-11)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.04</u>	<u>10/04/23</u>	<u>1544</u>	<u>23-0931-04 (OW-12)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.05</u>	<u>10/04/23</u>	<u>1110</u>	<u>23-0931-05 (KLI-SCS)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.06</u>	<u>10/04/23</u>	<u>1055</u>	<u>23-0931-06 (KLI-PCS)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.07</u>	<u>10/04/23</u>	<u>1034</u>	<u>23-0931-07 (SW-DITCH)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.08</u>	<u>10/04/23</u>	<u>-</u>	<u>23-0931-08 (DUP-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.09</u>	<u>10/04/23</u>	<u>1608</u>	<u>23-0931-09 (EB-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>
<u>.10</u>	<u>10/04/23</u>	<u>1451</u>	<u>23-0931-10 (FB-KLI)</u>	<u>GW</u>	<u>1</u>					<u>1</u>			<input checked="" type="checkbox"/>					<u>"</u>

RELINQUISHED BY: SIGNATURE/ORGANIZATION Y. CONSUMERS ENERGY Sampler DATE 10-05-23 TIME 1850
 RECEIVED BY: SIGNATURE/ORGANIZATION [Signature] DATE 10/5/23 TIME 1850
 RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME
 SEAL NO. SEAL INTACT YES NO INITIALS
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL 6.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

To: JFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. 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: 23-0930

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment 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.

Samples for Total Sulfide have been subcontracted to Merit Laboratories, Inc. and the results are listed under the analyst initials “Merit”. Samples for Total & Dissolved Organic Carbon have been subcontracted to Brighton Analytical LLC and the results are listed under the analyst initials “BAL”. The original reports from both labs are attached. Please note that the subcontracted work is not reported under the CE laboratory scope of accreditation.

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

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q4-2023 DEK Bottom Ash Pond & Lined Impoundment
Date Received: 10/5/2023
Chemistry Project: 23-0930

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
23-0930-01	DEK-MW-18001	Groundwater	10/04/2023 06:12	DEK Bottom Ash Pond & Lined Impoundment
23-0930-02	DEK-MW-18001 MS	Groundwater	10/04/2023 06:12	DEK Bottom Ash Pond & Lined Impoundment
23-0930-03	DEK-MW-18001 MSD	Groundwater	10/04/2023 06:12	DEK Bottom Ash Pond & Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0930-01
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

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

Aliquot #: 23-0930-01-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	398		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	155		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	987		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	52500		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	720		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	9930		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	133		ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	9		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	5680		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	106000		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 #: 23-0930-01-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0930-01-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	ND		ug/L	100.0	10/05/2023	AB23-1006-01
Nitrite	ND		ug/L	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0930-01-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	69400		ug/L	1000.0	10/11/2023	AB23-1010-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 23-0930-01
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0930-01-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/11/2023	AB23-1010-02
Sulfate	158000		ug/L	1000.0	10/11/2023	AB23-1010-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0930-01-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	1890		ug/L	25.0	10/11/2023	AB23-1011-04

Total Dissolved Solids by SM 2540C Aliquot #: 23-0930-01-C04-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	551		mg/L	10.0	10/05/2023	AB23-1006-03

Alkalinity by SM 2320B Aliquot #: 23-0930-01-C05-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	193000		ug/L	10000.0	10/09/2023	AB23-1009-09
Alkalinity Bicarbonate	193000		ug/L	10000.0	10/09/2023	AB23-1009-09
Alkalinity Carbonate	ND		ug/L	10000.0	10/09/2023	AB23-1009-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0930-01-C07-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	ND		ug/L	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-01-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4800		ug/L	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-01-C09-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	5400		ug/L	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0930-02
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

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

Aliquot #: 23-0930-02-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	105		%	1.0	10/10/2023	AB23-1010-09
Arsenic	103		%	1.0	10/10/2023	AB23-1010-09
Barium	105		%	5.0	10/10/2023	AB23-1010-09
Beryllium	104		%	1.0	10/10/2023	AB23-1010-09
Boron	106		%	20.0	10/10/2023	AB23-1010-09
Cadmium	99.1		%	0.2	10/10/2023	AB23-1010-09
Calcium	107		%	1000.0	10/11/2023	AB23-1010-09
Chromium	98		%	1.0	10/10/2023	AB23-1010-09
Cobalt	98		%	6.0	10/10/2023	AB23-1010-09
Copper	92		%	1.0	10/10/2023	AB23-1010-09
Iron	92		%	20.0	10/10/2023	AB23-1010-09
Lead	100		%	1.0	10/10/2023	AB23-1010-09
Lithium	97		%	10.0	10/10/2023	AB23-1010-09
Magnesium	109		%	1000.0	10/11/2023	AB23-1010-09
Manganese	101		%	5.0	10/10/2023	AB23-1010-09
Molybdenum	109		%	5.0	10/10/2023	AB23-1010-09
Nickel	93		%	2.0	10/10/2023	AB23-1010-09
Potassium	111		%	100.0	10/11/2023	AB23-1010-09
Selenium	101		%	1.0	10/10/2023	AB23-1010-09
Silver	94.4		%	0.2	10/10/2023	AB23-1010-09
Sodium	112		%	1000.0	10/11/2023	AB23-1010-09
Thallium	99		%	2.0	10/10/2023	AB23-1010-09
Vanadium	101		%	2.0	10/10/2023	AB23-1010-09
Zinc	95		%	10.0	10/10/2023	AB23-1010-09

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0930-02-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	101		%	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0930-02-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	92		%	100.0	10/05/2023	AB23-1006-01
Nitrite	92		%	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0930-02-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	104		%	1000.0	10/11/2023	AB23-1010-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 23-0930-02
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0930-02-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	91		%	1000.0	10/11/2023	AB23-1010-02
Sulfate	101		%	1000.0	10/11/2023	AB23-1010-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0930-02-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	108		%	25.0	10/11/2023	AB23-1011-04

Alkalinity by SM 2320B Aliquot #: 23-0930-02-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	99.5		%	10000.0	10/09/2023	AB23-1009-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0930-02-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-02-C07-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	83		%	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-02-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	80		%	1000.0	10/10/2023	AB23-1015-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0930-03
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

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

Aliquot #: 23-0930-03-C01-A01

Analyst: EB

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	105		%	1.0	10/10/2023	AB23-1010-09
Arsenic	101		%	1.0	10/10/2023	AB23-1010-09
Barium	104		%	5.0	10/10/2023	AB23-1010-09
Beryllium	106		%	1.0	10/10/2023	AB23-1010-09
Boron	125		%	20.0	10/10/2023	AB23-1010-09
Cadmium	101		%	0.2	10/10/2023	AB23-1010-09
Calcium	103		%	1000.0	10/11/2023	AB23-1010-09
Chromium	95		%	1.0	10/10/2023	AB23-1010-09
Cobalt	98		%	6.0	10/10/2023	AB23-1010-09
Copper	92		%	1.0	10/10/2023	AB23-1010-09
Iron	102		%	20.0	10/10/2023	AB23-1010-09
Lead	98		%	1.0	10/10/2023	AB23-1010-09
Lithium	95		%	10.0	10/10/2023	AB23-1010-09
Magnesium	106		%	1000.0	10/11/2023	AB23-1010-09
Manganese	103		%	5.0	10/10/2023	AB23-1010-09
Molybdenum	108		%	5.0	10/10/2023	AB23-1010-09
Nickel	95		%	2.0	10/10/2023	AB23-1010-09
Potassium	108		%	100.0	10/11/2023	AB23-1010-09
Selenium	99		%	1.0	10/10/2023	AB23-1010-09
Silver	95.7		%	0.2	10/10/2023	AB23-1010-09
Sodium	108		%	1000.0	10/11/2023	AB23-1010-09
Thallium	98		%	2.0	10/10/2023	AB23-1010-09
Vanadium	101		%	2.0	10/10/2023	AB23-1010-09
Zinc	93		%	10.0	10/10/2023	AB23-1010-09

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 23-0930-03-C01-A02

Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	100.0		%	0.2	10/11/2023	AB23-1011-01

Anions by EPA 300.0 Aqueous, NO2, NO3

Aliquot #: 23-0930-03-C02-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Nitrate	95		%	100.0	10/05/2023	AB23-1006-01
Nitrite	96		%	100.0	10/05/2023	AB23-1006-01

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

Aliquot #: 23-0930-03-C02-A02

Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106		%	1000.0	10/11/2023	AB23-1010-02

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 23-0930-03
 Matrix: Groundwater

Laboratory Project: **23-0930**
 Collect Date: 10/04/2023
 Collect Time: 06:12 AM

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 23-0930-03-C02-A02 Analyst: KDR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	91		%	1000.0	10/11/2023	AB23-1010-02
Sulfate	104		%	1000.0	10/11/2023	AB23-1010-02

Nitrogen-Ammonia by SM4500NH3(h), Groundwater HL Aliquot #: 23-0930-03-C03-A01 Analyst: CLE

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	99		%	25.0	10/11/2023	AB23-1011-04

Alkalinity by SM 2320B Aliquot #: 23-0930-03-C04-A01 Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	98.0		%	10000.0	10/09/2023	AB23-1009-09

Sulfide, Total by SM 4500 S2D Aliquot #: 23-0930-03-C06-A01 Analyst: Merit

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	10/07/2023	AB23-1009-11

Total Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-03-C07-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	81		%	1000.0	10/10/2023	AB23-1015-01

Dissolved Organic Carbon by SM 5310B, Aqueous Aliquot #: 23-0930-03-C08-A01 Analyst: BAL

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	81		%	1000.0	10/10/2023	AB23-1015-02



Analytical Report

Report Date: 10/20/23

Laboratory Services
A CENTURY OF EXCELLENCE

Data Qualifiers	Exception Summary
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No exceptions occurred.

CONSUMERS
ENERGY

Chemistry Department
General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0930

Inspection Date: 10.05.23

Inspection By: UMO

Sample Origin/Project Name: Q4-2023 DEK Bottom Ash Pond + Lined Impound

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 _____ 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 3.2-4.5° Samples Received on Ice: Yes 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)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>12</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
250 mL (plastic)	<u>1</u>	_____	_____	_____	_____
Other <u>40 mL</u>	<u>6</u>	_____	_____	_____	_____
amber Borosilicate vial					

10.05.23 UMO

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / CUSTOMER: Q4-2023 DEK Bottom Ash Pond & Lined Impound.			PROJECT NUMBER: 23-0930			SAP CC or WO#: REQUESTER: Harold Register			ANALYSIS REQUESTED (Attach List if More Space is Needed)								QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____
SAMPLING TEAM:			TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER _____			email: _____ phone: _____											
SEND REPORT TO: Joseph Firlit	COPY TO: Harold Register		MATRIX CODES: GW = Groundwater OX = Other WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air S = Soil / General Solid WP = Wipe O = Oil WT = General Waste			CONTAINERS PRESERVATIVE			Total Metals	Anions	Ammonia	TDS	Alkalinity	Sulfide	Total Organic Carbon	Dissolved Organic Carbon	REMARKS
LAB SAMPLE ID	SAMPLE COLLECTION																
	DATE	TIME	MATRIX														
23-0930-01	10/14/23	0615	GW	DEK-MW-18001			9	4	1	1	1	2					
↓ -02	11 11	0615	GW	DEK-MW-18001 MS			8	3	1	1	1	2					
↓ -03	11 11	0615	GW	DEK-MW-18001 MSD			8	3	1	1	1	2					

RELINQUISHED BY:		DATE/TIME: 10/15/23 10730		RECEIVED BY:		COMMENTS:	
RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:		Received on Ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: <u>LS028757</u> Temperature: <u>3.2-4.5</u> °C Cal. Due Date: <u>11-15-23</u>	

October 11, 2023

Consumers Energy Company
135 W. Trail St.
Jackson, MI 49201

Subject: Q4-2023 DEK Bottom Ash Pond & Lined Impound
23-930

Dear : Mr. Blaj

Thank you for making Brighton Analytical, L.L.C. your laboratory of choice. Attached are the results for the samples submitted on 10/06/2023 for the above mentioned project. NELAP/TNI Accredited Analysis and EGLE Drinking Water Certified Analysis will be identified in their respective reporting formats. Hard copies can be supplied at your request for a fee of \$20.00 per copy.

The invoice for this project will be emailed separately. If you have any questions concerning the data or invoice, please don't hesitate to contact our office. We welcome your comments and suggestions to improve our quality systems. Please reference Brighton Analytical, L.L.C. Project ID 92712 when calling or emailing. We thank you for this opportunity to partner with you on this project and hope to work with you again in the future.

Sincerely,
Brighton Analytical, L.L.C.



Brighton Analytical LLC
 2105 Pless Drive
 Brighton, Michigan 48114
 Phone: (810)229-7575 (810)229-8650
 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 10/11/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92712** Project Name: **Q4-2023 DEK Bottom Ash Pond & Lined Impound**
 BA Sample ID: **CU03407** Project Number: **23-930**

Sample ID: **23-930-01 DEK-MW-18001**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
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Organic Analysis

Dissolved Organic Carbon	5400	ug/L	1000	SM5310B	RG	10/10/2023
Total Organic Carbon	4800	ug/L	1000	SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 10/11/2023



Brighton Analytical LLC
 2105 Pless Drive
 Brighton, Michigan 48114
 Phone: (810)229-7575 (810)229-8650
 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 10/11/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92712** Project Name: **Q4-2023 DEK Bottom Ash Pond & Lined Impound**
 BA Sample ID: **CU03408** Project Number: **23-930**

Sample ID: **23-930-02 DEK-MW-18001 MS**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
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Organic Analysis

Dissolved Organic Carbon	80%	ug/L		SM5310B	RG	10/10/2023
Total Organic Carbon	83%	ug/L		SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 10/11/2023



Brighton Analytical LLC
 2105 Pless Drive
 Brighton, Michigan 48114
 Phone: (810)229-7575 (810)229-8650
 e-mail: bai-brighton@sbcglobal.net
 EGLE Certified #9404
 NELAC Accredited #176507

Sample Date: 10/04/2023
 Submit Date: 10/06/2023
 Report Date: 10/11/2023

To: Consumers Energy Company
 135 W. Trail St.
 Jackson, MI 49201

BA Report Number: **92712** Project Name: **Q4-2023 DEK Bottom Ash Pond & Lined Impound**
 BA Sample ID: **CU03409** Project Number: **23-930**

Sample ID: **23-930-03 DEK-MW-18001 MSD**

Parameters	Result	Units	DL	Method Reference	Analyst	Analysis Date
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Organic Analysis

Dissolved Organic Carbon	81%	ug/L		SM5310B	RG	10/10/2023
Total Organic Carbon	81%	ug/L		SM5310B	RG	10/10/2023

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by *Cynthia Williams*
 Date 10/11/2023



BRIGHTON ANALYTICAL, LLC

QUALITY ASSURANCE/QUALITY
CONTROL

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: TOC

Analysis Date: 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY

Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03407	TV=10000	4800	83/80	80 - 120	ND

Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)
CU03407	13100	12800	2.30	≤ 20

MISCELLANEOUS

	Standard ID #	%Recoveries
Independent Secondary Reference Material:	WP-337	99
Method Standard (Lab. Control Spike):	#3046.8	90

COMMENTS: _____

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: RG

Parameter: DOC

Analysis Date: 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

SPIKE - ACCURACY					
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03407	TV=10000	5400	81/81	80 - 120	ND
MISCELLANEOUS					
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03407	13400	13400	0.00	≤ 20	
MISCELLANEOUS					
	Standard ID #	%Recoveries			
Independent Secondary Reference Material:	WP-337	99			
Method Standard (Lab. Control Spike):	#3046.8	90			

COMMENTS: _____



Analytical Laboratory Report

Report ID: S54195.01(01)
Generated on 10/09/2023

Report to

Attention: Emil Blaj
Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Phone: D:517-788-5888 C:517-684-9467 FAX:
Email: emil.blaj@cmsenergy.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S54195.01-S54195.03
Project: 23-0930 PR#23101280
Collected Date(s): 10/04/2023
Submitted Date/Time: 10/06/2023 08:15
Sampled by: Unknown
P.O. #: 4400114090

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- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

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Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

All accreditations/certifications held by this laboratory are listed on page 3. Not all accreditations/certifications are applicable to this report.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Accreditations

Authority	Accreditation ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:2017	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
SM4500-S2 D	Standard Method 4450 S2 D 2011



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S54195.01	23-0930-01 (DEK-MW-18001)	Groundwater	10/04/23 06:12
S54195.02	23-0930-02 (DEK-MW-18001 Field MS)	Groundwater	10/04/23 06:12
S54195.03	23-0930-03 (DEK-MW-18001 Field MSD)	Groundwater	10/04/23 06:12



Analytical Laboratory Report

Lab Sample ID: S54195.01

Sample Tag: 23-0930-01 (DEK-MW-18001)

Collected Date/Time: 10/04/2023 06:12

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:06, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.0005	mg/L	1	18496-25-8	



Analytical Laboratory Report

Lab Sample ID: S54195.02

Sample Tag: 23-0930-02 (DEK-MW-18001 Field MS)

Collected Date/Time: 10/04/2023 06:12

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:10, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.184	0.02	0.0005	mg/L	1	18496-25-8	1

1-* Sample spiked @ 0.20ppm level



Analytical Laboratory Report

Lab Sample ID: S54195.03

Sample Tag: 23-0930-03 (DEK-MW-18001 Field MSD)

Collected Date/Time: 10/04/2023 06:12

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	NaOH/Zn Acetate	Yes	6.3	IR

Inorganics

Method: SM4500-S2 D, Run Date: 10/07/23 11:12, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.184	0.02	0.0005	mg/L	1	18496-25-8	1

1-* Sample spiked @ 0.20ppm level

Merit Laboratories Login Checklist

Lab Set ID:S54195

Attention: Emil Blaj

Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Client: CONSUMERS (Consumers Energy Company)

Project: 23-0930 PR#23101280

Submitted: 10/06/2023 08:15 Login User: MMC

Phone: D:517-788-5888 FAX:

Email: emil.blaj@cmsenergy.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 6.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S54195 Submitted: 10/06/2023 08:15
Client: CONSUMERS (Consumers Energy Company)
Project: 23-0930 PR#23101280

Attention: Emil Blaj
Address: Consumers Energy Company
135 West Trail Street
Jackson, MI 49201

Initial Preservation Check: 10/06/2023 09:38 MMC
Preservation Recheck (E200.8): N/A

Phone: D:517-788-5888 FAX:
Email: emil.blaj@cmsenergy.com

Sample ID	Bottle / Preservation	pH (Orig)	Add ml	pH (New)	Notes
S54195.01	125ml Plastic NaOH/Zn Acetate	>12			
S54195.02	125ml Plastic NaOH/Zn Acetate	>12			
S54195.03	125ml Plastic NaOH/Zn Acetate	>12			



ANALYTICAL REPORT

PREPARED FOR

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

Generated 11/10/2023 1:35:53 PM

JOB DESCRIPTION

Karn/Weadock CCR Groundwater Monitoring

JOB NUMBER

240-193317-1

Eurofins Cleveland

Job Notes

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

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

Authorization



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



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Definitions/Glossary

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Qualifiers

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
F	Duplicate RPD exceeds the control limit
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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

Case Narrative

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Job ID: 240-193317-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-193317-1

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 temperature of the cooler at receipt time was 1.7°C

Gas Flow Proportional Counter

Method 903.0: Radium-226 batch 631942

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.

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.

DEK-MW-15003 (240-193317-1), OW-10 (240-193317-2), OW-11 (240-193317-3), OW-12 (240-193317-4), DUP-KLI (240-193317-5), EB-KLI (240-193317-6), (LCS 160-631942/2-A), (MB 160-631942/1-A) and (240-193317-B-6-A DU)

Method 904.0: Radium-228 Prep Batch 160-632941

Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-15003 (240-193317-1), OW-11 (240-193317-3), OW-12 (240-193317-4) and DUP-KLI (240-193317-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 904.0: Radium-228 Prep Batch 160-632941

The following sample was prepared at a reduced aliquot due to Matrix: OW-10 (240-193317-2). 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 batch 631946

The precision was outside the acceptable control limits. The original sample and batch duplicate were recounted but yielded inconsistent results. A re-extract was initiated however there is insufficient sample volume to perform it, therefore the original results have been reported. The client should take this into consideration when evaluating the data

(240-193317-B-6-B DU)

Method 904.0: Radium-228 batch 631946

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.

