

January 30, 2024

TRANSMITTAL VIA EMAIL 01/30/2024

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

SUBJECT:2023 Annual Groundwater Monitoring and Corrective Action Report §257.90(e)inclusive of the Semiannual Progress Report §257.97(a)DE Karn Bottom Ash Pond 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 – 257.98), apply to the Consumers Energy Company (Consumers Energy) Bottom Ash Pond CCR Unit at the DE Karn Power Plant Site. Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). This 2023 Annual Groundwater Monitoring and Corrective Action report documents activities from January 2023 through December 2023.

This letter along with the May 2023 and October 2023 semiannual groundwater sampling reports for the Karn Bottom Ash Pond (Enclosures 2 and 3) and a technical memorandum discussing the nature and extent of contamination characterization (Enclosure 4) 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).

The Karn Bottom Ash Pond was in assessment monitoring at the beginning and at the end of the period covered by this report. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97 and is continuing semiannual assessment monitoring in accordance with §257.95.

This groundwater monitoring and corrective action report includes a Semiannual Progress Report, prepared as a requirement of §257.97(a) of the Federal Coal Combustion Residual (CCR) Rule and describes progress towards selecting and implementing the final remedy for the Karn Bottom Ash Pond after the completion of the Assessment of Corrective Measures, DE Karn Bottom Ash Pond Coal Combustion Residual Unit, dated September 11, 2019 (Karn Bottom Ash Pond ACM)

Consumers Energy Environmental Services 1945 W Parnall Road, Jackson MI

Environmental Quality & Sustainability



(TRC, 2019). Groundwater management alternatives considered to be technically feasible following source removal activities that could potentially address the residual arsenic under <u>known</u> groundwater conditions were identified in the report as: 1) Source removal with post-remedy monitoring, 2) Source removal with groundwater capture/control, 3) Source removal with impermeable barrier, 4) Source removal with active geochemical sequestration, and 5) Source removal with post-

Karn Bottom Ash Pond Closure Activities

Consumers Energy prepared and submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) a closure work plan for the Karn Bottom Ash Pond (Karn Bottom Ash Pond Work Plan) and a Response Action Plan developed in accordance with Part 115 dated April 9, 2018 and March 15, 2019, respectively. These plans were developed in anticipation of supporting the Assessment of Corrective Measures that would be necessary for evaluating and selecting a final remedy for the Karn Bottom Ash Pond after Consumers Energy provided notification of exceeding Groundwater Protection Standard (GWPS) per §257.95(g) that arsenic was present at statistically significant levels above the federal GWPS in five of six downgradient wells at the Karn Bottom Ash Pond.

EGLE approved the Karn Bottom Ash Pond Work Plan on December 20, 2018 based on expectation that a report documenting the removal activities and certifying solid waste has been removed in accordance with the work plan would be submitted at the completion of activities. Subsequently, EGLE approved the Response Action Plan on May 14, 2019 based on the anticipated submitted of the Assessment of Corrective Measures. Consumers Energy submitted for review and approval, *D.E. Karn Generating Facility Bottom Ash Pond CCR Removal Documentation Report* (Karn Bottom Ash Pond Closure Report) on October 30, 2019 to satisfy requirements for completing the removal of solid waste so that obtaining a solid waste operating license was unnecessary. The certification of solid waste removal was approved by EGLE on December 1, 2020.

Closure by removal has been achieved pursuant to 324.11519b(9)(b) by documenting the removal of sources of contamination under the response action plan. However, concentrations of arsenic in groundwater exceeding the GWPS pursuant to 40 CFR 257.95(h) have persisted within the compliance monitoring well network after the source removal activities were completed. EGLE has approved a remedy consistent with R 299.4444 and R 299.4445 of the Part 115 rules through the approval of the DE Karn Hydrogeological Monitoring Plan, Rev. 03 that includes the determination of Groundwater Not in an Aquifer and groundwater mixing zone authorization. Additional steps needed to address residual groundwater contamination are discussed in the observations and results sections below.

Karn Bottom Ash Pond Assessment Activities for this Period

Consumers Energy instrumented the six new monitoring wells constructed within the former Karn Bottom Ash Pond area during the first week of March 2022 and the existing, certified Groundwater Monitoring System with mini-Troll™ pressure transducers that started collecting high-



resolution groundwater elevation data starting on April 7, 2023. These data will be summarized in the 2024 Semiannual Progress Report to be submitted in July 2024. Based on the evaluation of data from the May and October 2023 sampling events, the following general observations were noted:

- Groundwater flow and direction was found to confirm the lack of radial flow within the former bottom ash pond area and helped to refine the extent of the new potentiometric high;
- The Karn 1&2 Electrical Generating Units that contributed process water discharges to the unlined ditch located immediately northeast of the former bottom ash pond ceased operation on May 30, 2023; and
- The distribution of arsenic was confirmed to be below the site-specific chronic concentration of 100 ug/L at all six well locations located within the former Karn Bottom Ash Pond footprint; however, several monitoring wells had arsenic observed at concentrations above the site-specific GWPS of 21 ug/L.

Results of May 2023 and October Sampling Event

Statistical analysis from the May and October 2023 semiannual groundwater monitoring events verified that the only constituent of concern that is present at statistically significant levels above the established GWPS is arsenic. Results are presented in May 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit (Enclosure 2) October 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit (Enclosure 2) October 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit (Enclosure 3). Additionally, monitoring performed under the Karn Groundwater Surface-Water Interface (GSI) Compliance Plan demonstrates protection of human health and the environment with criteria determined to be protective at the point of exposure. These results are presented in the Second Semiannual 2023 Nature and Extent Data Summary, DE Karn Bottom Ash Pond, Consumers Energy (N&E Summary) (Enclosure 4).

Significant observations from the event summaries are as follows:

- Groundwater potentiometric surface within the area of the former Karn Bottom Ash Pond exhibits flow primarily moving west towards the intake channel, or south towards the Karn Generating Plant rather than radially from within the pond area;
- Regionally, radial flow is observed with a new "high" point shifted to the east of the former Karn Bottom Ash Pond geographically centered between monitoring wells DEK-MW-15003 and OW-12;
- No additional Appendix IV constituents have been observed at statistically significant levels above GWPS for the Karn Bottom Ash Pond groundwater monitoring system;
- > Redox conditions continue to demonstrate that groundwater redox chemistry



equilibrium is continuing to shift back to pre-source removal conditions as reflected in the trends for dissolved oxygen reverting back to primarily anoxic concentrations (e.g. less than 0.5 mg/L) and electrical potential primarily returning to negative potential; and

- The mean arsenic concentration at DEK-MW-15002 is significantly lower than concentrations observed while the pond was in operation (prior to June 2018), indicating that the discontinuation of hydraulic loading to the Karn Bottom Ash Pond and the completed source removal of CCR was successful in removing a source of arsenic.
- Although arsenic is present in site wells at concentrations above the GWPS, the drinking water pathway is not complete. Monitoring performed under the Michiganapproved GSI Compliance Monitoring Program demonstrates protection of human health and the environment with criteria determined to be protective at the potential point of exposure (Enclosure 4: Figures 1 & 2).
 - Groundwater monitoring locations along the DE Karn Intake Channel and boundary between the coal ash management areas and the power plant complex (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006) document contaminant concentrations of arsenic are less than the authorized mixing zone-based chronic concentration of 100 ug/L.
 - Total chronic loading (i.e., mass flux), calculated from concentrations observed in transect groundwater samples collected from push-point samplers advanced at locations T1-3GSI through T6-3GSI, remains below the chronic mixing zone GSI criterion, indicating current conditions are protective of the GSI pathway.

Conclusions

Source removal activities for the Karn Bottom Ash Pond have been completed and documented in the Karn Bottom Ash Pond Closure Report submitted to EGLE on October 30, 2019. Improvements in groundwater quality have been observed in the groundwater monitoring system, but observations of ongoing changes in groundwater potentiometric surface that may influence groundwater flow characteristics and/or alter groundwater redox conditions at monitoring locations that could influence constituent concentrations, still require further evaluation before a final remedy can be selected. To aid in the further evaluation, Consumers Energy installed six additional monitoring wells within the former Karn Bottom Ash Pond area that were integrated into the 2022 sampling schedule. Additionally, these groundwater monitoring wells have been instrumented with mini-Trolls™ that measure the groundwater elevation to a calibrated datum on frequent basis to better understand the relationships between groundwater elevation and potential flux. Subsequent sampling events to include the additional monitoring wells will inform the on-going improvements and retention of monitoringonly, passive, or active remedial options following the source removal. As conditions continue to



be evaluated post-source removal, the drinking water and groundwater-surface water interface (GSI) pathway are protected by quarterly monitoring performed under the Michigan-approved hydrogeological monitoring plan that includes a GSI Compliance Monitoring Program.

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

The next semiannual progress report will be submitted in six months by July 30, 2024. Please feel free to contact me with any questions or clarifications.

Sincerely,

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Harold D. Register, Jr., P.E.

Sr. Principal Environmental Engineer Risk Management Phone: (517) 788-2982 Email: <u>harold.registerjr@cmsenergy.com</u>

cc: Mr. Jim Ferritto, EGLE Bay City District Office Mr. John Ozoga, EGLE Bay City District Office Mr. Mike Quigg, EGLE Bay City District Office Ms. Margie Ring, EGLE Lansing Office Mr. Jim Arduin, EGLE Lansing Office Mr. Joe Firlit, Consumers Energy Ms. Darby Litz, TRC Ms. Kristin Lowery, TRC Mr. Andrew Whaley, TRC



Enclosures:

- 1) CCR Annual Groundwater Report Requirements: § 257.90(e). Checklist for the Karn Bottom Ash Pond CCR Unit.
- 2) May 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit. (TRC, July 21, 2023).
- 3) October 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit. (TRC, January 30, 2024).
- 4) Second Semiannual 2023 Nature and Extent Data Summary, DE Karn, Consumers Energy, Essexville, Michigan. (TRC, January 29, 2024).

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

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Notes:

(1) 2023 Annual Groundwater Monitoring and Corrective Action Report DE Karn Bottom Ash Pond Coal Combustion Residuals CCR Units. Consumers Energy. January 30, 2024.

(2) May 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit. TRC. July 21, 2023.

(3) October 2023 Assessment Monitoring Data Summary and Statistical Evaluation Consumers Energy, DE Karn Site, Bottom Ash Pond CCR Unit. TRC. January 30, 2024.

(4) Second Semiannual 2023 Nature and Extent Data Summary, DE Karn, Consumers Energy, Essexville, Michigan. TRC. January 29, 2024.



May 2023 Assessment Monitoring Data Summary and Statistical Evaluation

DE Karn, Bottom Ash Pond CCR Unit

Essexville, Michigan

July 2023

Darby Litz Hydrogeologist/Project Manager

Prepared For: Consumers Energy Company

Prepared By: TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

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Andrew Whaley Project Geologist



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FIGURES

Figure 1	Site Location Map
Figure 2	Karn and Weadock Complex Map
Figure 3	Shallow Groundwater Contour Map – May 2023

APPENDICES

- Appendix A Data Quality Reviews
- Appendix B Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event
- Appendix C Laboratory Analytical Reports



1.0 Introduction

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

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

1.1 **Program Summary**

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

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

- Boron at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15004, DEK-MW-15005, DEK-MW-15006;
- Fluoride at DEK-MW-15001;
- Field pH at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15005, DEK-MW-15006; and
- Sulfate at DEK-MW-15006.

On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. After subsequent sampling for Appendix IV constituents, Consumers Energy provided notification that arsenic was present at statistically significant levels above the Ground Water Protection Standards (GWPS) established at 21 ug/L (Consumers Energy, January 2019) in five of the six downgradient monitoring wells at the Karn Bottom Ash Pond as follows:

 Arsenic at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15004, and DEK-MW-15005.

The notification of the GWPS exceedance on January 14, 2019 was followed up with a Response Action Plan submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on March 15, 2019 laying out the preliminary understanding of water quality and



actions that were underway to mitigate or eliminate unacceptable risk associated with the identified release from the CCR unit. The *Assessment of Corrective Measures* (ACM) (TRC, September 2019) was initiated on April 14, 2019 and submitted on September 11, 2019 in accordance with the schedule in §257.96 and the requirements of the Response Action Plan.

The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1). Although arsenic concentrations exceed the GWPS in on-site groundwater monitoring locations, arsenic is delineated within the limits of the property owned by Consumers Energy and there are **currently no adverse effects on human health or the environment** from either surface water or groundwater due to CCR management at the Karn Bottom Ash Pond. Per §257.96(b), Consumers Energy is continuing to monitor groundwater in accordance with the assessment monitoring program as specified in §257.95.

Evaluation of groundwater under the CCR Rule focused on the following constituents that were collected *unfiltered* in the field:

-	
Apper	ndix IV
Antimony	Mercury
Arsenic	Molybdenum
Barium	Radium 226/228
Beryllium	Selenium
Cadmium	Thallium
Chromium	
Cobalt	
Fluoride	
Lead	
Lithium	
	Antimony Arsenic Barium Beryllium Cadmium Chromium Cobalt Fluoride Lead

CCR Rule Monitoring Constituents



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

	0 /
Detection Monitoring	Assessment Monitoring
Iron	Copper
	Nickel
	Silver
	Vanadium
	Zinc

Additional Monitoring Constituents (Michigan Part 115/PA 640)

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

1.2 Site Overview

The Karn Bottom Ash Pond is located within the DE Karn Power Plant site, which is located north of the 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 Karn Landfill and the Karn Lined Impoundment. The Karn Landfill has been certified closed and is now in post-closure care and is being monitored in accordance with the EGLE-approved *Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area* (December 19, 2017). The Karn Lined Impoundment has been licensed to operate by the EGLE under Part 115 (License Number 9629) and is being monitored in accordance with the EGLE-approved *Karn Lined Impoundment Hydrogeological Monitoring Plan* (November 13, 2020). The locations of the Karn Landfill, the Karn Lined Impoundment, and the Karn Bottom Ash Pond are shown on Figure 2.

Previously, the Karn Bottom Ash Pond was used for wet ash dewatering and was the primary settling/detention structure for the National Pollutant Discharge Elimination System (NPDES) treatment system prior to discharge. Consumers Energy provided notification of initiation of closure on October 12, 2018 to implement the certified closure plan by removal of CCR under the self-implementing requirements and schedule of the CCR Rule. In preparation for removal of the Karn Bottom Ash Pond, a new lined impoundment (Karn Lined Impoundment) was constructed meeting the requirements of the CCR Rule and the operational needs at the Karn Power Plant. The Karn Lined Impoundment began receipt of CCR and non-CCR on June 7,

¹ On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule.



2018 when it replaced the Karn Bottom Ash Pond operations.

Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Karn Bottom Ash Pond under the DE Karn Bottom Ash Pond Closure Plan (Golder, January 2018; Revised April 2018) and the CCR Rule's closure by removal provisions in §257.102(c). Consumers Energy ceased hydraulic loading to the Karn Bottom Ash Pond in June 2018 and allowed the area to dewater by gravity. Consumers Energy then operated a construction dewatering system to allow for excavation of the vertical and lateral extent of CCR that commenced on March 20, 2019 and has operated through the construction and restoration period. The excavation extended to six inches below known CCR elevations established from previous investigations. Excavated CCR has been placed in the neighboring Weadock Landfill that is constructed with of a fully encapsulation soil-bentonite slurry wall keyed into a competently confining clay unit. The Karn Bottom Ash Pond has been restored by backfilling and grading the surface with clean fill in accordance with the plan to promote stormwater drainage, minimize ponding of surface water, and to reduce the potential of infiltration and migration of residual arsenic and any future constituents of concern (COCs). With the CCR removal complete, Consumers Energy submitted the DE Karn Generating Facility Bottom Ash Pond CCR Removal Documentation Report (Golder, October 2019) on October 30, 2019. EGLE approved the documentation removal report on December 1, 2020. Groundwater conditions post-CCR removal continue to be monitored.

1.3 Geology/Hydrogeology

The majority of the Karn Bottom Ash Pond area is comprised of surficial CCR and sand fill. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (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 DE Karn Power Plant site is bounded by several surface water features (Figure 1): 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 Bottom Ash Pond, the shallow groundwater flow is generally to the west, toward the intake channel.



2.0 Groundwater Monitoring

2.1 Monitoring Well Network

In accordance with 40 CFR 257.91, Consumers Energy established a groundwater monitoring system for the Karn Bottom Ash Pond, which consists of 10 monitoring wells (four background monitoring wells and six downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

Groundwater around the Karn Bottom Ash Pond was initially characterized as radial based on the eight initial background sampling events prior to commencing detection monitoring; therefore, the six downgradient wells (DEK-MW-15001 through DEK-MW-15006) that were installed and spaced along the circumference of the Karn Bottom Ash Pond continued to accurately represent the quality of groundwater passing the waste boundary that ensures detection of groundwater contamination such that all potential contaminant pathways are monitored. Monitoring well DEK-MW-15001 was decommissioned on April 18, 2018 due to the installation of the new Karn Lined Impoundment, which is a new double composite lined CCR unit constructed as a replacement to the Karn Bottom Ash Pond. Monitoring well DEK-MW-18001 was installed on May 21, 2018 approximately 80 feet southeast of DEK-MW-15001 to maintain the perimeter downgradient monitoring well network.

Groundwater flow direction near the former pond has changed as a result of the pond decommissioning and monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit (Figure 3). These two wells were removed from the certified downgradient monitoring well network. The recertification was included in Appendix D of the *October 2021 Assessment Monitoring Data Summary and Statistical Evaluation* (TRC, January 2022).

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

2.2 May 2023 Assessment Monitoring

Per §257.95, all wells in the CCR unit groundwater monitoring program must be sampled semiannually. TRC conducted the first semiannual assessment monitoring event of 2023 for Appendix III and IV constituents at the Karn Bottom Ash Pond CCR Unit in accordance with the *DE Karn Monitoring Program Sample Analysis Plan* (ARCADIS, May 2016) (SAP). The semiannual assessment monitoring event was performed on May 1st 3 through 3, 2023.

The May 2023 sampling event included collection of static water level measurements from the Karn Bottom Ash Pond groundwater monitoring system and other site wells to support preparation of a groundwater contour map. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. The Karn Bottom Ash Pond monitoring wells (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006 and DEK-MW-18001) and



background monitoring wells (MW-15002, MW-15008, MW-15016, and MW-15019) 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.

The groundwater samples were analyzed by the Consumers Energy Trail Street Laboratory for Appendix III and IV constituents in accordance with the SAP. Radium analyses were completed by Eurofins Environment Testing. The analytical results for the background wells are summarized in Table 3, and the analytical results for the downgradient monitoring wells are summarized in Table 4. Analytical results from the May 2023 monitoring event are included in the attached laboratory reports (Appendix C).

2.2.1 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the May 2023 assessment monitoring event are provided in Table 1. These 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 or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although historically the point source discharge of sluiced bottom ash into the Karn Bottom Ash Pond 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 from the groundwater monitoring system of the former Karn Bottom Ash Pond in May 2023demonstrate a reduction in groundwater elevation measurements by several feet when compared to groundwater elevations measured prior to June 2018. Due to the operational changes of the bottom ash pond and the completion of the landfill capping activities, the gradient between the bottom ash pond area and the surrounding surface water bodies is flattening out as compared to previous quarters as the groundwater elevations are reaching a new equilibrium, as expected. 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 with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as illustrated in Figure 3. As such, the groundwater flow across the footprint of the former bottom ash pond is generally to the west.



The average hydraulic gradient observed on May 1, 2023 in the Karn Bottom Ash Pond area during these events is estimated at 0.0054 ft/ft. The gradient was calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005 and DEK-MW-15003/DEK-MW-15006. 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 0.27 ft/day or 98 ft/year.

2.2.2 Data Quality

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



3.0 Assessment Monitoring Statistical Evaluation

Assessment monitoring is continuing at the Karn Bottom Ash Pond while Consumers Energy further evaluates corrective measures in accordance with §257.96 and §257.97 as outlined in the ACM. The following section summarizes the statistical approach applied to assess the May 2023 groundwater data in accordance with the assessment monitoring program.

3.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess whether Appendix IV constituent concentrations are present in groundwater at unacceptable levels as a result of CCR Unit operations by statistically comparing concentrations in the downgradient wells to the GWPSs for each Appendix IV constituent. In accordance with §257.95(h) and the Stats Plan, GWPSs were established for the Appendix IV constituents following the preliminary assessment monitoring event as documented in the Groundwater Protection Standards technical memorandum (Appendix C of the *2018 Annual Groundwater Monitoring Report*, TRC, January 2019). The GWPS is established as the higher of the EPA Maximum Contaminant Level (MCL) or statistically derived background level for constituents with MCLs and the higher of the EPA Regional Screening Levels (RSLs) or background level for constituents without an established MCL.

3.2 Data Comparison to Groundwater Protection Standards

The compliance well groundwater concentrations for Appendix IV constituents were compared to the GWPSs to determine if a statistically significant exceedance had occurred in accordance with §257.95. Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance) (USEPA, 2009), the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient monitoring well data exceeds the GWPS of any Appendix IV constituent. As documented in the January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, arsenic was present at statistically significant levels above the federal GWPS in five of the six downgradient wells at the Karn Bottom Ash Pond.

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

Due to changes in groundwater flow direction on site, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit and were determined to be no longer indicative of groundwater conditions influenced by the Karn Bottom Ash Pond. Therefore, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer included for assessment monitoring statistical analysis. The monitoring well network for statistical evaluation consists of the four monitoring wells located downgradient of the bottom ash pond (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001). Overall, the assessment



monitoring statistical evaluations have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the GWPS. The statistical evaluation of the May 2023 semiannual assessment monitoring event data indicate that arsenic is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Karn Bottom Ash Pond:

Constituent	GWPS	#Downgradient Wells Observed
Arsenic	21 ug/L	2 of 4

Previously, arsenic was present in downgradient well DEK-MW-15002 and DEK-MW-15006 at a statistically significant level; however, arsenic concentrations have declined since sluicing to the Karn Bottom Ash Pond ceased in June 2018 and the bottom ash and transport water was diverted to the Karn Lined Impoundment (Appendix B: Attachment 1). The statistical evaluation of the April 2019 through May 2023 data show that the lower confidence limit for arsenic is below the GWPS at DEK-MW-15002 and DEK MW-15006.

Concentrations of arsenic at DEK-MW-18001 have decreased since loading to the Karn Bottom Ash Pond ceased; however, arsenic remains above the GWPS at a statistically significant level. Arsenic at DEK-MW-15005 also remain above the GWPS at a statistically significant level. A summary of the confidence intervals for May 2023 is provided in Table 5. Although arsenic is present above the GWPS, the drinking water pathway is not complete as there are no drinking water wells on-site. Redox conditions, which affect contaminant transport, are still stabilizing in the Bottom Ash Pond Area following removal activities and will continue to be evaluated further.



4.0 Conclusions and Recommendations

Corrective action has been triggered and assessment monitoring is ongoing at the Karn Bottom Ash Pond CCR unit. A summary of the May 2023assessment monitoring event is presented in this report.

Overall, the statistical assessments have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the GWPS. Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Karn Bottom Ash Pond under the *DE Karn Bottom Ash Pond Closure Plan* (Golder, January 2018; Revised April 2018) and the CCR Rule's closure by removal provisions in §257.102(c).

The ACM Report provided a high-level assessment of groundwater remediation technologies that could potentially address site-specific COCs (i.e., arsenic) under known groundwater conditions. Groundwater chemistry appears to be improving in some areas as a result of discontinuing the hydraulic loading to the Karn Bottom Ash Pond and the completed source removal of CCR, as shown by the decreasing concentration of arsenic at DEK-MW-15002 ; however, attainment of the GWPS at all of the Bottom Ash Pond compliance wells may not be feasible due to influences other than the former pond, such as the presence and former operation of the nearby Karn Landfill. Redox conditions, which affect contaminant transport, are still stabilizing following pond removal and will continue to be evaluated further.

Consumers Energy will continue assessment monitoring and evaluate corrective measures in accordance with §257.96 and §257.97 as outlined in the Karn Bottom Ash Pond ACM. The groundwater management remedy for the Karn Bottom Ash Pond will be selected as soon as feasible to meet the federal standards of §257.96(b) of the CCR Rule. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98. The next semiannual monitoring event is tentatively scheduled for the fourth calendar quarter of 2023.



5.0 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
- ARCADIS. May 13, 2016. Summary of Monitoring Well Design, Installation, and Development. DE Karn Electric Generation Facility – Essexville, Michigan. Prepared for Consumers Energy Company.
- ARCADIS. May 18, 2016. Electric Generation Facilities RCRA CCR Detection Monitoring Program. DE Karn Monitoring Program Sample Analysis Plan, Essexville, Michigan. Prepared for Consumers Energy Company.
- Consumers Energy Company. December 19, 2017. Hydrogeological Monitoring Plan Rev. 3: DE Karn Solid Waste Disposal Area.
- Consumers Energy Company. January 2019. Notification of Appendix IV Constituent Exceeding Groundwater Protection Standards per §257.95(g).
- Golder Associates Inc. January 2018. D.E. Karn Generating Facility Bottom Ash Pond Closure Plan, Essexville, Michigan. Prepared for Consumers Energy Company.
- Golder Associates Inc. April 2018. D.E. Karn Generating Facility Revised Bottom Ash Pond Closure Work Plan, Essexville, Michigan. Prepared for Consumers Energy Company.
- Golder Associates Inc. October 2019. D.E. Karn Generating Facility Bottom Ash Pond CCR Removal Documentation Report. Prepared for Consumers Energy Company.
- TRC. October 2017. Groundwater Statistical Evaluation Plan DE Karn Power Plant, Bottom Ash Pond, Essexville, Michigan. Prepared for Consumers Energy Company.
- TRC. January 2018. Annual Groundwater Monitoring Report DE Karn Power Plant, Bottom Ash Pond CCR Unit. Prepared for Consumers Energy Company.
- TRC. January 2019. 2018 Annual Groundwater Monitoring Report DE Karn Power Plant, Bottom Ash Pond CCR Unit. Prepared for Consumers Energy Company.
- TRC. September 2019. Assessment of Corrective Measures DE Karn Bottom Ash Pond Coal Combustion Residual Unit. 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 2022. October 2021 Assessment Monitoring Data Summary and Statistical Evaluation – DE Karn Power Plant, Bottom Ash Pond CCR Unit. 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).
- USEPA. April 2018. Barnes Johnson (Office of Resource Conservation and Recovery) to James Roewer (c/o Edison Electric Institute) and Douglas Green, Margaret Fawal (Venable LLP). Re: Coal Combustion Residuals Rule Groundwater Monitoring Requirements. April 30, 2018. United States Environmental Protection Agency, Washington, D.C. 20460. Office of Solid Waste and Emergency Response, now the Office of Land and Emergency Management.



Tables

Table 1 Summary of Groundwater Elevation Data DE Karn – RCRA CCR Monitoring Program Essexville, Michigan

	тос		Screen Interval	Мау	1, 2023
Well Location	Elevation (ft)	Screen Interval		Depth to Water	Groundwater Elevation
			(ft BTOC)	(ft)	
DEK Bottom Ash Pon					
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 Pon					
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.89	584.58
Karn Lined Impoundn		F			
DEK-MW-15003			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 Exter		F			
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 Lev	el				
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 2Summary of Field ParametersDE Karn Bottom Ash Pond – RCRA CCR Monitoring ProgramEssexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity				
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)				
Background											
MW-15002	5/1/2023	0.48	-80.3	7.2	413	9.0	3.1				
MW-15008	5/1/2023	0.22	-106.3	6.6	1,032	9.0	8.9				
MW-15016	5/2/2023	0.37	-43.9	6.9	914	8.1	3.0				
MW-15019	5/1/2023	0.49	-99.3	6.6	1,457	8.1	3.5				
Karn Bottom Ash Po	ond					•					
DEK-MW-15002	5/2/2023	0.39	-135.9	7.2	936	9.1	2.9				
DEK-MW-15005	5/2/2023	0.31	-106.4	7.4	830	9.3	2.9				
DEK-MW-15006	5/2/2023	0.33	-131.4	7.5	888	9.9	2.1				
DEK-MW-18001	5/3/2023	0.19	-228.5	7.6	858	9.6	9.9				

Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celsius

NTU - Nephelometric Turbidity Unit.

Table 3 Summary of Groundwater Sampling Results (Analytical) DE Karn & JC Weadock Background – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:	MW-15002	MW-15008	MW-15016	Μ
					Sample Date:	5/1/2023	5/1/2023	5/1/2023	Ę
				MI Non-			De else		
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^		Васко	ground	
Appendix III ⁽¹⁾									
Boron	ug/L	NC	500	500	4,000	< 20	107	347	
Calcium	mg/L	NC	NC	NC	500 ^{EE}	48.4	108	175	
Chloride	mg/L	250**	250 ^E	250 ^E	50	64.5	259	106	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250**	250 ^E	250 ^E	500 ^{EE}	14.9	10.5	253	
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	351	877	889	
pH, Field	SŬ	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	7.2	6.6	6.9	
Appendix IV ⁽¹⁾									
Antimony	ug/L	6	6.0	6.0	2.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	10	10	10	< 1.0	1	2	
Barium	ug/L	2,000	2,000	2,000	1,200	63	71	58	
Beryllium	ug/L	4	4.0	4.0	33	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	< 1.0	
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	
Lead	ug/L	NC	4.0	4.0	14	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	170	350	440	< 10	24	64	
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	
Radium-226	pCi/L	NC	NC	NC	NC	< 0.183	< 0.249	< 0.127	
Radium-228	pCi/L	NC	NC	NC	NC	< 0.547	< 1.16	< 1.01	
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.547	< 1.16	< 1.01	
Selenium	ug/L	50	50	50	5.0	< 1.0	< 1.0	< 1.0	
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	
Additional MI Part 1	15 ⁽²⁾								
Iron	ug/L	300**	300 ^E	300 ^E	500,000EE	729	17,900	1,970	
Copper	ug/L	1,000**	1,000E	1,000 ^E	20	1	< 1.0	< 1.0	
Nickel	ug/L	NC	100	100	120	< 2	2	6	
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	
Vanadium	ug/L	NC	4.5	62	27	< 2	5	< 2	
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 10	

Notes:

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

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

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

NC - no criteria; -- - not analyzed.

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

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

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

- If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

 $^{\sf E}$ - Criterion is the aesthetic drinking water value per footnote {E}.

 $^{\mbox{\scriptsize EE}}$ - Criterion is based on the total dissolved solids GSI value per footnote {EE}.

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

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

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

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

MW-15019
5/1/2023
0,172020
211
159
302
< 1,000
94.2
1,170
6.6
< 1.0 1
1
317
< 1.0
< 0.2
< 1.0 < 6
< 6
< 1,000
< 1.0 13
13 < 0.2
< 0.2 < 5
< 5 0.31
< 0.859
< 0.859
< 1.0
< 2
21,500
< 1.0
< 1.0 3
< 0.2
< 2
< 10

Table 4 Summary of Groundwater Sampling Results (Analytical) JC Weadock Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

					Sample Location:		JCW-MW-15009	JCW-MW-15010	JCW-MW-15028
					Sample Date:	5/2/2023	5/2/2023	5/2/2023	5/2/2023
				MI Non-					
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^				
Appendix III ⁽¹⁾									
Boron	ug/L	NC	500	500	4,000	212	170	1,100	508
Calcium	mg/L	NC	NC	NC	500 ^{EE}	207	526	199	198
Chloride	mg/L	250**	250 ^E	250 [≞]	50	1,810	36.2	25	1,110
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 ^E	250 [≞]	500 ^{EE}	175	1,490	273	122
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	3,630	2,260	936	2,520
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 [⊨]	6.5 - 9.0	7.0	5.8	7.1	7.6
Appendix IV ⁽¹⁾									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	8	< 1	14	< 1
Barium	ug/L	2,000	2,000	2,000	1,200	189	19	285	381
Beryllium	ug/L	4	4.0	4.0	33	< 1	1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	55	79	78	56
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NC	NC	NC	0.216	< 0.134	0.304	0.448
Radium-228	pCi/L	NC	NC	NC	NC	< 0.579	< 0.944	< 0.740	0.968
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.579	< 0.944	< 0.740	1.42
Selenium	ug/L	50	50	50	5.0	3	2	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 1	15 ⁽²⁾								
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	1,460	13,900	417	585
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1	1	< 1	< 1
Nickel	ug/L	NC	100	100	120	6	13	4	4
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	17	< 2	< 2	8
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 10	< 10

Notes:

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

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

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

NC - no criteria; -- - not analyzed.

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

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

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

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

E - Criterion is the aesthetic drinking water value per footnote {E}.

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

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

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) 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 5 Summary of Assessment Monitoring Statistical Evaluation – May 2023 DE Karn Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

Constituent	Units	GWPS	DEW-MW-15002		DEK-MW-15005		DEK-MW-15006		DEK-MW-18001	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Arsenic	ug/L	21	1.7	14	30	83	20	28	99	331

Notes:

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

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

ug/L - micrograms per Liter.

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

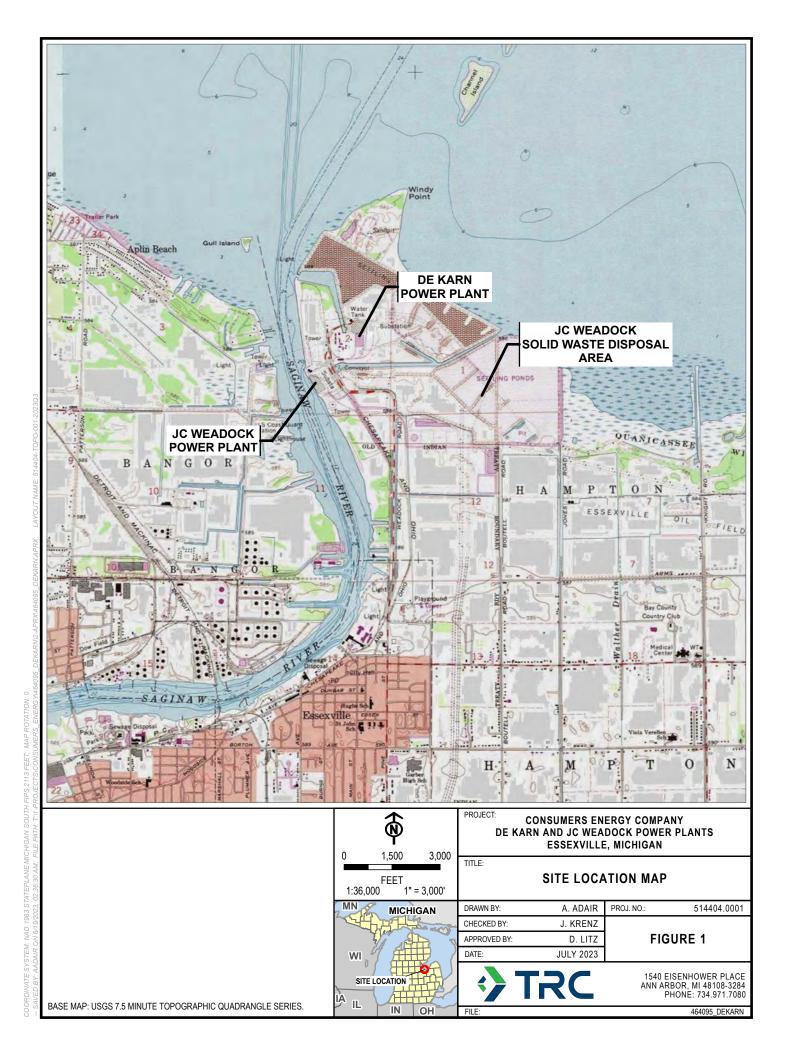
UCL - Upper Confidence Limit ($\alpha = 0.01$) of the downgradient data set.

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

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



Figures





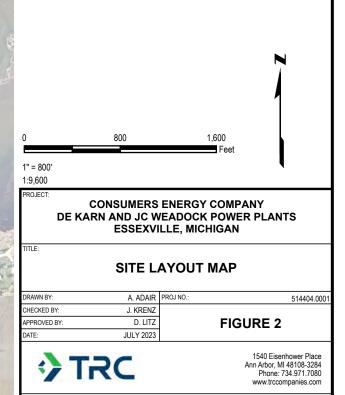
Coordi Map Re

LEGEND

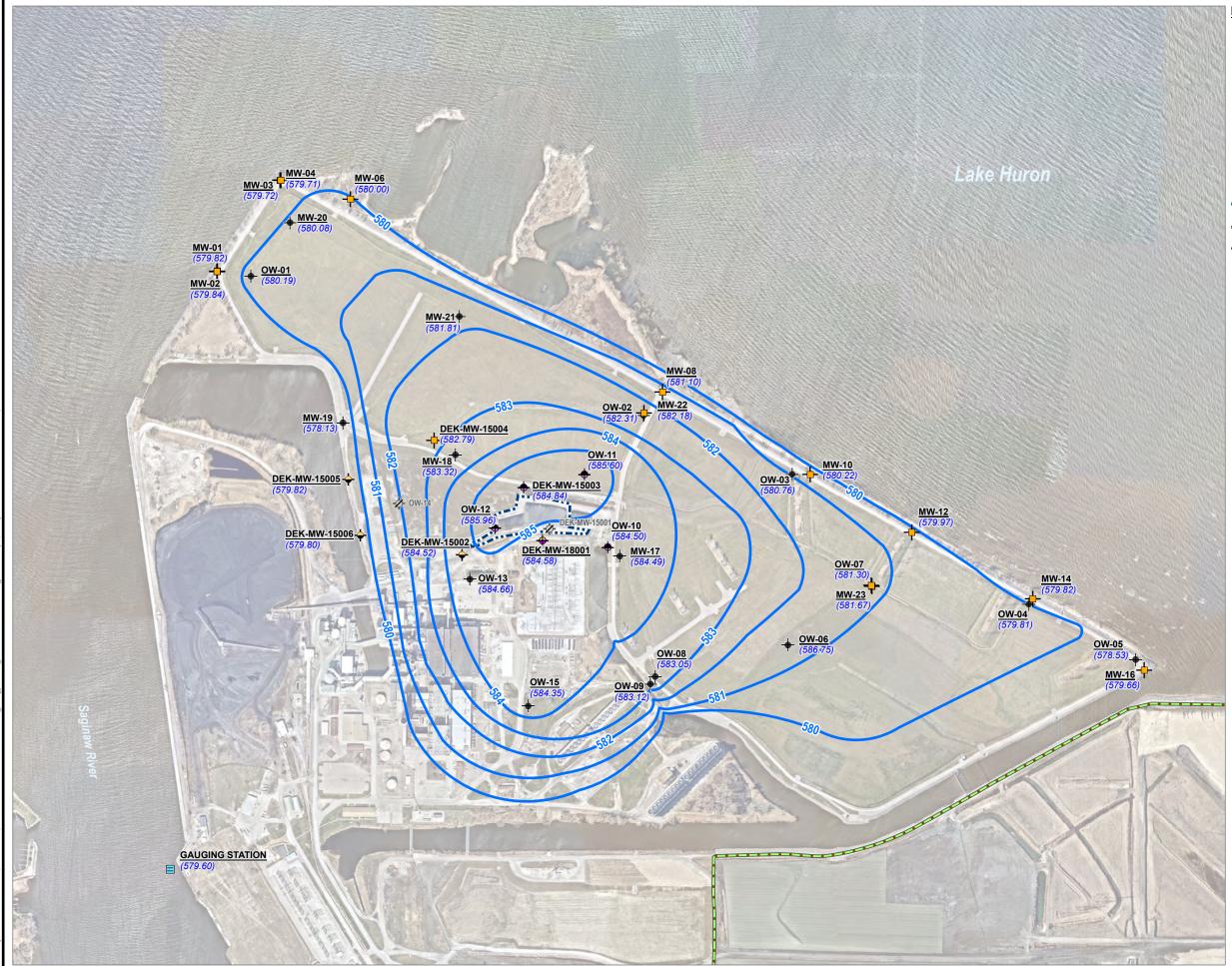
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL ø
- MONITORING WELL (STATIC WATER LEVEL ONLY) +
- ------NATURE AND EXTENT WELL
- SURFACE WATER GAUGING STATION
- + BACKGROUND MONITORING WELL
 - 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).
- 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.



0.07



LEGEND

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT ÷ MONITORING WELL
- ✦ DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL +
- DECOMMISSIONED MONITORING WELL -Ø-
- 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.

7,200 " = 600'			
	600	1,200) FEET
PROJECT: C	ONSUMERS EN DE KARN PC ESSEXVILLE	WER PLAN	IT
SHALLC	W GROUNDW MAY	ATER COI 2023	NTOUR MAP
DRAWN BY:	A. ADAIR	PROJ. NO.:	514404.0001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ	FI	GURE 3
DATE:	JULY 2023		
•	TRC	ANN ARE	SENHOWER PLACE 30R, MI 48108-3284 10NE: 734.971.7080

464095 DEKARN.aprx



Appendix A Data Quality Reviews

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

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

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

- MW-15002 MW-15008 MW-15016
- MW-15019

Each sample was analyzed for the following constituents:

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

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

Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

Review Summary

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

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

Laboratory Data Quality Review Groundwater Monitoring Event May 2023 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 Monitoring Event May 2023 DE Karn Bottom Ash Pond

Groundwater samples were collected by TRC for the May 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) 23-0400 and S48155.01(01).

During the May 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-15005; 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 May 2023 JC Weadock/Karn DEK Background

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

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

- MW-15002 MW-15008 MW-15016
- MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

Data Usability Review Procedure

The analytical data were reviewed using the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary

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

Attachment A Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn/JC Weadock Background– CCR Monitoring Program Essexville, Michigan

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

Laboratory Data Quality Review Groundwater Monitoring Event May 2023 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 radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-184761-1 Revision 1.

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
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

Data Usability Review Procedure

The analytical data were reviewed using the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;

- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary

- Target analytes were not detected in the method blanks (MBs) with the following exception.
 - Radium-226 was detected in MB 160-611074/1-A at 0.1185 +/- 0.0829 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.
- No equipment or field blanks were collected.
- LCS/LCSD recoveries and relative percent differences for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this SDG.
- A field duplicate pair was not collected.
- Carrier recoveries were within 40-110%.

Attachment A Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn Bottom Ash Pond and Lined Impoundment – CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue			
DEK-MW-18001 5/3/2023 Radium 226 Detected result is potentially a false positive due to method blank contami						

Laboratory Data Quality Review Groundwater Monitoring Event May 2023 DE Karn Bottom Ash Pond

Groundwater samples were collected by TRC for the May 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri (Eurofins – St. Louis). The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-184755-1.

During the May 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 one or more of the following constituents:

Analyte Group	Method
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

Data Usability Review Procedure

The analytical data were reviewed using the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;

- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary

- Target analytes were not detected in the method blanks (MBs) with the following exception.
 - Radium-226 was detected in MB 160-611074/1-A at 0.1185 +/- 0.0829 pCi/L. Potential false positive exists for radium-226 results with normalized absolute differences (NADs) <1.96, as summarized in attachment A.
- One equipment blank (EB-DEK-BAP) was collected. Target analytes were not detected in the equipment blank sample.
- LCS/LCSD recoveries and relative percent differences (RPDs) for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this SDG.
- The field duplicate pair samples were DUP-DEK-BAP-01/DEK-MW-15005. All criteria were met.
- Carrier recoveries were within 40-110%.

Attachment A Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn Bottom Ash Pond – CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue		
DEK-MW-15002	5/2/2023				
DEK-MW-15005 DEK-MW-15006	5/2/2023	Radium 226	Detected result is potentially a false positive due to method blank contamination (normalized absolute different		
	5/2/2023	Raululli 220	<1.96).		
DUP-DEK-BAP-01	5/2/2023				



Appendix B Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event



Technical Memorandum

Date:	June 20, 2023
То:	J.R. Register, Consumers Energy
From:	Darby Litz, TRC Alex Eklund, TRC
Project No.:	514404.0001.0000Phase 002, Task 002
Subject:	Statistical Evaluation of May 2023 Assessment Monitoring Sampling Event DE Karn Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan

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

An assessment monitoring event was conducted between May 1st and 3rd, 2023. In accordance with §257.95, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix IV constituents are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 Groundwater Protection Standards technical memorandum, which was also included in the 2018 Annual Groundwater Monitoring Report (TRC, January 2019).

The statistical evaluation of the assessment monitoring event data indicates the following constituent is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Karn Bottom Ash Pond:

Constituent	GWPS	#Downgradient Wells Observed
Arsenic	21 ug/L	2 of 4

The results of the assessment monitoring statistical evaluation for the downgradient wells are consistent with the results of the previous assessment monitoring data statistical evaluations, indicating that arsenic is the only constituent present at concentrations above the GWPS. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 -

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

§257.98.

Assessment Monitoring Statistical Evaluation

When the initial assessment monitoring event was completed in May 2018, the compliance well network at the Karn Bottom Ash Pond included six wells encircling the unit (DEK-MW-15002 through DEK-MW-15006 and DEK-MW-18001). Due to changes in groundwater flow direction on site, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit and were determined to be no longer indicative of groundwater conditions influenced by the Karn Bottom Ash Pond. Therefore, monitoring wells DEK-MW-15003 and DEK-MW-15003 and DEK-MW-15004 are no longer included for statistical analysis. Starting with the May 2021 statistical evaluation, the compliance well network includes DEK-MW-15002, DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001.

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

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

For each detected Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight sampling events (October 2019 through May 2023) were retained for further analysis. Arsenic in DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001

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

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at the Karn Bottom Ash Pond had individual results exceeding the GWPS.

Groundwater data were then evaluated utilizing SanitasTM statistical software. SanitasTM is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the SanitasTM statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each of the CCR Appendix IV constituents using a using a per test³ 99 percent confidence level, i.e., a significance level (α) of 0.01. The following narrative describes the methods employed, the results obtained and the SanitasTM output files are included as an attachment.

The statistical data evaluation included the following steps:

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

The results of these evaluations are presented and discussed below.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the CCR assessment monitoring program. Initially, the assessment monitoring results were visually assessed for potential outliers or trends. No outliers were identified. Arsenic concentrations at DEK-MW-18001 appear to exhibit an upward trend on the time-series chart over the eight most recent sampling events (Attachment 1). This data set was tested further in Sanitas[™] utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test to test for significance of the trend at the 98% confidence level. The trend test showed that arsenic concentration at DEK-MW-18001 is generally increasing with time, as evidenced by the positive Sen's Slope. Additionally, the increase in concentration at DEK-MW-18001 was shown to be statistically significant (Attachment 1). Confidence bands are identified by the UG as the appropriate method for calculating confidence intervals on trending data. A confidence band calculates upper and lower confidence limits at each point along the trend to reduce variability and create a narrower confidence interval. At least 8 to 10 measurements should be available when computing a confidence band around a linear regression, and as of the May 2023 event, eight semiannual sampling events have been completed post-CCR removal.

The Sanitas[™] software was used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent 8 sampling events. Eight independent sampling events

³ Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

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provide the appropriate density of data as recommended per the UG yet are collected recently enough to provide an indication of current condition. The tests were run with a per-test significance of $\alpha = 0.01$. The software outputs are included in Attachment 1 along with data reports showing the values used for the evaluation. The percentage of non-detect observations for well/constituent pairs with a direct GWPS exceedance are also included in Attachment 1. Non-detect data was handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas[™] software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well, along with notes on data transformations, as appropriate. Due to the increasing trend, a confidence band was calculated for the arsenic data set at DEK-MW-18001. The arsenic data set at DEK-MW-15006 was found to be normally distributed and the arsenic data set at DEK-MW-15005 was normalized using a square root transformation. The confidence bands and interval tests compare the lower confidence limit to the GWPS. The statistical evaluation of the Appendix IV parameters shows exceedances for arsenic at two of the four monitoring locations (DEK-MW-15005 and DEK-MW-18001). The results of the assessment monitoring statistical evaluation for the other downgradient wells are consistent with the results of the previous assessment monitoring data statistical evaluations, indicating that arsenic is the only constituent present at concentrations above the GWPS. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

Attachments

 Table 1
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Attachment 1 Sanitas[™] Output Files

Table

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

				S	ample Location:	DEK-MW-15002									
	_				Sample Date:	10/15/2019	5/13/2020	10/6/2020	10/6/2020	5/3/2021	10/4/2021	5/3/2022	10/4/2022	10/4/2022	5/2/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient									
Appendix III									Field Dup					Field Dup	
Boron	ug/L	NC	NA	619	NA	1,600	1,390	1,580	1,600	1,420	1,530	1,100	1,340	1,370	1,270
Calcium	mg/L	NC	NA	302	NA	130	170	126	122	148	73.1	105	70.2	68	122
Chloride	mg/L	250*	NA	2,440	NA	410	130	106	102	148	102	99.3	105	103	81.7
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	1,300	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	150	367	142	139	216	58.3	172	33.7	33.2	225
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	1,300	1,100	791	776	926	599	779	584	631	899
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.3	7.1	7.1		7.4	7.1	7.0	7.4		7.2
Appendix IV															
Antimony	ug/L	6	NA	1	6	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	6.5	3	8	8	2	2	2	3	4	< 1
Barium	ug/L	2,000	NA	1,300	2,000	140	196	133	131	211	102	134	92	95	176
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1	1	1	< 1	1	1	1	1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	<1,000	< 1,000	1,300	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	35	48	35	36	36	29	28	25	27	29
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5.0	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.334	0.673	< 0.430	< 0.577	0.582	1.47	< 0.423	0.219	0.287	0.431
Radium-228	pCi/L	NC	NA	NA	NA	0.987	0.899	1.06	< 0.577	0.811	2.29	< 0.530	1.81	2.70	< 1.5
Radium-226/228	pCi/L	5	NA	3.32	5	0.654	< 0.763	0.642	< 0.460	< 0.537	0.827	0.636	2.03	2.99	< 1.5
Selenium	ug/L	50	NA	2	50	< 1.0	< 1	< 1	1	< 1	3	1	< 1	1	< 1
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

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

(SDWR) April 2012.

Bold value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

		DEK-MW-15005															
		10/15/2019	10/15/2019	5/13/2020	5/13/2020	10/7/2020	5/3/2021	5/3/2021	10/4/2021	5/3/2022	10/4/2022	5/2/2023	5/2/2023				
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
Appendix III							Field Dup		Field Dup			Field Dup					Field Dup
Boron	ug/L	NC	NA	619	NA	700	650	863	858	847	926	948	991	787	911	856	864
Calcium	mg/L	NC	NA	302	NA	60	59	71.0	72.1	155	95.6	97.6	102	127	130	106	107
Chloride	mg/L	250*	NA	2,440	NA	64	64	48.0	47.5	52.7	65.2	65.1	82.3	141	138	86.7	87.4
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	5.2	5.0	18.9	18.9	102	50.8	50.2	57.2	151	130	189	189
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	390	400	419	425	687	534	561	546	909	894	767	764
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.6		8.1		7.7	7.6		7.1	7.1	7.5	7.4	
Appendix IV																	
Antimony	ug/L	6	NA	1	6	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	120	120	34	34	42	45	44	68	54	54	32	32
Barium	ug/L	2,000	NA	1,300	2,000	110	100	127	127	248	173	170	192	305	312	228	224
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	<1,000	<1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	16	15	20	20	45	38	39	41	36	36	27	28
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5.0	< 5.0	< 5	< 5	< 5	8	8	7	12	8	8	8
Radium-226	pCi/L	NC	NA	NA	NA	0.165	0.185	< 0.469	< 0.335	0.621	0.291	< 0.187	1.12	0.620	0.544	0.355	0.417
Radium-228	pCi/L	NC	NA	NA	NA	0.524	0.682	1.34	0.662	0.875	0.722	0.650	2.06	1.08	3.11	< 0.755	< 0.785
Radium-226/228	pCi/L	5	NA	3.32	5	< 0.456	0.497	1.14	< 0.554	< 0.502	< 0.459	0.479	0.940	1.70	3.66	< 0.755	< 0.785
Selenium	ug/L	50	NA	2	50	< 1.0	< 1.0	< 1	< 1	< 1	1	1	2	1	1	1	< 1
Thallium	ug/L	2	NA	2	2	< 2.0	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

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

(SDWR) April 2012.

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

GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

Sample Location:							DEK-MW-15006 10/14/2019 5/13/2020 10/7/2020 5/3/2021 10/4/2021 10/4/2021 5/3/2022 5/3/2022 10/4/2022 5/2/2023									
Sample Date: 1							5/13/2020	10/7/2020	5/3/2021	10/4/2021	10/4/2021	5/3/2022	5/3/2022	10/4/2022	5/2/2023	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS		downgradient									
Appendix III											Field Dup		Field Dup			
Boron	ug/L	NC	NA	619	NA	1,200	1,090	1,220	938	1,050	1,080	893	888	871	944	
Calcium	mg/L	NC	NA	302	NA	34	70.4	106	115	117	117	65.0	65.5	83.8	127	
Chloride	mg/L	250*	NA	2,440	NA	45	71.5	102	63.5	78.9	74.7	68.6	67.9	70.6	61.2	
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	1,060	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250*	NA	407	NA	74	316	296	324	209	196	173	168	254	385	
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	450	833	1,010	790	712	708	597	609	720	847	
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.8	8.1	7.7	7.5	7.3		7.4		7.8	7.5	
Appendix IV																
Antimony	ug/L	6	NA	1	6	< 1.0	3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Arsenic	ug/L	10	NA	21	21	27	21	27	24	23	24	25	24	26	16	
Barium	ug/L	2,000	NA	1,300	2,000	51	86	141	139	125	126	68	67	94	137	
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium	ug/L	100	NA	3	100	1.1	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1	
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	
Fluoride	ug/L	4,000	NA	1,000	4,000	<1,000	< 1,000	1,060	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Lithium	ug/L	NC	40	180	180	11	15	22	21	19	19	16	15	18	19	
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Molybdenum	ug/L	NC	100	6	100	11	18	11	9	7	7	6	6	7	7	
Radium-226	pCi/L	NC	NA	NA	NA	< 0.159	< 0.370	0.629	0.353	0.797	0.832	< 0.449	0.395	0.242	0.324	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.581	1.01	1.12	1.16	1.50	1.35	0.870	< 0.502	1.43	< 0.894	
Radium-226/228	pCi/L	5	NA	3.32	5	< 0.581	0.780	0.492	0.804	0.704	0.518	1.29	0.742	1.67	< 0.894	
Selenium	ug/L	50	NA	2	50	< 1.0	< 1	< 1	< 1	2	2	< 1	1	1	1	
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.

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

Bold value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

Sample Location:				DEK-MW-18001									
			•		Sample Date:	10/15/2019	5/14/2020	10/6/2020	5/3/2021	10/7/2021	5/3/2022	10/4/2022	5/3/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient							
Appendix III													
Boron	ug/L	NC	NA	619	NA	2,200	1,670	1,740	1,180	1,370	869	1,060	931
Calcium	mg/L	NC	NA	302	NA	84	72.1	71.7	65.2	71.0	63.7	58.3	54.6
Chloride	mg/L	250*	NA	2,440	NA	81	64.7	60.7	51.6	55.2	65.9	62.5	62.2
Fluoride	ug/L	4,000	NA	1,000	NA	1,000	1,090	1,240	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	31	51.1	91.9	121	118	187	140	148
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	500	484	476	486	494	555	551	575
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.3	7.7	7.6	7.3	7.4	7.6	7.6	7.6
Appendix IV													
Antimony	ug/L	6	NA	1	6	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	63	79	85	92	85	113	109	304
Barium	ug/L	2,000	NA	1,300	2,000	160	130	136	135	135	164	135	152
Beryllium	ug/L	4	NA	1	4	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6.0	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	1,000	1,090	1,240	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	36	27	26	25	24	22	23	20
Mercury	ug/L	2	NA	0.2	2	< 0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5.0	< 5	< 5	< 5	< 5	< 5	< 5	11
Radium-226	pCi/L	NC	NA	NA	NA	0.206	< 0.608	< 0.473	0.189	0.873	0.294	0.264	0.268
Radium-228	pCi/L	NC	NA	NA	NA	0.952	< 0.676	0.591	0.828	1.85	0.592	1.67	0.599
Radium-226/228	pCi/L	5	NA	3.32	5	0.746	< 0.676	0.463	0.639	0.979	0.885	1.93	0.868
Selenium	ug/L	50	NA	2	50	< 1.0	< 1	1	< 1	2	2	< 1	1
Thallium	ug/L	2	NA	2	2	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

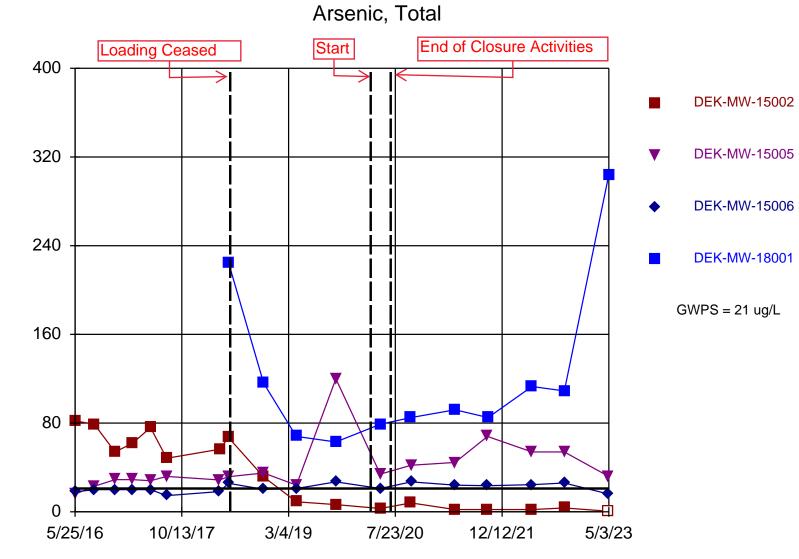
* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April 2012.

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

GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

Attachment 1 Sanitas™ Output Files

Sanitas[™] v.9.6.37 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.