EB-KLI (240-193317-6), (LCS 160-631946/2-A), (MB 160-631946/1-A) and (240-193317-B-6-B DU)

Case Narrative

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Job ID: 240-193317-1 (Continued)

Laboratory: Eurofins Cleveland (Continued)

Method 904.0: Radium-228 prep batch 160-632941:

The LCSD recovered at 131% which is outside the 75-125 limits. The LCS recovery was within the 75-125 QC limits. Additionally the primary purpose of the LCSD is to demonstrate method precision. The RER/RPD/DER between the LCS/LCSD passed. In addition all associated samples have activity below the MDC and RL. Original results will be qualified and reported. (LCSD 160-632941/3-A)

Method 904.0: Radium-228 prep batch 160-632941:

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. DEK-MW-15003 (240-193317-1), OW-10 (240-193317-2), OW-11 (240-193317-3), OW-12 (240-193317-4), DUP-KLI (240-193317-5), (LCS 160-632941/2-A), (LCSD 160-632941/3-A) and (MB 160-632941/1-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.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

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 Groundwater Monitoring

Job ID: 240-193317-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193317-1	DEK-MW-15003	Water	10/04/23 13:47	10/11/23 08:00
240-193317-2	OW-10	Water	10/04/23 14:57	10/11/23 08:00
240-193317-3	OW-11	Water	10/04/23 12:29	10/11/23 08:00
240-193317-4	OW-12	Water	10/04/23 15:44	10/11/23 08:00
240-193317-5	DUP-KLI	Water	10/04/23 00:00	10/11/23 08:00
240-193317-6	EB-KLI	Water	10/04/23 16:08	10/11/23 08:00

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Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: DEK-MW-15003

Lab Sample ID: 240-193317-1

Date Collected: 10/04/23 13:47

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	0.0354	U	0.0715	0.0716	1.00	0.129	pCi/L	10/13/23 10:40	10/24/23 11:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.2		30 - 110					10/13/23 10:40	10/24/23 11:33	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	0.491	U *	0.351	0.354	1.00	0.522	pCi/L	10/23/23 11:14	10/30/23 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.4		30 - 110					10/23/23 11:14	10/30/23 11:48	1
Y Carrier	75.1		30 - 110					10/23/23 11:14	10/30/23 11:48	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	0.526		0.358	0.361	5.00	0.522	pCi/L		11/09/23 23:21	1

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: OW-10
Date Collected: 10/04/23 14:57
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-2
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	0.0931	U	0.116	0.116	1.00	0.192	pCi/L	10/13/23 10:40	10/24/23 11:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					10/13/23 10:40	10/24/23 11:33	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	0.634	U *	0.489	0.493	1.00	0.745	pCi/L	10/23/23 11:14	10/30/23 11:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.1		30 - 110					10/23/23 11:14	10/30/23 11:51	1
Y Carrier	77.8		30 - 110					10/23/23 11:14	10/30/23 11:51	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	0.727	U	0.503	0.506	5.00	0.745	pCi/L		11/09/23 23:21	1

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: OW-11

Lab Sample ID: 240-193317-3

Date Collected: 10/04/23 12:29

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	0.0306	U	0.0748	0.0749	1.00	0.137	pCi/L	10/13/23 10:40	10/24/23 11:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.6		30 - 110					10/13/23 10:40	10/24/23 11:34	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	0.234	U *	0.298	0.299	1.00	0.496	pCi/L	10/23/23 11:14	10/30/23 11:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.2		30 - 110					10/23/23 11:14	10/30/23 11:51	1
Y Carrier	81.5		30 - 110					10/23/23 11:14	10/30/23 11:51	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	0.265	U	0.307	0.308	5.00	0.496	pCi/L		11/09/23 23:21	1

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: OW-12
Date Collected: 10/04/23 15:44
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-4
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	0.259		0.110	0.112	1.00	0.124	pCi/L	10/13/23 10:40	10/24/23 11:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.1		30 - 110					10/13/23 10:40	10/24/23 11:34	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	0.341	U *	0.310	0.312	1.00	0.488	pCi/L	10/23/23 11:14	10/30/23 11:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.2		30 - 110					10/23/23 11:14	10/30/23 11:51	1
Y Carrier	80.0		30 - 110					10/23/23 11:14	10/30/23 11:51	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	0.600		0.329	0.331	5.00	0.488	pCi/L		11/09/23 23:21	1

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: DUP-KLI

Lab Sample ID: 240-193317-5

Date Collected: 10/04/23 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	0.281		0.123	0.126	1.00	0.143	pCi/L	10/13/23 10:40	10/24/23 11:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.9		30 - 110					10/13/23 10:40	10/24/23 11:34	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	0.208	U *	0.371	0.371	1.00	0.638	pCi/L	10/23/23 11:14	10/30/23 11:52	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		30 - 110					10/23/23 11:14	10/30/23 11:52	1
Y Carrier	79.6		30 - 110					10/23/23 11:14	10/30/23 11:52	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	0.489	U	0.391	0.392	5.00	0.638	pCi/L		11/09/23 23:21	1

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: EB-KLI
Date Collected: 10/04/23 16:08
Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-6
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	0.143		0.100	0.101	1.00	0.142	pCi/L	10/13/23 10:40	10/24/23 11:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.8		30 - 110					10/13/23 10:40	10/24/23 11:34	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	0.321	U	0.314	0.315	1.00	0.503	pCi/L	10/13/23 10:49	10/19/23 11:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.8		30 - 110					10/13/23 10:49	10/19/23 11:19	1
Y Carrier	81.9		30 - 110					10/13/23 10:49	10/19/23 11:19	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	0.464	U	0.330	0.331	5.00	0.503	pCi/L		11/09/23 23:21	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

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)	
240-193317-1	DEK-MW-15003	93.2	
240-193317-2	OW-10	88.5	
240-193317-3	OW-11	94.6	
240-193317-4	OW-12	95.1	
240-193317-5	DUP-KLI	91.9	
240-193317-6	EB-KLI	96.8	
240-193317-6 DU	EB-KLI	95.4	
LCS 160-631942/2-A	Lab Control Sample	96.8	
MB 160-631942/1-A	Method Blank	96.8	
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)
240-193317-1	DEK-MW-15003	90.4	75.1
240-193317-2	OW-10	84.1	77.8
240-193317-3	OW-11	89.2	81.5
240-193317-4	OW-12	92.2	80.0
240-193317-5	DUP-KLI	83.6	79.6
240-193317-6	EB-KLI	96.8	81.9
240-193317-6 DU	EB-KLI	95.4	70.3
LCS 160-631946/2-A	Lab Control Sample	96.8	83.0
LCS 160-632941/2-A	Lab Control Sample	96.0	78.9
LCS 160-632941/3-A	Lab Control Sample Dup	96.2	76.3
MB 160-631946/1-A	Method Blank	96.8	75.9
MB 160-632941/1-A	Method Blank	92.7	77.0
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

QC Sample Results

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-631942/1-A
Matrix: Water
Analysis Batch: 633301

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 631942

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.09547	U	0.0895	0.0899	1.00	0.139	pCi/L	10/13/23 10:40	10/24/23 11:33	1
Carrier	MB	MB	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	%Yield	Qualifier	30 - 110				10/13/23 10:40		10/24/23 11:33	1
	96.8									

Lab Sample ID: LCS 160-631942/2-A
Matrix: Water
Analysis Batch: 633301

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631942

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	11.73		1.23	1.00	0.145	pCi/L	103	75 - 125
Carrier	LCS	LCS	Limits						
Ba Carrier	%Yield	Qualifier	30 - 110						
	96.8								

Lab Sample ID: 240-193317-6 DU
Matrix: Water
Analysis Batch: 633301

Client Sample ID: EB-KLI
Prep Type: Total/NA
Prep Batch: 631942

Analyte	Sample	Sample	DU	DU	Total	RL	MDC	Unit	RER	RER
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					Limit
Radium-226	0.143		0.02905	U	0.0708	1.00	0.130	pCi/L	0.66	1
Carrier	DU	DU	Limits							
Ba Carrier	%Yield	Qualifier	30 - 110							
	95.4									

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-631946/1-A
Matrix: Water
Analysis Batch: 632573

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 631946

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.6152		0.355	0.359	1.00	0.506	pCi/L	10/13/23 10:49	10/19/23 11:18	1
Carrier	MB	MB	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	%Yield	Qualifier	30 - 110				10/13/23 10:49		10/19/23 11:18	1
Y Carrier	75.9		30 - 110				10/13/23 10:49		10/19/23 11:18	1

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QC Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

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

Lab Sample ID: LCS 160-631946/2-A
Matrix: Water
Analysis Batch: 632573

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631946

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
									75	125
Radium-228	7.79	8.402		1.16	1.00	0.490	pCi/L	108	75	125
LCS LCS										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	96.8		30 - 110							
Y Carrier	83.0		30 - 110							

Lab Sample ID: 240-193317-6 DU
Matrix: Water
Analysis Batch: 632573

Client Sample ID: EB-KLI
Prep Type: Total/NA
Prep Batch: 631946

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
										1
Radium-228	0.321	U	2.645	F	0.633	1.00	0.552	pCi/L	2.45	1
DU DU										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	95.4		30 - 110							
Y Carrier	70.3		30 - 110							

Lab Sample ID: MB 160-632941/1-A
Matrix: Water
Analysis Batch: 634308

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632941

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
										1
Radium-228	0.03289	U	0.307	0.307	1.00	0.568	pCi/L	10/23/23 11:14	10/30/23 11:48	1
MB MB										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	92.7		30 - 110							
Y Carrier	77.0		30 - 110							

Lab Sample ID: LCS 160-632941/2-A
Matrix: Water
Analysis Batch: 634308

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632941

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
									75	125
Radium-228	7.76	8.365		1.20	1.00	0.507	pCi/L	108	75	125
LCS LCS										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	96.0		30 - 110							
Y Carrier	78.9		30 - 110							

QC Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

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

Lab Sample ID: LCSD 160-632941/3-A
Matrix: Water
Analysis Batch: 634308

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 632941

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228	7.76	10.18	*	1.38	1.00	0.519	pCi/L	131	75 - 125	0.70	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	96.2		30 - 110
Y Carrier	76.3		30 - 110

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Association Summary

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Rad

Prep Batch: 631942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193317-1	DEK-MW-15003	Total/NA	Water	PrecSep STD	
240-193317-2	OW-10	Total/NA	Water	PrecSep STD	
240-193317-3	OW-11	Total/NA	Water	PrecSep STD	
240-193317-4	OW-12	Total/NA	Water	PrecSep STD	
240-193317-5	DUP-KLI	Total/NA	Water	PrecSep STD	
240-193317-6	EB-KLI	Total/NA	Water	PrecSep STD	
MB 160-631942/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-631942/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
240-193317-6 DU	EB-KLI	Total/NA	Water	PrecSep STD	

Prep Batch: 631946

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193317-6	EB-KLI	Total/NA	Water	PrecSep_0	
MB 160-631946/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-631946/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
240-193317-6 DU	EB-KLI	Total/NA	Water	PrecSep_0	

Prep Batch: 632941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193317-1	DEK-MW-15003	Total/NA	Water	PrecSep_0	
240-193317-2	OW-10	Total/NA	Water	PrecSep_0	
240-193317-3	OW-11	Total/NA	Water	PrecSep_0	
240-193317-4	OW-12	Total/NA	Water	PrecSep_0	
240-193317-5	DUP-KLI	Total/NA	Water	PrecSep_0	
MB 160-632941/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-632941/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-632941/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: DEK-MW-15003

Date Collected: 10/04/23 13:47

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:33
Total/NA	Prep	PrecSep_0			632941	KAC	EET SL	10/23/23 11:14
Total/NA	Analysis	904.0		1	634308	SCB	EET SL	10/30/23 11:48
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Client Sample ID: OW-10

Date Collected: 10/04/23 14:57

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:33
Total/NA	Prep	PrecSep_0			632941	KAC	EET SL	10/23/23 11:14
Total/NA	Analysis	904.0		1	634362	MLK	EET SL	10/30/23 11:51
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Client Sample ID: OW-11

Date Collected: 10/04/23 12:29

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:34
Total/NA	Prep	PrecSep_0			632941	KAC	EET SL	10/23/23 11:14
Total/NA	Analysis	904.0		1	634362	MLK	EET SL	10/30/23 11:51
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Client Sample ID: OW-12

Date Collected: 10/04/23 15:44

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:34
Total/NA	Prep	PrecSep_0			632941	KAC	EET SL	10/23/23 11:14
Total/NA	Analysis	904.0		1	634362	MLK	EET SL	10/30/23 11:51
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Client Sample ID: DUP-KLI

Date Collected: 10/04/23 00:00

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:34
Total/NA	Prep	PrecSep_0			632941	KAC	EET SL	10/23/23 11:14
Total/NA	Analysis	904.0		1	634362	MLK	EET SL	10/30/23 11:52
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Client Sample ID: EB-KLI

Date Collected: 10/04/23 16:08

Date Received: 10/11/23 08:00

Lab Sample ID: 240-193317-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep STD			631942	BMW	EET SL	10/13/23 10:40
Total/NA	Analysis	903.0		1	633301	FLC	EET SL	10/24/23 11:34
Total/NA	Prep	PrecSep_0			631946	BMW	EET SL	10/13/23 10:49
Total/NA	Analysis	904.0		1	632573	FLC	EET SL	10/19/23 11:19
Total/NA	Analysis	Ra226_Ra228		1	636194	EMH	EET SL	11/09/23 23:21

Laboratory References:

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

Accreditation/Certification Summary

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193317-1

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
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.

1.8/1.7



Client Information		Lab PM: Brooks, Kris M		Carrier Tracking No(s): 240-112532-29054-1	
Client Contact: Jacob Krenz		E-Mail: Kns Brooks@et.eurofins.com		Page: 1 of 1	
Company: TRC Environmental Corporation		PWSID		Job #	
Address: 1540 Eisenhower Place		Due Date Requested:		Preservation Codes:	
City: Ann Arbor		TAT Requested (days):		A - HCL	
State, Zip: MI, 48108-7080		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		B - NaOH	
Phone: 734-971-7080 (Tel) 734-971-9022 (Fax)		PO # 199812		C - Zn Acetate	
Email: JKrenz@trccompanies.com		WO #		D - Nitric Acid	
Project Name: Karm/Wleadock CCR DEK Lined Impoundment		Project #: 24024154		E - NaHSO4	
Site: S20W#		SOW#		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:	
				Total Number of Containers	
				Special Instructions/Note:	
				<p style="text-align: center; font-size: 2em; font-weight: bold;">MICHIGAN 190</p>	
				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
				Special Instructions/QC Requirements	
				Method of Shipment:	
				Date/Time: 10/10/23 13:00 Company: EETA	
				Date/Time: 10/11/23 8:00am Company: EETNC	
				Date/Time: _____ Company: _____	
				Cooler Temperatures: °C and Other Remarks	
				Custody Seal No.: <input type="checkbox"/> Yes <input type="checkbox"/> No	



Eurofins - Cleveland Sample Receipt Form/Narrative
Barberton Facility


Login # : 193317

Client Tre environmental Site Name _____
 Cooler Received on 10/11/23 Opened on 10/11/23
 FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other

Cooler unpacked by:
L Osborne

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. 1.8 °C Corrected Cooler Temp. 1.7 °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ 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: _____

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: _____

- 1
- 2
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- 9
- 10
- 11
- 12
- 13
- 14

Temperature readings:

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
DEK-MW-15003	240-193317-A-1	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15003	240-193317-B-1	Plastic 1 liter - Nitric Acid	<2			
OW-10	240-193317-A-2	Plastic 1 liter - Nitric Acid	<2			
OW-10	240-193317-B-2	Plastic 1 liter - Nitric Acid	<2			
OW-11	240-193317-A-3	Plastic 1 liter - Nitric Acid	<2			
OW-11	240-193317-B-3	Plastic 1 liter - Nitric Acid	<2			
OW-12	240-193317-A-4	Plastic 1 liter - Nitric Acid	<2			
OW-12	240-193317-B-4	Plastic 1 liter - Nitric Acid	<2			
DUP-KLI	240-193317-A-5	Plastic 1 liter - Nitric Acid	<2			
DUP-KLI	240-193317-B-5	Plastic 1 liter - Nitric Acid	<2			
EB-KLI	240-193317-A-6	Plastic 1 liter - Nitric Acid	<2			
EB-KLI	240-193317-B-6	Plastic 1 liter - Nitric Acid	<2			

Chain of Custody Record



Client Information (Sub Contract Lab)		Lab PM: Brooks, Kris M	Carmer Tracking No(s): 240-175097.1
Client Contact: Shipping/Receiving		E-Mail: Kris.Brooks@et.eurofins.com	Page: Page 1 of 1
Company: TesAmerica Laboratories, Inc.		Address: 13715 Rider Trail North, Earth City State, Zip: MO, 63045	Job #: 240-193317-1
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		PO #: WO #:	Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: Z - other (specify)
Project Name: Kam/Weadock CCR Groundwater Monitoring		Project #: 24024154	
Site:		SSOW#:	
Due Date Requested: 11/9/2023		TAT Requested (days):	
Analysis Requested		Total Number of Containers	
Perform MS/MSD (Yes or No)		903.0/PreSep_STD Standard Target List	
Field Filtered Sample (Yes or No)		904.0/PreSep_0 Standard Target List	
Matrix (W=Water, S=solid, O=Organic, BT=Blk, A=Al)		Ra226Ra228_GFPc	
Sample Type (C=Comp, G=grab)		903.0/PreSep_STD Standard Target List	
Sample Date		904.0/PreSep_0 Standard Target List	
Sample Time		Field Filtered Sample (Yes or No)	
Sample Identification - Client ID (Lab ID)		Preservation Code:	
DEK-MW-15003 (240-193317-1)	10/4/23	13:47 Eastern	Water
OW-10 (240-193317-2)	10/4/23	14:57 Eastern	Water
OW-11 (240-193317-3)	10/4/23	12:29 Eastern	Water
OW-12 (240-193317-4)	10/4/23	15:44 Eastern	Water
DUP-KLI (240-193317-5)	10/4/23	16:08 Eastern	Water
EB-KLI (240-193317-6)	10/4/23	16:08 Eastern	Water
Special Instructions/Note:			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			
TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.			

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the 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
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For Months

Empty Kit Relinquished by: *Brooks, Kris M* Date: 10/11/23 15:35
 Relinquished by: *Brooks, Kris M* Company: *Company*
 Relinquished by: *Brooks, Kris M* Company: *Company*
 Custody Seal No.: *1535* Cooler Temperature(s) °C and Other Remarks:



Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-193317-1

Login Number: 193317

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 10/12/23 12:19 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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 <math><6\text{mm}</math> (1/4").	N/A	
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 11/7/2023 2:58:30 PM

JOB DESCRIPTION

Karn/Weadock CCR Groundwater Monitoring

JOB NUMBER

240-193136-1

Eurofins Cleveland

Job Notes

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

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

Authorization



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



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Definitions/Glossary

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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

Case Narrative

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Job ID: 240-193136-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-193136-1

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 sample was received on 10/9/2023 8:00 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°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.

DEK-MW-18001 (240-193136-1), (LCS 160-631370/2-A), (MB 160-631370/1-A), (240-193059-A-6-A) and (240-193059-B-6-A 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.