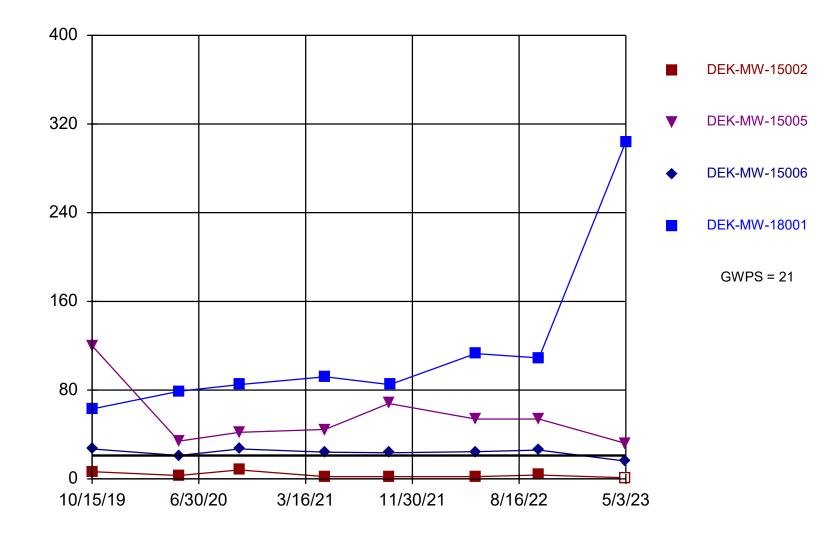


Time Series Analysis Run 6/29/2023 3:43 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Confidence interval evaluations include 8 most recent semiannual sampling events

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

Arsenic Comparison to GWPS



Time Series Analysis Run 5/26/2023 12:15 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

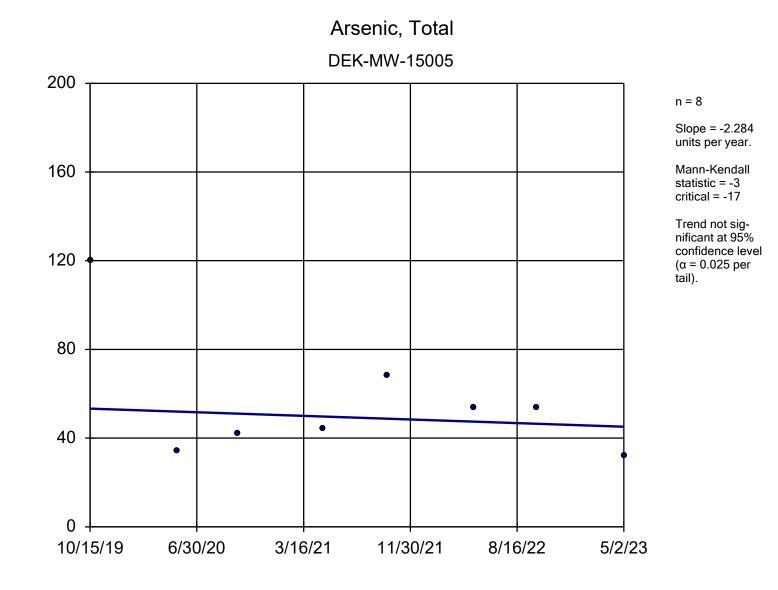
Summary Report

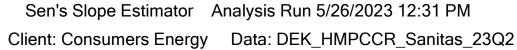
Constituent: Arsenic, Total Analysis Run 5/26/2023 12:28 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

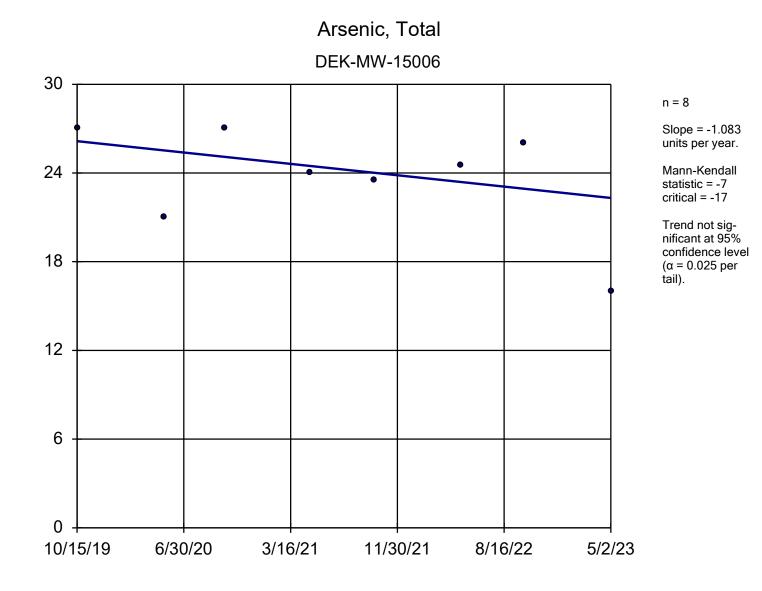
For observations made between 10/15/2019 and 5/3/2023, a summary of the selected data set:

Observations = 32 ND/Trace = 1 Wells = 4 Minimum Value = 1 Maximum Value = 304 Mean Value = 49.86 Median Value = 29.5 Standard Deviation = 58.51 Coefficient of Variation = 1.173 Skewness = 2.691

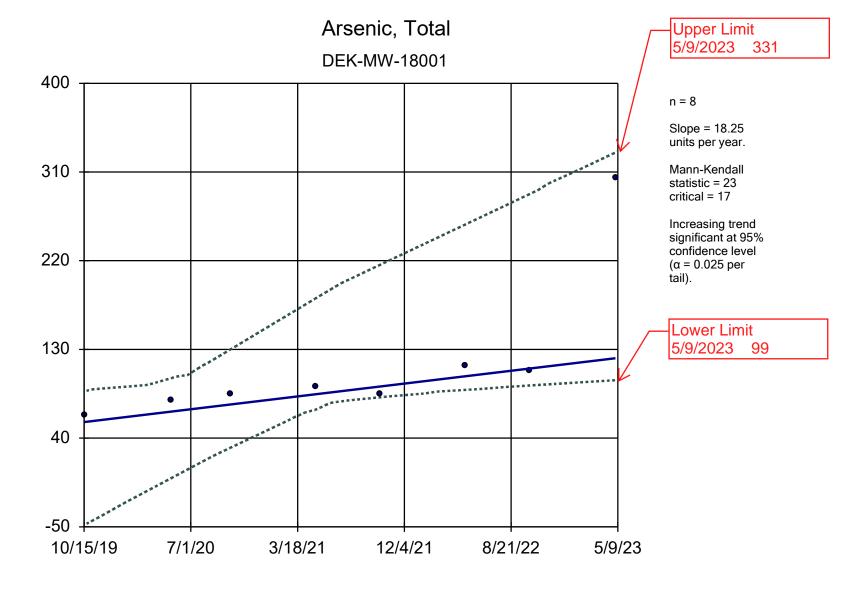
Well	<u>#Obs.</u>	ND/Trace	Min	Max	Mean	<u>Median</u>	Std.Dev.	CV	Skewness
DEK-MW-15002	8	1	1	8	3.5	2.5	2.464	0.704	0.9417
DEK-MW-15005	8	0	32	120	56.06	49.25	28.38	0.5061	1.565
DEK-MW-15006	8	0	16	27	23.63	24.25	3.672	0.1554	-1.143
DEK-MW-18001	8	0	63	304	116.3	88.5	77.53	0.6669	2.078

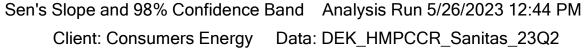






Sen's Slope Estimator Analysis Run 5/26/2023 12:31 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

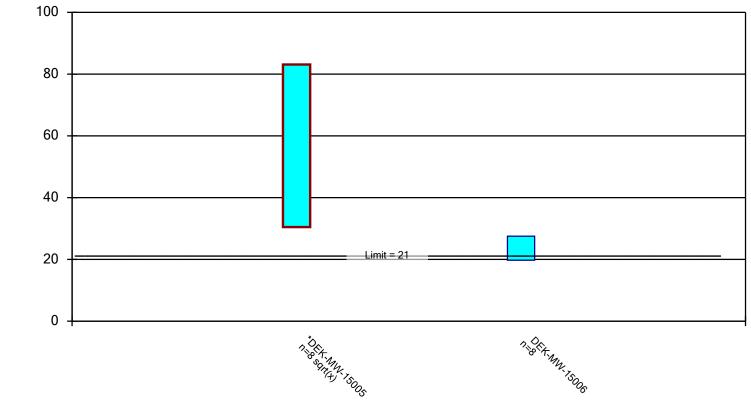




ng/L

Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 5/26/2023 12:35 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 5/26/2023 12:35 PM

Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q2

	DEK-MW-15005	DEK-MW-15006
10/15/2019	120 (D)	27
5/13/2020	34 (D)	21
10/7/2020	42	27
5/3/2021	44.5 (D)	24
10/4/2021	68	23.5 (D)
5/3/2022	54	24.5 (D)
10/4/2022	54	26
5/2/2023	32 (D)	16
Mean	56.06	23.63
Std. Dev.	28.38	3.672
Upper Lim.	83.11	27.52
Lower Lim.	30.44	19.73



Appendix C Laboratory Analytical Reports



135 W. Trail St. Jackson, MI 49201

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 19, 2023

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

CC: HDRegister, P22-521 BLSwanberg, P22-119 Darby Litz, Project Manager TRC Companies, Inc. 1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 23-0400

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

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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

<u>Qualifier</u>	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Н	The maximum recommended hold time was exceeded
Ι	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
Κ	Reporting limit raised due to matrix interference
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q2-2023 DEK Bottom Ash Pond WellsDate Received:5/3/2023Chemistry Project:23-0400

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	Site
23-0400-01	DEK-MW-15002	Groundwater	05/02/2023 12:07	DEK Bottom Ash Pond
23-0400-02	DEK-MW-15005	Groundwater	05/02/2023 09:53	DEK Bottom Ash Pond
23-0400-03	DEK-MW-15006	Groundwater	05/02/2023 11:13	DEK Bottom Ash Pond
23-0400-04	DUP-DEK-BAP-01	Groundwater	05/02/2023 00:00	DEK Bottom Ash Pond
23-0400-05	FB-DEK-BAP	Water	05/02/2023 12:07	DEK Bottom Ash Pond
23-0400-06	EB-DEK-BAP	Water	05/02/2023 12:21	DEK Bottom Ash Pond



Analyst: EB

Sample Site:	DEK Bottom Ash Pond
Field Sample ID:	DEK-MW-15002
Lab Sample ID:	23-0400-01
Matrix:	Groundwater

Laboratory Project:	23-0400
Collect Date:	05/02/2023
Collect Time:	12:07 PM

Aliquot #: 23-0400-01-C01-A01

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

				Aliquot #. 23-0	400-01-C01-A01	Allalyst. ED
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	176		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	1270		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	122000		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	1680		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	29		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	39700		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	354		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	10800		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	99500		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	19		ug/L	10.0	05/09/2023	AB23-0510-13
Mercury by EPA 7470A, Total,	Aqueous			Aliquot #: 23-0	400-01-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 #: 23-0	400-01-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	e Analyte List, Cl, F, S	SO4, Aqı	leous	Aliquot #: 23-0	400-01-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	81700		ug/L	1000.0	05/05/2023	AB23-0505-06

23-0400 Page 5 of 33

23-0400 05/02/2023 12:07 PM



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15002	Collect Date:
Lab Sample ID:	23-0400-01	Collect Time:
Matrix:	Groundwater	

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous				Aliquot #: 23-0	400-01-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	225000		ug/L	1000.0	05/05/2023	AB23-0505-06
Nitrogen-Ammonia by SM4500NH3(h),	Groundwater I	HL		Aliquot #: 23-0	400-01-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	5500		ug/L	25.0	05/12/2023	AB23-0512-02
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	400-01-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	899		mg/L	10.0	05/04/2023	AB23-0504-07
Alkalinity by SM 2320B				Aliquot #: 23-0	400-01-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	385000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	385000		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 #: 23-0	400-01-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	100		ug/L	20.0	05/05/2023	AB23-0504-02



Analyst: EB

Sample Site:	DEK Bottom Ash Pond
Field Sample ID:	DEK-MW-15005
Lab Sample ID:	23-0400-02
Matrix:	Groundwater

Laboratory Project:	23-0400
Collect Date:	05/02/2023
Collect Time:	09:53 AM

Aliquot #: 23-0400-02-C01-A01

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

			-	Aliquot #: 23-0	400-02-C01-A01	Analyst: ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	32		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	228		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	856		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	106000		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	695		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/18/2023	AB23-0510-13
Lithium	27		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	21400		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	294		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	8560		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	110000		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, To	otal, Aqueous			Aliquot #: 23-0	400-02-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 Aque	eous, NO2, NO3			Aliquot #: 23-0	400-02-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, CI, F, S	04, Aqu	leous	Aliquot #: 23-0	400-02-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	86700		ug/L	1000.0	05/05/2023	AB23-0505-06

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23-0400

05/02/2023

09:53 AM



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15005	Collect Date:
Lab Sample ID:	23-0400-02	Collect Time:
Matrix:	Groundwater	

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous			Aliquot #: 23-0	400-02-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	189000		ug/L	1000.0	05/05/2023	AB23-0505-06
Nitrogen-Ammonia by SM4500NH3(h), (Groundwater H	L		Aliquot #: 23-0	400-02-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3290		ug/L	25.0	05/12/2023	AB23-0512-02
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	400-02-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	767		mg/L	10.0	05/04/2023	AB23-0504-07
Alkalinity by SM 2320B				Aliquot #: 23-0	400-02-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	329000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	329000		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 #: 23-0	400-02-C07-A01	Analyst: Merit	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	60		ug/L	20.0	05/05/2023	AB23-0504-02



Analyst: EB

Sample Site:	DEK Bottom Ash Pond
Field Sample ID:	DEK-MW-15006
Lab Sample ID:	23-0400-03
Matrix:	Groundwater

Laboratory Project:	23-0400
Collect Date:	05/02/2023
Collect Time:	11:13 AM

Aliquot #: 23-0400-03-C01-A01

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

			-	Allquot #: 23-0	400-03-C01-A01	Analyst: ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Arsenic	16		ug/L	1.0	05/09/2023	AB23-0510-13
Barium	137		ug/L	5.0	05/09/2023	AB23-0510-13
Beryllium	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Boron	944		ug/L	20.0	05/09/2023	AB23-0510-13
Cadmium	ND		ug/L	0.2	05/09/2023	AB23-0510-13
Calcium	127000		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	985		ug/L	20.0	05/09/2023	AB23-0510-13
Lead	ND		ug/L	1.0	05/09/2023	AB23-0510-13
Lithium	19		ug/L	10.0	05/09/2023	AB23-0510-13
Magnesium	17900		ug/L	1000.0	05/09/2023	AB23-0510-13
Manganese	454		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	8840		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	103000		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, To	tal, Aqueous			Aliquot #: 23-0	400-03-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 Aque	ous, NO2, NO3			Aliquot #: 23-0	400-03-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, S	04, Aqı	leous	Aliquot #: 23-0	400-03-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	61200		ug/L	1000.0	05/05/2023	AB23-0505-06



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0400
Field Sample ID:	DEK-MW-15006	Collect Date:	05/02/2023
Lab Sample ID:	23-0400-03	Collect Time:	11:13 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analy	te List, CI, F	, SO4, Aqւ	leous	Aliquot #: 23-0	400-03-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	385000		ug/L	1000.0	05/06/2023	AB23-0505-06
Nitrogen-Ammonia by SM4500NH3(h)	, Groundwat	er HL		Aliquot #: 23-0	400-03-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3830		ug/L	25.0	05/12/2023	AB23-0512-02
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	400-03-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	847		mg/L	10.0	05/04/2023	AB23-0504-07
Alkalinity by SM 2320B				Aliquot #: 23-0	400-03-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	197000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	197000		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 #: 23-0	400-03-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	40		ug/L	20.0	05/05/2023	AB23-0504-02



Sample Site:	DEK Bottom Ash Pond	La
Field Sample ID:	DUP-DEK-BAP-01	
Lab Sample ID:	23-0400-04	
Matrix:	Groundwater	

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp Aliquot #: 23-0400-04-C01-A01 Analyst: EB Flag Units RL Parameter(s) Result Analysis Date Tracking ND Antimony ug/L 1.0 05/09/2023 AB23-0510-13 Arsenic 32 ug/L 1.0 05/09/2023 AB23-0510-13 Barium 224 ug/L 5.0 05/09/2023 AB23-0510-13 Beryllium ND ug/L 1.0 05/09/2023 AB23-0510-13 Boron 864 ug/L 20.0 05/09/2023 AB23-0510-13 Cadmium ND ug/L 0.2 05/09/2023 AB23-0510-13 Calcium 107000 ug/L 1000.0 05/09/2023 AB23-0510-13 ND Chromium 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 684 ug/L 20.0 05/09/2023 AB23-0510-13 Lead ND ug/L 1.0 05/09/2023 AB23-0510-13 Lithium 28 ug/L 10.0 05/09/2023 AB23-0510-13 21000 ug/L 1000.0 Magnesium 05/09/2023 AB23-0510-13 Manganese 299 ug/L 5.0 05/09/2023 AB23-0510-13 8 Molybdenum ug/L 5.0 05/09/2023 AB23-0510-13 3 Nickel ug/L 2.0 05/09/2023 AB23-0510-13 8530 ug/L Potassium 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 111000 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 10.0 AB23-0510-13 ug/L 05/09/2023

Mercury by EPA 7470A, Total, Aqueous			Aliquot #: 23-	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-	0400-04-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, CI, F, SO4, Aqueous			Aliquot #: 23-0	0400-04-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	87400	ug/L	1000.0	05/05/2023	AB23-0505-06

Laboratory Project:	23-0400
Collect Date:	05/02/2023
Collect Time:	12:00 AM



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0400
Field Sample ID:	DUP-DEK-BAP-01	Collect Date:	05/02/2023
Lab Sample ID:	23-0400-04	Collect Time:	12:00 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analy	te List, Cl, F,	SO4, Aqւ	ieous	Aliquot #: 23-0	400-04-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	189000		ug/L	1000.0	05/05/2023	AB23-0505-06
Nitrogen-Ammonia by SM4500NH3(h)	Groundwate	r HL		Aliquot #: 23-0	400-04-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3310		ug/L	25.0	05/12/2023	AB23-0512-02
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	400-04-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	764		mg/L	10.0	05/04/2023	AB23-0504-07
Alkalinity by SM 2320B				Aliquot #: 23-0	400-04-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	324000		ug/L	10000.0	05/05/2023	AB23-0505-09
Alkalinity Bicarbonate	324000		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 #: 23-0	400-04-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	60		ug/L	20.0	05/05/2023	AB23-0504-02



Sample Site: **DEK Bottom Ash Pond** Field Sample ID: FB-DEK-BAP Lab Sample ID: 23-0400-05 Matrix: Water

Laboratory Project: 23-0400 Collect Date: 05/02/2023 Collect Time: 12:07 PM

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

Metals by EPA 6020B: CCR R	ule Appendix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	400-05-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	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 #: 23-0	400-05-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 Aqueou	s, NO2, NO3			Aliquot #: 23-0	400-05-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 SM450	0NH3(h), Groundwate	er HL		Aliguot #: 23-0	400-05-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

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23-0400

05/02/2023

12:07 PM

Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	FB-DEK-BAP	Collect Date:
Lab Sample ID:	23-0400-05	Collect Time:
Matrix:	Water	

Sulfide, Total by SM 4500 S2D		Aliquot #: 23-0400-05-C04-A01					
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking		
Sulfide	ND	ug/L	20.0	05/05/2023	AB23-0504-02		

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Sample Site: **DEK Bottom Ash Pond** Field Sample ID: EB-DEK-BAP Lab Sample ID: 23-0400-06 Matrix: Water

Laboratory Project: 23-0400 Collect Date: 05/02/2023 Collect Time: 12:21 PM

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

Metals by EPA 6020B: CCR Rule Appe	als by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp					1 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, Aqueou	S			Aliquot #: 23-0	400-06-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, N	ons by EPA 300.0 Aqueous, NO2, NO3 Aliquot #: 23-0400-06-C02-A				400-06-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),	Groundwate	r HL		Aliquo <u>t #: 2</u> 3-0	400-06-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		

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23-0400 05/02/2023

12:21 PM

Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	EB-DEK-BAP	Collect Date:
Lab Sample ID:	23-0400-06	Collect Time:
Matrix:	Water	

Sulfide, Total by SM 4500 S2D		Aliquot #: 23-0400-06-C04-A01					
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking		
Sulfide	ND	ug/L	20.0	05/05/2023	AB23-0504-02		

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Data Qualifiers

Exception Summary

No exceptions occurred.

Other

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

and a second second	a contractor				
Project Log-In Number: 23					
Inspection Date: 5.03.23			Inspection By:	10	
Sample Origin/Project Name:	Q2-202	3 DEK	Bottom Ash	Pond Wells	
Shipment Delivered By: Ente	r the type of shi	ipment carr	ier.		
			USPS		borne
Tracking Number: 3	977 754	34 710	8 Shipping Form A	attached: Yes X	No
Shipping Containers: Enter th	he type and nun	ber of ship	ping containers received		
	Cardboard Box		Custom Case Other	_ Envelop	
Condition of Shipment: Enter	the as-received	d condition	of the shipment contained	er.	
			Dented	Lea	aking
Shipping Containers R Enclosed Documents: Enter th			Sealed \underline{X}	-	
CoC × Wor	rk Request		Air Data Sheet	Other	
Temperature of Containers: N	Measure the terr	perature of	several sample containe	ers.	
As-Received Tempera M&TE # and Expiration	ture Range <u>2.1</u>	-5.4	Samples Received		No
Number and Type of Contain			er of sample containers re	eceived.	
<u>Container Type</u> VOA (40mL or @mL)		<u>Soil</u>	Other	Broken	<u>Leaking</u>
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	24				
24 mL vial (glass) کچو 50 0 mL (plastic) دست 3.13	4				_

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

	Page	of	
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IPLING SITE / CUST	TOMER:			PROJECT NUMBER: SAP CC or WO#:							ANALYSIS REQUESTED										
2023 DEK Bottom	Ash Pond We	Vells		23-0400	23-0400 REQUESTER: Harold Register						(Attach List if More Space is Needed)								QA REQUIREMENT		
IPLING TEAM:				TURNAROUND TIME REQUIRED: 24 HR 48 HR 3 DAYS STA	NDARD 🛛 OTH	ER_														□ NPDES ⊠ TNI	
ND REPORT TO:	Caleb Batts	1		email:	phone:			-	-	-											□ ISO 17025
COPY TO: 1	Harold Regist	ster		MATRIX CODES: GW = Groundwater OX = Other	1	1.1	со	NTA	INF	RS										□ 10 CFR 50 APP. B	
	TRC		1	WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air		12	P	RESI	ERV	ATIV	/E	als		1						□ INTERNAL INFO	
LAB S.	SAMPLE COLL	LECTIO	z XIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gener		AL#					_	Total Metals	SU	Ammonia		Alkalinity	de			OTHER	
SAMPLE ID	DATE	TIM	MATRIX	FIELD SAMPLE ID / LOC	ATION	TOTAL None HN03 H304		None HNO ₃ H ₂ SO ₄ NaOH HCl McOH Other		Tota	Anions	Amn	TDS	Alka	Sulfide			REMARKS			
23-0400-01	5-2-23	120	7 GW	DEK-MW-15002	_	7	4	1 1	1			x	x	x	x	x	x				
-02	5-2-23	095	J GW	DEK-MW-15005		7	4	1 1	1			x	x	x	x	x	x				
-03	5-2-23	ma	GW	DEK-MW-15006		7	4	1 1	1			x	x	x	x	x	x				
-04 5	5-2-23	-	. GW	DUP-DEK-BAP-01		7	4	1 1	1			x	x	x	x	x	x				
-05	5-2-23	120	w	FB-DEK-BAP		4	1	1 1	1			x	x	x			x				
+ -06 S	5-2-23	122	W	EB-DEK-BAP		4	1	1 1	1			x	x	x			x				
						-															
																	-				
INQUISHED BY:	ty	-		-2-23 /1600 RI	ECEIVED BY: Fede	×						co	MME	ENTS	ар. С	- 0-					
INQUISHED BY: Fel G	×			5-03.23 10:20	ECEIVED BY:												s □ N 4 °C			: 27723 Date: 5-25-23	
	ky		DATE	TTIME: RI S-03.23 10:20	A		_													-	



Report ID: S48155.01(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

Analytical Laboratory Report

Merit Laboratories, Inc. 2680 East Lansing Drive East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions: John Laverty (johnlaverty@meritlabs.com) Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S48155.01-S48155.06 Project: 23-0400 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) Laboratory Certifications (Page 3) Qualifier Descriptions (Page 3) Glossary of Abbreviations (Page 3) Method Summary (Page 4) Sample Summary (Page 5)

Naya Mushah

Maya Murshak Technical Director



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



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
<u>!</u>	Result is outside of stated limit criteria
В	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
н	Sample submitted and run outside of holding time
1 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
М	Result reported to MDL not RDL
0	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
Т	No correction for total solids
Х	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
е	Reported value estimated due to interference
j	Analyte also found in associated method blank
р	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
х	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



Method Summary

Method

SM4500-S2 D

Version Standard Method 4450 S2 D 2011



Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S48155.01	23-0400-01 (DEK-MW-15002)	Groundwater	05/02/23 12:07
S48155.02	23-0400-02 (DEK-MW-15005)	Groundwater	05/02/23 09:53
S48155.03	23-0400-03 (DEK-MW-15006)	Groundwater	05/02/23 11:13
S48155.04	23-0400-04 (DUP-DEK-BAP-01)	Groundwater	05/02/23 00:01
S48155.05	23-0400-05 (FB-DEK-BAP)	Groundwater	05/02/23 12:07
S48155.06	23-0400-06 (EB-DEK-BAP)	Groundwater	05/02/23 12:21



Lab Sample ID: S48155.01

Sample Tag: 23-0400-01 (DEK-MW-15002) Collected Date/Time: 05/02/2023 12:07 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:06, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.10	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S48155.02

Sample Tag: 23-0400-02 (DEK-MW-15005) Collected Date/Time: 05/02/2023 09:53 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:08, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.06	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S48155.03

Sample Tag: 23-0400-03 (DEK-MW-15006) Collected Date/Time: 05/02/2023 11:13 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:16, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.04	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S48155.04

Sample Tag: 23-0400-04 (DUP-DEK-BAP-01) Collected Date/Time: 05/02/2023 00:01 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:18, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.06	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S48155.05

Sample Tag: 23-0400-05 (FB-DEK-BAP) Collected Date/Time: 05/02/2023 12:07 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:20, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S48155.06

Sample Tag: 23-0400-06 (EB-DEK-BAP) Collected Date/Time: 05/02/2023 12:21 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 15:22, 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:S48155

Client: CONSUMERS (Consumers Energy Company)

Project: 23-0400 PR#23050668

Submitted: 05/03/2023 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. X Yes No N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.1
02. X Yes No N/A	Received on ice/ cooling process begun	
03. Yes X No N/A	Samples shipped	
04. Yes X No N/A	Samples left in 24 hr. drop box	
05. Yes No X N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. X Yes No N/A	COC adequately filled out	
07. X Yes No N/A	COC signed and relinquished to the lab	
08. X Yes No N/A	Sample tag on bottles match COC	
09. Yes X No N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. X Yes No N/A	Do sample have correct chemical preservation	
10. X Yes No N/A 11. X Yes No N/A	Do sample have correct chemical preservation Completed pH checks on preserved samples? (no VOAs)	
	· ·	
11. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs)	
II. X Yes No N/A 12. Yes X No N/A	Completed pH checks on preserved samples? (no VOAs)	
11. X Yes No N/A 12. Yes No N/A Bottle Conditions	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab?	
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact	
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used	
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A 15. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used	
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A 15. X Yes No N/A 16. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used Sufficient sample volume received	

Corrective action for all exceptions is to call the client and to notify the project manager.

Date:

Merit Laboratories Bottle Preservation Check

Lab Set ID: S48155 Submitted: 05/03/2023 16:41 Client: CONSUMERS (Consumers Energy Company) Project: 23-0400 PR#23050668 Attention: Emil Blaj Address: Consumers Energy Company 135 West Trail Street Jackson, MI 49201

Initial Preservation Check: 05/04/2023 08:44 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
S48155.01	125ml Plastic NaOH/Zn Acetate	>12			
S48155.02	125ml Plastic NaOH/Zn Acetate	>12			
S48155.03	125ml Plastic NaOH/Zn Acetate	>12			
S48155.04	125ml Plastic NaOH/Zn Acetate	>12			
S48155.05	125ml Plastic NaOH/Zn Acetate	>12			
S48155.06	125ml Plastic NaOH/Zn Acetate	>12			

REPOR	TTO)	Laboratories, Inc.	www.meritlabs.		CU	STO	YOC	RFO	COR	D				5	INVOICE	: TC
CONTACT NAME E		-		0100				NTACT							XSAM		
COMPANY Cons	sumers F	nerov			_		co	MPANY									_
ADDRESS 135 V	V Trail S	treet					AD	DRESS									
Jackson	v. man s	ucci		STATE MI	CODE	0201	сп	TY						_	STATE	ZIP CODE	_
PHONE NO. 517-	700 2000	-	FAX NO. 517-788-2533	P.O. NO. 440011		9201		IONE NO	0.			E-MAR	ADDRESS				
			517-788-2555	440011 QUOTE NO.	4090	_	1				-						_
-MAIL ADDRESS						_			_		ANAL	YSIS (ATTA	CH LIST IF	MORE SPA	CE IS REQUIR		
ROJECT NO./NAM	E 23-040	0 PR#23	050668	SAMPLER(S) - PLEASE	PRINT/SK	3N NAM	AE.		3	N/A					Certificat		
URNAROUNE	TIME REC	UIRED	1 DAY 2 DAYS 3 D	AYS STANDARD	Пол	HER .										AP Drinkin	-
DELIVERABLE	S REQUIR					THER		-			0				DoD	NPDES	\$
	GW=GROUN SL=SLUDGI		WW=WASTEWATER S=SI DRINKING WATER O=OIL		SD=SOLI W=WAS				ainers vative:	&	Sulfide				Project L	ocations	ork
MERIT LAB NO. FOR LAB USE ONLY	YE. DATE	AR	SAMPLE IDENTIFICATION-DI		MATRIX	# OF BOTTLES	NONE	NNO.	H ₅₀	OTHER	Total				Other	nstructions	-
18155.01	05/02/23	1207	23-0400-01 (DEK-MW-	15002)	GW	1			1	1					preserved	with NaOH/Zn	Acetat
	05/02/23	0953	23-0400-02 (DEK-MW-	15005)	GW	1			1	1	1				"		
03	05/02/23	1113	23-0400-03 (DEK-MW-	15006)	GW	1			1	11,	1				"		
. 04	05/02/23	-	23-0400-04 (DUP-DEK-	BAP-01)	GW	1			1	11.	1				n -		
	05/02/23	1207	23-0400-05 (FB-DEK-B	AP)	GW	1		\square	1	11,	1						
	05/02/23		23-0400-06 (EB-DEK-B		GW	1			1		/				"		
					-												
					+												
RELINQUISHED BY		tim	SUMERS ENERGY	Sampler DA		IME VI	11.5		ISHED B						1	DATE	TIME
RECEIVED BY: SIGNATURE/ORG/		0 -1	M alanto	5/3/23		TIME 241	RE	CEIVED	DBY:	ANIZATI						DATE	TIME
RELINQUISHED BY SIGNATURE/ORGA RECEIVED BY:	¢:		anguno-	0/0/25 DA		IME						ARRIVAL	_				

23-0400 Page 33 of 33

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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 23-0401R

phone 517-788-1251 *fax* 517-788-2533

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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

<u>Qualifier</u>	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Н	The maximum recommended hold time was exceeded
Ι	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
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q2-2023 DEK Bottom Ash Pond & Lined ImpoundmentDate Received:5/4/2023Chemistry Project:23-0401

d Sample ID	<u>Matrix</u>	Sample Date	Site
WW-18001	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment
MW-18001 MS	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment
MW-18001 MSD	Groundwater	05/03/2023 06:40	DEK Bottom Ash Pond & Lined Impoundment
	MW-18001 MS	MW-18001 Groundwater MW-18001 MS Groundwater	MW-18001 Groundwater 05/03/2023 06:40 MW-18001 MS Groundwater 05/03/2023 06:40

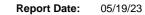


Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-01	Collect Time:	06:40 AM
Matrix:	Groundwater		

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

Metals by EPA 6020B: CCR Rule Appen	dix III-IV Total	Metal	s Exp	Aliquot #: 23-0	401-01-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	i			Aliquot #: 23-0	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, N	D 3			Aliquot #: 23-0	401-01-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, SC	04, Aqı	leous	Aliquot #: 23-0	401-01-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

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Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-01	Collect Time:	06:40 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analy	rte List, CI, F	, SO4, Aqւ	leous	Aliquot #: 23-0	401-01-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)	, Groundwat	er HL		Aliquot #: 23-0	401-01-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 #: 23-0	401-01-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 #: 23-0	401-01-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 #: 23-0	401-01-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



Analyst: EB

Aliquot #: 23-0401-02-C01-A01

Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-02	Collect Time:	06:40 AM
Matrix:	Groundwater		

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

			-	Allquot #: 23-0	401-02-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: CL		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 Ru	ıle Analyte List, CI, F,	SO4, Aqı	leous	Aliquot #: 23-0	401-02-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	99		%	1000.0	05/05/2023	AB23-0505-06



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-02	Collect Time:	06:40 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Ar	Aliquot #: 23-0	401-02-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), Groundwate	er HL		Aliquot #: 23-0	401-02-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 #: 23-0	401-02-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 #: 23-0	401-02-C06-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	92		%	20.0	05/05/2023	AB23-0505-10



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-03	Collect Time:	06:40 AM
Matrix:	Groundwater		

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

Metals by EPA 6020B: CCR Rule Appen	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	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 #: 23-0	401-03-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, N	03			Aliquot #: 23-0	401-03-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, Aqı	ieous	Aliquot #: 23-0	401-03-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	98		%	1000.0	05/05/2023	AB23-0505-06



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0401
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	05/03/2023
Lab Sample ID:	23-0401-03	Collect Time:	06:40 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Ar	Jeous	Aliquot #: 23-0	401-03-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	B(h), Groundwate	er HL		Aliquot #: 23-0	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 #: 23-0	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 #: 23-0	401-03-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.

Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inspection Date: 3.09. C	3		Inspection By: _U	10	
Sample Origin/Project Name:	Q2-202	3 Bottom	Ash Pond +	Luned Impa	und
Shipment Delivered By: Ente	r the type of sh	ipment carrie	r.		
Pony F	edEx	UPS_	USPS	S Air	borne
Other/Hand Carry (wh					
Tracking Number:			Shipping Form	Attached: Yes	No
Shipping Containers: Enter th	ne type and nur	nber of shippi	ng containers receive	ed.	
Cooler <u>×</u> C	Cardboard Box		Custom Case	Envelor	e/Mailer
Loose/Unpackaged Co					
Condition of Shipment: Enter					
Damaged Shipment Ol		2.0			Ada a
Other			Dented	Lea	iking
Shipment Security: Enter if an			20		
Shipping Containers R	eceived: Open	ed	Sealed	_	
Enclosed Documents: Enter th	ne type of docu	ments enclose	ed with the shipment.		
CoC 🔀 Wor	k Request		Air Data Sheet	Other	
Temperature of Containers: N	Measure the ten	nperature of s	everal sample contain	ners.	
	ture Range 1. 4	2-2-1	Samples Received	I on Ice: Yes X	No
As-Received Temperat	· · · · · · · · · · · · · · · · · · ·		and the second sec		
		12 575	1 -		
As-Received Temperat	n Lsan	23 5.25	23		
M&TE # and Expiration		1.1.1.2.2		received.	
M&TE # and Expiration Number and Type of Contain <u>Container Type</u>	ers: Enter the <u>Water</u>	total number		received. <u>Broken</u>	Leaking
M&TE # and Expiration	ers: Enter the	total number	of sample containers		Leaking
M&TE # and Expiration Number and Type of Contain <u>Container Type</u>	ers: Enter the <u>Water</u>	total number	of sample containers		Leaking
M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60m)	ers: Enter the <u>Water</u>	total number	of sample containers		Leaking
M&TE # and Expiration Number and Type of Container <u>Container Type</u> VOA (40mL or 60m) Quart/Liter (g/p)	ers: Enter the <u>Water</u>	total number	of sample containers		Leaking
M&TE # and Expiration Number and Type of Container <u>Container Type</u> VOA (40mL or 60mb) Quart/Liter (g/p) 9-oz (amber glass jar)	ers: Enter the <u>Water</u>	total number	of sample containers		<u>Leaking</u>
M&TE # and Expiration Number and Type of Container <u>Container Type</u> VOA (40mL or 60m) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	ers: Enter the <u>Water</u> <u>(</u>	total number	of sample containers		<u>Leaking</u>

PH Strup 6+# 205522 exp. 2.15.25

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CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / G	CUSTOMER:		. 1	PROJECT NUMBER:	SAP CC or WC)#:							A	NAL	YSI	SRE)	QA REQUIREMENT:			
Q2-2023 DEK Bot	tom Ash Pond &	Lined Impo	ound.	23-0401	REQUESTER:	Haro	ld R	egis	ter			10	Attac	h Lis	st if M	fore S	pace	is Nee	ded)	QA	A REQUIREMENT:
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:	STANDARD 🛛 OTH	IER_														1.1	NPDES TNI
SEND REPORT TO	Caleb Batts			email:	phone:																ISO 17025
COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Oti	her	1	CC	NTA	INI	ERS	10.6										10 CFR 50 APP. B
	TRC			WW = Wastewater SL = Sh W = Water / Aqueous Liquid A = Air	udge		P	RES	ERV	ATI	VE	Metals									INTERNAL INFO
LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = V	Vipe General Waste	LAL#			_	Anions	Ammonia		Alkalinity	ide				OTHER			
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / L	OCATION	TO'	None	UNH	NaOH NaOH HCl MeOH Other	Total	Ani	Ami	TDS	Alka	Sulfide				REMARKS		
23-0401-01	5/3/53	GLAC	GW	DEK-MW-18001		7	4	1 1	1			x	x	x	x	x	x				
-02	11 1	dello	GW	DEK-MW-18001 MS		6	3	1 1	1			x	x	x		x	x				
-03	1111	deile		DEK-MW-18001 MSD		6	3	1 1	1			x	x	x	1.	x	x				
															1	-					
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	1																				
RELINQUISHED B	-//	2	5/4	TIME: (5769Ce) TIME:	RECEIVED BY:				k				MME			1	5 0 1	No	M&T	F # 1-	5627723
Contractor of the second se			271112/	V	ALCENTED D1.												_°C				e:

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

monection Date: Did i D	5		Inspection By:	LWAD		
				A Contractor	Sec.	
Sample Origin/Project Name:	Q2-2023	3 Botton	n Ash rond	+ luned	Impa	und
Shipment Delivered By: Enter	r the type of shi	ipment carrie	r.			
Pony F	edEx	UPS_	t	JSPS	Air	borne
Other/Hand Carry (who						_
Tracking Number:			Shipping F	orm Attached:	Yes	No
Shipping Containers: Enter th	e type and num	nber of shipp	ing containers rec	eived.		
Cooler <u>×</u> C	ardboard Box_		Custom Case		Envelop	e/Mailer
Loose/Unpackaged Co					-	
Condition of Shipment: Enter						
Damaged Shipment Ob		200			Las	iking
Other			1997 1997		Lea	iking
			100 C			
Shipment Security: Enter if an	iy of the shipping	ng container:				
Shipping Containers Ro	eceived: Opene	ed	Sealed	∞		
Enclosed Documents: Enter th	e type of docur	ments enclos	ed with the shipn	ient.		
CoC Wor	k Request		Air Data Sheet		Other	
a second s		1				
	leasure the tem					
Temperature of Containers: M		2.000 million (m. 1			V	
As-Received Temperature		2.000 million (m. 1			es V	No
	ure Range <u>1. (a</u>	2-2.1	Samples Rece		es <u>×</u> 1	No
As-Received Temperation	ure Range <u>1. (מ</u> m_ נ רמים	23 5.25	Samples Rece	ived on Ice: Y	es <u>⊻</u> 1	No
As-Received Temperat M&TE # and Expiratio Number and Type of Containe	ure Range <u>1. ゆ</u> on <u>しらのつつ</u> ers: Enter the t	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiratio Number and Type of Containe <u>Container Type</u>	ure Range <u>ן. ע</u> on <u>רראס</u> ers: Enter the t <u>Water</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.	es <u>×</u> 1 Broken	
As-Received Temperat M&TE # and Expiratio Number and Type of Containe <u>Container Type</u>	ure Range <u>ן. ע</u> on <u>רראס</u> ers: Enter the t <u>Water</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiratio Number and Type of Containe <u>Container Type</u> VOA (40mL or 60m))	ure Range <u>ן. ע</u> on <u>רראס</u> ers: Enter the t <u>Water</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiratio Number and Type of Container <u>Container Type</u> VOA (40mL or 60m) Quart/Liter (g/p)	ure Range <u>ן. ע</u> on <u>רראס</u> ers: Enter the t <u>Water</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiration Number and Type of Container Container Type VOA (40mL or 60m) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	ure Range <u>ן. ע</u> on <u>רראס</u> ers: Enter the t <u>Water</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiration Number and Type of Container <u>Container Type</u> VOA (40mL or 60mt) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic)	ure Range <u>1. @</u> on <u>LS 2777</u> ers: Enter the t <u>Water</u> <u>(</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		
As-Received Temperat M&TE # and Expiration Number and Type of Container Container Type VOA (40mL or 60m) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	ure Range <u>1. @</u> on <u>LS 2777</u> ers: Enter the t <u>Water</u> <u>(</u>	2-2-1 23 5:25 total number	Samples Rece	ived on Ice: Y ners received.		No Leakins

PH Strup 6+# 205522 exp. 2.15.25

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CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE / G	CUSTOMER:		. 1	PROJECT NUMBER:	SAP CC or WC)#:							A	NAL	YSI	SRE)	QA REQUIREMENT:			
Q2-2023 DEK Bot	tom Ash Pond &	Lined Impo	ound.	23-0401	REQUESTER:	Haro	ld R	egis	ter			10	Attac	h Lis	st if M	fore S	pace	is Nee	ded)	QA	A REQUIREMENT:
SAMPLING TEAM:				TURNAROUND TIME REQUIRED:	STANDARD 🛛 OTH	IER_														1.1	NPDES TNI
SEND REPORT TO	Caleb Batts			email:	phone:																ISO 17025
COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Oti	her	1	CC	NTA	INI	ERS	10.6										10 CFR 50 APP. B
	TRC			WW = Wastewater SL = Sh W = Water / Aqueous Liquid A = Air	udge		P	RES	ERV	ATI	VE	Metals									INTERNAL INFO
LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = V	Vipe General Waste	LAL#			_	Anions	Ammonia		Alkalinity	ide				OTHER			
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / L	OCATION	TO'	None	UNH	NaOH NaOH HCl MeOH Other	Total	Ani	Ami	TDS	Alka	Sulfide				REMARKS		
23-0401-01	5/3/53	GLAC	GW	DEK-MW-18001		7	4	1 1	1			x	x	x	x	x	x				
-02	11 1	dello	GW	DEK-MW-18001 MS		6	3	1 1	1			x	x	x		x	x				
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Contractor of the second se			271112/	V	ALCENTED D1.												_°C				e:



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

Analytical Laboratory Report

Merit Laboratories, Inc. 2680 East Lansing Drive East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions: John Laverty (johnlaverty@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) Report Narrative (Page 2) Laboratory Certifications (Page 3) Qualifier Descriptions (Page 3) Glossary of Abbreviations (Page 3) Method Summary (Page 4) Sample Summary (Page 5)

Naya Mushah

Maya Murshak Technical Director



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



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
<u>!</u>	Result is outside of stated limit criteria
В	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
н	Sample submitted and run outside of holding time
1 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
М	Result reported to MDL not RDL
0	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
Т	No correction for total solids
Х	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
е	Reported value estimated due to interference
j	Analyte also found in associated method blank
р	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
х	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
i	



Method Summary

Method

SM4500-S2 D

Version Standard Method 4450 S2 D 2011



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



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	



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

#	Туре	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



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

#	Туре	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. X Yes No N/A	Samples are received at 4C +/- 2C Thermometer #	IR 3.7						
02. X Yes No N/A	Received on ice/ cooling process begun							
03. Yes X No N/A	Samples shipped							
04. Yes X No N/A	Samples left in 24 hr. drop box							
05. Yes No X N/A	Are there custody seals/tape or is the drop box locked							
Chain of Custody								
06. X Yes No N/A	COC adequately filled out							
07. X Yes No N/A	COC signed and relinquished to the lab							
08. X Yes No N/A	Sample tag on bottles match COC							
09. Yes X No N/A	Subcontracting needed? Subcontacted to:							
Preservation								
10. 🕱 Yes 🗌 No 🗌 N/A	Do sample have correct chemical preservation							
10. X Yes No N/A 11. X Yes No N/A	Do sample have correct chemical preservation Completed pH checks on preserved samples? (no VOAs)							
	· ·							
11. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs)							
II. X Yes No N/A 12. Yes X No N/A	Completed pH checks on preserved samples? (no VOAs)							
11. X Yes No N/A 12. Yes No N/A Bottle Conditions	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab?							
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact							
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used							
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A 15. Yes X No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used							
11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A 14. X Yes No N/A 15. Yes Xo N/A 16. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used Sufficient sample volume received							

Corrective action for all exceptions is to call the client and to notify the project manager.

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			

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/	Laboratories, Inc.	
1	/	

2680 East Lansing Dr., East Lansing, MI 48823 Phone (517) 332-0167 Fax (517) 332-4034 www.meritlabs.com C.O.C. PAGE #____ OF ____

REPOR				CH/	AIN O	FC	U	STO	DD	YF	RE	co	RD)					INVOI	CE TO
CONTACT NAME	Emil Blaj							CONTACT NAME SAME												
COMPANY Con	sumers H	Energy						COMPANY												
ADDRESS 135 V	W. Trail S	Street						ADDRESS												
спу Jackson	() () () () () () () () () ()			STATE MI	ZIP CODE	492	201	CITY STATE ZIP CODE												
PHONE NO. 517-	788-5888	8.1	FAX NO. 517-788-2533	P.O. NO. 44001	11409	0		PH	PHONE NO. E-MAIL ADDRESS											
E-MAIL ADDRESS	emil.blaj(acmsen	ergy.com	QUOTE NO.	OUDTE NO. ANALYSIS (ATTACH LIST IF MORE SPACE IS REQU							IRED)								
PROJECT NO./NAM				SAMPLER(S) - PLEA	SE PRINT	/SIGN I	NAM	IE	-		-	N/A	7		T	TT	TT	Certific		
			1 DAY 2 DAYS 3 D	AYS STANDAR		THE	R.											ОНО		
DELIVERABLE	S REQUIR					OTH	ER	(. <u> </u>										DoD		DES
MATRIX CODE:	GW=GROUN SL=SLUDG		WW=WASTEWATER S=S DRINKING WATER O=OIL	oil l=liquid WP=WIPE A=Air	SD=SC W=V					ntain erva			Sulfide					Project	Locations t New	v York
MERIT LAB NO. FOR LAB USE ONLY	YE DATE	AR	SAMPLE IDENTIFICATION-D			NATRIX # OF	BOTILES	NONE	HNO.	H ₅ SO.	NaOH	MeOH	Total					Other Special	Instructions	3
48227.01	05/03/23	0640	23-0401-01 (DEK-MW-	18001)	G	w]				Π	1		1					preserve	d with NaOH	/ZnAcetate
	05/03/23	0640	23-0401-02 (DEK-MW-	18001 Field MS)	G	w 1	1		Τ	Π	1		1					a		
.03	05/03/23	0640	23-0401-03 (DEK-MW-	8001 Field MSI	D) G	w]	1				1		1					"		
																		Please sp	ike MS/MSD	and report
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SIGNATURE/ORG		0	M allcott		123	10		SI	GNA	TURE/		GANIZ)	ATION	and the second second						TIME
RELINQUISHED B SIGNATURE/ORG RECEIVED BY:					DATE	TIME			EALN	_		_					NOTES:	TEMP. (ON ARRIVAL	3.7
SIGNATURE/ORG	ANIZATION				DATE	TIME		SE	EALN	10.				SEAL INTACT		ALS				1.1

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 – DEK-JCW BACKGROUND WELLS – 2023 Q2

CC: HDRegister, P22-521 BLSwanberg, P22-119 Darby Litz, Project Manager TRC Companies, Inc. 1540 Eisenhower Place Ann Arbor, MI 48108

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 23-0404

phone 517-788-1251 *fax* 517-788-2533

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

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. <u>Methodology</u>

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. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

<u>Qualifier</u>	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Η	The maximum recommended hold time was exceeded
Ι	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
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q2-2023 DEK-JCW Background WellsDate Received:5/3/2023Chemistry Project:23-0404

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



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

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

Aliquot #: 23-0404-01-C01-A01

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

	-		-	Allquot #: 23-0	404-01-C01-A01	Analyst: ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	63		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	48400		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	1		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	729		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	5950		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	834		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	72000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aque	ous			Aliquot #: 23-0	404-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Ana	alyte List, Cl, F,	SO4, Aqı	leous	Aliquot #: 23-0	404-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	64500		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	14900		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 25400	>			Aliquot #: 23-0	404-01-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	351		mg/L	10.0	05/04/2023	AB23-0504-07

23-0404 Page 5 of 13



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

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

Aliquot #: 23-0404-02-C01-A01

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

	•		-	Aliquot #: 23-0	404-02-C01-A01	Analyst: ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	71		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	107		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	108000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	17900		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	24		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	15400		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	2		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	3180		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	163000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	5		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aque	eous			Aliquot #: 23-0	404-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/12/2023	AB23-0512-06
Anions by EPA 300.0 CCR Rule Ana	alyte List, Cl, F,	SO4, Aqı	ueous	Aliquot #: 23-0	404-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	259000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	10500		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 25400)			Aliquot #: 23-0	404-02-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	877		mg/L	10.0	05/04/2023	AB23-0504-07

23-0404 Page 6 of 13



Sample Site:DEK JCW BackgroundField Sample ID:MW-15016Lab Sample ID:23-0404-03Matrix:Groundwater

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

Aliquot #: 23-0404-03-C01-A01

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

			-	Aliquot #: 23-0	404-03-C01-A01	Analyst: ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	2		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	58		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	347		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	175000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	1970		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	64		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	23900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	6		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	10300		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	84800		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqu	eous			Aliquot #: 23-0	404-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Ar	alyte List, Cl, F,	SO4, Aqı	leous	Aliquot #: 23-0	404-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	253000		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 2540	C			Aliquot #: 23-0	404-03-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	889		mg/L	10.0	05/04/2023	AB23-0504-07

23-0404 Page 7 of 13



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

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

Aliquot #: 23-0404-04-C01-A01

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

	<u> </u>			Allquot #. 23-0	404-04-C01-A01	Allalyst. ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	1		ug/L	1.0	05/10/2023	AB23-0510-14
Barium	317		ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Boron	211		ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	159000		ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND		ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21500		ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	13		ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	35900		ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND		ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3		ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1770		ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND		ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND		ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	200000		ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND		ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND		ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aque	eous			Aliquot #: 23-0	404-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Ana	alyte List, Cl, F,	SO4, Aqı	leous	Aliquot #: 23-0	404-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	302000		ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND		ug/L	1000.0	05/11/2023	AB23-0511-03
Sulfate	94200		ug/L	1000.0	05/11/2023	AB23-0511-03
Total Dissolved Solids by SM 25400	C			Aliquot #: 23-0	404-04-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07

23-0404 Page 8 of 13



Sulfate

23-0404

05/01/2023

12:00 AM

Sample Site:	DEK JCW Background	Laboratory Project:
Field Sample ID:	DUP-Background	Collect Date:
Lab Sample ID:	23-0404-05	Collect Time:
Matrix:	Groundwater	

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

Metals by EPA 6020B: CCR Rule A		tal Metals Exp	Aliquot #: 23-0	0404-05-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Barium	326	ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Boron	207	ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	157000	ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND	ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Iron	21700	ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	12	ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	36400	ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	3	ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	1800	ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	203000	ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total, Aqu	ieous		Aliquot #: 23-0	0404-05-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	05/16/2023	AB23-0516-03
Anions by EPA 300.0 CCR Rule Ar	nalyte List, CI, F,	SO4, Aqueous	Aliquot #: 23-0	0404-05-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	304000	ug/L	1000.0	05/11/2023	AB23-0511-03
Fluoride	ND	ug/L	1000.0	05/11/2023	AB23-0511-03

Total Dissolved Solids by SM 2540C				Aliquot #: 23-	0404-05-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1170		mg/L	10.0	05/04/2023	AB23-0504-07

ug/L

05/11/2023

1000.0

AB23-0511-03

93300



Field Sample ID: FB- Background

23-0404-06

Water

Sample Site:

Matrix:

Lab Sample ID:

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

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

DEK JCW Background

Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0)404-06-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Arsenic	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Barium	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Beryllium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Boron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Cadmium	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Calcium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Chromium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Cobalt	ND	ug/L	6.0	05/10/2023	AB23-0510-14
Copper	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Iron	ND	ug/L	20.0	05/10/2023	AB23-0510-14
Lead	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Lithium	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Magnesium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Molybdenum	ND	ug/L	5.0	05/10/2023	AB23-0510-14
Nickel	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Potassium	ND	ug/L	100.0	05/10/2023	AB23-0510-14
Selenium	ND	ug/L	1.0	05/10/2023	AB23-0510-14
Silver	ND	ug/L	0.2	05/10/2023	AB23-0510-14
Sodium	ND	ug/L	1000.0	05/10/2023	AB23-0510-14
Thallium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Vanadium	ND	ug/L	2.0	05/10/2023	AB23-0510-14
Zinc	ND	ug/L	10.0	05/10/2023	AB23-0510-14
Mercury by EPA 7470A, Total,	Aqueous		Aliquot #: 23-0	0404-06-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	05/16/2023	AB23-0516-03



Data Qualifiers

Exception Summary

No exceptions occurred.

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

	1.23	_	Inspection I	By: Lmo		
Sample Origin/Project Nat	me: 02-20	23 JCW	DEK B.	ekgrand	Weus	
Shipment Delivered By: E	nter the type of	shipment carri	er.			
Pony	FedEx	_ UPS		USPS	Airb	orne
Other/Hand Carry (whom)	1 H .				
Other/Hand Carry (Tracking Number:_	3997 80	26 0844	Shippi	ng Form Attac	hed: Yes 🔭	No
Shipping Containers: Ente	er the type and n	יור 34 און umber of ship	9 ping container	s received.		
Cooler	Cardboard Bo	ox x	Custom (Case	Envelope	/Mailer
Loose/Unpackaged	Containers	-	Other	1.00		
Condition of Shipment: Er						
Damaged Shipment				nted	Leal	ting
Other					Loui	ung
	the second second		-	- The second second	52	
Shipment Security: Enter i					pt.	
Shipping Container	s Received: Op	ened	Sea	led		
Enclosed Documents: Ente	er the type of do	cuments enclos	sed with the s	hipment.		
CoC V	Work Request		Air Data S	heet	Other	
	s: Measure the t	emperature of	several sampl	e containers.		
Temperature of Containers						
Temperature of Containers As-Received Temp	erature Range_	0.4-2.3	Samples	Received on I	ce: Yes X N	0
As-Received Tempo				Received on I	ce: Yes X N	o
As-Received Tempo M&TE # and Expir	ation 2772	5.25.2	3			0
As-Received Tempo M&TE # and Expir	ation 2772	5.25.2	3			0
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u>	ation <u>27723</u> ainers: Enter tl <u>Water</u>	5.25.2	3	ntainers recei		
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml	ation <u>27723</u> ainers: Enter tl <u>Water</u>	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml Quart/Liter (g/p)	ation <u>27723</u> ainers: Enter th <u>Water</u> L)	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml Quart/Liter (g/p) 9-oz (amber glass ja	ation <u>27723</u> ainers: Enter th <u>Water</u> L)	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml Quart/Liter (g/p) 9-oz (amber glass ja 2-oz (amber glass)	ation <u>27723</u> ainers: Enter th <u>Water</u> L)	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	
As-Received Tempo M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml Quart/Liter (g/p) 9-oz (amber glass ja 2-oz (amber glass) 125 mL (plastic)	ation <u>27723</u> ainers: Enter th <u>Water</u> L)	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	
M&TE # and Expir Number and Type of Conta <u>Container Type</u> VOA (40mL or 60ml Quart/Liter (g/p) 9-oz (amber glass ja 2-oz (amber glass)	ation <u>27723</u> ainers: Enter th <u>Water</u> L)	3 S. 25. 23	3 r of sample co	ntainers recei	ved.	o

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

Page _] of _ [

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

SAMP	LING SITE / CU	ISTOMER:			PROJECT NUMBER: SAP CC or WO#: 23-0404 REQUESTER: Harold Regist						ANALYSIS REQUESTED					D						
Q2-20	23 JCW-DEK	Background W	ells				ster					(Attach List if More Space is Needed)					-	QA REQUIREMENT:				
SAMP	LING TEAM:				TURNAROUND TIME REQUIRED:														⊐ NPDES ⊠ TNI			
SENI	D REPORT TO:	Caleb Batts	19	-	email:	phone:				-											I	□ ISO 17025
(COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Oth	er		CC	NT.	AINI	ERS										1	□ 10 CFR 50 APP. B
		TRC			WW = Wastewater SL = Sluc W = Water / Aqueous Liquid A = Air			P	RES	ERV	ATI	VE	Metals								I	INTERNAL INFO
	LAB	SAMPLE COL	LECTION	RIX		pe neral Waste	TOTAL #			3 1				suo							1	OTHER
SAMPLE ID		DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	DCATION	TOT	None	ONH	NaOH	HCI	MeOF	Total	Anions	TDS							REMARKS
2	23-0404-01	5-1-27	1501	GW	MW-15002		3	2	1				x	x	x							
10	-02	5-1-23	1240	GW	MW-15008		3	2	1				x	x	x							
	-03	5-2-23	0840	GW	MW-15016		3	2	1				x	x	x					-		
	-04	5-1-27	1343	GW	MW-15019		3	2	1				x	x	x							
	-05	5-1-23		GW	DUP-Background		E	2	1				x	x	x							
	-06	5-1-23	1240	w	FB- Background		1			T		T	x								-	
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RELIN	QUISHED BY:	Fel EX	I		TIME: 5-03-25 10:20	RECEIVED BY:							100					s ⊡ 1 3 °C			1.10	27723 nate: 5-25-23



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 6/8/2023 4:39:25 PM

JOB DESCRIPTION

Karn/Weadock CCR DEK Bottom Ash Pond

JOB NUMBER

240-184755-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203







Eurofins Cleveland

Job Notes

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

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

Authorization

Sroohs

Generated 6/8/2023 4:39:25 PM 5

12 13

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

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Certification Summary	19
Chain of Custody	20
Receipt Checklists	24

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

3

Qualifiers

R	а	d
	-	-

Rad	
Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 240-184755-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-184755-1

Receipt

The samples were received on 5/5/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

Gas Flow Proportional Counter

Method 903.0: Radium-226 Prep Batch 160-611074Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-15002 (240-184755-1), DEK-MW-15005 (240-184755-2), DEK-MW-15006 (240-184755-3), DUP-DEK-BAP-01 (240-184755-4) and EB-DEK-BAP (240-184755-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 903.0: Radium-226 batch 611074Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.DEK-MW-15002 (240-184755-1), DEK-MW-15005 (240-184755-2), DEK-MW-15006 (240-184755-3), DUP-DEK-BAP-01 (240-184755-4), EB-DEK-BAP (240-184755-5), (LCS 160-611074/2-A), (LCSD 160-611074/3-A) and (MB 160-611074/1-A)

Method 904.0: Radium-228 Prep Batch 160-611088Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-15002 (240-184755-1), DEK-MW-15005 (240-184755-2), DEK-MW-15006 (240-184755-3), DUP-DEK-BAP-01 (240-184755-4) and EB-DEK-BAP (240-184755-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 904.0: Radium-228 batch 611088The detection goal was not met for the following sample(s). The samples and batch QC were prepped at full volume. Matrix interferences are suspected because the method blank achieved the detection goal demonstrating acceptable sample preparation and instrument performance: DEK-MW-15002 (240-184755-1). Analytical results are reported with the detection limit achieved

Method 904.0: Radium-228 batch 611088Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.DEK-MW-15002 (240-184755-1), DEK-MW-15005 (240-184755-2), DEK-MW-15006 (240-184755-3), DUP-DEK-BAP-01 (240-184755-4), EB-DEK-BAP (240-184755-5), (LCS 160-611088/2-A), (LCSD 160-611088/3-A) and (MB 160-611088/1-A)