DEK-MW-18001 (240-193136-1), (LCS 160-631371/2-A), (MB 160-631371/1-A), (240-193059-A-6-B) and (240-193059-B-6-B DU)

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

Rad

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

Method Summary

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

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 Groundwater Monitoring

Job ID: 240-193136-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193136-1	DEK-MW-18001	Water	10/04/23 06:12	10/09/23 08:00

- 1
- 2
- 3
- 4
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- 10
- 11
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- 13
- 14

Client Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Client Sample ID: DEK-MW-18001

Lab Sample ID: 240-193136-1

Date Collected: 10/04/23 06:12

Matrix: Water

Date Received: 10/09/23 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	0.148		0.0808	0.0819	1.00	0.0936	pCi/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.7		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	0.286	U	0.351	0.352	1.00	0.581	pCi/L	10/10/23 12:35	10/16/23 12:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.7		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	0.434	U	0.360	0.361	5.00	0.581	pCi/L		11/07/23 15:48	1

Tracer/Carrier Summary

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

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)	
240-193136-1	DEK-MW-18001	90.7	
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)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
240-193136-1	DEK-MW-18001	90.7	74.4
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			

QC Sample Results

Client: TRC Environmental Corporation.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-631370/1-A
Matrix: Water
Analysis Batch: 633137

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 631370

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
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	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.93		1.13	1.00	0.0948	pCi/L	97	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	101		30 - 110					10/10/23 12:33	10/24/23 09:19

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	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
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			

Lab Sample ID: LCS 160-631371/2-A
Matrix: Water
Analysis Batch: 632123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 631371

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-228	7.79	8.365		1.15	1.00	0.475	pCi/L	107	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	101		30 - 110					10/10/23 12:35	10/16/23 12:05
Y Carrier	84.9		30 - 110		10/10/23 12:35	10/16/23 12:05	1		

QC Association Summary

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Rad

Prep Batch: 631370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193136-1	DEK-MW-18001	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	

Prep Batch: 631371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193136-1	DEK-MW-18001	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	

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Lab Chronicle

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Client Sample ID: DEK-MW-18001

Lab Sample ID: 240-193136-1

Date Collected: 10/04/23 06:12

Matrix: Water

Date Received: 10/09/23 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.
 Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
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 Sample Receipt Form/Narrative

Login # : _____


Barberton Facility

Client TAC Environmental Site Name _____ Cooler unpacked by: [Signature]
Cooler Received on 10-7-23 Opened on 10-9-23
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. 0.6 °C Corrected Cooler Temp. 0.5 °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 NA
 -Were tamper/custody seals intact and uncompromised? Yes No NA
- 3. Shippers' packing slip attached to the cooler(s)? Yes No
- 4. Did custody papers accompany the sample(s)? Yes No
- 5. Were the custody papers relinquished & signed in the appropriate place? Yes No
- 6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
- 7. Did all bottles arrive in good condition (Unbroken)? Yes No
- 8. Could all bottle labels (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# 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: _____

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
DEK-MW-18001	240-193136-A-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DEK-MW-18001	240-193136-B-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Eurofins – Cleveland Sample Receipt Form/Narrative Login # : _____
Barberton Facility

Client TAC Environmental Site Name _____ Cooler unpacked by: [Signature]
Cooler Received on 10-7-23 Opened on 10-9-23
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. 0.6 °C Corrected Cooler Temp. 0.5 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 7 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

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: _____



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
DEK-MW-18001	240-193136-A-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DEK-MW-18001	240-193136-B-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-193136-1

Login Number: 193136

List Number: 2

Creator: Pinette, Meadow L

List Source: Eurofins St. Louis

List Creation: 10/10/23 11:23 AM

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 B Field Notes



PROJECT NAME:	CEC Karn BAP/LI: 2023 GW Compliance
PROJECT NUMBER:	514404.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	10/2/2023 TO 10/5/2023
PURPOSE OF FIELDWORK:	Fourth Quarter 2023 Groundwater Sampling
WORK PERFORMED BY:	J. Jasso, J. Krenz, A. Whaley

JL Krenz 10-13-23
SIGNED DATE

A. Whaley 10-31-23
CHECKED BY DATE



GENERAL NOTES

PROJECT NAME: CEC Kern BAP/LI: 2023 GW Comp	DATE: 10-2-23	TIME ARRIVED: 0800
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ (JK) AW	TIME LEFT: 1600

WEATHER		
TEMPERATURE: <u>73</u> °F	WIND: <u>0-5</u> MPH	VISIBILITY: <u>clear</u>
WORK / SAMPLING PERFORMED		
Downloaded data from transducers		
Sampled background monitoring wells MW-15008		
and MW-15019		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
P. Madzair	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	Purge to Ground

10-13-23
 SIGNED DATE

10-31-23
 CHECKED BY DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Comp	DATE: <u>10/3/23</u>	TIME ARRIVED: <u>0531</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ JK AW	TIME LEFT: <u>1300</u>

WEATHER		
TEMPERATURE: <u>60</u> °F	WIND: <u>ll</u> MPH	VISIBILITY: <u>overcast</u>

WORK / SAMPLING PERFORMED
<u>wells An</u>
<u>DEK-mw 22006, Dup-H02, DEKmw-22004, DEK-mw 22003</u>
<u>DEKmw 22002, DEKmw 22001, DEKmw 22001</u>

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
Darby Litz	TRC	PM - Updates
	Consumers	Site Contact

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
Groundwater	NM	Purge to Ground

SIGNED [Signature] DATE 10/4/23

CHECKED BY [Signature] DATE 10-27-23



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Comp	DATE: <u>10/4/2023</u>	TIME ARRIVED: <u>0715</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ JK <u>AW</u>	TIME LEFT: <u>1640</u>

WEATHER		
TEMPERATURE: <u>64-81</u> °F	WIND: <u>5-10</u> MPH	VISIBILITY: <u>Clear</u>

WORK / SAMPLING PERFORMED
<u>Calibrate Insitu</u>
<u>Sample DEH-MW-15002 with DOP-DEK BAP -01</u>

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>Darby Litz</u>	<u>TRC</u>	<u>PM - Updates</u>
<u>Pete Madzior</u>	<u>Consumers</u>	<u>Site Contact</u>

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>Groundwater</u>	<u>NM</u>	<u>Purge to Ground</u>

[Signature] 10/11/23
 SIGNED DATE

[Signature] 10-30-23
 CHECKED BY DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Comp	DATE: <u>10/5/2023</u>	TIME ARRIVED: <u>0705</u>
PROJECT NUMBER: 514404.0001.0000	AUTHOR: JJ JK <u>(W)</u>	TIME LEFT: <u>1030</u>

WEATHER		
TEMPERATURE: <u>61</u> °F	WIND: <u>0-5</u> MPH	VISIBILITY: <u>LOW-Rain</u>

WORK / SAMPLING PERFORMED
<u>Check in w/ Security</u>
<u>Calibrate Insitu AquaTron 600</u>
<u>Sample DEK-MW-15006, and DEK-MW 15005</u>
<u>Drop samples off to Trail st. Labs</u>
<u>Return MW keys to Pete Madziar</u>

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>Darby Litz</u>	<u>TRC</u>	<u>PM - Updates</u>
<u>Pete Madziar</u>	<u>Consumers</u>	<u>Site Contact</u>

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>Groundwater</u>	<u>NM</u>	<u>Purge to Ground</u>

[Signature]
 SIGNED _____ DATE 10/10/23

[Signature] 10-30-23
 CHECKED BY _____ DATE



EQUIPMENT SUMMARY

PROJECT NAME:	CEC Karn BAP/LI: 2023 GW	SAMPLER NAME:	J. Jasso, J. Krenz, A. Whaley
PROJECT NO.:	514404.0001.0000		

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	<input checked="" type="checkbox"/> LOW-FLOW SAMPLING EVENT
TUBING TYPE	

PURGE WATER DISPOSAL METHOD

GROUND
 DRUM
 POTW
 POLYTANK
 OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE

 10/01/23
 SIGNED _____ DATE

 10-27-23
 CHECKED BY _____ DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	MODEL: VSI PRO DSS	SAMPLER: AW (K)JJ
PROJECT NO.: 514404.0001.0000	SERIAL #: Ann Arbor	DATE: 10-2-23

PH CALIBRATION CHECK

pH 7 (LOT #): 36C914 (EXP. DATE): Mar/25	pH 4 / 10 (LOT #): 36A1136 (EXP. DATE): Jan/25	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.01 / 7.01	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	1106
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): 36E040 (EXP. DATE): May/24	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
1362 / 1362	23.5	<input checked="" type="checkbox"/> WITHIN RANGE	1102
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): 236100046 (EXP. DATE): 7-4-28	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
218.4 / 218.4	21.9	<input checked="" type="checkbox"/> WITHIN RANGE	1109
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
8.9 / 8.9	21.4	<input checked="" type="checkbox"/> WITHIN RANGE	1111
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): A53120 (EXP. DATE): Jun/25	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
10.1 / 10.0	/	<input checked="" type="checkbox"/> WITHIN RANGE	1112
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #): (EXP. DATE):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED: *JL King* DATE: **10-13-23**

CHECKED BY: *Andrew White* DATE: **10-31-23**



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn LF: 2023 GW Compliance	MODEL: YSI Pro DSS	SAMPLER: AW, JJ, JK
PROJECT NO.: 514404.0000.0000	SERIAL #: <i>Rented</i>	DATE: <i>10/3/23</i>

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL. RANGE	TIME
(LOT #): <i>309359</i>	(EXP. DATE): <i>2/5</i>	(LOT #): <i>36044</i>	(EXP. DATE): <i>3/5</i>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
<i>700 / 700</i>	<i>400 / 400</i>	<input checked="" type="checkbox"/>	WITHIN RANGE	<i>0500</i>	
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <i>360493</i>	(°CELSIUS)		
(EXP. DATE): <i>3/24</i>			
POST-CAL. READING / STANDARD			
<i>1300 / 1300</i>	<i>24.</i>	<input checked="" type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE

ORP CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <i>22K10510</i>	(°CELSIUS)		
(EXP. DATE): <i>10/07</i>			
POST-CAL. READING / STANDARD			
<i>220 / 220</i>	<i>23.</i>	<input checked="" type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR	(°CELSIUS)		
<i>7.89 / 7.89</i>	<i>26.</i>	<input checked="" type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE
/		<input type="checkbox"/>	WITHIN RANGE

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <i>A3097</i>	(LOT #):		
(EXP. DATE): <i>4/5</i>	(EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>0 / 0</i>	<i>/</i>	<input checked="" type="checkbox"/>	WITHIN RANGE
<i>100 / 100</i>	<i>/</i>	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

NOTES

Blank area for notes.

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED: *[Signature]* DATE: *10/06/23*

CHECKED BY: *[Signature]* DATE: *10-27-23*



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW Compliance	MODEL: <i>In Situ AquaTroll</i>	SAMPLER: <i>AW JK, JJ</i>
PROJECT NO.: 514404.0001.0000	SERIAL #: <i>AA office</i>	DATE: <i>10/5/23</i>

PH CALIBRATION CHECK

pH 7		pH 10		CAL. RANGE	TIME
(LOT #): <i>BGG121</i>	(EXP. DATE): <i>Jul 25</i>	(LOT #): <i>36F1085</i>	(EXP. DATE): <i>Jul 25</i>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
<i>7.02 / 7.02</i>	<i>4.00 / 4.00</i>	<input checked="" type="checkbox"/>	WITHIN RANGE	<i>0724</i>	
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #): <i>36F084</i>	(EXP. DATE): <i>Jul 24</i>	(°CELSIUS)		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
<i>1290 / 1290</i>	<i>26.59</i>	<input checked="" type="checkbox"/>	WITHIN RANGE	<i>0727</i>
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #): <i>23610036</i>	(EXP. DATE): <i>Jul 28</i>	(°CELSIUS)		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
<i>223.4 / 223.4</i>	<i>19.89</i>	<input checked="" type="checkbox"/>	WITHIN RANGE	<i>0730</i>
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #):	(EXP. DATE):	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR	POST-CAL. READING / SATURATED AIR			
<i>8.80 / 8.80</i>	<i>20.30</i>	<input checked="" type="checkbox"/>	WITHIN RANGE	<i>0733</i>
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <i>A3097</i>	(EXP. DATE): <i>Jul 24</i>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>100.0 / 100.0</i>	/	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES ⁽¹⁾
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
	⁽¹⁾ CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

John L. Kelly
 SIGNED _____ DATE *10/11/23*

John L. Kelly
 CHECKED BY _____ DATE *10-30-23*



WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, JJ	DATE: 10-4-23
	BY: AW	DATE: 10/11/23

SAMPLE ID: Mw-15002	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 0800	DATE: 10-4-23	SAMPLE	TIME: 0913	DATE: 10-4-23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 6.65 SU		CONDUCTIVITY: 7538 umhos/cm		
DEPTH TO WATER: 7.67 T/ PVC	ORP: -96.7 mV		DO: 0.2 mg/L		
DEPTH TO BOTTOM: 16.87 T/ PVC	TURBIDITY: 3.7 NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 15.3 °C		OTHER: _____		
VOLUME REMOVED: 14 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: clear		ODOR: none		
COLOR: clear	ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: _____		FILTRATE ODOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
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	4754	-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	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	125ml	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	250ml	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	1L	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: lab drop off	DATE SHIPPED: 10-5-23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <i>je ky</i>	DATE SIGNED: 10-13-23



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: AW <u>(K) JJ</u>	DATE: <u>10-2-23</u>	BY: <u>AJ</u>	DATE: <u>10/3/23</u>
SAMPLE ID: <u>MW-15008</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>1120</u>	DATE: <u>10-2-23</u>	SAMPLE	TIME: <u>1151</u>	DATE: <u>10-2-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: <u>6.48</u> SU		CONDUCTIVITY: <u>1506</u> umhos/cm	
		ORP: <u>-87.4</u> mV		DO: <u>0.1</u> mg/L	
DEPTH TO WATER: <u>6.467</u> T/ PVC		TURBIDITY: <u>2.7</u> NTU			
DEPTH TO BOTTOM: <u>17.44</u> T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>15.7</u> °C		OTHER: _____	
VOLUME REMOVED: <u>6</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>4.67</u>		ODOR: _____	
COLOR: <u>Clear</u> ODOR: <u>None</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: _____		FILTRATE ODOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>Background</u>		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	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	125ml	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	125ml	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
4	1L	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>lab Drop off</u>	DATE SHIPPED: <u>10-5-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10-13-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2023 GW Comp	PREPARED	CHECKED
PROJECT NUMBER: 514404.0000.0000	BY: AW, JJ, JK	DATE: 10/27/23

SAMPLE ID: DEKML8001	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 0947	DATE: 10/26/23	SAMPLE	TIME: 0612	DATE: 10/26/23
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 7.43 SU	CONDUCTIVITY: 870 umhos/cm	ORP: -96.0 mV	DO: 038 mg/L	
DEPTH TO WATER: 970 T/ PVC	TURBIDITY: 2.4 NTU		TEMPERATURE: 14.4 °C		
DEPTH TO BOTTOM: 1965 T/ PVC	NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY <input type="checkbox"/>		OTHER: _____		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: Clear		ODOR: none		
VOLUME REMOVED: 2.5 LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR: Clear		
COLOR: cloudy	ODOR: none		FILTRATE ODOR: none		
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0547	100	4.00	413	220	7.86	2.0	18.3	930	INITIAL
0552		7.45	868	-57.5	1.32	2.0	14.7	935	1.5
0557		7.44	868	-82.3	0.67	2.2	14.5	931	1
0602		7.43	869	-45.3	0.48	2.2	14.4	935	1.5
0607		7.44	870	-45.5	0.35	2.3	14.4	931	2
0613		7.43	870	-96.0	0.38	2.4	14.4	931	2.5
0617									3
									3.5
									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	
4	125	glass	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	3	125	PI	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
3	40	Amh	E	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	3	125	PI	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
3	40	Amh	E	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	3	125	PI	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	250	PI	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	1L	PI	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
3	125	PI	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Fed Ex	DATE SHIPPED: 10-4-23	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE:	DATE SIGNED: 10/26/23



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: <u>AW, JK, JJ</u>	DATE: <u>10/12/23</u>	BY: <u>JK</u>	DATE: <u>10-30-23</u>
SAMPLE ID: <u>DEK MW-15002</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>1452</u>	DATE: <u>10/12/23</u>	SAMPLE	TIME: <u>1517</u>	DATE: <u>10/12/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.34</u> SU		CONDUCTIVITY: <u>885.16</u> umhos/cm		
DEPTH TO WATER: <u>7.18</u> T/ PVC		ORP: <u>-205.8</u> mV		DO: <u>1.62</u> mg/L	
DEPTH TO BOTTOM: <u>NA</u> T/ PVC		TURBIDITY: <u>8.97</u> NTU <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>17.21</u> °C		OTHER: <u>-</u>	
VOLUME REMOVED: <u>5.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>Clear</u>		ODOR: <u>None</u>	
COLOR: <u>Clear</u>		ODOR: <u>Slight</u>		FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
TURBIDITY <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: <u>Clear</u>		FILTRATE ODOR: <u>None</u>	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>DEK-BAP-01</u>		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)
1452	200	7.46	775.72	-153.6	1.81	0.09	19.29	2.18	INITIAL
1457	↓	7.40	888.39	-175.3	1.67	1.34	18.00	7.32	1.0
1502		7.35	919.33	-185.4	1.54	9.26	18.26	2.0	
1507		7.36	889.75	-197.6	1.66	8.86	17.09	3.0	
1512		7.35	892.64	-202.6	1.59	9.42	17.36	4.0	
1517		7.34	885.16	-205.8	1.62	8.97	17.21	5.0	

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	1000	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
4	60	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
4	40	VOA	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
1	250	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	125	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: <u>DROP OFF</u>	DATE SHIPPED: <u>10/15/23</u>	AIRBILL NUMBER: <u>-</u>
COC NUMBER: <u>-</u>	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>10/11/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: <u>AWJK, JJ</u> DATE: <u>10/5/23</u>	BY: <u>JK</u> DATE: <u>10-30-23</u>

SAMPLE ID: <u>DEK-MW-15005</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>0855</u>	DATE: <u>10/5/23</u>	SAMPLE	TIME: <u>0920</u>	DATE: <u>10/5/23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.66</u> SU		CONDUCTIVITY: <u>1002.9</u> umhos/cm		
DEPTH TO WATER: <u>10.05</u> T/ PVC	ORP: <u>-133.8</u> mV		DO: <u>1.64</u> mg/L		
DEPTH TO BOTTOM: <u>NA</u> T/ PVC	TURBIDITY: <u>8.79</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>14.59</u> °C		OTHER: <u>-</u>		
VOLUME REMOVED: <u>5.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>Clear</u>		ODOR: <u>None</u>		
COLOR: <u>Clear</u> ODOR: <u>None</u>	FILTRATE (0.45 um) <input type="checkbox"/> YES <input type="checkbox"/> NO		FILTRATE COLOR: <u>-</u> FILTRATE ODOR: <u>-</u>		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		COMMENTS: <u>ER-DEK-BAP 0945</u>	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER					

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 $\frac{1}{8}$)
0855	200	7.70	902.00	-159.6	2.03	0.00	14.86	10.05	INITIAL
0900	↓	7.71	935.15	-150.0	1.71	1.01	14.61	10.15	1.0
0905		7.70	958.44	-141.0	1.69	2.34	14.66		2.0
0910		7.68	992.40	-137.6	1.67	5.45	14.64		3.0
0915		7.67	995.60	-136.1	1.63	6.35	14.64		4.0
0920		7.66	1002.9	-133.8	1.64	8.79	14.59		5.0

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	1000	Plastic	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	125	Plastic	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
2	60	VOA	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	↓	↓	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
2	40	VOA	E	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	1	↓	↓	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	250	plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	125	plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>Drop off</u>	DATE SHIPPED: <u>10/5/23</u>	AIRBILL NUMBER: <u>-</u>
COC NUMBER: <u>104</u>	SIGNATURE: <u>AW</u>	DATE SIGNED: <u>10/11/23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C		PREPARED		CHECKED	
PROJECT NUMBER: 514404.0001.0000		BY: AW, <u>OK JJ</u>	DATE: <u>10-4-23</u>	BY: <u>AW</u>	DATE: <u>10/31/23</u>
SAMPLE ID: <u>OW-10</u>		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: <u>1415</u>	DATE: <u>10-4-23</u>	SAMPLE	TIME: <u>1457</u>	DATE: <u>10-4-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: <u>7.21</u> SU		CONDUCTIVITY: <u>836</u> umhos/cm	
		ORP: <u>-153.6</u> mV		DO: <u>0.2</u> mg/L	
DEPTH TO WATER: <u>7.64</u> T/ PVC		TURBIDITY: <u>18.9</u> NTU			
DEPTH TO BOTTOM: <u>17.95</u> T/ PVC		<input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: <u>15.0</u> °C		OTHER: _____	
VOLUME REMOVED: <u>4.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>clear</u>		ODOR: <u>none</u>	
COLOR: <u>clear</u> ODOR: <u>none</u>		FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
TURBIDITY <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: <u>clear</u>		FILTRATE ODOR: <u>none</u>	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MSMSD <input type="checkbox"/> DUP-		COMMENTS: <u>FB-KLI collected</u>	