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

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

Method Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

904.0 Radium-228 (GFPC) EPA EE ^T Ra226_Ra228 Combined Radium-226 and Radium-228 TAL-STL EE ^T PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) None EE ^T PrecSep_0 Preparation, Precipitate Separation None EE ^T Protocol References: EPA = US Environmental Protection Agency None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure. Laboratory References:	Method	Method Description	Protocol	Laboratory
Ra226_Ra228 Combined Radium-226 and Radium-228 TAL-STL EE* PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) None EE* PrecSep_0 Preparation, Precipitate Separation None EE* Protocol References: EPA = US Environmental Protection Agency None EE* None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure. Laboratory References:	903.0	Radium-226 (GFPC)	EPA	EET SL
PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) None EE ⁻ PrecSep_0 Preparation, Precipitate Separation None EE ⁻ Protocol References: EPA = US Environmental Protection Agency None None EE ⁻ None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure. Laboratory References: Laboratory References:	904.0	Radium-228 (GFPC)	EPA	EET SL
PrecSep_0 Preparation, Precipitate Separation None EE ⁻ Protocol References: EPA = US Environmental Protection Agency None = None None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure. Laboratory References:	Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
Protocol References: EPA = US Environmental Protection Agency None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure. Laboratory References:	PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL
EPA = US Environmental Protection Agency None = None TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.	PrecSep 0	Preparation, Precipitate Separation	None	EET SL
•				
	-			
EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566	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 DEK Bottom Ash Pond

Job ID: 240-184755-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-184755-1	DEK-MW-15002	Water	05/02/23 12:07	05/05/23 08:00
240-184755-2	DEK-MW-15005	Water	05/02/23 09:53	05/05/23 08:00
240-184755-3	DEK-MW-15006	Water	05/02/23 11:13	05/05/23 08:00
240-184755-4	DUP-DEK-BAP-01	Water	05/02/23 00:00	05/05/23 08:00
240-184755-5	EB-DEK-BAP	Water	05/02/23 12:21	05/05/23 08:00

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-15002

Job ID: 240-184755-1

Lab Sample ID: 240-184755-1 Matrix: Water

Method: EPA 903	3.0 - Radium	-226 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	0.431		0.183	0.187	1.00	0.216	pCi/L	05/11/23 12:08	06/08/23 06:46	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Carrier Ba Carrier Method: EPA 904	58.9		<u> </u>	Total				Prepared 05/11/23 12:08	Analyzed 06/08/23 06:46	
Ba Carrier Method: EPA 904	<u>58.9</u> 4.0 - Radium	-228 (GFP	30 - 110 C) Count Uncert.	Total Uncert. (2σ+/-)	RL	MDC	Unit	05/11/23 12:08	06/08/23 06:46	
Ba Carrier	<u>58.9</u> 4.0 - Radium	-228 (GFP Qualifier	30 - 110 C) Count		RL 1.00	MDC 1.50	Unit pCi/L	· · ·		
Ba Carrier Method: EPA 904 Analyte	58.9 4.0 - Radium 	-228 (GFP Qualifier	30 - 110 C) Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				05/11/23 12:08	06/08/23 06:46	Dil Fa
Ba Carrier Method: EPA 904 Analyte Radium-228	58.9 4.0 - Radium 	-228 (GFP Qualifier U G	30 - 110 C) Count Uncert. (2σ+/-) 0.879	Uncert. (2σ+/-)				05/11/23 12:08	06/08/23 06:46 Analyzed 06/01/23 12:32	Dil Fa

			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226	0.979	U	0.898	0.901	5.00	1.50	pCi/L		06/08/23 14:39	1	

+ 228

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-15005 Date Collected: 05/02/23 09:53

Date Received: 05/05/23 08:00

Method: EPA 903.	0 - Radium	-226 (GFP	C)							
		·	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.355		0.125	0.129	1.00	0.122	pCi/L	05/11/23 12:08	06/08/23 06:46	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.2		30 - 110					05/11/23 12:08	06/08/23 06:46	1

Method: EPA 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.271	U	0.439	0.439	1.00	0.755	pCi/L	05/11/23 12:51	06/01/23 12:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.2		30 - 110					05/11/23 12:51	06/01/23 12:32	1
Y Carrier	52.0		30 - 110					05/11/23 12:51	06/01/23 12:32	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226 + 228	0.626	U	0.456	0.458	5.00	0.755	pCi/L		06/08/23 14:39	1	

Job ID: 240-184755-1

Matrix: Water

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Lab Sample ID: 240-184755-2

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-184755-1

Lab Sample ID: 240-184755-3 **Matrix: Water**

Analyzed

Prepared

Client Sample ID: DEK-MW-15006 Date Collected: 05/02/23 11:13 Date Received: 05/05/23 08:00 Method: EPA 903.0 - Radium-226 (GFPC) Count Total Uncert. Uncert. Analyte **Result Qualifier** (20+/-) (2**σ**+/-) RL MDC Unit

Radium-226	0.324	0.131	0.134	1.00	0.146 pCi/L	05/11/23 12:08	06/08/23 06:46	1
Carrier Ba Carrier	%Yield Qualifier 87.8	Limits 30 - 110				Prepared 05/11/23 12:08	Analyzed 06/08/23 06:46	Dil Fac

Method: EPA 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.111	U	0.491	0.492	1.00	0.894	pCi/L	05/11/23 12:51	06/01/23 12:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.8		30 - 110					05/11/23 12:51	06/01/23 12:32	1
Y Carrier	52.5		30 - 110					05/11/23 12:51	06/01/23 12:32	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226 + 228	0.434	U	0.508	0.510	5.00	0.894	pCi/L		06/08/23 14:39	1	

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13

Dil Fac

Client Sample ID: DUP-DEK-BAP-01 Date Collected: 05/02/23 00:00 Date Rece

Date Collected: 05/02/23 00:00		Matrix: Water
Date Received: 05/05/23 08:00		
Method: EPA 903.0 - Radium-226 (GFPC)		
Count	Total	
Uncort	Uncort	

			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.417		0.149	0.153	1.00	0.143	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.1		30 - 110					05/11/23 12:08	06/08/23 06:47	1

Method: EPA 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Radium-228	0.206	U	0.449	0.449	1.00	0.785	pCi/L	05/11/23 12:51	06/01/23 12:38	1	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac	
Ba Carrier	68.1		30 - 110					05/11/23 12:51	06/01/23 12:38	1	
Y Carrier	79.2		30 - 110					05/11/23 12:51	06/01/23 12:38	1	

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(2 σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226 + 228	0.622	U	0.473	0.474	5.00	0.785	pCi/L		06/08/23 14:39	1	

Job ID: 240-184755-1

Lab Sample ID: 240-184755-4

5 6 7

Job ID: 240-184755-1

Lab Sample ID: 240-184755-5 Matrix: Water

Client Sample ID: EB-DEK-BAP Date Collected: 05/02/23 12:21 Date Received: 05/05/23 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0170	U	0.0594	0.0594	1.00	0.129	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					05/11/23 12:08	06/08/23 06:47	1

Method: EPA 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2 σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.110	U	0.278	0.279	1.00	0.496	pCi/L	05/11/23 12:51	06/01/23 12:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.9		30 - 110					05/11/23 12:51	06/01/23 12:39	1
Y Carrier	82.6		30 - 110					05/11/23 12:51	06/01/23 12:39	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226 + 228	0.0929	U	0.284	0.285	5.00	0.496	pCi/L		06/08/23 14:39	1	

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-184755-1

Prep Type: Total/NA

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(30-110)	
240-184755-1	DEK-MW-15002	58.9	
240-184755-2	DEK-MW-15005	83.2	
240-184755-3	DEK-MW-15006	87.8	
240-184755-4	DUP-DEK-BAP-01	68.1	
240-184755-5	EB-DEK-BAP	93.9	
LCS 160-611074/2-A	Lab Control Sample	96.1	
LCSD 160-611074/3-A	Lab Control Sample Dup	81.0	
MB 160-611074/1-A	Method Blank	93.4	
	_		
Tracer/Carrier Legend	t i i i i i i i i i i i i i i i i i i i		

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Lab Sample ID Client Sample ID (30-110) (30-110) 240-184755-1 DEK-MW-15002 58.9 50.0 240-184755-2 DEK-MW-15005 83.2 52.0	
240-184755-1 DEK-MW-15002 58.9 50.0	
240-184755-2 DEK-MW-15005 83.2 52.0	
240-184755-3 DEK-MW-15006 87.8 52.5	
240-184755-4 DUP-DEK-BAP-01 68.1 79.2	
240-184755-5 EB-DEK-BAP 93.9 82.6	
LCS 160-611088/2-A Lab Control Sample 96.1 78.7	
LCSD 160-611088/3-A Lab Control Sample Dup 81.0 62.1	
MB 160-611088/1-A Method Blank 93.4 79.2	

Tracer/Carrier Legend

Ba = Ba Carrier Y = Y Carrier

QC Sample Results

Job ID: 240-184755-1

Method: 903.0 - Radium-226 (GFPC)

Image: Non-State index in	Matrix: Water									Prep Type:	
Uncert. ifierUncert. $(2\sigma+/-)$ RL $(2\sigma+/-)$ MDC $(1.00$ Unit 0.113 Prepared $05/11/23$ Analyzed $06/08/23$ Dil Fac $11/23$ ifierLimits $30 - 110$ 0.0822 0.0829 1.00 0.113 pCi/L $05/11/23$ $06/08/23$	Analysis Batch: 615	046		Count	Total					Prep Batch	1: 611074
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		MB	МВ								
$\frac{1}{11.3} + \frac{1}{10.42} + \frac{1}{1.42} + \frac{1}{1.12} + \frac{1}{1.12} + \frac{1}{1.12} + \frac{1}{1.00} + \frac{1}{1.13} + \frac{1}{1.12} + \frac{1}{1.00} + \frac{1}{1.00} + \frac{1}{1.13} + \frac{1}{1.00} + $	Analyte		Qualifier			RL	MDC	Unit	Prepared	Analyzed	Dil Fac
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Radium-226	0.1185		<u> </u>	. ,						
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											
$\boxed{30.110}$ $\boxed{30.110}$ $\boxed{05/11/23 12:08} \boxed{06/08/23 06:45}$ $\boxed{105/11/23 12:08} \boxed{105/11/24}$ $\boxed{100}$ $\boxed{100} \boxed{101} \boxed{101} \boxed{101} \boxed{100} \boxed{101} \boxed{101} \boxed{100} \boxed{101} $	Carrier		MB Qualifier	Limite					Proparad	Applyzod	Dil Ea
2-A Client Sample ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 611074 Total Spike LCS LCS Uncert. Added Result Qual (2 σ +/-) RL MDC Unit ${pCi/L}$ %Rec Limits 30 - 110 M/3-A Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 MDC Unit ${pCi/L}$ %Rec Limits ${prep Type: Total/NA}$ Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Sample ID: Lab Control Sampl	Ba Carrier	93.4	Quanner						·		
Prep Type: Total/NA Prep Batch: 611074SpikeLCSLCSUncert. (2σ +/-)MDCUnit%RecLimits11.39.514(2σ +/-)RLMDC0.110 pCi/L %RecLimits30 - 1109.514(2σ +/-)1.000.110 pCi/L %RecLimitsLimits 30 - 110Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074SpikeLCSDLCSDUncert. (2σ +/-)MDCUnit%RecREF Prep Type: Total/NA Prep Batch: 611074SpikeLCSDLCSDUncert. (2σ +/-)MDCUnit%RecREF Pic/LREF 92LimitsLimitsLimits1.121.00MDCUnit%RecREF LimitsLimitsLimitsLimitsClient Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074											
Spike LCS LCS Uncert. MDC Unit %Rec Limits 11.3 9.514 1.02 1.00 0.110 pCi/L %Rec Limits	Lab Sample ID: LCS	5 <mark>160-611</mark>	074/2-A					Cli	ent Sample ID:		
Spike LCS LCS Uncert. MDC Unit %Rec Limits 11.3 9.514 1.02 1.00 0.110 pCi/L 84 75-113	Matrix: Water										
Spike Added LCS Result 9.514 LCS Qual Uncert. (2σ+/-) RL 1.00 MDC 0.110 Unit pCi/L %Rec 84 Limits 75-113 Limits 30 - 110	Analysis Batch: 615	046				Tadal				Prep Batch	i: 611074
Added 11.3Result 9.514Qual (2 σ +/-)RL 1.02MDC 0.110Unit pCi/L%Rec 84Limits 75-113Limits 30-110			Caller	1.00						% Dee	
11.3 9.514 1.02 1.00 0.110 pCi/L 84 75-113 Limits 30-110 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 K/3-A Total Washington Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Spike LCSD LCSD Uncert. MDC Unit %Rec REF Limits Added Result Qual (20+/-) RL MDC Unit %Rec RER Limits Limits 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 75-113	Analyte		•	-			DI	MDC	Linit %Poc		
Limits 30 - 110 W/3-A Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Spike LCSD LCSD Uncert. Added Result Qual (20+/-) RL MDC Unit %Rec REF 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 RER Limit Limits	Radium-226										
30 - 110 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 M/3-A Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Spike LCSD LCSD Uncert. Added Result Qual (2σ+/-) RL MDC Unit %Rec REF 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 Limits Limits RER Limits RER Limits			11.0	5.514		1.02	1.00	0.110	po//2 04	75-115	
30 - 110 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 M/3-A Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Spike LCSD LCSD Uncert. Added Result Qual (2σ+/-) RL MDC Unit %Rec REF 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 Limits Limits RER Limits RER Limits		S LCS									
Limits Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 611074 Spike LCSD LCSD Uncert. Added Result Qual (2σ+/-) RL MDC Unit %Rec RER Limits Limits 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 1.00		Qualifier		_							
Spike LCSD LCSD Uncert. MDC Unit %Rec RER Added Result Qual (2σ+/-) RL MDC Unit %Rec RER Limits 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 1 Limits Limits RER Limits RER Limits RER	Ba Carrier 96.1	1	30 - 110								
Spike LCSD LCSD Uncert. MDC Unit %Rec RER Added Result Qual (2σ+/-) RL MDC Unit %Rec RER Limits 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 1 Limits Limits RER Limits RER Limits RER											
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Spike LCSD LCSD Uncert. MDC Unit %Rec REF Added Result Qual (2σ+/-) RL MDC Unit %Rec RER Limits 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75 - 113 0.42 1.12	· · · · · · · · · · · · · · · · · · ·	D 160-61	1074/3-A					Client S	ample ID: Lab		
Added Result Qual (2σ+/-) RL MDC Unit %Rec Limits RER Limit 11.3 10.42 1.12 1.00 0.131 pCi/L 92 75 - 113 0.42 1 Limits Limits RER Limits RER Limits	Matrix: Water		1074/3-A					Client S	ample ID: Lab	Prep Type:	Total/NA
11.3 10.42 1.12 1.00 0.131 pCi/L 92 75-113 0.42 1 Limits	Matrix: Water		1074/3-A			Total		Client S	ample ID: Lab	Prep Type:	Total/NA
Limits	Matrix: Water			LCSD	LCSD			Client S	ample ID: Lab	Prep Type: Prep Batch	Total/NA 1: 611074
	Matrix: Water Analysis Batch: 615 Analyte		Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit %Rec	Prep Type: Prep Batch %Rec Limits R	Total/NA 1: 611074 REF ER Limi
	Matrix: Water Analysis Batch: 615 Analyte		Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit %Rec	Prep Type: Prep Batch %Rec Limits R	Total/NA 1: 611074 REF ER Limi
30 110	Matrix: Water Analysis Batch: 615 Analyte Radium-226		Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit %Rec	Prep Type: Prep Batch %Rec Limits R	Total/NA 1: 611074 REF ER Limi
	Matrix: Water Analysis Batch: 615 Analyte Radium-226	0 46	Spike Added 11.3	Result		Uncert. (2σ+/-)	RL	MDC	Unit %Rec	Prep Type: Prep Batch %Rec Limits R	Total/NA 1: 611074 REF ER Limi
	Analysis Batch: 615		Spike			Uncert.			·	Prep Type Prep Bate %Rec	ə: ch
	Matrix: Water Analysis Batch: 615 Analyte Radium-226 Carrier Ba Carrier Ba Carrier Method: 904.0 - R	D LCSD	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits R 75_113 0	Total/NA :: 611074 REF ER <u>Limi</u> 42
	Matrix: Water Analysis Batch: 615 Analyte Radium-226 <i>Carrier</i> Ba Carrier Ba Carrier Rathod: 904.0 - R Lab Sample ID: MB	D LCSD	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits 75 - 113 R 0	Total/NA :: 611074 REF ER Limi 42
Prep Type: Total/NA	Matrix: Water Analysis Batch: 615 Analyte Radium-226 <i>Carrier</i> Ba Carrier Matrix: Water	2046 2 LCSD 4 Qualifier adium-2 160-6110	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits 75-113 R 0	Total/NA I: 611074 REF ER Limi 42 Dd Blank Total/NA
Prep Type: Total/NA Prep Batch: 611088	Matrix: Water Analysis Batch: 615 Analyte Radium-226 <i>Carrier</i> Ba Carrier Ba Carrier Rathod: 904.0 - R Lab Sample ID: MB Matrix: Water	2046 2 LCSD 4 Qualifier adium-2 160-6110	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42	Qual	Uncert. (2σ+/-)	RL	MDC	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits 75-113 R 0	Total/NA I: 611074 REF ER Limi 42 Dd Blank Total/NA
Prep Type: Total/NA Prep Batch: 611088 Count Total	Matrix: Water Analysis Batch: 615 Analyte Radium-226 <i>Carrier</i> Ba Carrier Method: 904.0 - R Lab Sample ID: MB Matrix: Water	2046 2) LCSD 2) Qualifier 2) adium-2 160-6110 160	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42	Qual	Uncert. (2σ+/-)	RL	MDC	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits 75-113 R 0	Total/NA I: 611074 REF ER Limi 42 Dd Blank Total/NA
Prep Type: Total/NA Prep Batch: 611088 Uncert. Uncert.	Matrix: Water Analysis Batch: 615 Analyte Radium-226 <i>LCSL</i> Carrier %Yield Ba Carrier 81.0	2046 2) LCSD 2) Qualifier 2) adium-2 160-6110 160 MB	Spike Added 11.3 <u>Limits</u> 30 - 110 228 (GFPC	Result 10.42	Qual Total Uncert.	Uncert. (2σ+/-) 1.12	RL 1.00	MDC 0.131	Unit %Rec pCi/L 92	Prep Type: Prep Batch %Rec Limits R 75-113 0	Total/NA REF ER Limi 42 1 Dd Blank Total/NA 1: 611088

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QC Sample Results

Job ID: 240-184755-1

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

Lab Sample Matrix: Wat Analysis B	ter										Prep Typ Prep Ba		
-						Total							
			Spike	LCS	LCS	Uncert.					%Rec		
Analyte			Added	Result	Qual	(2 σ +/-)	RL	MDC	Unit	%Rec	Limits		
Radium-228			8.15	9.437		1.30	1.00	0.530	pCi/L	116	75 - 125		
	LCS	LCS											
Carrier	%Yield	Qualifier	Limits										
Ba Carrier	96.1		30 - 110										
Y Carrier	78.7		30 - 110										
-		460 6440						Client C	omalo	ID: Lob	Control C	Samula	Dun
Lab Sample	e ID: LCSD) 160-6110					(Client S	ample	ID: Lab	Control S		
Lab Sample Matrix: Wat	e ID: LCSD ter						(Client S	ample	ID: Lab	Prep Typ	e: Tot	al/NA
Lab Sample	e ID: LCSD ter					Total	(Client S	ample	ID: Lab		e: Tot	al/NA
Lab Sample Matrix: Wat	e ID: LCSD ter		88/3-A	LCSD	LCSD	Total Uncert.	(Client S	ample	ID: Lab	Prep Typ Prep Ba	e: Tot	al/NA 11088
Lab Sample Matrix: Wat Analysis B	e ID: LCSD ter			LCSD Result	LCSD Qual	Uncert.	RL	Client S		ID: Lab	Prep Typ	e: Tot	al/NA
Lab Sample Matrix: Wat Analysis B Analyte	e ID: LCSD ter		88/3-A Spike								Prep Typ Prep Ba %Rec	be: Tot tch: 6 ⁻	al/NA 11088 RER
Lab Sample Matrix: Wat	e ID: LCSD ter atch: 6141	59	88/3-A Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	RER Limit
Lab Sample Matrix: Wat Analysis B Analyte Radium-228	e ID: LCSD ter atch: 6141 <i>LCSD</i>	59 	88/3-A Spike Added 8.15	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	RER Limit
Lab Sample Matrix: Wat Analysis B	e ID: LCSD ter atch: 6141 <i>LCSD</i>	59	88/3-A Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	RER Limit

QC Association Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond Job ID: 240-184755-1

Rad	

Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184755-1	DEK-MW-15002	Total/NA	Water	PrecSep STD	
240-184755-2	DEK-MW-15005	Total/NA	Water	PrecSep STD	
240-184755-3	DEK-MW-15006	Total/NA	Water	PrecSep STD	
240-184755-4	DUP-DEK-BAP-01	Total/NA	Water	PrecSep STD	
240-184755-5	EB-DEK-BAP	Total/NA	Water	PrecSep STD	
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	
Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184755-1	DEK-MW-15002	Total/NA	Water	PrecSep_0	
240-184755-2	DEK-MW-15005	Total/NA	Water	PrecSep_0	
240-184755-3	DEK-MW-15006	Total/NA	Water	PrecSep_0	
240-184755-4	DUP-DEK-BAP-01	Total/NA	Water	PrecSep_0	
240-184755-5	EB-DEK-BAP	Total/NA	Water	PrecSep_0	
MB 160-611088/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-611088/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-611088/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-15002 Date Collected: 05/02/23 12:07 Date Received: 05/05/23 08:00

Lab Sample ID: 240-184755-3

Lab Sample ID: 240-184755-4

Lab Sample ID: 240-184755-2

Matrix: Water

Matrix: Water

Matrix: Water

Date Receive	d: 05/05/23 0	8:00						
_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:46
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614160	FLC	EET SL	06/01/23 12:32
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: DEK-MW-15005 Date Collected: 05/02/23 09:53 Date Received: 05/05/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared	
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed	
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08	
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:46	
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51	
Total/NA	Analysis	904.0		1	614160	FLC	EET SL	06/01/23 12:32	
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39	

Client Sample ID: DEK-MW-15006 Date Collected: 05/02/23 11:13 Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:46
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614160	FLC	EET SL	06/01/23 12:32
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client Sample ID: DUP-DEK-BAP-01 Date Collected: 05/02/23 00:00 Date Received: 05/05/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615046	FLC	EET SL	06/08/23 06:47
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:38
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: EB-DEK-BAP Date Collected: 05/02/23 12:21 Date Received: 05/05/23 08:00

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

Laboratory References:

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

Job ID: 240-184755-1

Matrix: Water

Lab Sample ID: 240-184755-5

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Accreditation/Certification Summary

68-00540

85002001

058448

10310

C592

381

T104704193

P330-17-00028

MO000542021-14

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Laboratory: Eurofins St. Louis

Authority

ANAB

ANAB

ANAB

Arizona

California

California

HI - RadChem Recognition

MI - RadChem Recognition

Florida

Illinois

lowa

Kansas

Kentucky (DW)

Kentucky (WW)

Louisiana (All)

Louisiana (DW)

Maryland

Missouri

Nevada

New Jersey

North Dakota

Pennsylvania

South Carolina

US Fish & Wildlife

West Virginia DEP

North Carolina (DW)

New York

Oklahoma

Oregon

Texas

USDA

Virginia

Washington

Utah

Alaska (UST)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certification

Los Angeles County Sanitation

Dept. of Defense ELAP

Dept. of Energy

ISO/IEC 17025

Program

State

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US Federal Programs

US Federal Programs

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Districts

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rtifications are applicable t	o this report.
Identification Number	Expiration Date
20-001	05-06-25
L2305	04-06-25
L2305.01	04-06-25
L2305	04-06-25
AZ0813	12-08-23
10259	06-30-22 *
2886	06-30-23
E87689	06-30-23
n/a	06-30-23
200023	11-30-23
373	12-01-24
E-10236	10-31-23
KY90125	12-31-23
KY90125 (Permit KY0004049)	12-31-23
04080	06-30-23
LA011	12-31-23
310	09-30-23
9005	06-30-23
780	06-30-25
MO000542020-1	07-31-23
MO002	06-30-23
11616	03-31-24
29700	07-31-23
R-207	06-30-23
9997	08-31-23
4157	09-01-23

02-28-24

06-30-23

07-31-23

07-31-23

05-18-26

07-31-23

06-14-23

08-30-23

10-31-23

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

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Contribution Description Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772	O Cha	o nain o	iin of Custody Record	ody R	ecord	\bigcirc	5/0.	0.5/0.5 MICHIGAN	N 🔅 eurofins	IS Environment Testing
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Intercention Terret IntercentIntercention Terret Intercention <td>Client Contact Jacob Krenz</td> <td></td> <td>2</td> <td>19083</td> <td>E-Mail Kris.E</td> <td>trooks@e</td> <td>t.eurofin</td> <td>sus.com</td> <td>State of Origin:</td> <td>Page Page 1 of 1</td> <td></td>	Client Contact Jacob Krenz		2	19083	E-Mail Kris.E	trooks@e	t.eurofin	sus.com	State of Origin:	Page Page 1 of 1	
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0 Эндинистрании Сощиместрании 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /	City Ann Arbor	TAT Requested (day	÷			7.5				A - HCL B - NaOH C - Zn Acetate	N - None O - AsNaO2
0. 734.671-6022/E160) 7058.7 0. 70.68 BUTE CONTRIDUCTION 000	State, Zip: Mi, 48108-7080	Compliance Project:	A Yes	No	Τ					D - Nitric Acid E - NaHSO4	P - Na2045 Q - Na2S03 R - Na2S203
WOA MOA 200214 20001 200214 20001 200214 20001 200214 20001 20001 20001 20001 20001 20001 20001 20001 20001 20001 20000 20001 20000 20001 20000 20001 20000 20001 20000 20001 20000 20001 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 20000 20011 <td>71-7080(Tel)</td> <td>PO#. 178827</td> <td></td> <td></td> <td></td> <td>(0</td> <td></td> <td></td> <td></td> <td>F - MeOH G - Amchlor H - Ascorbic Aci</td> <td></td>	71-7080(Tel)	PO#. 178827				(0				F - MeOH G - Amchlor H - Ascorbic Aci	
Propertial Properind Properind Properind	Email JKrenz@trccompanies.com	*O								I - Ice J - DI Water	
Scona Scona <th< td=""><td>Project Name Karn/Weadock CCR DEK Bottom Ash Pond</td><td>Project # 24024154</td><td></td><td></td><td></td><td>JO SE</td><td></td><td></td><td>240-1</td><td></td><td>Y - Trizma Z - other (specify)</td></th<>	Project Name Karn/Weadock CCR DEK Bottom Ash Pond	Project # 24024154				JO SE			240-1		Y - Trizma Z - other (specify)
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ant Poison B Unknown Radiological Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Secial Instructions/OC Requirements: Date:											
ant poison B Unknown Radiological Return To Client Disposal By Lab Archive For Months Special Instructions/QC Requirements: Date Date Months Date Date Itime Method of Shipment Date/Imme 5-4-23 / 14/17 Company Received by Date/Imme Date/Imme Company Date/Imme Date/Imme Date/Imme Date/Imme Date/Imme Company Date/Imme Company Received by Acc Date/Imme Date/Imme Company Date/Imme Company Received by Acc Date/Imme Date/Imme Company Date/Imme Company Received by Acc Date/Imme Company Dater/Imme Dater/Imme Date/Imme Date/Imme Company Company						Sampl	e Dispo	Sal (A fee n	nav be assessed if samples a	retained longer than	n 1 month)
Date Time Method of Shipment Date/Time 5-4-23 / 14/17 Company Bate/Time 5-41/23 14/17 Company Date/Time 5-41/23 14/17 Company Date/Time 0ate/Time 0ate/Time 0ate/Time Date/Time 0ate/Time 0ate/Time 0ate/Time Date/Time 0ate/Time 0ate/Time 0ate/Time Date/Time Company Received by Note Date/Time Company Received by Company Company Received by Note Date/Time Date/Time Company Received by Company	ant			diological		Special	Return T	o Client tions/OC Re	Disposal By Lab	Archive For	Months
Method of Shipment Uate Itme: Method of Shipment Method of Shipment Date/Time 25-4-23 / 1417 Company Company Date/Time 5-4-23 / 1417 Company Received by Date/Time 0316/Time 314/7.23 1417 Company Received by Received by 0316/Time 3100 Custody Seal No: Date/Time Company Received by Custody Seal No: Company Cooler Temperature(s) °C and Other Remarks	Emoty Kit Beling is had his								. 1		
Letter Company Received by the Date/Time S-4-23/1417 Company Received by Date/Time 21417 Company Extension 234173 1417 Ext. Company is intact. Custody Seal No. Date/Time Company Company Received by Date/Time Company Company And Company And Company And Company Company And Company Compan	Entropy for restrictions and by	0	ate	Ċ					Method of Shipment		
A HE LC Detertine Object A Company Received by Detertine 39 (200 Company Received by Detertine 39 (200 Company Is intact: Custody Seal No.: Company Received by Cooler Temperature(s) °C and Other Remarks:	reinguyre un	Uate/ 1mme.	141		TRC	Re	YO DA	the	Date/im	53	Company
Is Intact: Custody Seal No.: Date/Time Company Received by Cooler Temperature(s) °C and Other Remarks:	Relinguished by Letter CC	DateTime S/U/23	1412	<u>3</u>	mpany	Ł	Apparte			50.5	Ľ
Custody Seal No.:	•	Date/Time (ů	mpany	α. Φ	beived by:				Company
						ð	oler Tempe	srature(s) °C ar	d Other Remarks:		
							1				