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1417	100	7.36	861	-101.9	2.0	17.7	17.0	8.24	INITIAL
1422	100	7.17	835	-123.5	0.5	19.3	15.3	8.61	0.5
1427	100	7.17	829	-135.2	0.4	23.2	15.1	8.75	1.0
1432	100	7.19	829	-144.5	0.3	26.4	15.1	8.84	1.5
1437	100	7.20	828	-152.6	0.3	25.8	15.1	8.89	2.0
1442	100	7.20	827	-157.8	0.3	22.4	15.0	8.94	2.5
1447	100	7.21	831	-154.3	0.3	19.3	15.1	9.00	3.0
1452	100	7.21	833	-153.7	0.2	19.2	15.0	9.02	3.5
1457	100	7.21	836	-153.6	0.2	18.9	15.0	9.06	4.0

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	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	1L	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	40mL	↓	E	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	40mL	↓	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Lab Drop off</u>	DATE SHIPPED: <u>10-5-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10-13-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW, <u>JK JJ</u> DATE: <u>10-4-23</u>	BY: <u>AW</u> DATE: <u>10/11/23</u>

SAMPLE ID: <u>ow-11</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1131</u>	DATE: <u>10-4-23</u>	SAMPLE	TIME: <u>1229</u>	DATE: <u>10-4-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>9.76</u> SU		CONDUCTIVITY: <u>347.4</u> umhos/cm		
DEPTH TO WATER: <u>22.58</u> T/ PVC		ORP: <u>-23.2</u> mV		DO: <u>1.1</u> mg/L	
DEPTH TO BOTTOM: <u>25.41</u> T/ PVC		TURBIDITY: <u>5.8</u> NTU			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		TEMPERATURE: <u>15.4</u> °C OTHER: _____	
VOLUME REMOVED: <u>5.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: <u>clear</u>		ODOR: <u>none</u>	
COLOR: <u>clear</u> ODOR: <u>none</u>		FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		FILTRATE COLOR: <u>clear</u> FILTRATE ODOR: <u>none</u>	
TURBIDITY <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		COMMENTS:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER					

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)
1174	100	9.34	456.0	100.4	3.3	20.1	15.6	23.39	INITIAL
1139	100	9.38	382.5	85.7	1.6	11.9	15.2	23.53	.5
1144	100	9.67	358.9	61.0	1.2	9.4	14.9	23.75	1.0
1149	100	9.75	349.6	44.0	1.1	7.9	14.8	23.91	1.5
1154	100	9.81	342.3	28.0	1.0	6.2	14.8	24.06	2.0
1159	100	9.77	346.8	16.3	1.1	7.1	15.6	24.06	2.5
1204	100	9.78	346.8	4.1	1.1	6.8	15.5	24.06	3.0
1209	100	9.77	445 345.9	-2.9	1.1	7.0	15.5	24.06	3.5
1214	100	9.76	346.8	-7.8	1.1	5.9	15.8	24.06	4.0
1219	100	9.75	346.2	-13.6	1.1	6.6	15.7	24.06	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	125mL	plastic	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	1L	plastic	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	2	60mL	vot	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	40mL	↓	E	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	40mL	↓	E	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: <u>Int Drop off</u>	DATE SHIPPED: <u>10-5-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10-13-23</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2023 GW C	PREPARED	CHECKED
PROJECT NUMBER: 514404.0001.0000	BY: AW <u>(JK) JJ</u> DATE: <u>10-4-23</u>	BY: <u>AW</u> DATE: <u>10/4/23</u>

SAMPLE ID: <u>DEK-MW-15003</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1304</u>	DATE: <u>10-4-23</u>	SAMPLE	TIME: <u>1347</u>	DATE: <u>10-4-23</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>8.22</u> SU	CONDUCTIVITY: <u>457.6</u> umhos/cm	
DEPTH TO WATER: <u>17.23</u> T/ PVC			ORP: <u>-152.1</u> mV	DO: <u>0.5</u> mg/L	
DEPTH TO BOTTOM: <u>27.27</u> T/ PVC			TURBIDITY: <u>5.2</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>20.2</u> °C	OTHER: <u> </u>	
VOLUME REMOVED: <u>8</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u>	ODOR: <u>none</u>	
COLOR: <u>clear</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: <u>clear</u>	FILTRATE ODOR: <u>none</u>	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1307	200	8.77	450.1	-72.6	1.4	6.4	20.5	18.80	INITIAL
1312	200	8.71	448.9	-107.3	0.8	5.2	21.0	19.11	1
1317	200	8.52	445.5	-116.0	0.6	5.3	20.8	19.55	2
1322	200	8.41	447.2	-122.9	0.5	5.3	20.8	19.83	3
1327	200	8.28	447.3	-130.2	0.5	5.0	20.6	19.95	4
1332	200	8.21	448.1	-131.7	0.5	5.3	20.3	19.99	5
1337	200	8.24	449.0	-142.4	0.5	5.1	20.2	20.06	6
1342	200	8.24	452.1	-148.7	0.5	5.2	20.2	20.10	7
1347	200	8.22	457.6	-152.1	0.5	5.2	20.2	20.12	8

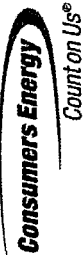
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

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	25mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	1L	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	40mL	↓	E	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
1	↓	↓	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	40mL	↓	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Lab Drop off</u>	DATE SHIPPED: <u>10-5-23</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10-13-23</u>

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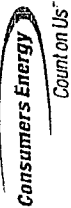
SAMPLING SITE / CUSTOMER: Q4-2023 JCW-DEK Background Wells		PROJECT NUMBER: 23-0933		SAP CC or WO#: _____ REQUESTER: Harold Register		ANALYSIS REQUESTED (Attach List if More Space is Needed)											
SAMPLING TEAM: SEND REPORT TO: Joseph Firlit		TURNAROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER		email: _____ phone: _____		QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER _____											
COPY TO: Harold Register TRC		MATRIX CODES: GW = Groundwater WW = Wastewater W = Water / Aqueous Liquid S = Soil / General Solid O = Oil		CONTAINERS PRESERVATIVE None HNO ₃ H ₂ SO ₄ NaOH HCl MeOH Other		REMARKS											
LAB SAMPLE ID		FIELD SAMPLE ID / LOCATION		# TOTAL		TDS											
23-0933-01	10-4-23	0913	GW	MW-15002	3	2	1	x	x								
-02	10-2-23	1151	GW	MW-15008	3	2	1										
-03	10-4-23	0949	GW	MW-15016	3	2	1										
-04	10-2-23	1236	GW	MW-15019	3	2	1										
-05	10-2-23	---	GW	DUP-Background	3	2	1										
-06	10-2-23	1236	W	FB- Background	1												
RELINQUISHED BY: <i>[Signature]</i>		DATE/TIME: 10-5-23/0710		RECEIVED BY: <i>[Signature]</i>		DATE/TIME:		COMMENTS:									
RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:		DATE/TIME:		Received on Ice? <input type="checkbox"/> Yes <input type="checkbox"/> No M&TE #: _____ Temperature: _____ °C Cal. Due Date: _____									

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Client Information Client Contact: Jacob Krenz Company: TRC Environmental Corporation. Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax) Email: JKrenz@trccompanies.com Project Name: Karm/Weadock CCR DEK Lined Impoundment Site:		Lab PIV: Brooks, Kris M E-Mail: Kris.Brooks@et.eurofins.com Carrier Tracking No(s): 240-112532-29054.1 State of Origin:	
Sampler: Jake Krenz Phone: 734-395-9804 PWSID:		COC No: 240-112532-29054.1 Page: Page 1 of 1 Job #:	
Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No PO #: 199812 WO #: Project #: 24024154 SSOW#:		Analysis Requested Total Number of Containers:	
Sample Identification DEK-MW-15003 OW-10 OW-11 OW-12 DUP-KLI EB-KLI		Matrix (W=Water, S=Soil, O=Other, T=Tissue, A=Air) Sample Type (C=Comp, G=grab) Sample Date Sample Time Preservation Code 903.0, Ra226Ra228, GPC 904.0 - Standard Target List 904.0 - Standard Target List	
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Special Instructions/Note: M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify) Other:	
Deliverable Requested: <input type="checkbox"/> I, <input type="checkbox"/> II, <input type="checkbox"/> III, <input type="checkbox"/> IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <i>[Signature]</i> Date: 10-10-23 Company: TRC		Received by: <i>[Signature]</i> Date/Time: 10/10/23 13:00 Company: EETA	
Relinquished by: <i>[Signature]</i> Date/Time: 10-10-23 Company: TRC		Received by: <i>[Signature]</i> Date/Time: 10/10/23 13:00 Company: EETA	
Relinquished by: <i>[Signature]</i> Date/Time: 10-10-23 Company: TRC		Received by: <i>[Signature]</i> Date/Time: 10/10/23 13:00 Company: EETA	
Custody Seal Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No:		Cooler Temperature(s) °C and Other Remarks:	

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SAMPLING SITE CUSTOMER: Q1-2023 DEK Lined Impoundment		PROJECT NUMBER: 23-0931		SAP CC or WO#:		ANALYSIS REQUESTED (Attach List if More Space is Needed)	
SAMPLING TEAM:		TURN-AROUND TIME REQUIRED: <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 3 DAYS <input type="checkbox"/> STANDARD <input checked="" type="checkbox"/> OTHER		REQUESTER: Harold Register		QA REQUIREMENT: <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> TNI <input type="checkbox"/> ISO 17025 <input type="checkbox"/> 10 CFR 50 APP. B <input type="checkbox"/> INTERNAL INFO <input type="checkbox"/> OTHER	
SEND REPORT TO: Joseph Fritt		email:		phone:		REMARKS	
COPY TO: Harold Register		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		Total Metals	
TRC		CONTAINERS		PRESERVATIVE		Total Organic Carbon	
SAMPLE COLLECTION		TOTAL #		None		Sulfide	
LAB SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOCATION	None	Ammonia	Alkalinity
23-0931-01	10-4-23	1347	GW	DEK-MW-15003	None	TD5	Total Organic Carbon
-02	10-4-23	1457	GW	OW-10	9	X	Dissolved Metals
-03	10-4-23	1729	GW	OW-11	9	X	
-04	10-4-23	1544	GW	OW-12	9	X	
-05	10-4-23	1110	W	KLI-SCS	9	X	
-06	10-4-23	1055	SW	KLI-PCS	9	X	
-07	10-4-23	1034	SW	SW-DITCH	9	X	
-08	10-4-23	—	GW	DUP-KLI	9	X	
-09	10-4-23	1608	W	EB-KLI	6	X	
-10	10-4-23	1457	W	FB-KLI	6	X	

RECEIVED BY: *[Signature]*

DATE/TIME: 10-5-23/0730

REINQUISHED BY: *[Signature]*

DATE/TIME: 11-15-23

Received on ice: Yes No
Temperature: 27.25°C
MATE #: LS028757
Cal. Due Date: 11-15-23

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Appendix C

Data Quality Reviews

Laboratory Data Quality Review Groundwater Monitoring Event October 2023 DE Karn Bottom Ash Pond and Lined Impoundment

A groundwater sample was collected by TRC for the October 2023 sampling event. The sample was analyzed for total metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The total organic carbon and dissolved organic carbon analyses were subcontracted to Brighton Analytical LLC (BAL) in Brighton, Michigan. The sulfide analysis was subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0930, 92712, and S54195.01(01).

During the October 2023 sampling event, a groundwater sample was collected from the following well:

- DEK-MW-18001

The sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D
Total/Dissolved Organic Carbon (TOC/DOC)	SM 5310B

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, when collected. 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 and Merit. 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, ammonia, TDS, alkalinity, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of a detection or assessment monitoring program.
- Data are usable for the purposes of the detection or assessment monitoring program.
- When the data are evaluated through a detection or assessment monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- The samples submitted to Merit for sulfide analysis were received at 6.3°C; there is no adverse impact on the data usability due to this issue since the samples were received by Merit on the same day as shipment from CE Laboratory Services and since the samples were received by CE Laboratory Services at an acceptable temperature. Merit noted that the samples were on ice and that the cooling process had begun.
- A field blank was not collected with this data set.
- An equipment blank was not collected with this data set.

- MS and MSD analyses were performed on sample DEK-MW-18001 for total metals, anions, ammonia, total alkalinity, sulfide, TOC, and DOC. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory for all parameters except TOC and DOC and therefore were not evaluated; further, with the exception of sulfide, TOC, and DOC, 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.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on the sample in this data set.

Laboratory Data Quality Review Groundwater Monitoring Event October 2023 DE Karn Bottom Ash Pond and Lined Impoundment

A groundwater sample was collected by TRC for the October 2023 sampling event. The sample was analyzed for radium by Eurofins in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-193136-1.

During the October 2023 sampling event, a groundwater sample was collected from the following well:

- DEK-MW-18001

The 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. The sample has activity below the RL (1.0 picocuries per liter) 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.
- No equipment or field blanks were collected.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on the sample from this data set.
- A field duplicate pair was not collected.
- Carrier recoveries were within 40-110%.

Attachment A

Summary of Data Non-Conformances for Impoundment Groundwater Analytical Data
DE Karn Bottom Ash Pond and Lined Impoundment
Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
DEK-MW-18001	10/4/2023	Radium-226	Result has a 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 deemed usable as reported

Laboratory Data Quality Review Groundwater/Surface Water Monitoring Event October 2023 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for total and/or dissolved metals, anions, total dissolved solids, ammonia, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The sulfide analysis was subcontracted to Merit Laboratories, Inc. (Merit) in East Lansing, Michigan. The total organic carbon and dissolved organic carbon analyses were subcontracted to Brighton Analytical LLC (BAL) in Brighton, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 23-0931R, S54196.01(01), and 92713.

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

- OW-10
- OW-11
- OW-12
- DEK-MW-15003

During the October 2023 sampling event, the following water/surface water samples were collected:

- KLI-PCS
- KLI-SCS
- SW-DITCH

Each sample was analyzed for one or more of the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate, Nitrate, Nitrite)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total and/or Dissolved Metals	SW-846 6020B
Total and/or Dissolved Mercury	SW-846 7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Ammonia	SM 4500 NH3(h)
Sulfide	SM 4500 S2D
Total/Dissolved Organic Carbon (TOC/DOC)	SM 5310B

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 and Merit. 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 and dissolved metals, total and dissolved mercury, anions, alkalinity, TDS, ammonia, and sulfide 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, additional Part 115 constituents, and additional geochemistry parameters will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- The samples submitted to Merit for sulfide analysis were received at 6.3°C; there is no adverse impact on the data usability due to this issue since the samples were received by Merit on the same day as shipment from CE Laboratory Services and since the samples were received by CE Laboratory Services at an acceptable temperature. Merit noted that the samples were on ice and that the cooling process had begun.
- One field blank (FB-KLI) and one equipment blank (EB-KLI) were collected with this data set. Target analytes were not detected in these blank samples.
- Samples DUP-KLI and OW-12 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.
- The DOC result was greater than the TOC result by more than 20% for samples OW-11 (22%) and KLI-SCS (23%) and the results were >5x the RL. The positive results for DOC and TOC in these samples are potentially uncertain as summarized in the attached table, Attachment A.

Attachment A

Summary of Data Non-Conformances for Impoundment Groundwater and Surface Water Analytical Data
DE Karn Lined Impoundment Wells
Essexville, Michigan

Samples	Collection Date	Analytes	Non-Conformance/Issue
OW-11	10/4/2023	Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC)	The DOC concentration was higher than the TOC concentration by >20% and TOC and DOC results > 5x the reporting limit; potential uncertainty exists for the listed results.
KLI-PCS			

Laboratory Data Quality Review Groundwater and Surface water Monitoring Event October 2023 DE Karn Lined Impoundment

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) 240-193317-1.

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

- OW-10
- OW-11
- OW-12
- DEK-MW-15003

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. Samples have activity below the RL (1.0 picocuries per liter) 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 with the following exception.
 - Radium-228 was detected in MB 160-631946/1-A at 0.6152 +/- 0.359 pCi/L. There is no impact on the data usability due to this issue since radium-228 was nondetect in the associated sample.
- One equipment blank (EB-KLI) was collected. Target analytes were not detected in the equipment blank sample with the following exception.
 - Radium-226 was detected in sample EB-KLI at 0.143 +/- 0.101 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.
- LCS/LCSD recoveries and replicate error ratios (RERs), as applicable, for all target analytes were within laboratory control limits with the following exception.
 - The LCSD recovery for radium-228 (131%) was above laboratory control limits (75-125%) in LCSD 160-632941/3-A. There is no impact on the data usability due to this issue since radium-228 was nondetect in the associated samples.
- MS/MSD analyses were not performed on a sample from this data set.

- Laboratory duplicate analyses were performed on sample EB-KLI for radium-226 and radium-228; all criteria were met with the following exception.
 - The RER for radium-228 (2.45) was above the laboratory acceptance criteria (1.00). There is no impact on the data usability due to this issue since radium-228 was nondetect in the parent sample.
- Samples OW-12/DUP-DEK-BAP-01 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 Impoundment Groundwater Analytical Data
DE Karn Lined Impoundment Wells
Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
OW-12	10/4/2023	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 deemed usable as reported
DUP-KLI	10/4/2023		
EB-KLI	10/4/2023		
OW-12	10/4/2023		Equipment blank contamination; potential false positive.
DUP-KLI	10/4/2023		

Appendix D

Statistical Analysis

Appendix D
 Statistical Summary for DE Karn Lined Impoundment
 Fourth Quarter 2023
 Data from February 2022 to October 2023

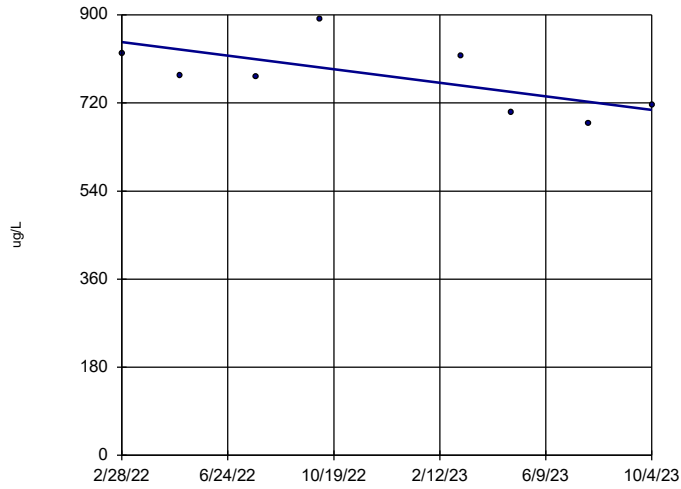
Karn Lined Impoundment Wells						
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12
Boron	Trend	○	○	○	○	○
Calcium	Trend	○	↓	○	○	○
Chloride	Trend	○	○	○	○	○
Fluoride	Trend	○*	○*	○*	○	○*
Iron	Trend	○	↓	○	○	○
pH	Trend	○	○	○	○	○
Sulfate	Trend	↑*	○	○	↓	○
Total Dissolved Solids	Trend	○	○	○	○	○

Notes:

- * = Non-detect
- = No trend
- ↑ = Upward trend, continuous
- ↑* = Upward trend, new
- ↑ = Upward trend, confirmed
- ↓ = Downward trend, continuous
- ↓* = Downward trend, new

Boron, Total

DEK-MW-15003

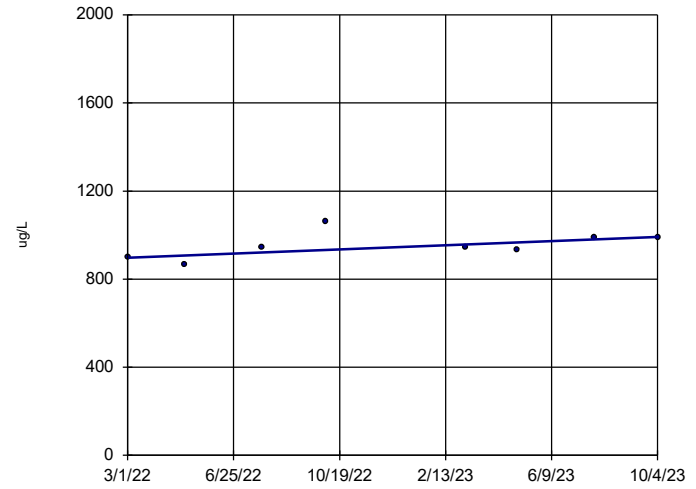


n = 8
 Slope = -86.56 units per year.
 Mann-Kendall statistic = -14
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Boron, Total