16117-0
Eurofins - Canton Sample Receipt Form/Narrative Login # :
Barberton Facility
Client RC Site Name Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23
FedEx: 1 st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/TimeStorage Location
Eurofins Cooler # Foam Box Client Cooler Box Other
Packing material used: Bubble Wrap Foam Plastic Bag None Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt See Multiple Cooler Form
IR GUN # $\mathcal{A} = \mathcal{A} = (CF + 0.0 \circ C)$ Observed Cooler Temp. $\mathcal{O} = \mathcal{S} \circ C$ Corrected Cooler Temp. $\mathcal{O} = \mathcal{S} \circ C$
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA Tests that are not checked for pH by
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No Receiving:
-Were tamper/custody seals intact and uncompromised?
3. Shippers' packing slip attached to the cooler(s)? 4. Did susted u memory accompany the comple(c)? VoAs Oil and Grease
 4. Did custody papers accompany the sample(s)? 5. Were the custody papers relinquished & signed in the appropriate place? Yes No Yes No TOC
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?
9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y)N)?
10. Were correct bottle(s) used for the test(s) indicated?
11. Sufficient quantity received to perform indicated analyses? Yes No
12. Are these work share samples and all listed on the COC? Yes No
If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt? (Yes) No NA pH Strip Lot# HC208070 14. Were VOAs on the COC? Yes No NA pH Strip Lot# HC208070
14. Were VOAs on the COC? Yes No. 15. Were air bubbles >6 mm in any VOA vials? Larger than this.
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 U 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
Sample(s)
VOA Sample Preservation - Date/Time VOAs Frozen:

Login Container Summary Report

Temperature readings: _____

			Cont	ainer	Preservative	
Client Sample ID	Lab ID	Container Type	<u>рН</u>	Temp	Added (mls) Lot #	
DEK-MW-15002	240-184755-A-1	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15002	240-184755-B-1	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15005	240-184755-A-2	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15005	240-184755-B-2	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15006	240-184755-A-3	Plastic 1 liter - Nitric Acid	<2			
DEK-MW-15006	240-184755-B-3	Plastic 1 liter - Nitric Acid	<2			
DUP-DEK-BAP-01	240-184755-A-4	Plastic 1 liter - Nitric Acid	<2			
DUP-DEK-BAP-01	240-184755-B-4	Plastic 1 liter - Nitric Acid	<2			
EB-DEK-BAP	240-184755-A-5	Plastic I liter - Nitric Acid	<2			
EB-DEK-BAP	240-184755-B-5	Plastic 1 liter - Nitric Acid	<2			

Eurofins Cleveland	180 S. Van Buren Avenue	001110
Ē	180	

Chain of Custody Record



🎲 eurofins

barrenon, UH 44203 Phone: 330-497-9396 Fax: 330-497-0772		5		vi Anoie		3		نط ك					Environment Testing
Client Information (Sub Contract Lab)	Sampler.			Lab Pi Brool	Lab PM: Brooks, Kris M				Carrier Tracking No(s)	Vo(s):	COC No:		
Nuent contact: Shipping/Receiving	Phone:			E-Mail: Kris.E	Prooks@	et.eurof	E-Mail: Kris.Brooks@et.eurofinsus.com		State of Origin: Michican		Page:		
company. TestAmerica Laboratories, Inc.					Accreditatio	ns Requ	Accreditations Required (See note):	:()	5		Job # Job #	_	
Address: 13715 Rider Trail North,	Due Date Requested: 6/6/2023	÷Þe									240-184755- Preservation	240-184755-1 Preservation Codes:	
City Farth City	TAT Requested (days):	ays):		T					lested	-	A - HCL		
State, Zp: MO, 63045											B - NaOH C - Zn Acetate D - Nitric Acid		0 - AsNaO2 P - Na204S Q - Na2SO3
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	#0			Γ							F - MeOH G - Amchlo		5
Email:	:# OM				(0)					_	-		decahydrate
Project Name. Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				JO 98						J - UI Water K - EDTA L - EDA		
ste	SSOW#:				N OS		Dd:				~	Z - other (s	becify)
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Marrix (www.bur, 9=colid, 0=wasta/cil, BT=Tasue, A=At)	Field Filtered MAXM monet	geScerg(0.600	Ra226Ra228_GF				Total Number of	Consist Instantial Constantial	
	X	X	Preservation Code:	on Code:	X								Note
DEK-MW-15002 (240-184755-1)	5/2/23	12:07 Eastern		Water	×	×	×				2 TVA protoc	TVA protocol - Ra-226+228 action limit at	tion limit at
DEK-MW-15005 (240-184755-2)	5/2/23	09:53 Eastern		Water	×	×	×				2 TVA protoc	DVA protocol - Ra-226+228 action limit at	ction limit at
DEK-MW-15006 (240-184755-3)	5/2/23	11:13 Factorn		Water	×	×	×					5.0 pCi/L. TVA protocol - Ra-226+228 action limit at	tion limit at
DUP-DEK-BAP-01 (240-184755-4)	5/2/23	Eastern		Water	×	+	×					5.0 pCi/L. TVA protocol - Ra-226+228 action limit at	tion limit at
EB-DEK-BAP (240-184755-5)	5/2/23	12:21 Eastern		Water	×	×	×					5.0 pCVL. IVA protocol - Ra-226+228 action limit at	tion limit at
											- 5.0 pCi/L.		
											(0)		
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC plac laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lests/matrix bein accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately.	tt Testing North Centri ove for analysis/tests/ ntral, LLC attention im	al, LLC places i matrix being ar mediately. If al	he ownership of alyzed, the sam requested accr	method, analy ples must be s editations are o	te & accred hipped bac urrent to d	itation co k to the E ate, return	mpliance upo urofins Envir	n our subcontra onment Testing Chain of Custody	ct laboratories.	This sample ship C laboratory or I compliance to	ment is forwarded other instructions v	places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC Iaboratory or other instructions will perovided. Any changes to allow a screditations are current to date, return in a signed Chain of Custody attesting to said compliance to Erurinkins. Functions will be provided and chain-of-custody. If the	dy. If the changes to
Possible Hazard Identification					Sample	Dispo	sal (A fee	may be ass	essed if sam	ples are ret	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	han 1 month)	ווימו, בבט.
Deliverable Requested: I, II, II, IV, Other (specify)	Primary Deliverable Rank: 2	ble Rank: 2			Snecial R	leturn 7	Return To Client	Shecial Instructions/OC Boordination	Disposal By Lab		Archive For	Months	
Empty Kit Relinctuished hv.					n			adminettiettie					
		Date:			Time:				Method of Shipment:	pment:			Γ
the second s	RSS	1011		Company N	<u>,)</u>	Received by:	folex	2	<u>ă</u>	Date/Time:		Company	
fedex	Date/Time:	,	Cor	Company	Rece	Received by:	Shauk	- 5	dama p De			Company	
	Date/Time:		S	Company	Rece	Received by:				3	0110 SE	Company	225
Custody Seals Intact: Custody Seal No.:					Coole	er Tempe	rature(s) °C a	Cooler Temperature(s) °C and Other Remarks:					Τ
					14	13	12	10 11	9	7	5 6		-1 2

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Login Number: 184755 List Number: 2 Creator: Sharkey-Gonzalez, Briana L

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

List Source: Eurofins St. Louis

List Creation: 05/08/23 02:13 PM



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 7/5/2023 11:17:35 AM Revision 1

JOB DESCRIPTION

Karn/Weadock CCR DEK Bottom Ash Pond

JOB NUMBER

240-184761-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203







Eurofins Cleveland

Job Notes

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

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

Authorization

nuse DHeckler Generated 7/5/2023 11:17:35 AM **Revision 1**

Authorized for release by Denise Heckler, Project Manager II <u>Denise.Heckler@et.eurofinsus.com</u> Designee for Kris Brooks, Project Manager II <u>Kris.Brooks@et.eurofinsus.com</u> (330)966-9790

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Definitions/Glossary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

3

Qualifiers

Rad

2	^	ĉ

Rad		
Qualifier	Qualifier Description	4
U	Result is less than the sample detection limit.	
Glossary		5
Abbreviation	These commonly used abbreviations may or may not be present in this report.	6
¤	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	0
CNF	Contains No Free Liquid	0
DER	Duplicate Error Ratio (normalized absolute difference)	
Dil Fac	Dilution Factor	9
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)	13
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
MPN	Most Probable Number	
MQL	Method Quantitation Limit	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
NEG	Negative / Absent	
POS	Positive / Present	
PQL	Practical Quantitation Limit	
PRES	Presumptive	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	
TEQ	Toxicity Equivalent Quotient (Dioxin)	
TNTC	Too Numerous To Count	

Job ID: 240-184761-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-184761-1

Comments

A revised report was provided on July 5, 2023. The sample ID was corrected to: DEK-MW-18001.

Receipt

The sample was received on 5/5/2023 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 was 2.4° C.

RAD

Method 903.0: Radium-226 batch 611074: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Method 904.0: Radium-228 batch 611088: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Method PrecSep_0: Radium-228 Prep Batch 160-611088: Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-18001 (240-184761-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Radium-226 Prep Batch 160-611074: Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-18001 (240-184761-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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

Method Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

903.0 Radium-226 (GFPC) 904.0 Radium-228 (GFPC) Ra226_Ra228 Combined Radium-226 and Radium-228 PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) PrecSep_0 Preparation, Precipitate Separation Protocol References: EPA = US Environmental Protection Agency None = None	EPA EPA TAL-STL None None	EET SL EET SL EET SL EET SL EET SL EET SL
Ra226_Ra228 Combined Radium-226 and Radium-228 PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) PrecSep_0 Preparation, Precipitate Separation Protocol References: EPA = US Environmental Protection Agency None = None None	TAL-STL None	EET SL EET SL
PrecSep STD Preparation, Precipitate Separation (Standard In-Growth) PrecSep_0 Preparation, Precipitate Separation Protocol References: EPA = US Environmental Protection Agency None = None None = None	None	EET SL
PrecSep_0 Preparation, Precipitate Separation Protocol References: EPA = US Environmental Protection Agency None = None		
Protocol References: EPA = US Environmental Protection Agency None = None	None	EET SL
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 DEK Bottom Ash Pond

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-184761-1	DEK-MW-18001	Water	05/03/23 06:40	05/05/23 08:00

Eurofins Cleveland 7/5/2023 (Rev. 1)

Total

Uncert.

(2σ+/-)

0.112

Total

Uncert.

(2**σ**+/-)

0.331

RL

1.00

RL

1.00

MDC Unit

0.120 pCi/L

MDC Unit

0.455 pCi/L

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Result Qualifier

Result Qualifier

Qualifier

Qualifier

0.268

%Yield

0.599

%Yield

95.4

90.4

95.4

Client Sample ID: DEK-MW-18001

Method: EPA 903.0 - Radium-226 (GFPC)

Method: EPA 904.0 - Radium-228 (GFPC)

Date Collected: 05/03/23 06:40

Date Received: 05/05/23 08:00

Analyte

Carrier

Ba Carrier

Analyte

Carrier

Ba Carrier

Y Carrier

Radium-228

Radium-226

Job ID: 240-184761-1

Lab Sample ID: 240-184761-1

05/11/23 12:08 06/08/23 08:26

05/11/23 12:08 06/08/23 08:26

05/11/23 12:51 06/01/23 12:43

05/11/23 12:51 06/01/23 12:43

05/11/23 12:51 06/01/23 12:43

Analyzed

Analyzed

Analyzed

Analyzed

Prepared

Prepared

Prepared

Prepared

240 10	47011	
40-184 Matrix:	-	
		5
lyzed 23 08:26	Dil Fac	6
lyzed	Dil Fac	7
23 08:26	1	8
		9
lyzed	Dil Fac	

1

1

1

Dil Fac

Method: TAL-STL Ra226 Ra228 - Combined Radium-226 and Radium-228

Count

Uncert.

(20+/-)

Limits

30 - 110

Count

Uncert.

(2σ+/-)

0.327

Limits

30 - 110

30 - 110

0.109

			Count	Iotai							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226 + 228	0.868		0.345	0.349	5.00	0.455	pCi/L		06/08/23 14:39	1	

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond Job ID: 240-184761-1

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

240-184761-1 DB LCS 160-611074/2-A La LCSD 160-611074/3-A La	lient Sample ID EK-MW-18001 ab Control Sample ab Control Sample Dup ethod Blank	Ba (30-110) 95.4 96.1 81.0 93.4			
240-184761-1 DI LCS 160-611074/2-A La LCSD 160-611074/3-A La MB 160-611074/1-A Max Tracer/Carrier Legend Tracend	EK-MW-18001 ab Control Sample ab Control Sample Dup	95.4 96.1 81.0			
LCS 160-611074/2-A La LCSD 160-611074/3-A La MB 160-611074/1-A Mo Tracer/Carrier Legend	ab Control Sample ab Control Sample Dup	96.1 81.0			
LCSD 160-611074/3-A La MB 160-611074/1-A Mo Tracer/Carrier Legend	ab Control Sample Dup	81.0			
MB 160-611074/1-A Mo					
Tracer/Carrier Legend	ethod Blank	93.4			
Bo = Bo Corrier					
Da – Da Camer					
lethod: 904.0 - Radiu	ım-228 (GFPC)				
atrix: Water				Prep Type: Total/NA	
				Percent Yield (Acceptance Limits)	
		Ва	Y		
.ab Sample ID CI	lient Sample ID	(30-110)	(30-110)		
240-184761-1 DE	EK-MW-18001	95.4	90.4		
-CS 160-611088/2-A La	ab Control Sample	96.1	78.7		
_CSD 160-611088/3-A La	ab Control Sample Dup	81.0	62.1		
MB 160-611088/1-A M	ethod Blank	93.4	79.2		

Y = Y Carrier

QC Sample Results

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-184761-1

Method: 903.0 - Radium-226 (GFPC)

Ba Carrier

Y Carrier

93.4

79.2

30 - 110

30 - 110

	ID: MB 1	60-6110	74/1-A						Clie		le ID: Meth	
Matrix: Wate											Prep Type:	
Analysis Bat	tch: 6150	46									Prep Batch	n: 6110
				Count	Total							
		MB	MB	Uncert.	Uncert.							
Analyte		Result	Qualifier	(2σ+/-)	(2 σ+/-)	RL	MDC		Ρ	repared	Analyzed	Dil F
Radium-226		0.1185		0.0822	0.0829	1.00	0.113	pCi/L	05/1	1/23 12:08	06/08/23 06:4	5
		МВ	МВ									
Carrier		%Yield	Qualifier	Limits					P	repared	Analyzed	Dil I
Ba Carrier		93.4		30 - 110					05/1	1/23 12:08	06/08/23 06:4	5
Lab Sample		160-611	074/2-0					Cli	ont Sar	nnle ID:	Lab Contro	l Samr
Matrix: Wate		100-011	014/2-4						Sint Oal		Prep Type:	
Analysis Bat		46									Prep Batch	
niaiysis Ddi	1011. 0130	U-U				Total					TTEP Datci	
			Spike	201	LCS	Uncert.					%Rec	
Analyte			Added	Result		(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-226				9.514	<u></u>	1.02	1.00	0.110		- <u>%Rec</u> - 84	75 - 113	
Addum-220			11.5	9.514		1.02	1.00	0.110	poi/L	04	75-115	
. .	LCS											
Carrier Ba Carrier	96.1	Qualifier	Limits 	-								
Matrix: Wate Analysis Bat		46	Spike	LCSD	LCSD	Total Uncert.					Prep Type: Prep Batch %Rec	
Analyte			Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits R	ER Li
Radium-226		_	11.3	10.42		1.12	1.00	0.131	pCi/L	92	75-113 0	.42
	LCSD	LCSD										
Carrier		Qualifier	Limits									
	81.0		30 - 110	-								
sa Carrier												
lethod: 904 Lab Sample	ID: MB 1			;)					Clie		le ID: Meth	
lethod: 904 Lab Sample Matrix: Wate	ID: MB 1 er	60-6110		;)					Clie		Prep Type:	Total/I
lethod: 904 Lab Sample Matrix: Wate	ID: MB 1 er	60-6110			T-1-1				Clie			Total/I
lethod: 904 Lab Sample Matrix: Wate	ID: MB 1 er	60-6110 60	88/1-A	Count	Total				Clie		Prep Type:	Total/I
lethod: 904 Lab Sample Matrix: Wate Analysis Bat	ID: MB 1 er	60-6110 60 МВ	88/1-A MB	Count Uncert.	Uncert.			lleit			Prep Type: Prep Batch	Total/I 1: 6110
lethod: 904 Lab Sample Matrix: Wate Analysis Bat	ID: MB 1 er	60-6110 60 MB Result	88/1-A MB Qualifier	Count Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC		P	repared	Prep Type: Prep Batch Analyzed	Total/I 1: 6110
lethod: 904 Lab Sample Matrix: Wate Analysis Bat Analyte	ID: MB 1 er	60-6110 60 MB Result 0.4069	MB Qualifier U	Count Uncert.	Uncert.		MDC 0.512		P	repared	Prep Type: Prep Batch	Total/I 1: 6110
Ba Carrier Iethod: 904 Lab Sample Matrix: Wate Analysis Bat Analyte Radium-228 Carrier	ID: MB 1 er	60-6110 60 MB Result 0.4069 MB	MB Qualifier U	Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				P	repared	Prep Type: Prep Batch Analyzed	Total/I 1: 6110

05/11/23 12:51 06/01/23 12:31

05/11/23 12:51 06/01/23 12:31

1

lah II

Job ID: 240-184761-1

9

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

Lab Sample ID: LCS 160-611088/2-A **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA Analysis Batch: 614160 Prep Batch: 611088 Total LCS LCS %Rec Spike Uncert. Analyte Added Result Qual (2**σ**+/-) RL MDC Unit %Rec Limits Radium-228 8.15 9.437 1.30 1.00 0.530 pCi/L 116 75 - 125 LCS LCS %Yield Qualifier Carrier Limits Ba Carrier 96.1 30 - 110 Y Carrier 78.7 30 - 110 Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 160-611088/3-A **Matrix: Water** Prep Type: Total/NA Analysis Batch: 614159 Prep Batch: 611088 Total Spike LCSD LCSD Uncert. %Rec RER %Rec Limits Limit Analyte Added RL MDC Unit Result Qual (2**σ**+/-) RER 1.00 Radium-228 8.15 8.686 1.67 1.09 pCi/L 107 75 - 125 0.25 1 LCSD LCSD %Yield Qualifier Carrier Limits Ba Carrier 30 - 110 81.0 30 - 110 Y Carrier 62.1

QC Association Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond Job ID: 240-184761-1

Rad

Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-184761-1	DEK-MW-18001	Total/NA	Water	PrecSep STD	
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD	
_CS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	
rep Batch: 611088					
-	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
Lab Sample ID	Client Sample ID DEK-MW-18001	Prep Type Total/NA	Matrix Water	Method PrecSep_0	Prep Batch
Lab Sample ID 240-184761-1	•				Prep Batch
rep Batch: 611088 Lab Sample ID 240-184761-1 MB 160-611088/1-A LCS 160-611088/2-A	DEK-MW-18001	Total/NA	Water	PrecSep_0	Prep Batch

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-18001 Date Collected: 05/03/23 06:40 Date Received: 05/05/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			611074	KAC	EET SL	05/11/23 12:08
Total/NA	Analysis	903.0		1	615045	FLC	EET SL	06/08/23 08:26
Total/NA	Prep	PrecSep_0			611088	KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	904.0		1	614159	FLC	EET SL	06/01/23 12:43
Total/NA	Analysis	Ra226_Ra228		1	615062	EMH	EET SL	06/08/23 14:39

Laboratory References:

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

Job ID: 240-184761-1

Matrix: Water

Lab Sample ID: 240-184761-1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Accreditation/Certification Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-184761-1

12 13

Laboratory: Eurofins St. Louis

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

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

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

Phone: 330-497-9396 Fax: 330-497-0772	190			130	
Client Information	Sampler	Lab Bro	Lab PM Brooks, Kris M	Carrier Tracking No(s):	COC No 240-107206-29052.1
Client Contact Jacob Krenz	Phone	E-M. Kris	E-Mail. Kris. Brooks@et. eurofinsus. com	State of Origin	Page Page 1 of 1
Company TRC Environmental Corporation.		PWSID	Analvsi	Analvsis Requested	Job#
Address 1540 Eisenhower Place	Due Date Requested:				Preservation Codes:
City Ann Arbor	TAT Requested (days):				4 3
State, Zip MI, 48108-7080	ice Project: A Yes	A No			
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO# 178827		(0		0
Email JKrenz@trccompanies.com	#OM				I - Ice J - DI Water
Project Name Karn/Weadock CCR DEK Bottom Ash Pond	Project # 24024154		EbC Baj OL		K - EDTA L - EDA
Site	SSOW#		528-G SD (X		Other:
Sample Identification	Sample Date Time	Sample Matrix Type (wwww. C=comp, c=www. G=drab) startantant	berejiti bisi barejita bisi M/SM mrofre aRassa (0.00 aRassa (0.00 nabnai2 - 0.40(240-184	Fotal Number
	X	0	XXD	761	
DEK-MW-15002		Water		Cha	
DEK-MW-15005		Water		in of	
DEK-MW-15006		Water		Cust	
DUP-DEK-BAP-01		Water		ody	
EB-DEK-BAP		Water			
DEK-mar 12001	513 152 13640	C Water	× 44		0
Possible Hazard Identification	Poison B Dunknown Ra	Radiological	Sample Disposal (A fee mu	ay the assessed if samples	Sample Disposal (A fee may the assessed if samples are retained longer than 1 month) Return To Client Disposal By Lab Archive For Months
III, IV, Othe			Special Instructions/QC Requirements	uirements:	
Empty Kit Relinquished by:	Date:		Time:	Method of Shipment	1t
Reinquished by	- Salertime (13 Cf	200 Company	Received by the	14/2	1/23 800 Rev Company
Kelinquished by Lever And Relinquished by	5/4/23 80000	Company	Received by	My Deletion	5.23 900
Custodi. Sosla Jatasi. Custodi. Sosl Ma		funding	An newspace		Company
			Cooler Temperature(s) °C and Other Remarks	Other Remarks	
					Ver. 06/08/2021

5 6

10117/1
Eurofins - Canton Sample Receipt Form/Narrative Login # : 0 1/e Barberton Facility
Client TRC Site Name Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23
FedEx: 1 st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # E Form Box Client Cooler Box Other
Packing material used. Brisble Wrap Foam Plastic Bag None Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt
IR GUN # $(CF + 0.0 \circ C)$ Observed Cooler Temp. $\circ C$ Corrected Cooler Temp. $\circ C$
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity Ver No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA checked for nH by
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?
-Were tamper/custody seals intact and uncompromised?
S. Simplet's packing ship attached to the cooler(s):
 4. Did custody papers accompany the sample(s)? 5. Were the custody papers relinquished & signed in the appropriate place?
 Were the custody papers relinquished & signed in the appropriate place? Was/were the person(s) who collected the samples clearly identified on the COC?
7. Did all bottles arrive in good condition (Unbroken)?
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC?
9. For each sample, does the COC specify preservatives (Y/b), # of containers (Y/N), and sample type of grab/comp(Y/N)?
10. Were correct bottle(s) used for the test(s) indicated?
11. Sufficient quantity received to perform indicated analyses? 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? Ves No NA pH Strip Lot# HC208070
14. Were VOAs on the COC? Yes No 15. Were air bubbles >6 mm in any VOA vials? Larger than this.
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)
Sample(s) were received with bubble >6 mm in diameter. (Notify PM)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s)
VOA Sample Preservation - Date/Time VOAs Frozen:

Client Sample ID

DEK-MW-08001

DEK-MW-08001

Temperature readings:

Lab ID

240-184761-A-1

240-184761-B-1

Login Container Summary Report

Container Type

Plastic 1 liter - Nitric Acid

Plastic 1 liter - Nitric Acid

Preservative Temp Added (mls) Lot #

Container

<u>рН</u>

<2

<2

5

Chain of Custody Record



👬 eurofins

Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772		unain or custody kecord	Kecord			2	CUTOTINS Environment Testing	t Testing
Client Information (Sub Contract Lab)	Sampler:		Lab PM: Brooks Kris M		Carrier Tracking No(s):		COC No:	
Client Contact. Shipping/Receiving	Phone:		E-Mail: Kris.Brooks@et eurofineus.com		State of Origin:		240-167649.1 Page:	Τ
Company: TestAmerica Laboratories, Inc.			Accreditations Required (See note)	ed (See note):	wichigan	Τ	Page 1 of 1 Job #:	Τ
Address: 13715 Rider Trail North,	Due Date Requested: 6/6/2023			Analveie I	Analveie Dominostad	T	۳.	Τ
City Earth City State Zin	TAT Requested (days):						A - HCL M - Hexane B - NaOH N - None C - Zn Acelate O - ASNAO2	
Mare, zip. Mor, 63045 Phone:							D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3	
714-298-8566(Tel) 314-298-8757(Fax)	PO #:		t List					
Email:	** OM		Targe (o)			C. A. S. C. Street, St		nydrate
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154		e or a				J - DI Water W - pH 4-5 K - EDTA Y - Trizma L - EDA	
Sile:	SSOW#:		D CT D Stand	Ĵe		_	Z - other (specify) Other:	~
Sample Identification - Client ID (Lab ID)	Sample Date (Sample (www.water. Type s=solid. (C≕comp, BT*18eue. G=grab) A=Ath	8 benefit bielt 903.01 PrecSep_0 8 904.01PrecSep_0 9 904.01PrecSep_0	Ra226Ra228_GFF		otal Number of	Constant	
		Preservation Code:				×	opecial Instructions/Note:	
DEK-MW-08001 (240-184761-1)	5/3/23 06:40 Eastern	Water	××	×		2	TVA protocol - Ra-226+228 action limit at 5.0 nCi/l	limit at
								Τ
Motor Clines Internet						1		
and the seconditation compliance upon our subcontrost in the Stand 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 accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC attention suil 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 Enrofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central. LLC attention immediately.	nt Testing North Central, LLC places th bove for analysis/tests/matrix being ana antral, LLC attention immediately. If all ,	e ownership of method, lyzed, the samples mus equested accreditations	analyte & accreditation cor t be shipped back to the Eu are current to date, return	mpliance upon our sub urofins Environment T the signed Chain of C	contract laboratories. This sau asting North Central, LLC labor ustody attesting to said compl	nple shipment atory or other i iance to Eurofir	s forwarded under chain-of-custody. If istructions will be provided. Any chan s Environment Testing Mode Constant	f the ges to
Possible Hazard Identification Unconfirmed			Sample Dispos	sal (A fee may b	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	are retained	longer than 1 month)	
Deliverable Requested: I, II, II, IV, Other (specify)	Primary Deliverable Rank 2		Return To Client	o Client	Disposal By Lab	Archive For	e For Months	
Emoty Kit Relinerished hu				special instructions/QC Kequirements:	nents:			
Belindlished by:	Date:	-	Time:		Method of Shipment:			Τ
4		ANNO TO	The Received by:	Color	Date/Time:	6	Company	Τ
Keinquished by: Fecile x	Date/Time:	Company	Received by:	Sharkau	Date/Time:	-		Τ
	Date/Time:	Company	Received by:		Date/Time	218	22 07/0 ETASTC Company	Τ
Custody Seals Intact: Custody Seal No.:			Cooler Temper:	Cooler Temperature(s) °C and Other Remarks:	Remarks:			Τ
			13	11	8 9 10		2 3 4 5	-1
			3	1				

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Login Number: 184761 List Number: 2 Creator: Sharkey-Gonzalez, Briana L

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

List Source: Eurofins St. Louis

List Creation: 05/08/23 01:17 PM



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 7/5/2023 11:48:36 AM Revision 2

JOB DESCRIPTION

Karn/Weadock CCR DEK JCW Background Wells

JOB NUMBER

240-184759-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



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

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

Authorized for release by Denise Heckler, Project Manager II <u>Denise.Heckler@et.eurofinsus.com</u> Designee for Kris Brooks, Project Manager II <u>Kris.Brooks@et.eurofinsus.com</u> (330)966-9790 5 AM

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Definitions/Glossary

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

Qualifiers

Glossary

Clossury	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 240-184759-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-184759-1

Comments

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

Receipt

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

RAD

Method 903.0: Radium-226 batch 611074: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

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

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

Method 904.0: Radium-228 batch 611088: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Method PrecSep_0: Radium-228 Prep Batch 160-611088: The following samples were prepared at a reduced aliquot due to Matrix: MW-15008 (240-184759-2), MW-15019 (240-184759-4) and DUP-BACKGROUND (240-184759-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep_0: Radium-228 Prep Batch 160-611088: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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

Method PrecSep STD: Radium-226 Prep Batch 160-611074: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-15002 (240-184759-1), MW-15016 (240-184759-3) and FB-BACKGROUND (240-184759-6). A laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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

Method Summary

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

EET SL EET SL EET SL EET SL
EET SL
EET QI
EET SL
EET SL

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 DEK JCW Background Wells

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

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

Client Sample ID: MW-15002 Date Collected: 05/01/23 15:01 Date Received: 05/05/23 08:00

Method: EPA 903.	u - Kaululli	-220 (GFF								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.115	U	0.115	0.115	1.00	0.183	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.0		30 - 110					05/11/23 12:08	06/08/23 06:47	1

Method: EPA 904.0 - Radium-228 (GFPC)

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

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

Job ID: 240-184759-1

Matrix: Water

Lab Sample ID: 240-184759-1

Eurofins Cleveland

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

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

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.102	U	0.147	0.147	1.00	0.249	pCi/L	05/11/23 12:08	06/08/23 06:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.4		30 - 110					05/11/23 12:08	06/08/23 06:47	1

Method: EPA 904.0 - Radium-228 (GFPC)

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

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

Job ID: 240-184759-1

Eurofins Cleveland

Lab Sample ID: 240-184759-2 Matrix: Water

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

Client Sample ID: MW-15016 Date Collected: 05/02/23 08:40 Date Received: 05/05/23 08:00

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

Method: EPA 904.0 - Radium-228 (GFPC)

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

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

Job ID: 240-184759-1

Matrix: Water

Lab Sample ID: 240-184759-3

Eurofins Cleveland

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

Client Sample ID: MW-15019 Date Collected: 05/01/23 13:43 Date Received: 05/05/23 08:00

Method: EPA 90	3.0 - Radium	-226 (GFP	C)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.134	0.137	1.00	0.137	pCi/L	05/11/23 12:08	06/08/23 08:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.1		30 - 110					05/11/23 12:08	06/08/23 08:21	1

Method: EPA 904.0 - Radium-228 (GFPC)

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

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

Job ID: 240-184759-1

Matrix: Water

Lab Sample ID: 240-184759-4

Eurofins Cleveland

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

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

Lab Sample ID: 240-184759-5 Matrix: Water

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

Method: EPA 904.0 - Radium-228 (GFPC)

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

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

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

Client Sample ID: FB-BACKGROUND Date Collected: 05/01/23 12:40 **Date Re**

Date Received: 05/05/23 08:00					
Method: EPA 903.0 - Radium-226 (GFPC)					
Cou	unt	Total			
Unce	ert.	Uncert.			
		<i>i</i> a <i>i</i> ,	 	_	

Analyte Radium-226	Result -0.0163	Qualifier U	(2σ+/-) 0.0448	(2σ+/-) 0.0449	RL 1.00	MDC 0.109	 Prepared 05/11/23 12:08	Analyzed 06/08/23 08:22	Dil Fac
Carrier Ba Carrier	% Yield 85.4	Qualifier	Limits 30 - 110				Prepared 05/11/23 12:08	Analyzed 06/08/23 08:22	Dil Fac

Method: EPA 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Radium-228	0.242	U	0.351	0.352	1.00	0.593	pCi/L	05/11/23 12:51	06/01/23 12:41	1	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac	
Ba Carrier	85.4		30 - 110					05/11/23 12:51	06/01/23 12:41	1	
Y Carrier	81.2		30 - 110					05/11/23 12:51	06/01/23 12:41	1	

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

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

Job ID: 240-184759-1

Matrix: Water

Lab Sample ID: 240-184759-6

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Tracer/Carrier Summary

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

Method: 903.0 - Radium-226 (GFPC) Matrix: Water

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

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

				Percent Yield (Acceptance Limits)
		Ва	Y	
ab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-184759-1	MW-15002	80.0	87.4	
40-184759-2	MW-15008	76.4	61.5	
240-184759-3	MW-15016	85.2	59.3	
240-184759-4	MW-15019	86.1	65.7	
0-184759-5	DUP-BACKGROUND	95.4	71.1	
0-184759-6	FB-BACKGROUND	85.4	81.2	
S 160-611088/2-A	Lab Control Sample	96.1	78.7	
SD 160-611088/3-A	Lab Control Sample Dup	81.0	62.1	
B 160-611088/1-A	Method Blank	93.4	79.2	

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

Prep Type: Total/NA

8

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QC Sample Results

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

Job ID: 240-184759-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample	ID: MB 1	<mark>60-6110</mark>	74/1-A						Cli	ent Samp	ole ID: Me	thod	Blan
Matrix: Wate	er										Prep Typ	e: Tot	tal/N/
Analysis Bat	tch: 6150	46									Prep Bat	ch: 6	1107
				Count	Total								
		MB	MB	Uncert.	Uncert.								
Analyte		Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC	Unit	F	Prepared	Analyze	d	Dil Fa
Radium-226		0.1185		0.0822	0.0829	1.00	0.113	pCi/L	05/	11/23 12:08	06/08/23 0	6:45	
		МВ	МВ										
Carrier		%Yield	Qualifier	Limits					F	Prepared	Analyze	d	Dil Fa
Ba Carrier		93.4		30 - 110					05/	11/23 12:08	06/08/23 0	6:45	
_ab Sample		160-611	074/2-4					Cli	ent Sa	mnle ID:	Lab Cont	rol Sa	amn
Aatrix: Wate								011			Prep Typ		
Analysis Bat		46									Prep Bat		
Dury Cie Dur						Total						•	
			Spike	LCS	LCS	Uncert.					%Rec		
nalyte			Added	Result		(2σ+/-)	RL	MDC	Unit	%Rec	Limits		
Radium-226			11.3	9.514		1.02	1.00	0.110	pCi/L	84	75 - 113		
	LCS	LCS											
Carrier	LCS %Yield		Limits										
		LCS Qualifier	Limits 30 - 110	-									
Ba Carrier Lab Sample Matrix: Wate	%Yield 96.1 ID: LCSE	Qualifier	30 - 110	-				Client S	ample		Control S Prep Typ Prep Bat	e: Tot	tal/N
Ba Carrier Lab Sample Matrix: Wate	%Yield 96.1 ID: LCSE	Qualifier	30 - 110	-		Total		Client S	ample			e: Tot	tal/N
^{3a Carrier} -ab Sample Matrix: Wate	%Yield 96.1 ID: LCSE	Qualifier	30 - 110	LCSD	LCSD	Total Uncert.		Client S	ample		Prep Typ	e: Tot	tal/N 1107
a Carrier ∟ab Sample Matrix: Wate Analysis Bat	%Yield 96.1 ID: LCSE	Qualifier	30 - 110 1074/3-A	LCSD			RL	Client S			Prep Typ Prep Bat	e: Tot	tal/N 1107 RE
a Carrier Lab Sample Matrix: Wate Analysis Bat	%Yield 96.1 ID: LCSE	Qualifier	30 - 110 1074/3-A Spike			Uncert.					Prep Typ Prep Bat %Rec	e: Tot ch: 6	tal/N 1107 RE
a Carrier Lab Sample Matrix: Wate Analysis Bat	%Yield 96.1 ID: LCSE er tch: 6150	Qualifier	30 - 110 1074/3-A Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bat %Rec Limits	e: Tot ch: 6 <u>RER</u>	tal/N 1107 RE
a Carrier Lab Sample Matrix: Wate Analysis Bat Analyte Radium-226	%Yield 96.1 ID: LCSE tch: 6150	Qualifier 0 160-61 046	30 - 110 1074/3-A Spike Added 11.3	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bat %Rec Limits	e: Tot ch: 6 <u>RER</u>	tal/N 1107 RE
a Carrier Lab Sample Matrix: Wate Analysis Bat Malyte Radium-226	%Yield 96.1 ID: LCSE tch: 6150	Qualifier 0 160-61 046 	30 - 110 1074/3-A Spike Added 11.3	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bat %Rec Limits	e: Tot ch: 6 <u>RER</u>	tal/N 1107 RE
a Carrier ab Sample Matrix: Wate Analysis Bat analyte adium-226 Carrier a Carrier	%Yield 96.1 ID: LCSE er tch: 6150 %Yield %Yield 81.0	Qualifier 0 160-61 046 LCSD Qualifier	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bat %Rec Limits	e: Tot ch: 6 <u>RER</u>	tal/N 1107 RE
Carrier Cab Sample Matrix: Wate Analysis Bat Analyte Radium-226 Carrier Ba Carrier Ba Carrier Ethod: 904	% Yield 96.1 ID: LCSE er tch: 6150	Qualifier 0 160-61 046 LCSD Qualifier	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 92	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42	tal/N 1107 RE Lin
Analyte Radium-226 Carrier Ba Carrier Ba Carrier Ba Carrier ethod: 904 Lab Sample	%Yield 96.1 ID: LCSE sr tch: 6150 %Yield %Yield 81.0 4.0 - Ra ID: MB 1	Qualifier 0 160-61 046 LCSD Qualifier	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	ent Samp	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42	tal/N 1107 RE Lin
Analyte Radium-226 Carrier Ba Carrier Ba Carrier Ba Carrier ethod: 904 Lab Sample Matrix: Wate	%Yield 96.1 ID: LCSE sr tch: 6150 %Yield %Yield 81.0 4.0 - Ra ID: MB 1	Qualifier 0 160-61 046 <i>LCSD</i> <i>Qualifier</i> 0dium-2 60-6110	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC	Result 10.42		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	ent Samp	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42 thod e: Tot	tal/N 1107 RE Lin Blan
Ba Carrier Lab Sample Matrix: Wate Analysis Bat Analyte Radium-226 Carrier Ba Carrier lethod: 904 Lab Sample Matrix: Wate	%Yield 96.1 ID: LCSE sr tch: 6150 %Yield %Yield 81.0 4.0 - Ra ID: MB 1	Qualifier 0 160-61 046 <i>LCSD</i> <i>Qualifier</i> 0dium-2 60-6110	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC	Result 10.42	Qual	Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	ent Samp	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42 thod e: Tot	tal/N 1107 RE Lin Blan
Ba Carrier Lab Sample Matrix: Wate Analysis Bat Analyte Radium-226 Carrier Ba Carrier lethod: 904 Lab Sample Matrix: Wate	%Yield 96.1 ID: LCSE sr tch: 6150 %Yield %Yield 81.0 4.0 - Ra ID: MB 1	Qualifier 0 160-61 046 <i>LCSD</i> <i>Qualifier</i> dium-2 60-6110 60	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC 88/1-A	Result 10.42	Qual	Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	ent Samp	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42 thod e: Tot	tal/N 1107 RE Lim Blan
Carrier Ba Carrier Lab Sample Matrix: Wate Analysis Bat Analyte Radium-226 Carrier Ba Carrier Lab Sample Matrix: Wate Analysis Bat	%Yield 96.1 ID: LCSE sr tch: 6150 %Yield %Yield 81.0 4.0 - Ra ID: MB 1	Qualifier 0 160-61 046 <i>LCSD</i> <i>Qualifier</i> 60-6110 60 MB	30 - 110 1074/3-A Spike Added 11.3 Limits 30 - 110 228 (GFPC 88/1-A	Result 10.42	Qual	Uncert. (2σ+/-)	RL	<u>MDC</u> 0.131	Unit pCi/L	ent Samp	Prep Typ Prep Bat %Rec Limits 75 - 113	e: Tot ch: 6 RER 0.42 thod e: Tot ch: 6	tal/N 1107 RE Lim Blan

Radium-228	0.4069	U	0.333	0.335	1.00	0.512 pCi/L	05/11/23 12:51	06/01/23 12:31	1
	МВ	МВ							
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	93.4		30 - 110				05/11/23 12:51	06/01/23 12:31	1
Y Carrier	79.2		30 - 110				05/11/23 12:51	06/01/23 12:31	1

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QC Sample Results

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

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

Matrix: Wat Analysis B		60									Prep Typ Prep Ba		
						Total							
			Spike	LCS	LCS	Uncert.					%Rec		
Analyte			Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits		
Radium-228			8.15	9.437		1.30	1.00	0.530	pCi/L	116	75 - 125		
	LCS	LCS											
Carrier	%Yield	Qualifier	Limits										
Ba Carrier	96.1		30 - 110										
V O a milan	78.7		30 - 110										
Y Carrier	70.7												
Lab Sample Matrix: Wat	le ID: LCSE iter						(Client S	ample	ID: Lab	Control S Prep Typ	e: Tot	al/NA
Y Carrier Lab Sample Matrix: Wat Analysis B	le ID: LCSE iter						(Client S	ample	ID: Lab		e: Tot	al/NA
Lab Sample Matrix: Wat	le ID: LCSE iter		88/3-A	1.005	1.000	Total	(Client S	ample	ID: Lab	Prep Typ Prep Ba	e: Tot	al/NA 11088
Lab Sampl Matrix: Wa Analysis B	le ID: LCSE iter		88/3-A Spike		LCSD	Uncert.			·		Prep Typ Prep Ba %Rec	e: Tot tch: 6 [,]	al/NA 11088 RER
Lab Sample Matrix: Wat Analysis B Analyte	le ID: LCSE iter		88/3-A Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	al/NA 11088 RER Limit
Lab Sample Matrix: Wat Analysis B	le ID: LCSE iter		88/3-A Spike			Uncert.			·		Prep Typ Prep Ba %Rec	e: Tot tch: 6 [,]	al/NA 11088 RER
Lab Sample Matrix: Wat Analysis B	le ID: LCSE iter	59	88/3-A Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	al/NA 11088 RER Limit
Lab Sample Matrix: Wat Analysis B Analyte Radium-228 Carrier	le ID: LCSE ster satch: 6141 LCSD %Yield	59	88/3-A Spike Added 8.15	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	al/NA 11088 RER Limit
Lab Sampl Matrix: Wa Analysis B	le ID: LCSE ter Batch: 6141	59 	88/3-A Spike Added 8.15	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Ba %Rec Limits	e: Tot tch: 6 ⁻ <u>RER</u>	al/NA 11088 RER Limit

Job ID: 240-184759-1

QC Association Summary

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

Rad

Prep Batch: 611074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch	
240-184759-1	MW-15002	Total/NA	Water	PrecSep STD		
240-184759-2	MW-15008	Total/NA	Water	PrecSep STD		Ę
240-184759-3	MW-15016	Total/NA	Water	PrecSep STD		
240-184759-4	MW-15019	Total/NA	Water	PrecSep STD		
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep STD		
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep STD		
MB 160-611074/1-A	Method Blank	Total/NA	Water	PrecSep STD		
LCS 160-611074/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD		8
LCSD 160-611074/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD		
Prep Batch: 611088						
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch	1
240-184759-1	MW-15002	Total/NA	Water	PrecSep_0		۵
240-184759-2	MW-15008	Total/NA	Water	PrecSep_0		
240-184759-3	MW-15016	Total/NA	Water	PrecSep_0		
240-184759-4	MW-15019	Total/NA	Water	PrecSep_0		
240-184759-5	DUP-BACKGROUND	Total/NA	Water	PrecSep_0		
240-184759-6	FB-BACKGROUND	Total/NA	Water	PrecSep_0		
MB 160-611088/1-A	Method Blank	Total/NA	Water	PrecSep_0		
LCS 160-611088/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0		

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

Lab Sample ID: 240-184759-1 Matrix: Water Dilution Batch Batch Batch Prepared Method Number Analyst or Analyzed Prep Type Type Run Factor Lab Total/NA PrecSep STD 05/11/23 12:08 Prep 611074 KAC EET SL Total/NA 903.0 06/08/23 06:47 Analysis 1 615046 FLC EET SL Total/NA Prep PrecSep 0 611088 KAC EET SL 05/11/23 12:51 Total/NA 06/01/23 12:40 Analysis 904.0 1 614159 FLC EET SL Total/NA EET SL 06/08/23 14:39 Analysis Ra226 Ra228 1 615062 EMH Client Sample ID: MW-15008 Lab Sample ID: 240-184759-2 Date Collected: 05/01/23 12:40 Matrix: Water Date Received: 05/05/23 08:00 Dilution Prepared Batch Batch Batch Method Prep Type Type Run Factor Number Analyst Lab or Analyzed Prep PrecSep STD 611074 KAC 05/11/23 12:08 Total/NA EET SL Total/NA Analysis 903.0 1 615046 FLC EET SL 06/08/23 06:47 Total/NA Prep PrecSep 0 611088 KAC EET SL 05/11/23 12:51 Total/NA Analysis 904.0 614159 FLC EET SL 06/01/23 12:40 1 Total/NA EET SL 06/08/23 14:39 Analysis Ra226_Ra228 1 615062 EMH Client Sample ID: MW-15016 Lab Sample ID: 240-184759-3 Date Collected: 05/02/23 08:40 Matrix: Water Date Received: 05/05/23 08:00 Dilution Batch Batch Batch Prepared Method Prep Type Туре Run Factor Number Analyst Lab or Analyzed 05/11/23 12:08 Total/NA Prep PrecSep STD 611074 KAC EET SL Total/NA Analysis 903.0 615045 FLC EET SL 06/08/23 06:49 1 Total/NA Prep PrecSep 0 611088 KAC EET SL 05/11/23 12:51 Total/NA 614159 FLC EET SL Analysis 904.0 06/01/23 12:40 1 Total/NA 615062 EMH EET SL 06/08/23 14:39

1

Client Sample ID: MW-15019 Date Collected: 05/01/23 13:43 Date Received: 05/05/23 08:00

Analysis

Ra226 Ra228

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

Eurofins Cleveland

Lab Sample ID: 240-184759-4

Matrix: Water

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

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

05/01/23 0)5/05/23 08							Matrix: Water
Batch Type Prep	Batch Method PrecSep STD	Run	Dilution Factor	Batch Number Analyst	Lab EET SL	Prepared or Analyzed 05/11/23 12:08	

Client San	nple ID: FB-	BACKGROUND			Lab	Sample ID: 240-184759-6
Total/NA	Analysis	Ra226_Ra228	1	615062 EMH	EET SL	06/08/23 14:39
Total/NA	Analysis	904.0	1	614159 FLC	EET SL	06/01/23 12:41
Total/NA	Prep	PrecSep_0		611088 KAC	EET SL	05/11/23 12:51
Total/NA	Analysis	903.0	1	614897 FLC	EET SL	06/08/23 08:22

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

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

Laboratory References:

Prep Type

Total/NA

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

Matrix: Water

Lab Sample ID: 240-184759-5

Accreditation/Certification Summary

Identification Number

20-001

L2305

L2305

10259

2886

PH-0241

E87689

200023

E-10236

KY90125

04080

04080

LA011

310

9005

MO002

11616

29700

R-207

9997

4157

68-00540

85002001

058448

10310

C592

381

T104704193

P330-17-00028

MO000542021-14

MO00054

780

KY90125 (Permit

MO000542020-1

KY0004049)

n/a

373

AZ0813

L2305.01

Expiration Date

05-06-25

04-06-25

04-06-25

04-06-25

12-08-23

06-30-22 *

06-30-23

03-31-25

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07-31-23

06-30-23

08-31-23

09-01-23

02-28-24

06-30-23

07-31-23

07-31-23

05-18-26

07-31-23

06-14-23

08-30-23

10-31-23

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

Laboratory: Eurofins St. Louis

Authority

ANAB

ANAB

ANAB

Arizona

California

California

Florida

Illinois

lowa

Kansas

Louisiana

Maryland

Missouri

Nevada

New Jersey

New Mexico

North Dakota

Pennsylvania South Carolina

US Fish & Wildlife

West Virginia DEP

Oklahoma

Oregon

Texas

USDA

Utah

Virginia

Washington

North Carolina (DW)

New York

Kentucky (DW)

Kentucky (WW)

Louisiana (All)

Louisiana (DW)

MI - RadChem Recognition

Connecticut

HI - RadChem Recognition

Alaska (UST)

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

Los Angeles County Sanitation

Dept. of Defense ELAP

Dept. of Energy

ISO/IEC 17025

Program

State

State

State

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State

NELAP

NELAP

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State

State

US Federal Programs

US Federal Programs

State

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NELAP

NELAP

NELAP

NELAP

Districts

8
9
12
13

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

Eurofins Cleveland MICHIK 180 S. Van Buren Avenue Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772		Chain e	\mathcal{O} - \mathcal{Z} / \mathcal{E}	⊘. tody R	0.3/0.3 iy Record		MIC	CHIGAN 190	Z	🔅 eurofins	fins Environment Testing	00
Client Information	Sampler.			Broo	Lab PM Brooks, Kris M			Carrier Tracking No(s)	ing No(s).	COC No: 240-107203-33282	03-33282.1	_
Client Contact Jacob Krenz	Phone			E-Ma Kris	E-Mail: Kris.Brooks@et.eurofinsus.com	eurofinsus	com	State of Orgin	e	Page 1 of 1	-	1
Company TRC Environmental Corporation.			DISMA				Analys	Analysis Requested		# qor		_
Address 1540 Eisenhower Place	Due Date Requested:	:p								Preservation Codes	i ž	
City: Ann Arbor	TAT Requested (days):	iys):				-				B - NaOH C - Zn Acetate	N - None 0 - AsNaO2 D - Na2OAS	
State, Zip. MI, 45108-7080	Compliance Project:	A Yes	A No			_				E - NaHSO	4 R - Na2S203	
Phone 734-971-7080(Tel) 734-971-9022(Fax)	PO# TBD				(0					G - Amchiol H - Ascorbid	S - H2SO4 C Acid T - TSP Dodecahydrate	_
Emait JKrenz@trccompanies.com	# 0M										V - MCAA	_
Project Name Karn/Weadock CCR Background Well	Project # 24024154				10 SO,	tei List				enistn L-EDA		
Site	SSOW				N) as	grsT b	_	_		of co		
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (www.ener. Breated.	Field Filtered MIZM mrone 903.0, Razzera	nabnat2 - 0.406		240-1847		Total Number	Special Instructions/Note	
	X	X	Preserval	Preservation Code:	Ž	0		59				1
MW-15002	5-1-23	1051	5	Water	NN X	×		Chair				-
MW-15008	5-1-23	1240	9	Water	XNN	×		n of C				
MW-15016	5-2-23	0400	9	Water	X NN	×	-	Custo				_
MW-15019	55-1-5	1343	S	Water	V N X	×		dy				_
DUP-Background	5-1-23		S	Water	N N X	×						
EQ-Backgrowd				Water		T	-			14		-
FB-Background	5-1-33	050	0	Water	N N X	X	$\left \right $					
						-	-					
ant	Poison B Unknown		Radiological		Sample	le Disposal (A i Return To Client	(A fee m tient	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Return To Client Disposal By Lab Archive For Mont	samples are r Lab	etained longer Archive For	than 1 month) Months	
Deliverable Requested: 1, 11, 11, 1V, Other (specify) Emoty if a balancia hod bu:		Cato:			Special	Instruction	s/QC Rec	Special Instructions/QC Requirements:	Mathematical Shimmond.			-
Relinquisted by	1 F	/ 11 I		Company	Rece	Received by			Date/Jime		Company	
Reindustreed by Art	DaterTime Date	LIPI		Company		in the test	2	, Der	Detel Terres	5-23	THAT WY	
Reinquished by	2			Company	Rece	Received by:		A	Date/Time:		Company	
Custody Seals Intact: Custody Seal No.: A Yes A No		£			Cool	yr Temperatu	re(s) °C and	Cooler Temperature(s) ^o C and Other Remarks				-
											Ver: 06/08/2021	1

1011750
Eurofins - Canton Sample Receipt Form/Narrative Login # : 10913
Barberton Facility
Client TRC Site Name Cooler unpacked by:
Cooler Received on 5-5-23 Opened on 5-5-23 Jam, Ky
FedEx: 1 st Grd Exp UPS FAS Clipper Client Drop Off Eurofins Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location
Eurofins Cooler # E Foam Box Client Cooler Box Other
Packing material used. Bubble Wrap Foam Plastic Bag None Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt
IR GUN # $(CF + 0.0 \circ C)$ Observed Cooler Temp. $\circ C$ Corrected Cooler Temp. $\circ C$
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?
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?
-Were tamper/custody seals intact and uncompromised? 3 Shippers' packing din attached to the cooler(c)?
5. Simpler's packing sing attached to the cooler(s):
4. Did custody papers accompany the sample(s)?
 5. Were the custody papers relinquished & signed in the appropriate place? 6. Was/were the person(s) who collected the samples clearly identified on the COC?
 6. Was/were the person(s) who collected the samples clearly identified on the COC? 7. Did all bottles arrive in good condition (Unbroken)?
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC?
9. For each sample, does the COC specify preservatives (Y/b) , # of containers (Y/N) , and eample type of grab/comp (Y/N) ?
10. Were correct bottle(s) used for the test(s) indicated?
11. Sufficient quantity received to perform indicated analyses?
12. Are these work share samples and all listed on the COC? 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 NA pH Strip Lot# HC208070
14. Were VOAs on the COC?
15. Were air bubbles >6 mm in any VOA vials? Larger than this. Yes NA 16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes Na
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes Not 17. Was a LL Hg or Me Hg trip blank present? Yes Not
17. Was a LL fig of Me fig up blank present.
Contacted PM Date by via Verbal Voice Mail Other
Concerning
18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES D additional next page Samples processed by:
19. SAMPLE CONDITION
Sample(s)
Sample(s) were received with bubble >6 mm in diameter. (Notify PM)
20. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Sample(s)
VOA Sample Preservation - Date/Time VOAs Frozen:

remperature readings.	Tempe	erature	readings:
-----------------------	-------	---------	-----------

			Container Preservative	
Client Sample ID	<u>Lab ID</u>	Container Type	pH Temp Added (mls) Lot #	
MW-15002	240-184759-A-1	Plastic 1 liter - Nitric Acid	<2	5
MW-15002	240-184759-B-1	Plastic 1 liter - Nitric Acid	<2	
MW-15008	240-184759-A-2	Plastic 1 liter - Nitric Acid	<2	
MW-15008	240-184759-B-2	Plastic 1 liter - Nitric Acid	<2	
MW-15016	240-184759-A-3	Plastic 1 liter - Nitric Acid	<2	
MW-15016	240-184759-B-3	Plastic 1 liter - Nitric Acid	<2	ð
MW-15019	240-184759-A-4	Plastic 1 liter - Nitric Acid	<2	9
MW-15019	240-184759-B-4	Plastic 1 liter - Nitric Acid	<2	
DUP-BACKGROUD	240-184759-A-5	Plastic 1 liter - Nitric Acid	<2	
DUP-BACKGROUD	240-184759-B-5	Plastic 1 liter - Nitric Acid	<2	
FB-BACKGROUND	240-184759-A-6	Plastic 1 liter - Nitric Acid	<2	
FB-BACKGROUND	240-184759-B-6	Plastic 1 liter - Nitric Acid	<2	
				11

Chain of Custody Record



🛟 eurofins

Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772	ر	unain o	of Cus	r Custody Record	ecor	7				24664		🐝 eurotins	NS Environment Testing
Client Information (Sub Contract Lab)	Sampler.			Lab PM: Brocks	Lab PM: Brocke Krie M				Carrier	Carrier Tracking No(s)		COC No:	
	Phone:			E-Mail	E-Mail:				State of	of Origin:		240-167649. Page:	-
Company				Kris.	srooks@	et.eurof	nsus.co	ε	Michi	Michigan		Page 1 of 1	
TestAmerica Laboratories, Inc.					Accreditations Required (See note):	ns Requi	ed (See n	ote):				Job #: 240-184760 4	
Address: 13715 Rider Trail North,	Due Date Requested: 6/6/2023	÷					Ā	Jalveis	Analveis Regineeted	1		Preservation Codes:	Codes:
City: Earth City	TAT Requested (days)	/s):				E	-					A - HCL B - NaOH	
State, Zip. MO, 63045	1											C - Zn Acetate D - Nitric Acid	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO#:			T								F - MeOH G - Amchlor	R - Na2S203 S - H2SO4
Email:	** OM				(0	_							P
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				N 10 \$							J - DI Water K - EDTA	W - pH 4-5 Y - Trizma
Site:	SSOW#:				•NO						etuo 5	<u> </u>	Z - other (specify)
					ISIME	_	0440				10.10	10.10	
Samule Identification - Cliant ID 4 - 14 ID			Sample Type (C=comp,	. = .	3.0/Precse 3.0/Precse	eScenq\0.4	326Ra228				dmuN lei		
	sample Uate	Ë	G=grab) A=A+) Preservation Code:			- 2	P.N				100		Special Instructions/Note:
MW-15002 (240-184759-1)	5/1/23	15:01		Water		>	,						TVA nmtocol - Ra-2264228 antion limit at
MW-15008 (240-184759-2)	E11:23	Eastern 12:40			< :	< 1	<					2 5.0 pCi/L.	
	C7/1/C	Eastern		Water	×	×	×	_			2		IVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
WW-15016 (240-184759-3)	5/1/23	Eastern		Water	×	×	×				Ν.	1 4.	IVA protocol - Ra-226+228 action limit at
MW-15019 (240-184759-4)	5/1/23	13:43 Eastern		Water	×	×	×				2		TVA protocol - Ra-226+228 action limit at
DUP-BACKGROUD (240-184759-5)	5/1/23	Eastern		Water	×	×	×	-			2		TVA protocol - Ra-226+228 action limit at
FB-BACKGROUND (240-184759-6)	5/1/23	12:40 Eastern		Water	×	×	×	-			0	and the second second	5.0 pcvtL. TVA protocol - Ra-226+228 action limit at
								-				and the second second	
								-					
												(21)	
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's forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC algoratories. This sample shipment's forwarded under chain-of-custody. If the accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all nequested accreditations are current to date, return the signed Chain of Custody attesting is safe compliance to the Eurofins Environment Testing North Central, LLC attention minediately. If all nequested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all nequested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central, LLC attention immediately. If all nequested accreditations are current to date, return the signed Chain of Custody attesting to Eurofins Environment Testing North Central. LLC attention immediately.	ant Testing North Central sbove for analysis/tests/r entral, LLC attention imm	, LLC places th natrix being an iediately. If all	le ownership (alyzed, the sai requested acc	of method, analy mples must be s creditations are	te & accrec hipped bac urrent to d	itation cc k to the E ate, return	mpliance (urofins En	upon our s vironment od Chain o	ubcontract lab Testing North Custody attes	oratories. This Central, LLC la	sample shipme boratory or oth npliance to Eur	entrie forwarded un ler instructions will i rofins Environment	der chain-of-custody. If th be provided. Any changes Testing North Canters 110
Possible Hazard Identification					Sample	Dispo	sal (A I	ee may	be assesse	id if sample	s are retair	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	n 1 month)
Deliverable Reguested: 1. II. IV. Other (cnorie)		-			<u>ן</u>	eturn 1	Return To Client		Disposa	Disposal By Lab	A ⁶	Archive For	Months
	Frimary Deliverable Kank: 2	le Kank: 2			Special	Instruc	Special Instructions/QC Requirements:	Requin	ements:				
Empty Kit Keiinquished by:		Date:		T	Time:				We	Method of Shipment:	nt:		
	CT CLARE	2)10		Company	Rec	Received by:	Feder	۲ ۲		Date/Time	ime:		Company
reinquisired by: Faclex	Date/Time:	•	8	Company	Rece	Received by:	Xha	racer	4- Hange	Date/Time:	2	122 Cars	Company
- r	Date/Time:		S	Company	Rece	Received by:				Date/Time	ġ	67 A-110	
					Cool	ır Tempe	ature(s) °	C and Oth	Cooler Temperature(s) °C and Other Remarks:				

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

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

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

Job Number: 240-184759-1

List Source: Eurofins St. Louis

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



October 2023 Assessment Monitoring Data Summary and Statistical Evaluation

DE Karn, Bottom Ash Pond CCR Unit

Essexville, Michigan

January 2024

Darby Litz / Hydrogeologist/Project Manager

Prepared For: Consumers Energy Company

Prepared By: TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

whele Andrew Whaley

Andrew Whaley Project Geologist



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FIGURES

Figure 1	Site Location Map
Figure 2	Karn and Weadock Complex Map
Figure 3	Shallow Groundwater Contour Map – October 2023

APPENDICES

- Appendix A Data Quality Reviews
- Appendix B Statistical Evaluation of October 2023 Assessment Monitoring Sampling Event
- Appendix C Laboratory Analytical Reports



1.0 Introduction

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

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

1.1 **Program Summary**

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

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

- Boron at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15004, DEK-MW-15005, DEK-MW-15006;
- Fluoride at DEK-MW-15001;
- Field pH at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15005, DEK-MW-15006; and
- Sulfate at DEK-MW-15006.