DEK-MW-18001

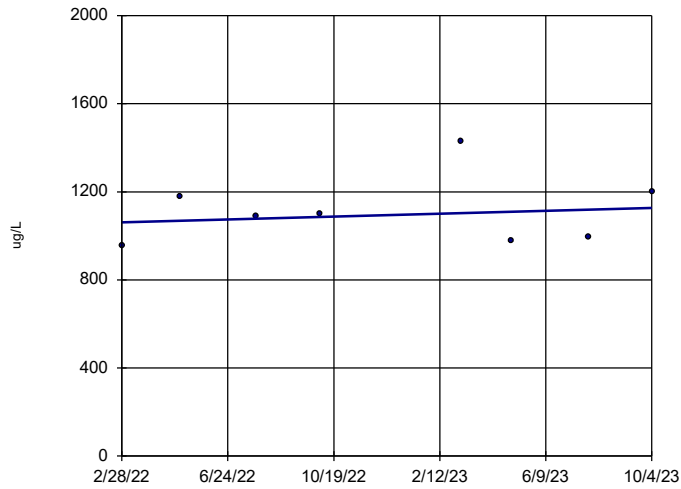


n = 8
 Slope = 58.91 units per year.
 Mann-Kendall statistic = 11
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Boron, Total

OW-10

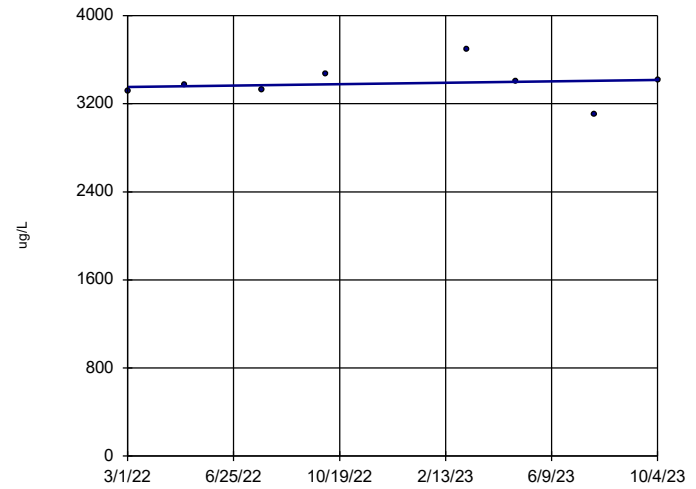


n = 8
 Slope = 40.84 units per year.
 Mann-Kendall statistic = 6
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Boron, Total

OW-11

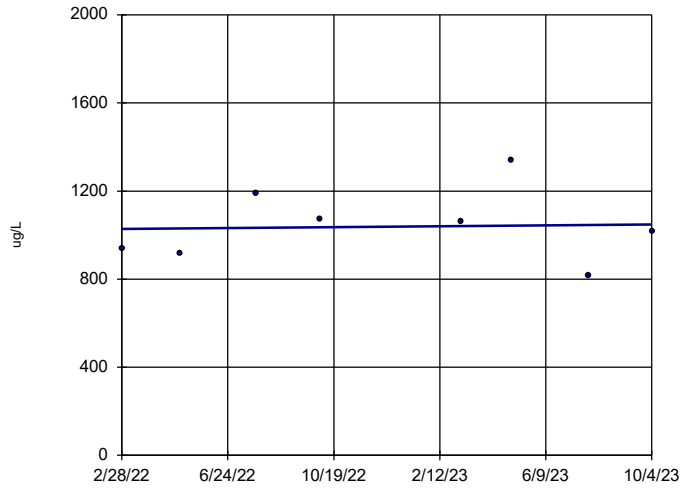


n = 8
 Slope = 39.87 units per year.
 Mann-Kendall statistic = 6
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Boron, Total

OW-12

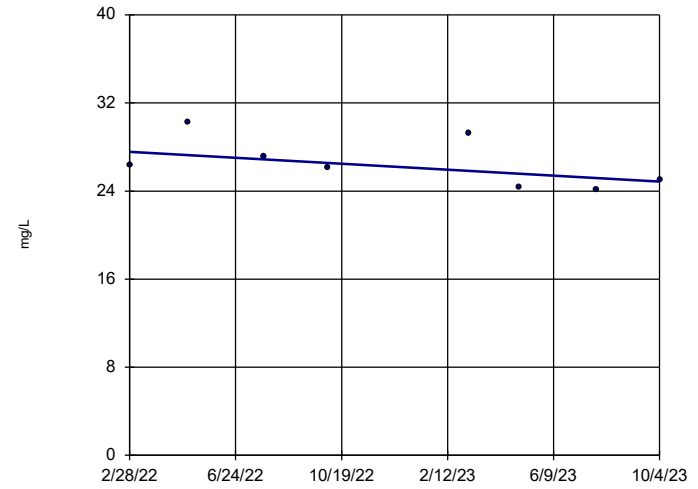


n = 8
 Slope = 12.96
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Calcium, Total

DEK-MW-15003

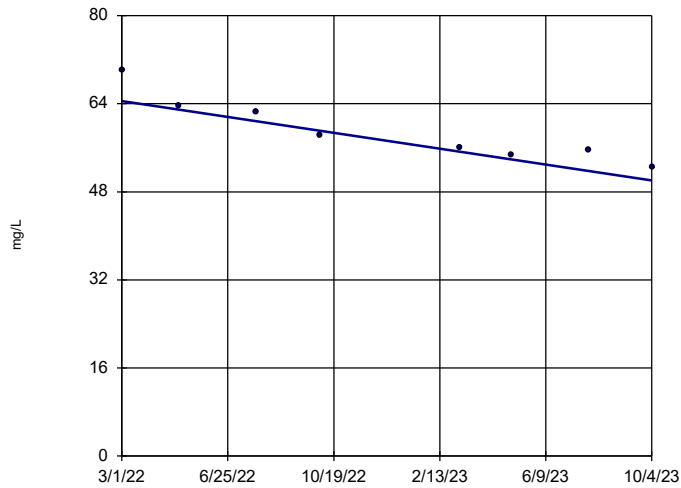


n = 8
 Slope = -1.691
 units per year.
 Mann-Kendall
 statistic = -14
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Calcium, Total

DEK-MW-18001

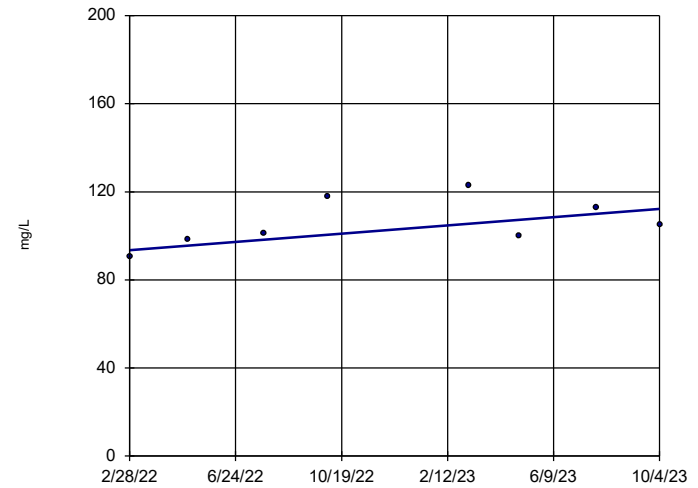


n = 8
 Slope = -9.053
 units per year.
 Mann-Kendall
 statistic = -26
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Calcium, Total

OW-10

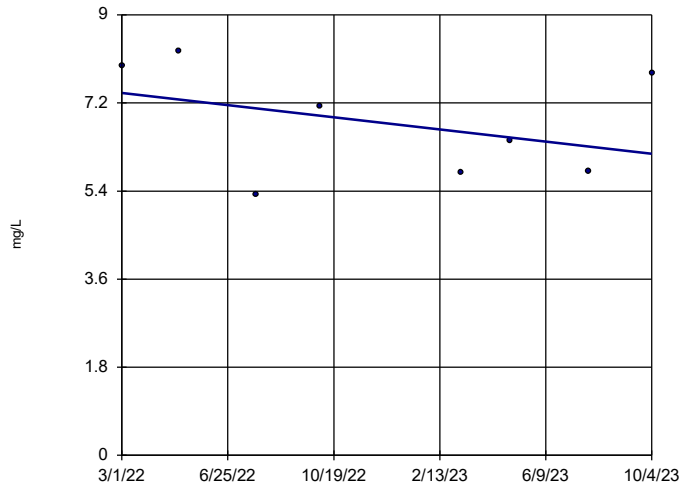


n = 8
 Slope = 11.75
 units per year.
 Mann-Kendall
 statistic = 12
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Calcium, Total

OW-11

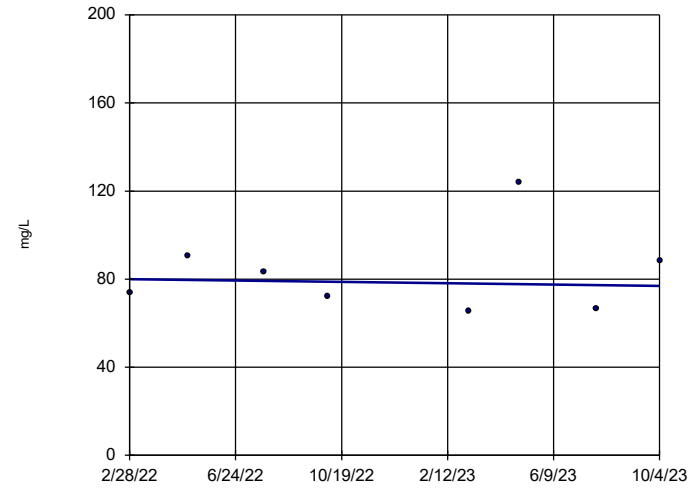


n = 8
 Slope = -0.7788 units per year.
 Mann-Kendall statistic = -4
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Calcium, Total

OW-12

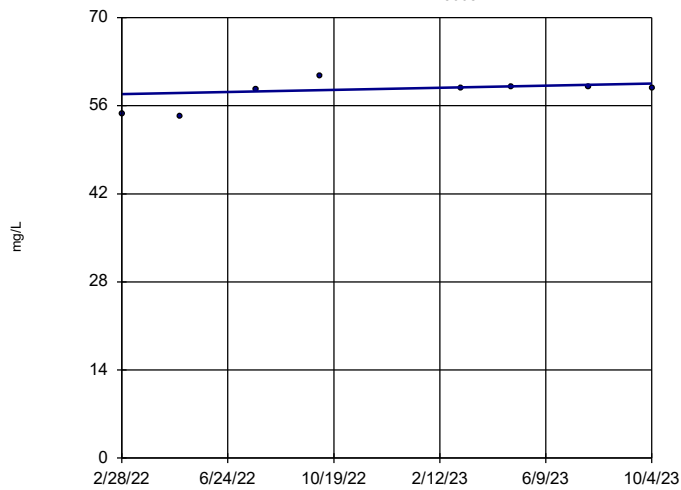


n = 8
 Slope = -1.91 units per year.
 Mann-Kendall statistic = -2
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Chloride

DEK-MW-15003

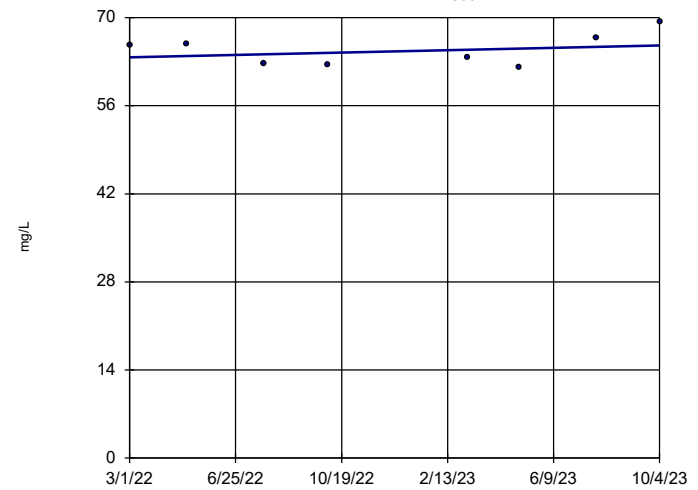


n = 8
 Slope = 1.055 units per year.
 Mann-Kendall statistic = 13
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Chloride

DEK-MW-18001

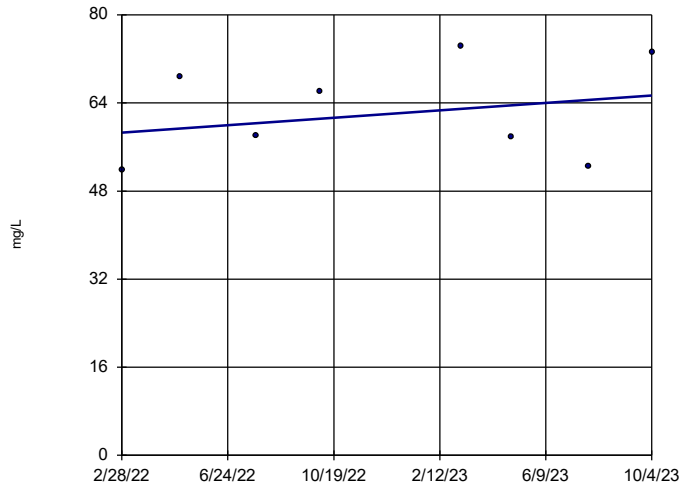


n = 8
 Slope = 1.207 units per year.
 Mann-Kendall statistic = 4
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Chloride

OW-10

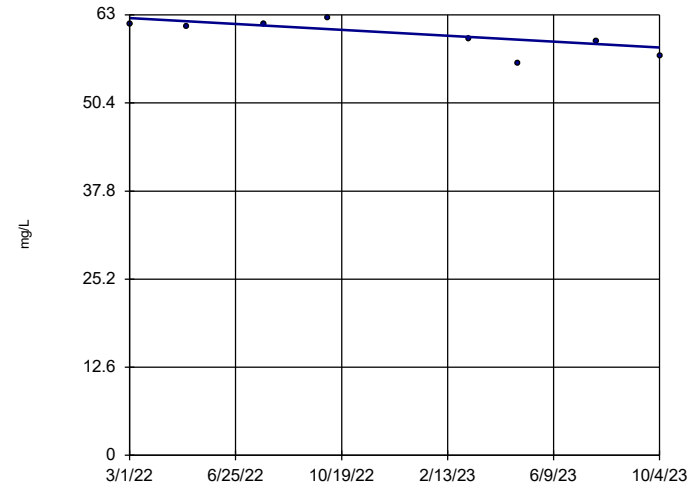


n = 8
 Slope = 4.226
 units per year.
 Mann-Kendall
 statistic = 4
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Chloride

OW-11

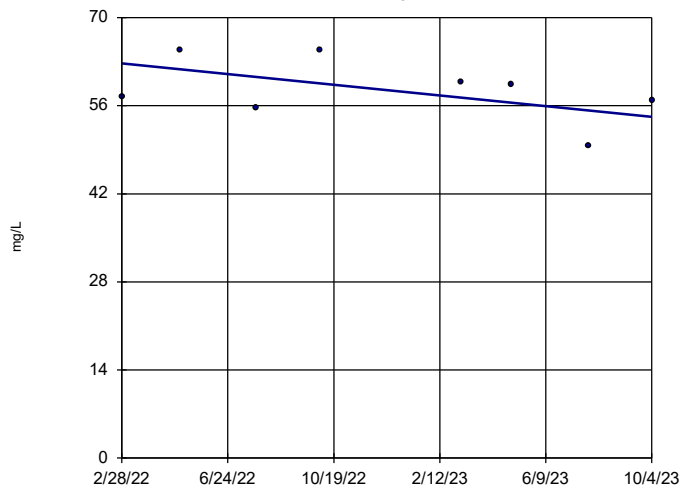


n = 8
 Slope = -2.642
 units per year.
 Mann-Kendall
 statistic = -16
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Chloride

OW-12

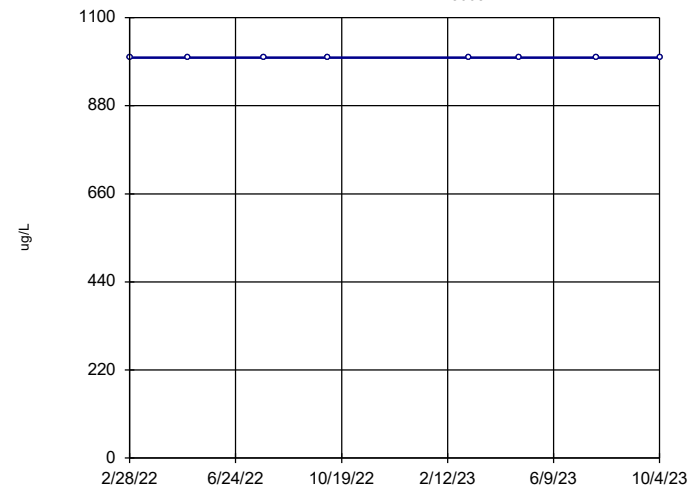


n = 8
 Slope = -5.321
 units per year.
 Mann-Kendall
 statistic = -10
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

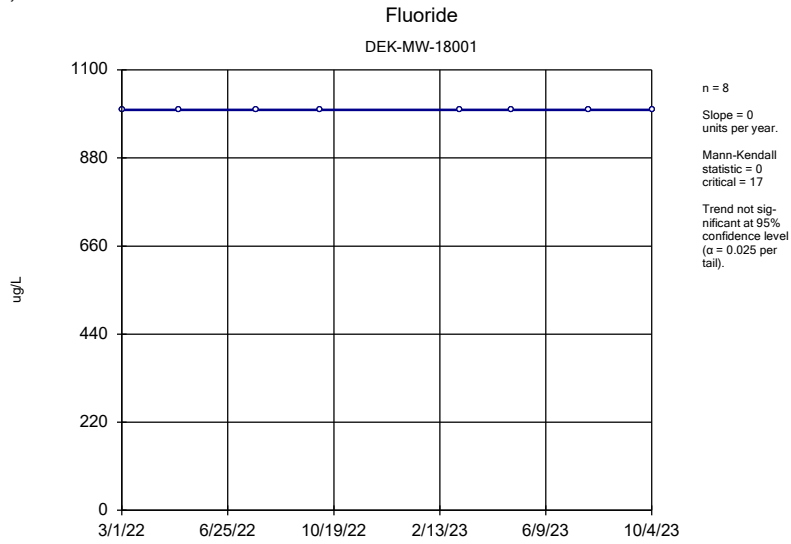
Fluoride

DEK-MW-15003

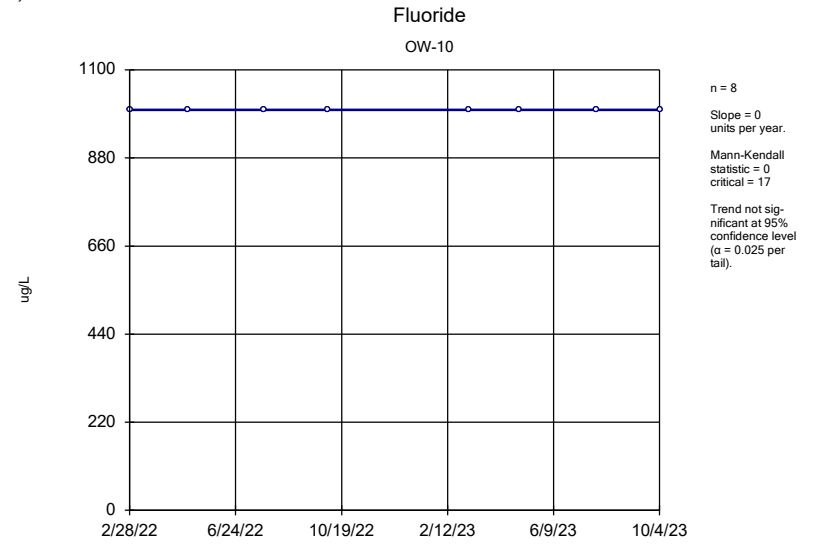


n = 8
 Slope = 0
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

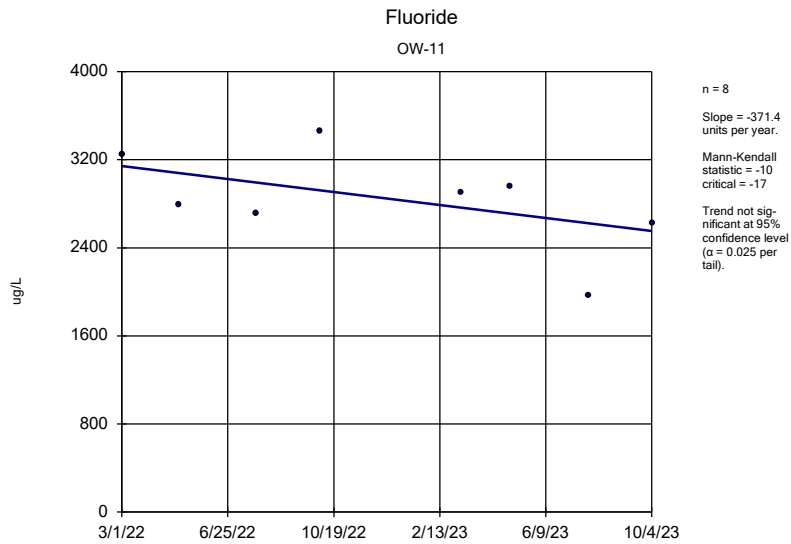
Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4



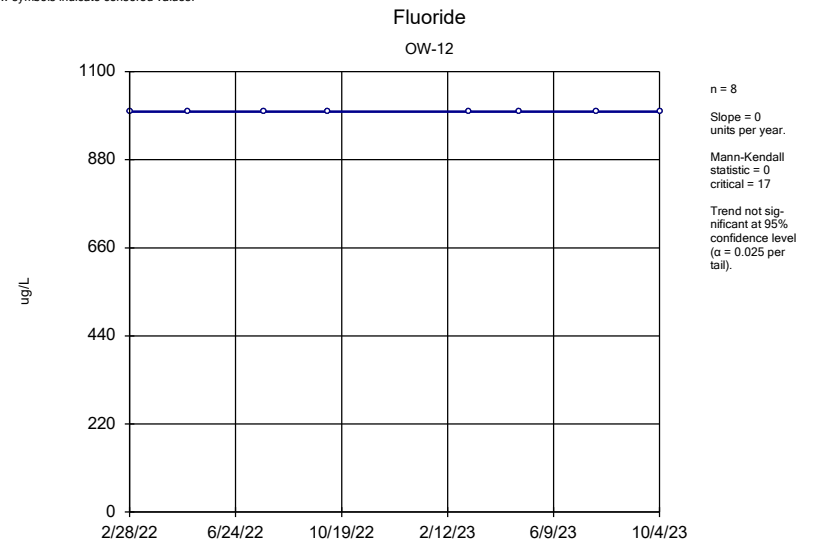
Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4



Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

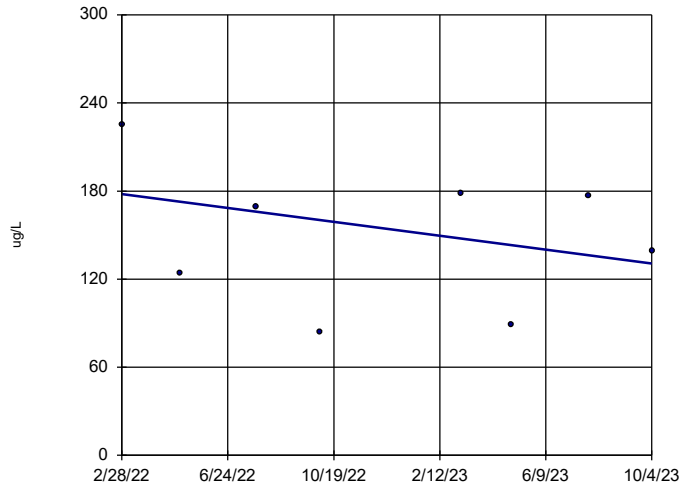


Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4



Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

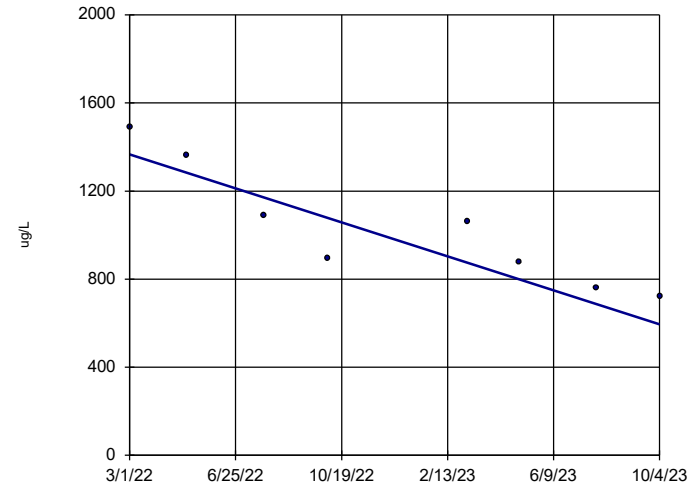
Iron, Total DEK-MW-15003



n = 8
 Slope = -29.66
 units per year.
 Mann-Kendall
 statistic = -4
 critical = -17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

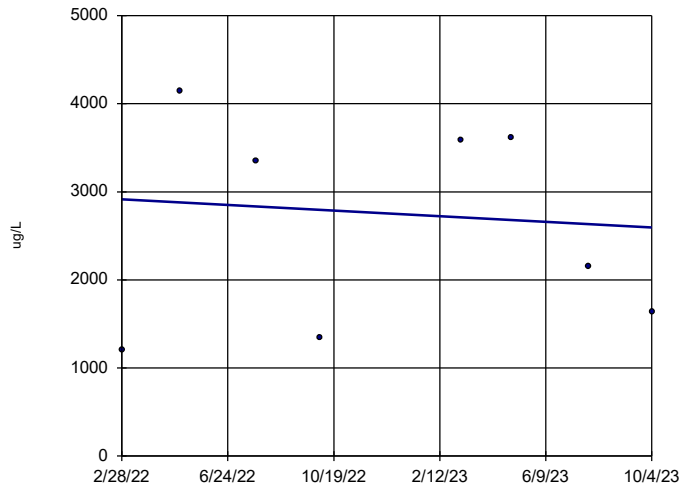
Iron, Total DEK-MW-18001



n = 8
 Slope = -484
 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 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

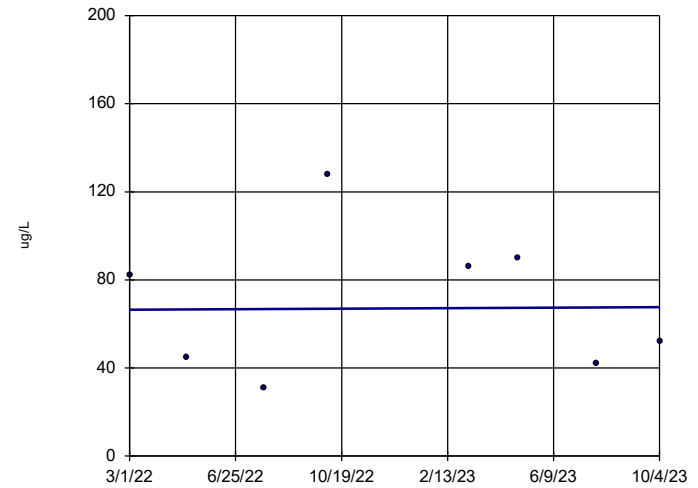
Iron, Total OW-10



n = 8
 Slope = -199.4
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

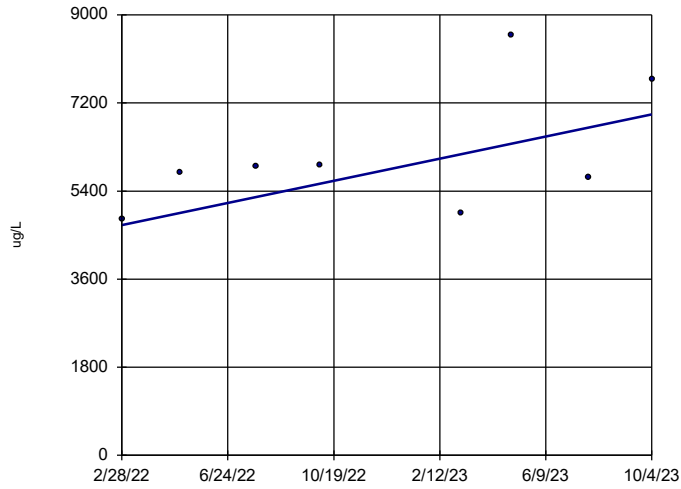
Iron, Total OW-11



n = 8
 Slope = 0.743
 units per year.
 Mann-Kendall
 statistic = 0
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 (α = 0.025 per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

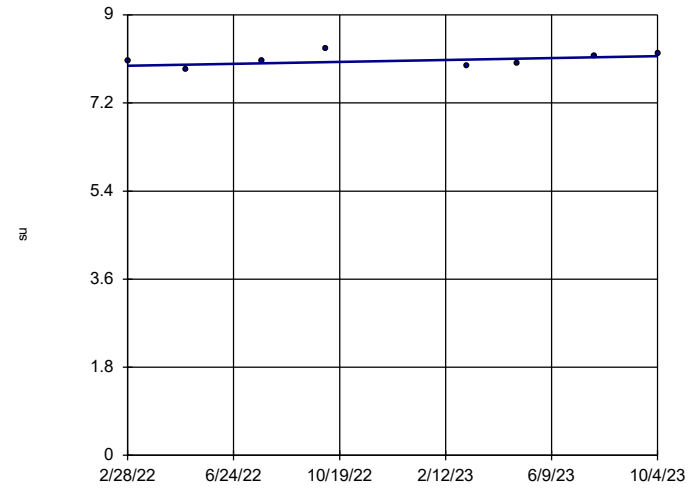
Iron, Total OW-12



n = 8
 Slope = 1415 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 4:32 PM
 Data: DEK_HMPCCR_23Q4

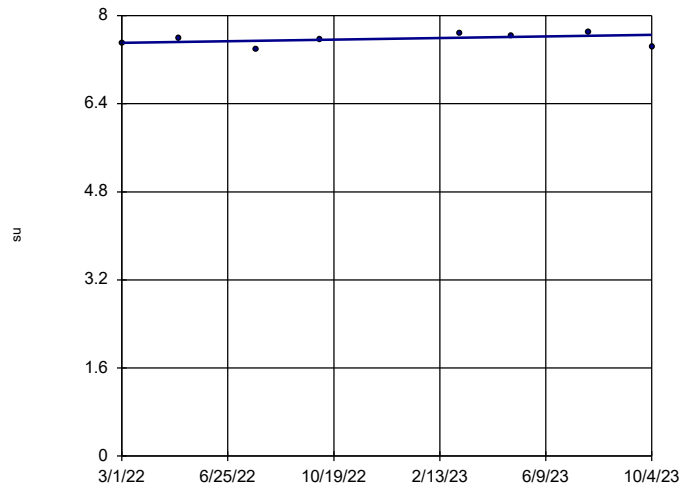
pH, Field DEK-MW-15003



n = 8
 Slope = 0.1252 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 4:32 PM
 Data: DEK_HMPCCR_23Q4

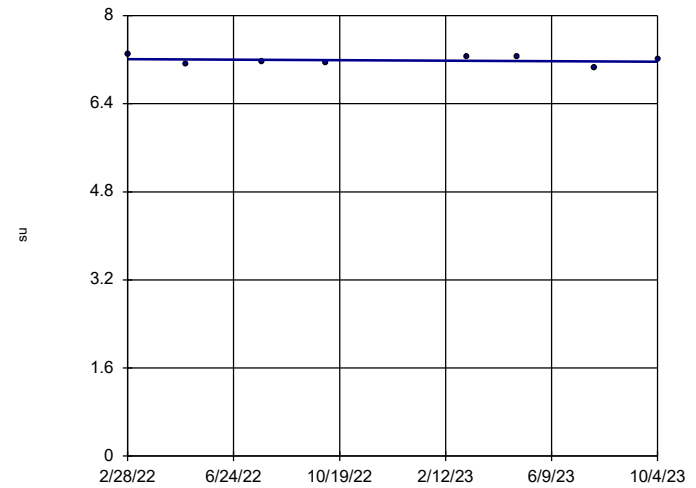
pH, Field DEK-MW-18001



n = 8
 Slope = 0.09211 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 4:32 PM
 Data: DEK_HMPCCR_23Q4

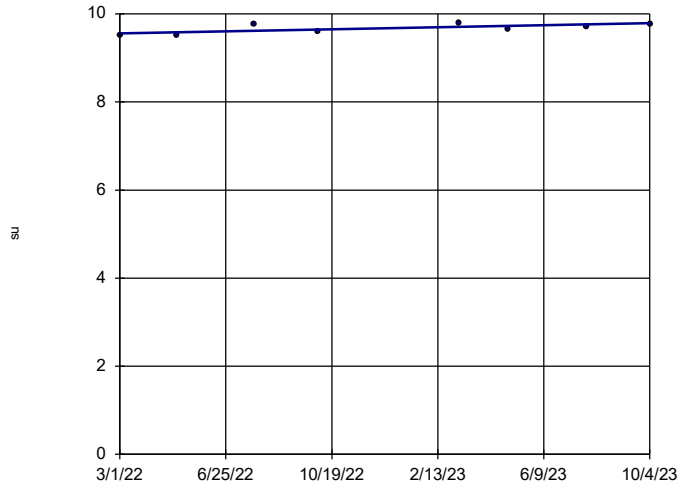
pH, Field OW-10



n = 8
 Slope = -0.02747 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 4:32 PM
 Data: DEK_HMPCCR_23Q4

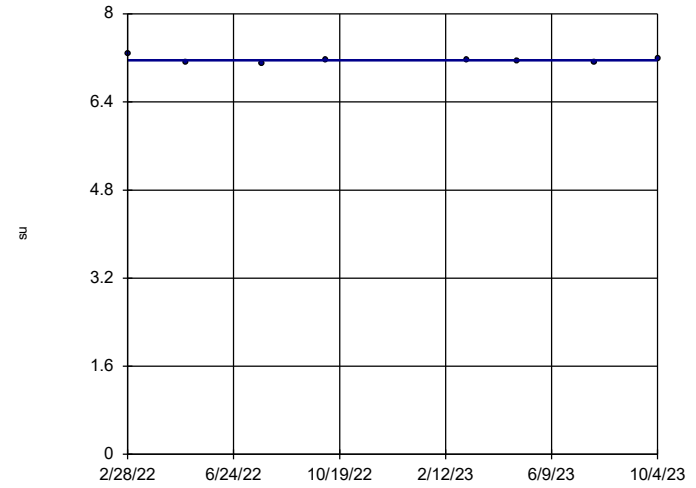
pH, Field OW-11



n = 8
Slope = 0.1463
units per year.
Mann-Kendall
statistic = 15
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

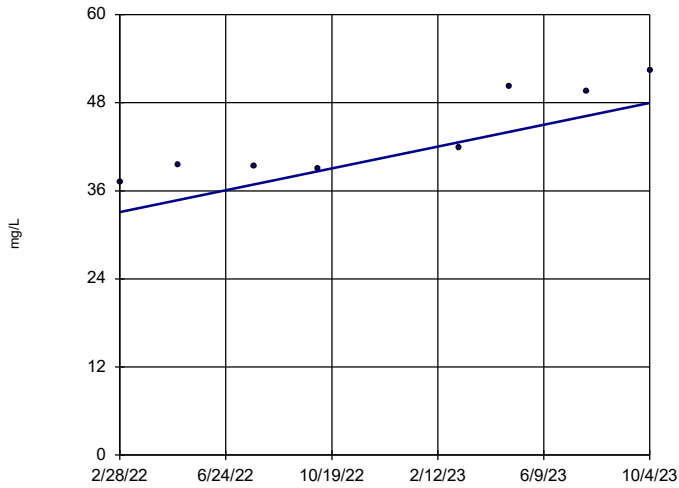
pH, Field OW-12



n = 8
Slope = 0
units per year.
Mann-Kendall
statistic = 0
critical = 17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

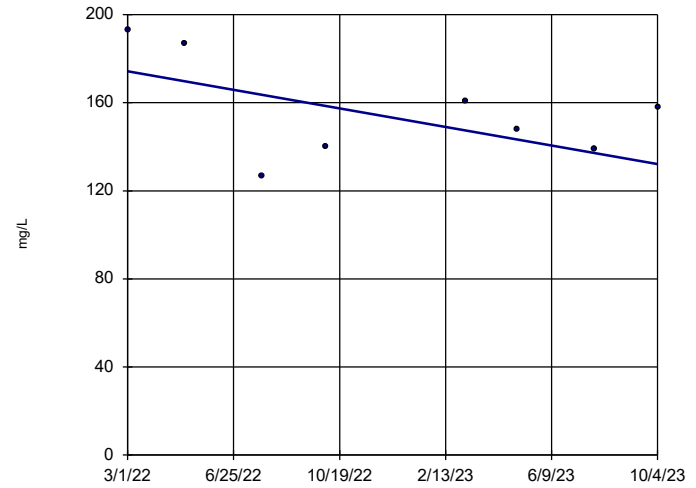
Sulfate DEK-MW-15003



n = 8
Slope = 9.312
units per year.
Mann-Kendall
statistic = 20
critical = 17
Increasing trend
significant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

Sulfate DEK-MW-18001

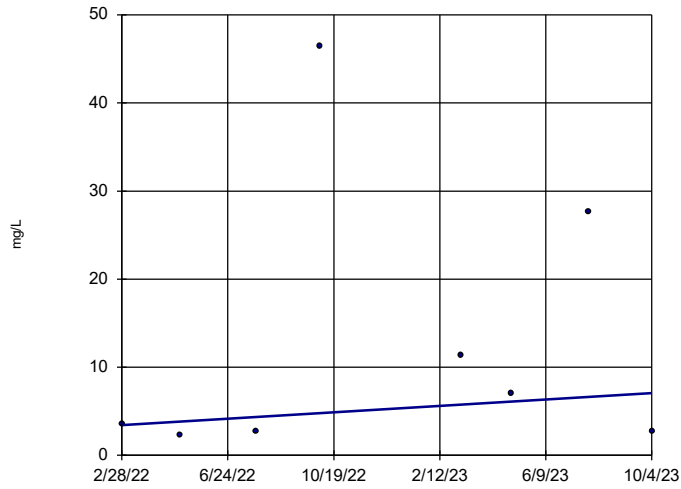


n = 8
Slope = -26.38
units per year.
Mann-Kendall
statistic = -8
critical = -17
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
Data: DEK_HMPCCR_23Q4

Sulfate

OW-10

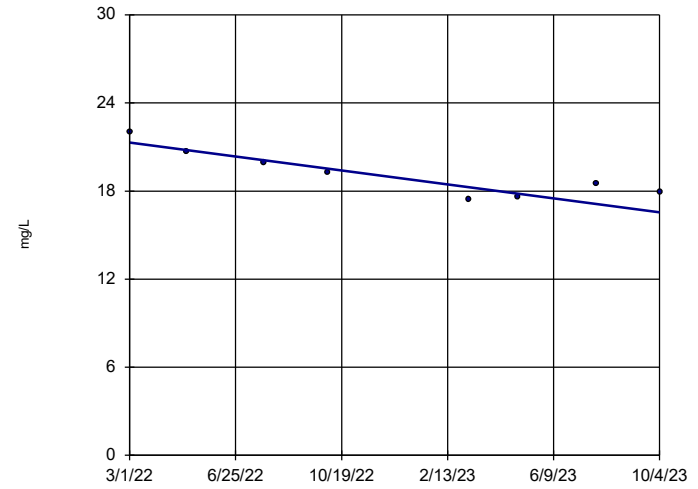


n = 8
 Slope = 2.263
 units per year.
 Mann-Kendall
 statistic = 4
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Sulfate

OW-11

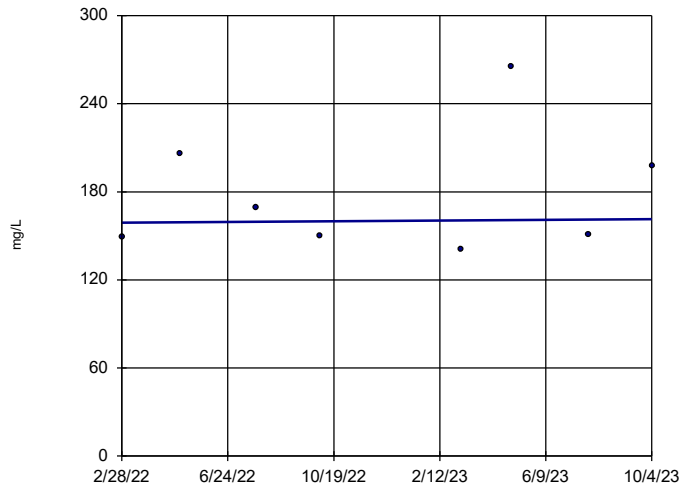


n = 8
 Slope = -2.976
 units per year.
 Mann-Kendall
 statistic = -18
 critical = -17
 Decreasing trend
 significant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Sulfate

OW-12

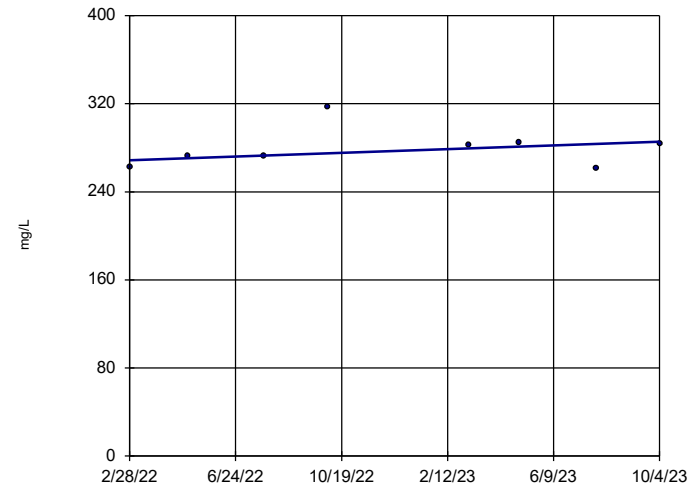


n = 8
 Slope = 1.549
 units per year.
 Mann-Kendall
 statistic = 4
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:32 PM
 Data: DEK_HMPCCR_23Q4

Total Dissolved Solids

DEK-MW-15003

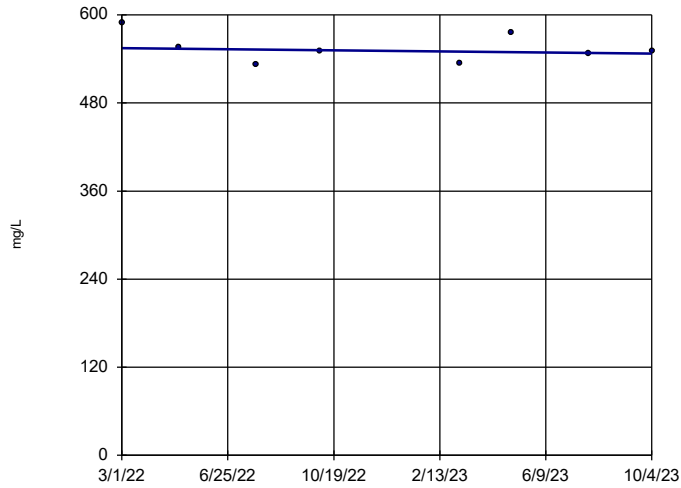


n = 8
 Slope = 10.65
 units per year.
 Mann-Kendall
 statistic = 6
 critical = 17
 Trend not sig-
 nificant at 95%
 confidence level
 ($\alpha = 0.025$ per
 tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:33 PM
 Data: DEK_HMPCCR_23Q4

Total Dissolved Solids

DEK-MW-18001

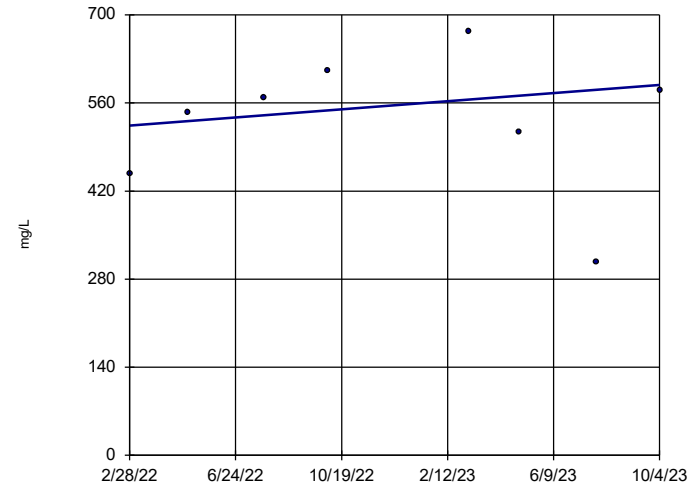


n = 8
 Slope = -4.701 units per year.
 Mann-Kendall statistic = -5
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:33 PM
 Data: DEK_HMPCCR_23Q4

Total Dissolved Solids

OW-10

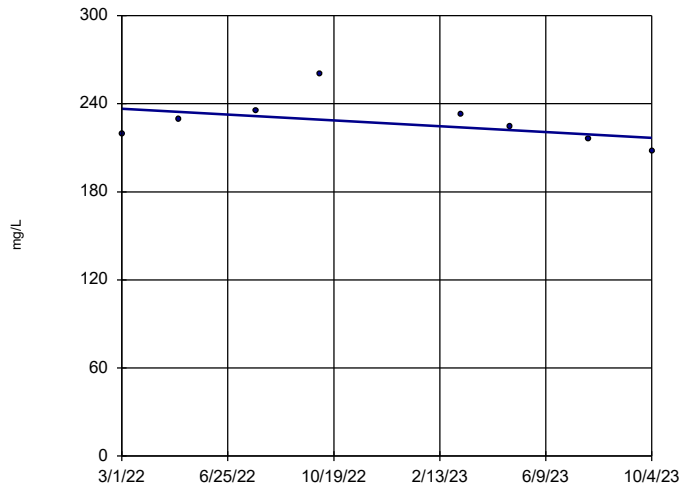


n = 8
 Slope = 40.45 units per year.
 Mann-Kendall statistic = 4
 critical = 17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:33 PM
 Data: DEK_HMPCCR_23Q4

Total Dissolved Solids

OW-11

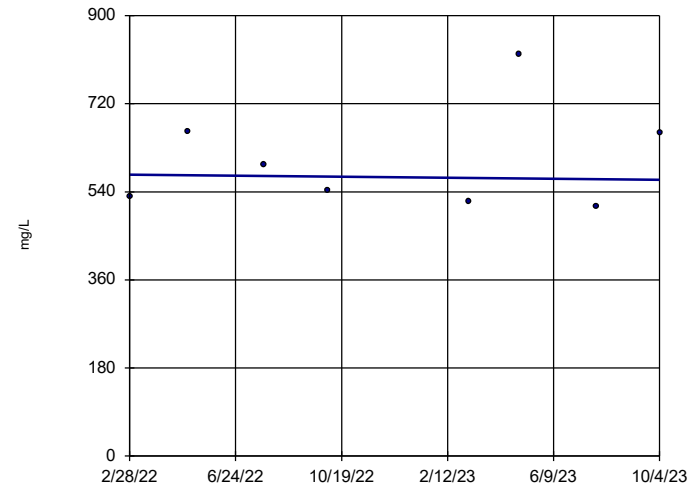


n = 8
 Slope = -12.45 units per year.
 Mann-Kendall statistic = -10
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:33 PM
 Data: DEK_HMPCCR_23Q4

Total Dissolved Solids

OW-12



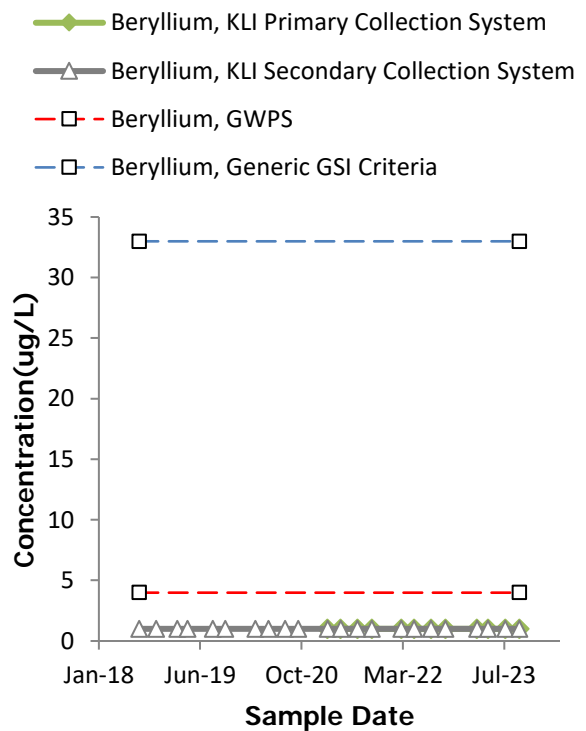
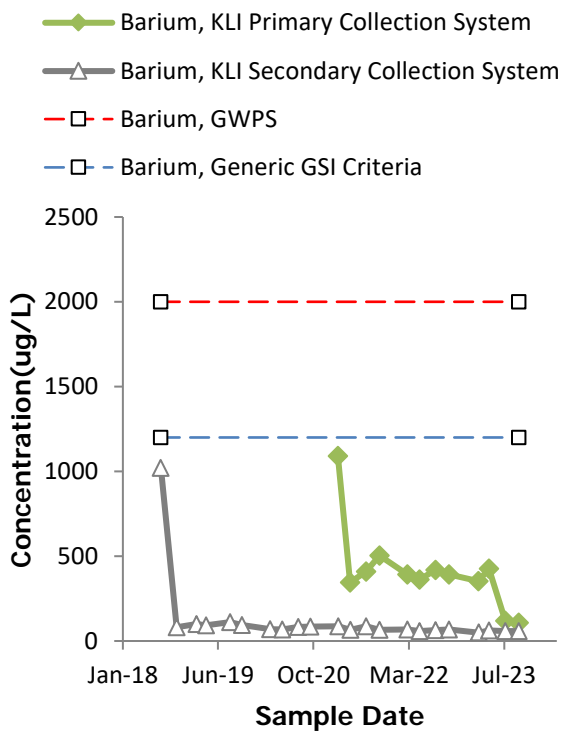
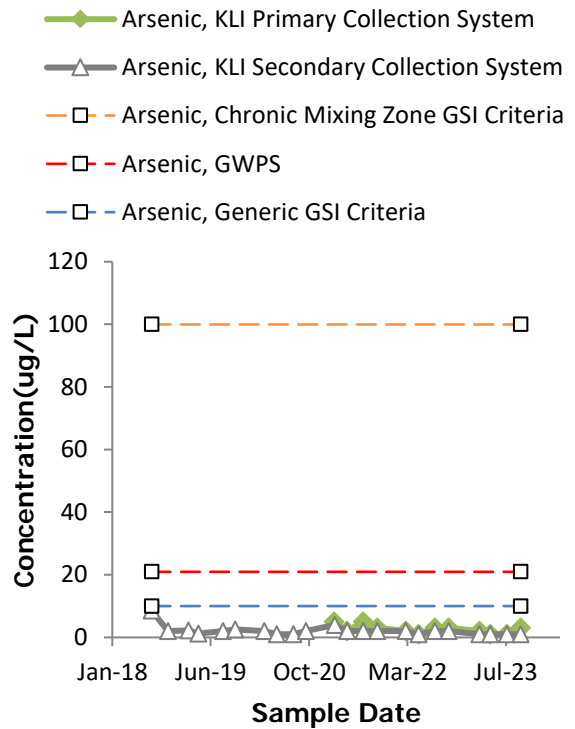
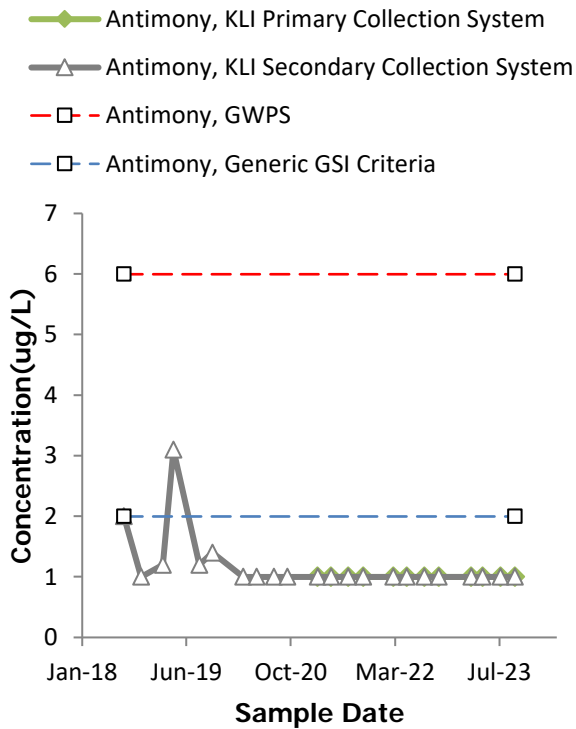
n = 8
 Slope = -6.437 units per year.
 Mann-Kendall statistic = -2
 critical = -17
 Trend not significant at 95% confidence level (α = 0.025 per tail).

Sen's Slope Estimator Analysis Run 11/20/2023 4:33 PM
 Data: DEK_HMPCCR_23Q4

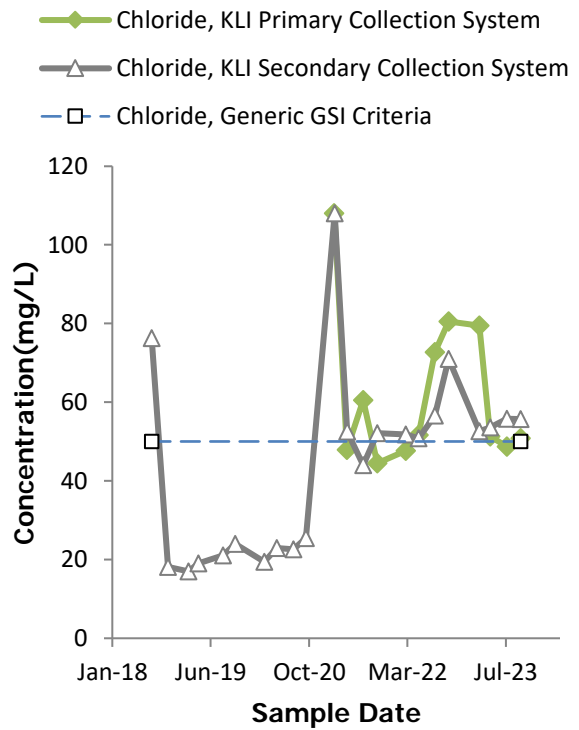
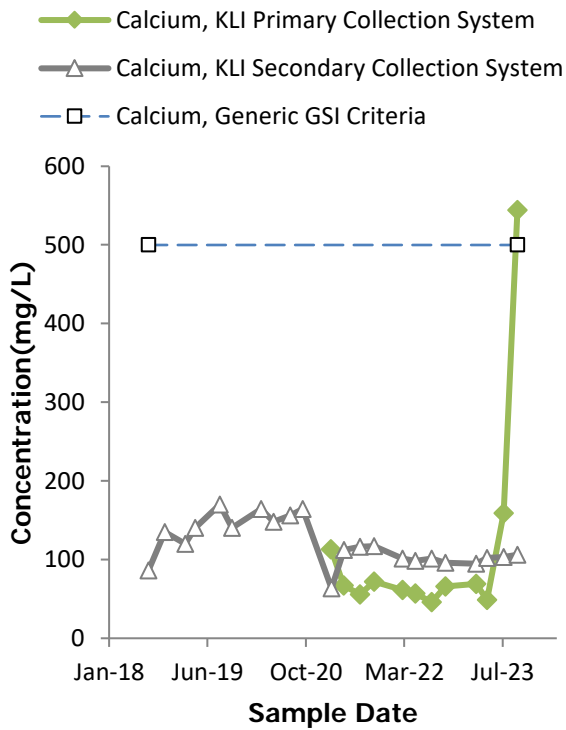
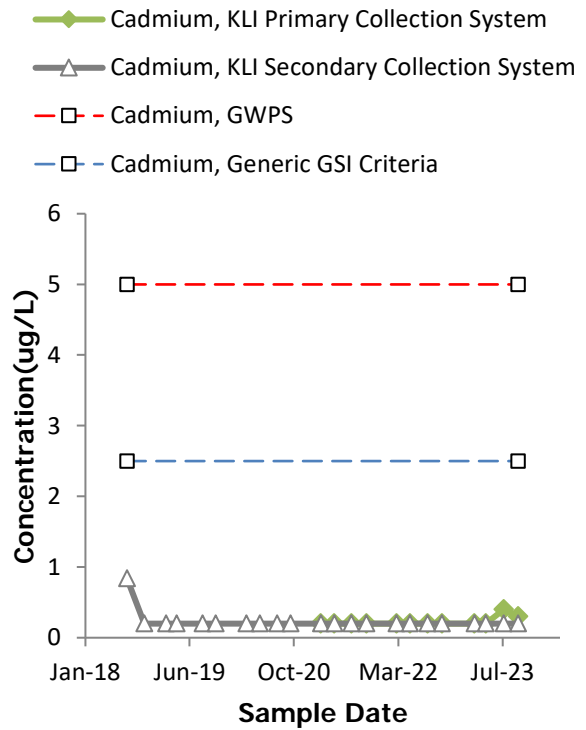
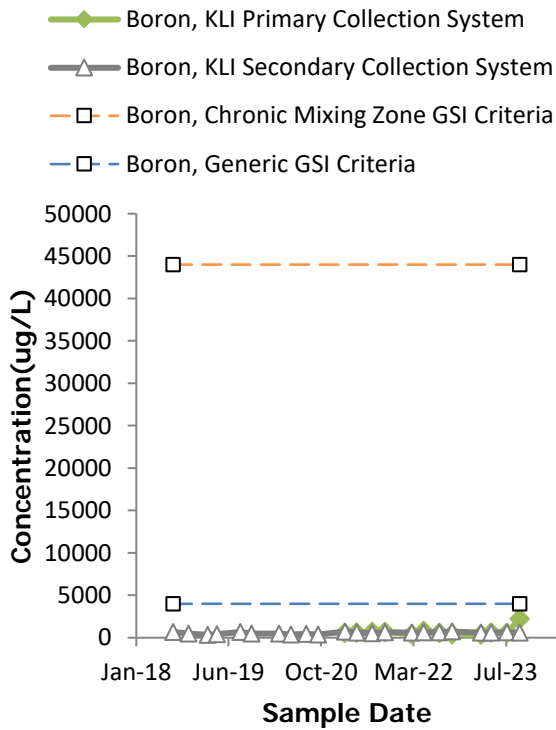
Appendix E

Secondary Leachate Collection System Monitoring

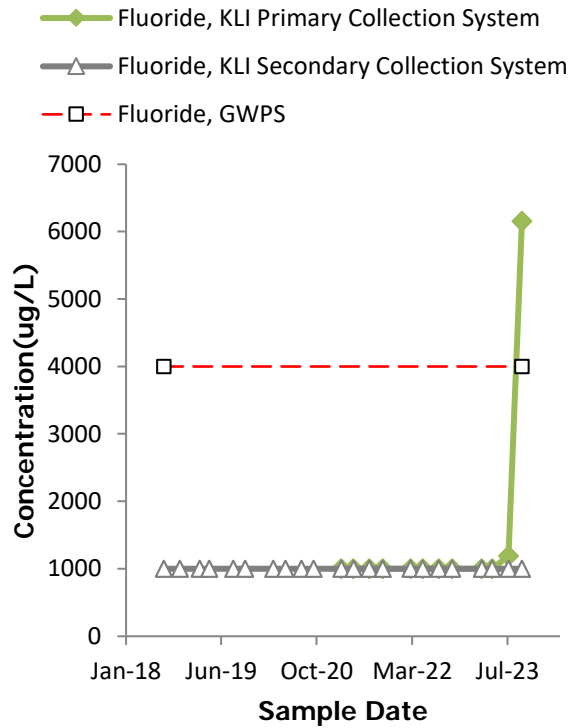
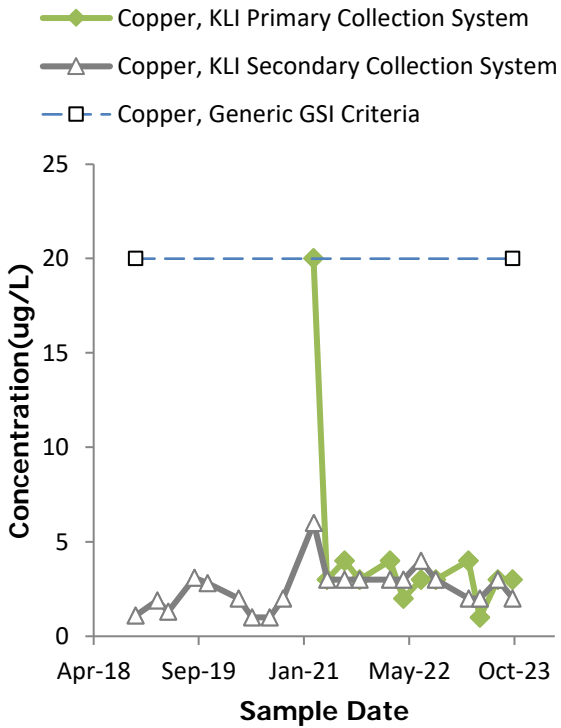
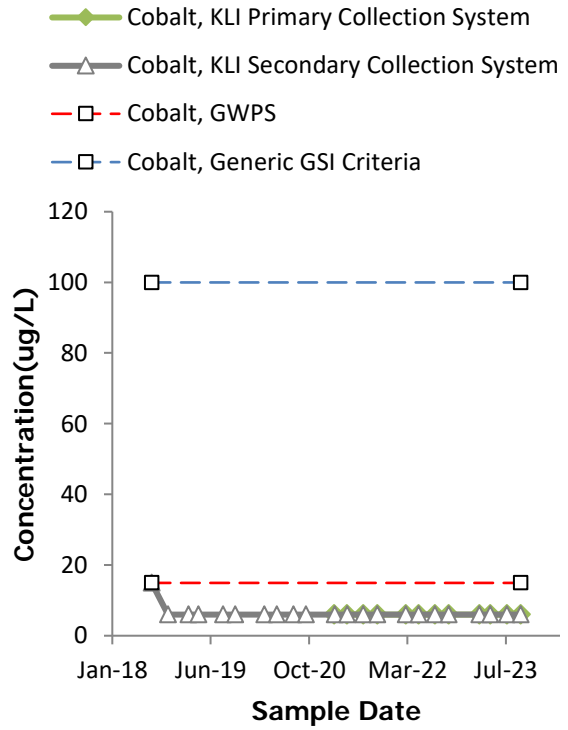
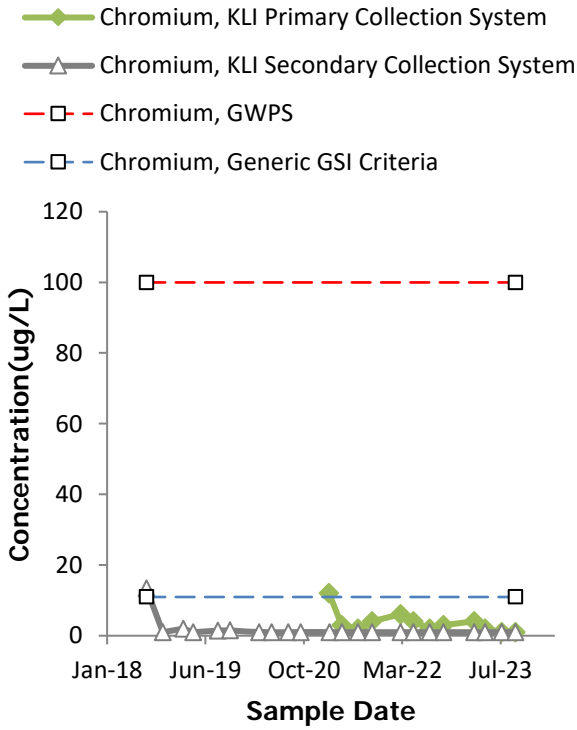
Water Quality Time Series



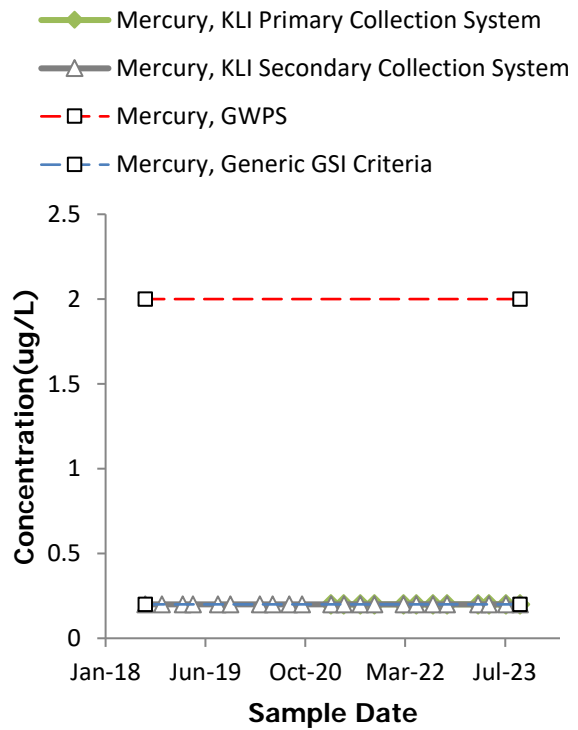
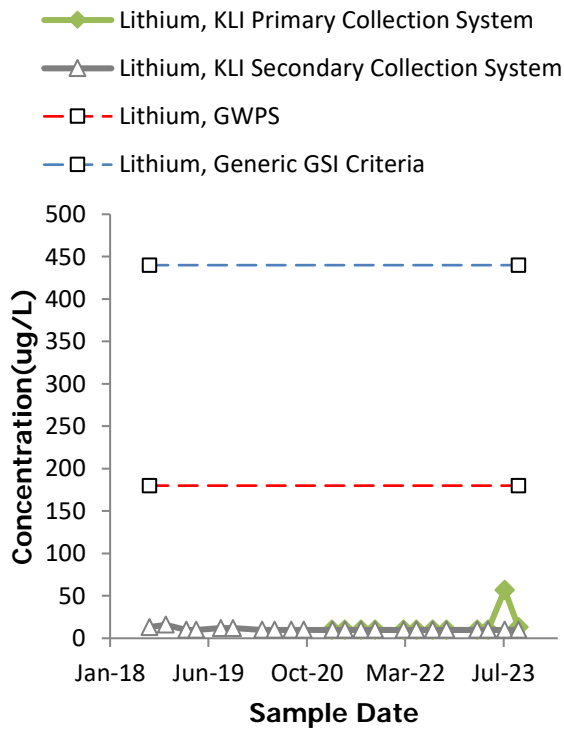
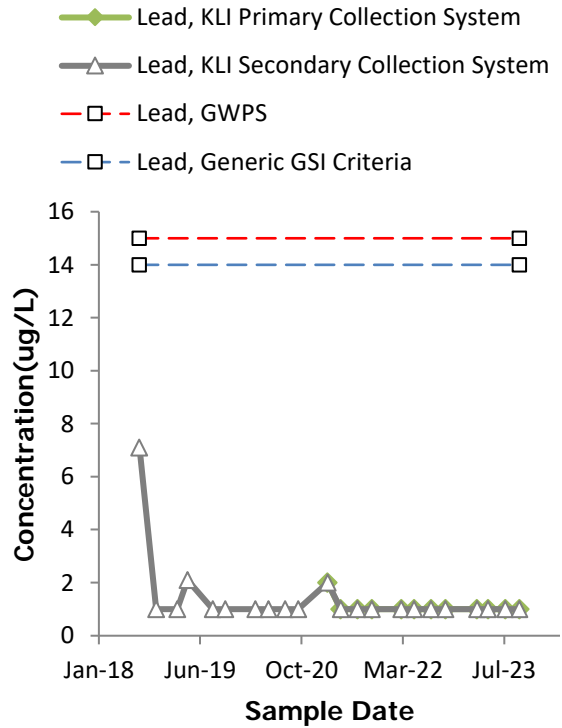
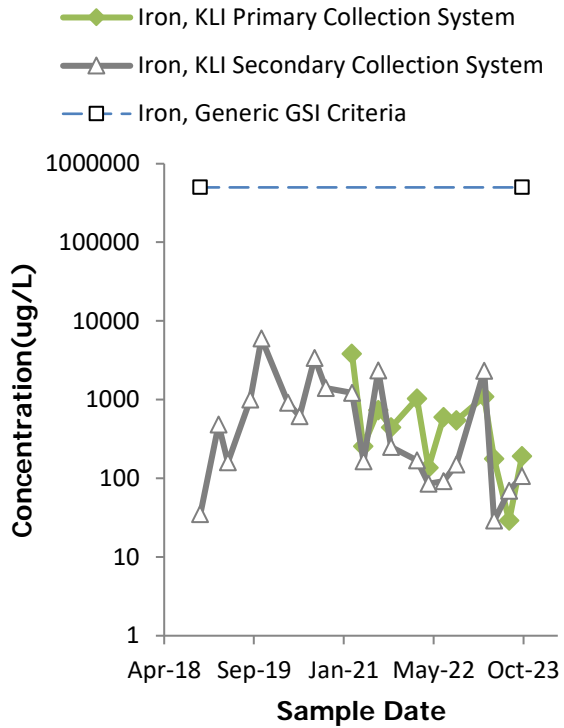
Water Quality Time Series



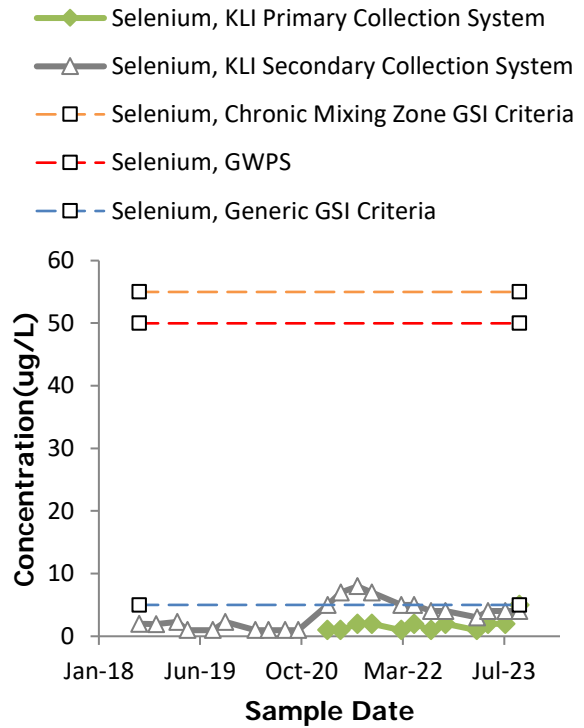
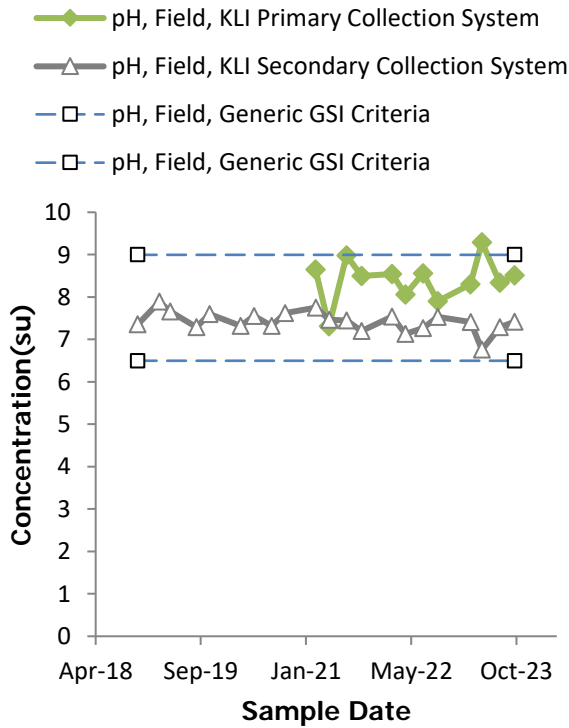
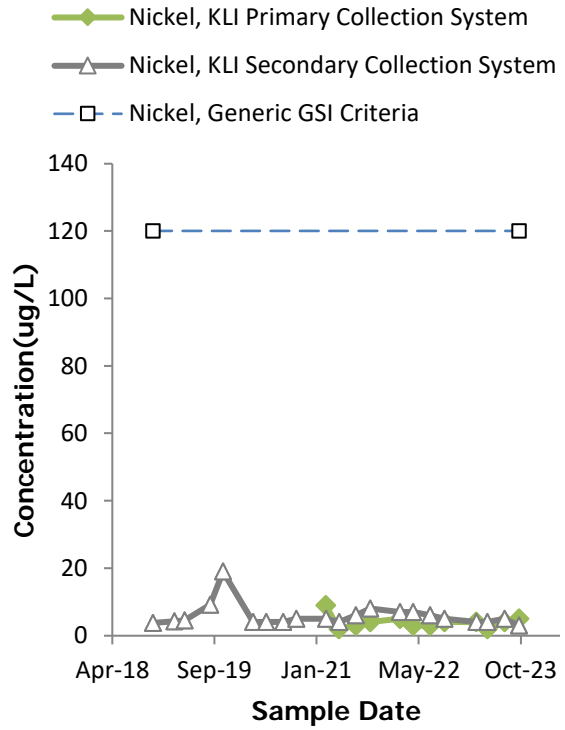
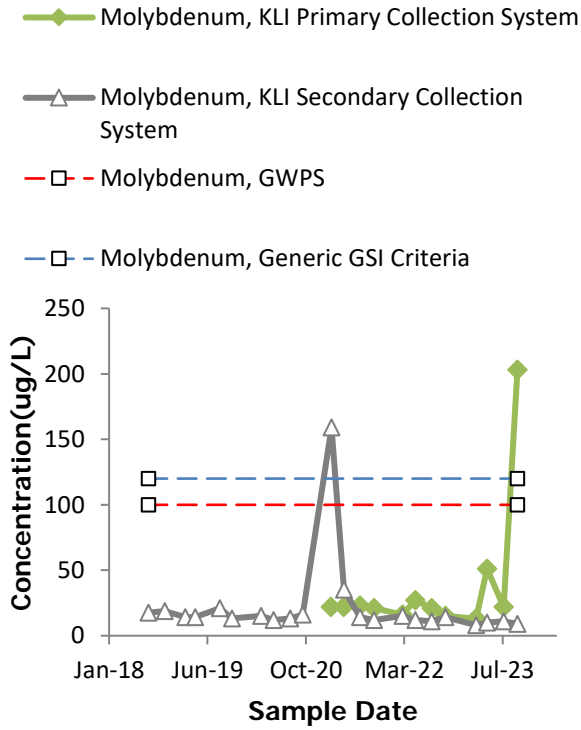
Water Quality Time Series



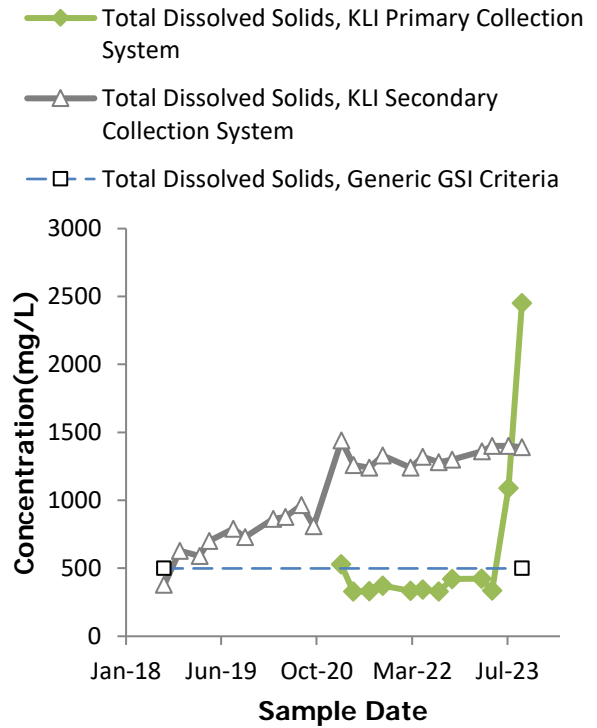
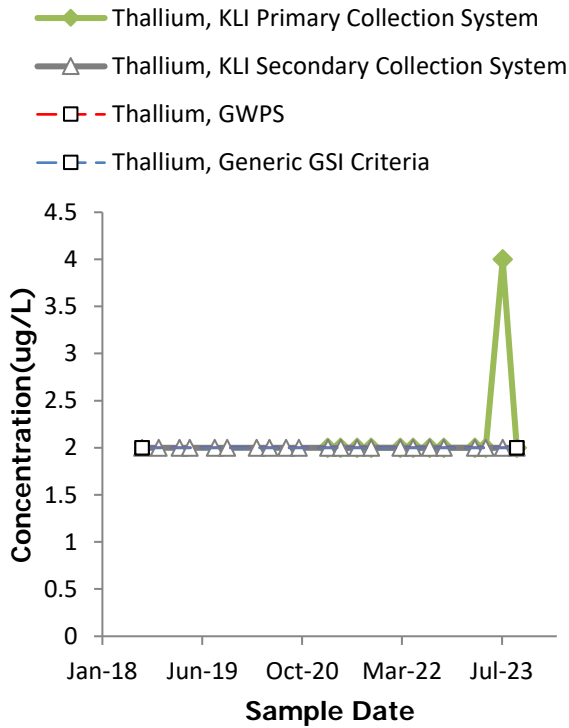
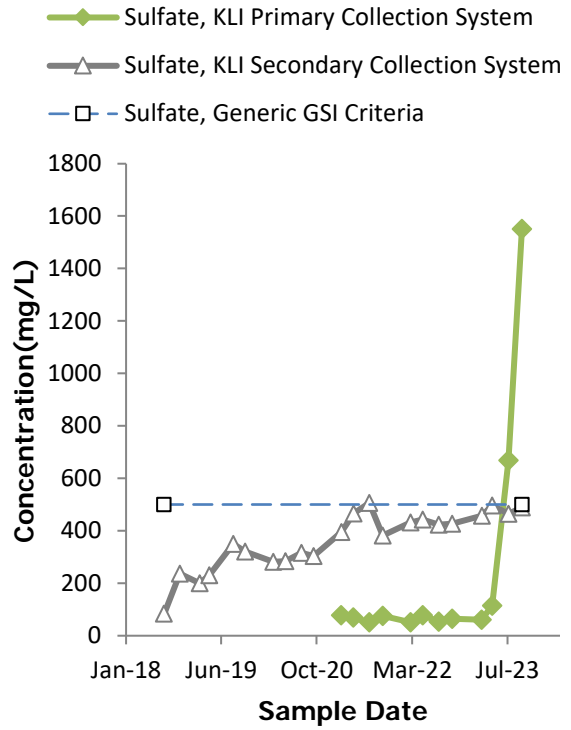
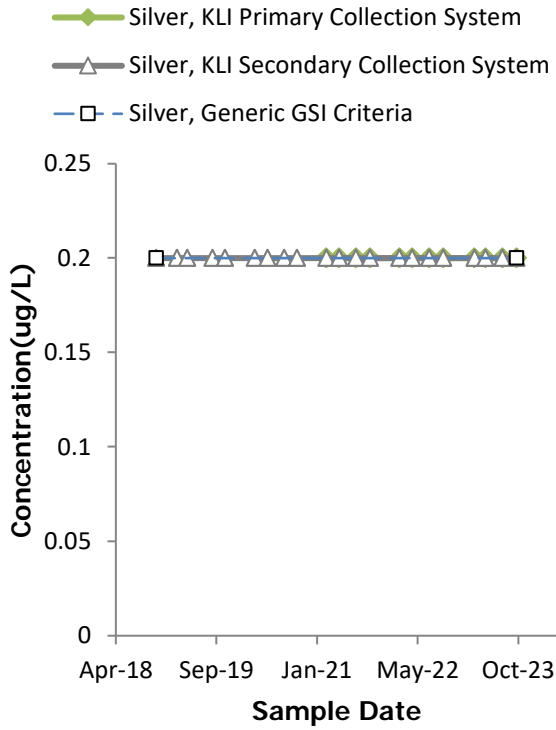
Water Quality Time Series



Water Quality Time Series



Water Quality Time Series



Water Quality Time Series