On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. After subsequent sampling for Appendix IV constituents, Consumers Energy provided notification that arsenic was present at statistically significant levels above the Ground Water Protection Standards (GWPS) established at 21 ug/L (Consumers Energy, January 2019) in five of the six downgradient monitoring wells at the Karn Bottom Ash Pond as follows:

 Arsenic at DEK-MW-15001, DEK-MW-15002, DEK-MW-15003, DEK-MW-15004, and DEK-MW-15005.

The notification of the GWPS exceedance on January 14, 2019 was followed up with a Response Action Plan submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on March 15, 2019 laying out the preliminary understanding of water quality and



actions that were underway to mitigate or eliminate unacceptable risk associated with the identified release from the CCR unit. The *Assessment of Corrective Measures* (ACM) (TRC, September 2019) was initiated on April 14, 2019 and submitted on September 11, 2019 in accordance with the schedule in §257.96 and the requirements of the Response Action Plan.

The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1). Although arsenic concentrations exceed the GWPS in on-site groundwater monitoring locations, arsenic is delineated within the limits of the property owned by Consumers Energy and there are **currently no adverse effects on human health or the environment** from either surface water or groundwater due to CCR management at the Karn Bottom Ash Pond. Per §257.96(b), Consumers Energy is continuing to monitor groundwater in accordance with the assessment monitoring program as specified in §257.95.

Evaluation of groundwater under the CCR Rule focused on the following constituents that were collected *unfiltered* in the field:

coming concentration	
Apper	ndix IV
Antimony	Mercury
Arsenic	Molybdenum
Barium	Radium 226/228
Beryllium	Selenium
Cadmium	Thallium
Chromium	
Cobalt	
Fluoride	
Lead	
Lithium	
	Apper Antimony Arsenic Barium Beryllium Cadmium Chromium Cobalt Fluoride Lead

CCR Rule Monitoring Constituents

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



5
Assessment Monitoring
Copper
Nickel
Silver
Vanadium
Zinc

Additional Monitoring Constituents (Michigan Part 115/PA 640)

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

1.2 Site Overview

The Karn Bottom Ash Pond is located within the DE Karn Power Plant site, which is located north of the 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 Karn Landfill and the Karn Lined Impoundment. The Karn Landfill has been certified closed and is now in post-closure care and is being monitored in accordance with the EGLE-approved *Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area* (December 19, 2017). The Karn Lined Impoundment has been licensed to operate by the EGLE under Part 115 (License Number 9629) and is being monitored in accordance with the EGLE-approved *Karn Lined Impoundment Hydrogeological Monitoring Plan* (November 13, 2020). The locations of the Karn Landfill, the Karn Lined Impoundment, and the Karn Bottom Ash Pond are shown on Figure 2.

Previously, the Karn Bottom Ash Pond was used for wet ash dewatering and was the primary settling/detention structure for the National Pollutant Discharge Elimination System (NPDES) treatment system prior to discharge. Consumers Energy provided notification of initiation of closure on October 12, 2018 to implement the certified closure plan by removal of CCR under the self-implementing requirements and schedule of the CCR Rule. In preparation for removal of the Karn Bottom Ash Pond, a new lined impoundment (Karn Lined Impoundment) was constructed meeting the requirements of the CCR Rule and the operational needs at the Karn Power Plant. The Karn Lined Impoundment began receipt of CCR and non-CCR on June 7, 2018 when it replaced the Karn Bottom Ash Pond operations.

¹ On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule.



Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Karn Bottom Ash Pond under the DE Karn Bottom Ash Pond Closure Plan (Golder, January 2018; Revised April 2018) and the CCR Rule's closure by removal provisions in §257.102(c). Consumers Energy ceased hydraulic loading to the Karn Bottom Ash Pond in June 2018 and allowed the area to dewater by gravity. Consumers Energy then operated a construction dewatering system to allow for excavation of the vertical and lateral extent of CCR that commenced on March 20, 2019 and has operated through the construction and restoration period. The excavation extended to six inches below known CCR elevations established from previous investigations. Excavated CCR has been placed in the neighboring Weadock Landfill that is constructed with of a fully encapsulation soil-bentonite slurry wall keyed into a competently confining clay unit. The Karn Bottom Ash Pond has been restored by backfilling and grading the surface with clean fill in accordance with the plan to promote stormwater drainage, minimize ponding of surface water, and to reduce the potential of infiltration and migration of residual arsenic and any future constituents of concern (COCs). With the CCR removal complete, Consumers Energy submitted the DE Karn Generating Facility Bottom Ash Pond CCR Removal Documentation Report (Golder, October 2019) on October 30, 2019. EGLE approved the documentation removal report on December 1, 2020. Groundwater conditions post-CCR removal continue to be monitored.

1.3 Geology/Hydrogeology

The majority of the Karn Bottom Ash Pond area is comprised of surficial CCR and sand fill. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (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 DE Karn Power Plant site is bounded by several surface water features (Figure 1): 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 Bottom Ash Pond, the shallow groundwater flow is generally to the west, toward the intake channel.



2.0 Groundwater Monitoring

2.1 Monitoring Well Network

In accordance with 40 CFR 257.91, Consumers Energy established a groundwater monitoring system for the Karn Bottom Ash Pond, which consists of 10 monitoring wells (four background monitoring wells and six downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

Groundwater around the Karn Bottom Ash Pond was initially characterized as radial based on the eight initial background sampling events prior to commencing detection monitoring; therefore, the six downgradient wells (DEK-MW-15001 through DEK-MW-15006) that were installed and spaced along the circumference of the Karn Bottom Ash Pond continued to accurately represent the quality of groundwater passing the waste boundary that ensures detection of groundwater contamination such that all potential contaminant pathways are monitored. Monitoring well DEK-MW-15001 was decommissioned on April 18, 2018 due to the installation of the new Karn Lined Impoundment, which is a new double composite lined CCR unit constructed as a replacement to the Karn Bottom Ash Pond. Monitoring well DEK-MW-18001 was installed on May 21, 2018 approximately 80 feet southeast of DEK-MW-15001 to maintain the perimeter downgradient monitoring well network.

Groundwater flow direction near the former pond has changed as a result of the pond decommissioning and monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit (Figure 3). These two wells were removed from the certified downgradient monitoring well network. The recertification was included in Appendix D of the *October 2021 Assessment Monitoring Data Summary and Statistical Evaluation* (TRC, January 2022).

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

2.2 October 2023 Assessment Monitoring

Per §257.95, all wells in the CCR unit groundwater monitoring program must be sampled semiannually. TRC conducted the second semiannual assessment monitoring event of 2023 for Appendix III and IV constituents at the Karn Bottom Ash Pond CCR Unit in accordance with the *DE Karn Monitoring Program Sample Analysis Plan* (ARCADIS, May 2016) (SAP). The semiannual assessment monitoring event was performed on October 2 through 5, 2023.

The October 2023 sampling event included collection of static water level measurements from the Karn Bottom Ash Pond groundwater monitoring system and other site wells to support preparation of a groundwater contour map. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. The Karn Bottom Ash Pond monitoring wells (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006 and DEK-MW-18001) and



background monitoring wells (MW-15002, MW-15008, MW-15016, and MW-15019) 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.

The groundwater samples were analyzed by the Consumers Energy Trail Street Laboratory for Appendix III and IV constituents in accordance with the SAP. Radium analyses were completed by Eurofins Environment Testing. The analytical results for the background wells are summarized in Table 3, and the analytical results for the downgradient monitoring wells are summarized in Table 4. Analytical results from the October 2023 monitoring event are included in the attached laboratory reports (Appendix C).

2.2.1 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the October 2023 assessment monitoring event are provided in Table 1. These 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 or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although historically the point source discharge of sluiced bottom ash into the Karn Bottom Ash Pond 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 from the groundwater monitoring system of the former Karn Bottom Ash Pond in October 2023 demonstrate a reduction in groundwater elevation measurements by several feet when compared to groundwater elevations measured prior to June 2018. Due to the operational changes of the bottom ash pond and the completion of the landfill capping activities, the gradient between the bottom ash pond area and the surrounding surface water bodies is flattening out as compared to previous quarters as the groundwater elevations are reaching a new equilibrium, as expected. 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 with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as illustrated in Figure 3. As such, the groundwater flow across the footprint of the former bottom ash pond is generally to the west.



The average hydraulic gradient observed on October 2, 2023 in the Karn Bottom Ash Pond area during these events is estimated at 0.0051 ft/ft. The gradient was calculated using the monitoring well pairs DEK-MW-15004/DEK-MW-15005 and DEK-MW-15003/DEK-MW-15006. 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 0.25 ft/day or 92 ft/year.

2.2.2 Data Quality

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



3.0 Assessment Monitoring Statistical Evaluation

Assessment monitoring is continuing at the Karn Bottom Ash Pond while Consumers Energy further evaluates corrective measures in accordance with §257.96 and §257.97 as outlined in the ACM. The following section summarizes the statistical approach applied to assess the October 2023 groundwater data in accordance with the assessment monitoring program.

3.1 Establishing Groundwater Protection Standards

The GWPSs are used to assess whether Appendix IV constituent concentrations are present in groundwater at unacceptable levels as a result of CCR Unit operations by statistically comparing concentrations in the downgradient wells to the GWPSs for each Appendix IV constituent. In accordance with §257.95(h) and the Stats Plan, GWPSs were established for the Appendix IV constituents following the preliminary assessment monitoring event as documented in the Groundwater Protection Standards technical memorandum (Appendix C of the *2018 Annual Groundwater Monitoring Report*, TRC, January 2019). The GWPS is established as the higher of the EPA Maximum Contaminant Level (MCL) or statistically derived background level for constituents with MCLs and the higher of the EPA Regional Screening Levels (RSLs) or background level for constituents without an established MCL.

3.2 Data Comparison to Groundwater Protection Standards

The compliance well groundwater concentrations for Appendix IV constituents were compared to the GWPSs to determine if a statistically significant exceedance had occurred in accordance with §257.95. Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance) (USEPA, 2009), the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient monitoring well data exceeds the GWPS of any Appendix IV constituent. As documented in the January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, arsenic was present at statistically significant levels above the federal GWPS in five of the six downgradient wells at the Karn Bottom Ash Pond.

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

Due to changes in groundwater flow direction on site, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit and were determined to be no longer indicative of groundwater conditions influenced by the Karn Bottom Ash Pond. Therefore, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer included for assessment monitoring statistical analysis. The monitoring well network for statistical evaluation consists of the four monitoring wells located downgradient of the bottom ash pond (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001). Overall, the assessment



monitoring statistical evaluations have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the GWPS. The statistical evaluation of the October 2023 semiannual assessment monitoring event data indicate that arsenic is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Karn Bottom Ash Pond:

Constituent	GWPS	#Downgradient Wells Observed
Arsenic	21 ua/L	2 of 4

Previously, arsenic was present in downgradient well DEK-MW-15002 and DEK-MW-15006 at a statistically significant level; however, arsenic concentrations have declined since sluicing to the Karn Bottom Ash Pond ceased in June 2018 and the bottom ash and transport water was diverted to the Karn Lined Impoundment (Appendix B: Attachment 1). The statistical evaluation of the May 2020 through October 2023 data show that the lower confidence limit for arsenic is below the GWPS at DEK-MW-15002 and DEK MW-15006.

Arsenic concentrations at DEK-MW-15005 and DEK-MW-18001 remain above the GWPS at a statistically significant level (i.e., lower confidence limit is above the GWPS) and arsenic concentrations at DEK-MW-18001 have recently been increasing. A summary of the confidence intervals for October 2023 is provided in Table 5. Although arsenic is present above the GWPS, the drinking water pathway is not complete as there are no drinking water wells on-site. Redox conditions, which affect contaminant transport, are still stabilizing in the Bottom Ash Pond Area following removal activities and will continue to be evaluated further.



4.0 Conclusions and Recommendations

Corrective action has been triggered and assessment monitoring is ongoing at the Karn Bottom Ash Pond CCR unit. A summary of the October 2023 assessment monitoring event is presented in this report.

Overall, the statistical assessments have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the GWPS. Consumers Energy has completed the removal of CCR consistent with the timeline for closure of the Karn Bottom Ash Pond under the *DE Karn Bottom Ash Pond Closure Plan* (Golder, January 2018; Revised April 2018) and the CCR Rule's closure by removal provisions in §257.102(c).

The ACM Report provided a high-level assessment of groundwater remediation technologies that could potentially address site-specific COCs (i.e., arsenic) under known groundwater conditions. Groundwater chemistry appears to be improving in some areas as a result of discontinuing the hydraulic loading to the Karn Bottom Ash Pond and the completed source removal of CCR, as shown by the decrease in concentration of arsenic at DEK-MW-15002 ; however, attainment of the GWPS at all of the Bottom Ash Pond compliance wells may not be feasible due to influences other than the former pond, such as the presence and former operation of the nearby Karn Landfill. Redox conditions, which affect contaminant transport, are still stabilizing following pond removal and will continue to be evaluated further.

Consumers Energy will continue assessment monitoring and evaluate corrective measures in accordance with §257.96 and §257.97 as outlined in the Karn Bottom Ash Pond ACM. The groundwater management remedy for the Karn Bottom Ash Pond will be selected as soon as feasible to meet the federal standards of §257.96(b) of the CCR Rule. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98. The next semiannual monitoring event is tentatively scheduled for the second calendar quarter of 2024.



5.0 References

- AECOM. 2009. Potential Failure Mode Analysis (PFMA) Report. DE Karn Electric Generation Facility Ash Dike Risk Assessment Essexville, Michigan. Prepared for Consumers Energy Company. October 30.
- ARCADIS. 2016. Summary of Monitoring Well Design, Installation, and Development. DE Karn Electric Generation Facility Essexville, Michigan. Prepared for Consumers Energy Company. May 13.
- ARCADIS. 2016. Electric Generation Facilities RCRA CCR Detection Monitoring Program. DE Karn Monitoring Program Sample Analysis Plan, Essexville, Michigan. Prepared for Consumers Energy Company. May 18.
- Consumers Energy Company. 2017. Hydrogeological Monitoring Plan Rev. 3: DE Karn Solid Waste Disposal Area. December 19.
- Consumers Energy Company. 2019. Notification of Appendix IV Constituent Exceeding Groundwater Protection Standards per §257.95(g). January.
- Golder Associates Inc. 2018. D.E. Karn Generating Facility Bottom Ash Pond Closure Plan, Essexville, Michigan. Prepared for Consumers Energy Company. January.
- Golder Associates Inc. 2018. D.E. Karn Generating Facility Revised Bottom Ash Pond Closure Work Plan, Essexville, Michigan. Prepared for Consumers Energy Company. April.
- Golder Associates Inc. 2019. D.E. Karn Generating Facility Bottom Ash Pond CCR Removal Documentation Report. Prepared for Consumers Energy Company. October.
- TRC. 2017. Groundwater Statistical Evaluation Plan DE Karn Power Plant, Bottom Ash Pond, Essexville, Michigan. Prepared for Consumers Energy Company. October.
- TRC. 2018. Annual Groundwater Monitoring Report DE Karn Power Plant, Bottom Ash Pond CCR Unit. Prepared for Consumers Energy Company. January.
- TRC. 2019. 2018 Annual Groundwater Monitoring Report DE Karn Power Plant, Bottom Ash Pond CCR Unit. Prepared for Consumers Energy Company. January.
- TRC. 2019. Assessment of Corrective Measures DE Karn Bottom Ash Pond Coal Combustion Residual Unit. Prepared for Consumers Energy Company. September.
- TRC. 2020. Karn Lined Impoundment Hydrogeological Monitoring Plan for the DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company. November.
- TRC. 2022. October 2021 Assessment Monitoring Data Summary and Statistical Evaluation DE Karn Power Plant, Bottom Ash Pond CCR Unit. Prepared for Consumers Energy Company. January.
- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.



- USEPA. 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301). April.
- USEPA. 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435). July.
- USEPA. 2018. Barnes Johnson (Office of Resource Conservation and Recovery) to James Roewer (c/o Edison Electric Institute) and Douglas Green, Margaret Fawal (Venable LLP).
 Re: Coal Combustion Residuals Rule Groundwater Monitoring Requirements. April 30, 2018. United States Environmental Protection Agency, Washington, D.C. 20460. Office of Solid Waste and Emergency Response, now the Office of Land and Emergency Management. April.



Tables

Table 1 Summary of Groundwater Elevation Data DE Karn – RCRA CCR Monitoring Program Essexville, Michigan

	тос		Screen Interval	Octobe	er 2, 2023
Well Location	Elevation (ft)	Screen Interval		Depth to Water	Groundwater Elevation
DEK Dettem Ach Der				(ft BTOC)	(ft)
DEK Bottom Ash Pon		Cond	570.0 to 575.0	7.05	583.62
DEK-MW-15002	590.87	Sand	578.3 to 575.3	7.25	
DEK-MW-15005	589.72	Sand	572.3 to 567.3	10.00 9.48	579.72 579.76
DEK-MW-15006	589.24	Sand	573.0 to 568.0	9.48	579.76
DEK Bottom Ash Pon	593.47	Sand	579.2 to 574.2	9.30	504.47
DEK-MW-18001		Sand	579.2 to 574.2	9.30	584.17
Karn Lined Impound		Cond	570.0 to 574.0	17.31	585.43
DEK-MW-15003	602.74	Sand	578.8 to 574.8	7.72	
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	22.68	583.86 585.22
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5		
OW-12 DEK Nature and Exte	603.10	Silty Sand	584.2 to 579.2	17.48	585.62
DEK-MW-15004	611.04	2004	576.6 to 571.6	28.50	582.54
	597.02	Sand Sand		28.50	582.54
MW-01		Sand		17.43	579.66
MW-03	597.30		569.8 to 566.8	9.93	
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		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 Lev		One of an el O'llow Olaws		47.75	530.50
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 2Summary of Field ParametersDE Karn Bottom Ash Pond – RCRA CCR Monitoring ProgramEssexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Background							
MW-15002	10/4/2023	0.20	-96.7	6.7	7,538	15.3	3.7
MW-15008	10/2/2023	0.10	-87.4	6.5	1,506	15.7	2.7
MW-15016	10/4/2023	0.30	-122.4	6.9	1,844	17.7	5.8
MW-15019	10/2/2023	0.30	-92.9	6.6	1,691	15.9	2.6
Karn Bottom Ash Po	ond						
DEK-MW-15002	10/4/2023	1.62	-205.8	7.3	885	17.2	9.0
DEK-MW-15005	10/5/2023	1.64	-133.8	7.7	1,003	14.6	8.8
DEK-MW-15006	10/5/2023	1.61	-145.6	7.7	1,043	15.1	0.1
DEK-MW-18001	10/4/2023	0.38	-96.0	7.4	870	14.4	2.4

Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celsius

NTU - Nephelometric Turbidity Unit.

Table 3Summary of Groundwater Sampling Results (Analytical)DE Karn & JC Weadock Background – RCRA CCR Monitoring ProgramEssexville, Michigan

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

 \simeq - Chileholt is the aesthetic difficing water value per foothole { \simeq }.

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.

NUM 45040
MW-15019
10/2/2023
275
162
368
< 1,000
101
1,400
6.6
< 1
1
373
< 1
< 0.2
< 1
< 6
< 6 < 1,000
- 1
14
< 0.2
< 5
0.543
1.23
1.77
< 1 < 2
< 2
21 900
21,800 < 1
3
< 0.2
< 2
< 10

Table 4Summary of Groundwater Sampling Results (Analytical)DE Karn Bottom Ash Pond – RCRA CCR Monitoring ProgramEssexville, Michigan

					Sample Location:	DEK-MW-15002	DEK-MW-15005	DEK-MW-15006	DEK-MW-18001
					Sample Date:	10/4/2023	10/5/2023	10/5/2023	10/4/2023
				MI Non-					
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^				
Appendix III ⁽¹⁾									
Boron	ug/L	NC	500	500	4,000	1,280	957	1,050	987
Calcium	mg/L	NC	NC	NC	500 ^{EE}	71.7	125	143	52.5
Chloride	mg/L	250**	250 ^E	250 ^E	50	86.3	89.2	62.6	69.4
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 ^E	250 [⊑]	500 ^{EE}	50.2	290	446	158
Total Dissolved Solids	mg/L	500**	500 ^E	500 ^E	500	596	892	926	551
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	7.3	7.7	7.7	7.4
Appendix IV ⁽¹⁾									
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	1	48	22	398
Barium	ug/L	2,000	2,000	2,000	1,200	110	267	150	155
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	25	27	18	19
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	< 5	7	7	9
Radium-226	pCi/L	NC	NC	NC	NC	0.272	0.512	0.452	0.148
Radium-228	pCi/L	NC	NC	NC	NC	1.13	1.11	< 0.666	< 0.581
Radium-226/228	pCi/L	5	NC	NC	NC	1.41	1.63	1.04	< 0.581
Selenium	ug/L	50	50	50	5.0	< 1	< 1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2
Additional MI Part 11	15 ⁽²⁾								
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	< 20	1,360	1,860	720
Copper	ug/L	1,000**	1,000 ^E	1,000 ^E	20	< 1	< 1	< 1	< 1
Nickel	ug/L	NC	100	100	120	< 2	5	3	< 2
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	< 2	< 2
Zinc	ug/L	5,000**	2,400	5,000 ^E	260	< 10	< 10	< 10	< 10

Notes:

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

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

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

NC - no criteria; -- - not analyzed.

- * Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013, updated October, 12, 2023.
- ** Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for surface water used as a drinking water source as described in footnote {X}. GSI criterion for chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}
- # If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.
- E Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.

(2) Per Michigan Part 115 Amendment - Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) 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 5 Summary of Assessment Monitoring Statistical Evaluation – October 2023 DE Karn Bottom Ash Pond – RCRA CCR Monitoring Program Essexville, Michigan

Constituent	Units	GWPS	DEK-MW-15005		DEK-MW-15006		DEK-MW-18001	
			LCL	UCL	LCL	UCL	LCL	UCL
Arsenic	ug/L	21	35	60	19	27	85	610

Notes:

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

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

ug/L - micrograms per Liter.

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

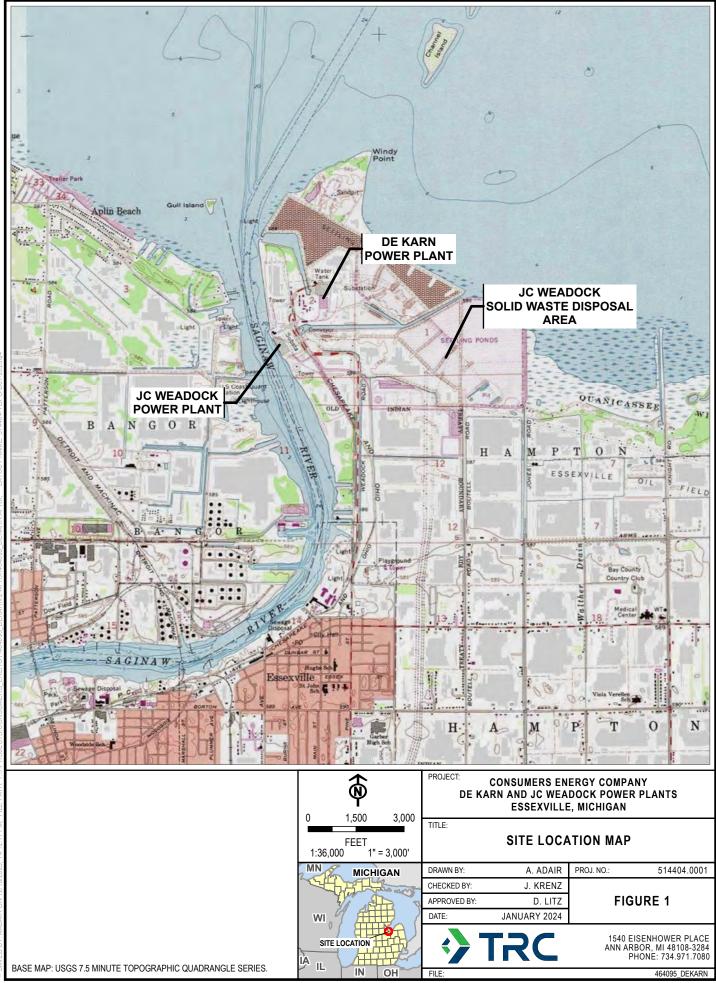
UCL - Upper Confidence Limit ($\alpha = 0.01$) of the downgradient data set.

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

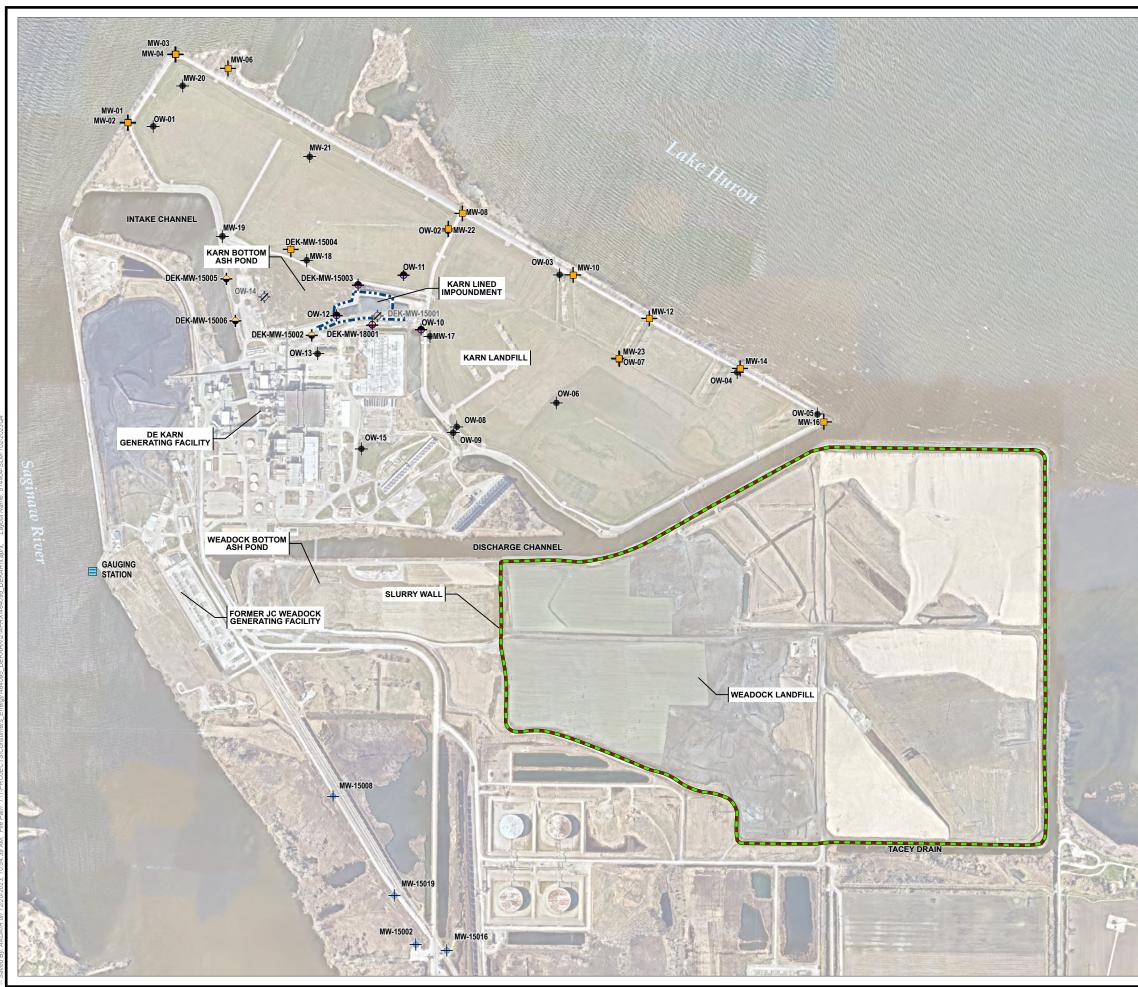
Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.



Figures



COORDIVATE SYSTEM AD 1983 SYTTEMLOURD MICHAEN SOUTH FIPS 2115 FEET, MAR POTATION: 0 SAUED EV. ADVAID ON 1444 BOARD FIELE EATL FILL BOARD FILL BOARD FILL ADVAID FILL ADVAID ADVAENDE DEVLEM ADE



LEGEND

÷

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT + MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- + DEK LINED IMPOUNDMENT MONITORING WELL
- ø DECOMMISSIONED MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY) +
- NATURE AND EXTENT WELL
- SURFACE WATER GAUGING STATION
- BACKGROUND MONITORING WELL
- 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).
- LA 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.



1:9,600 1" = 800'

1,600 Feet

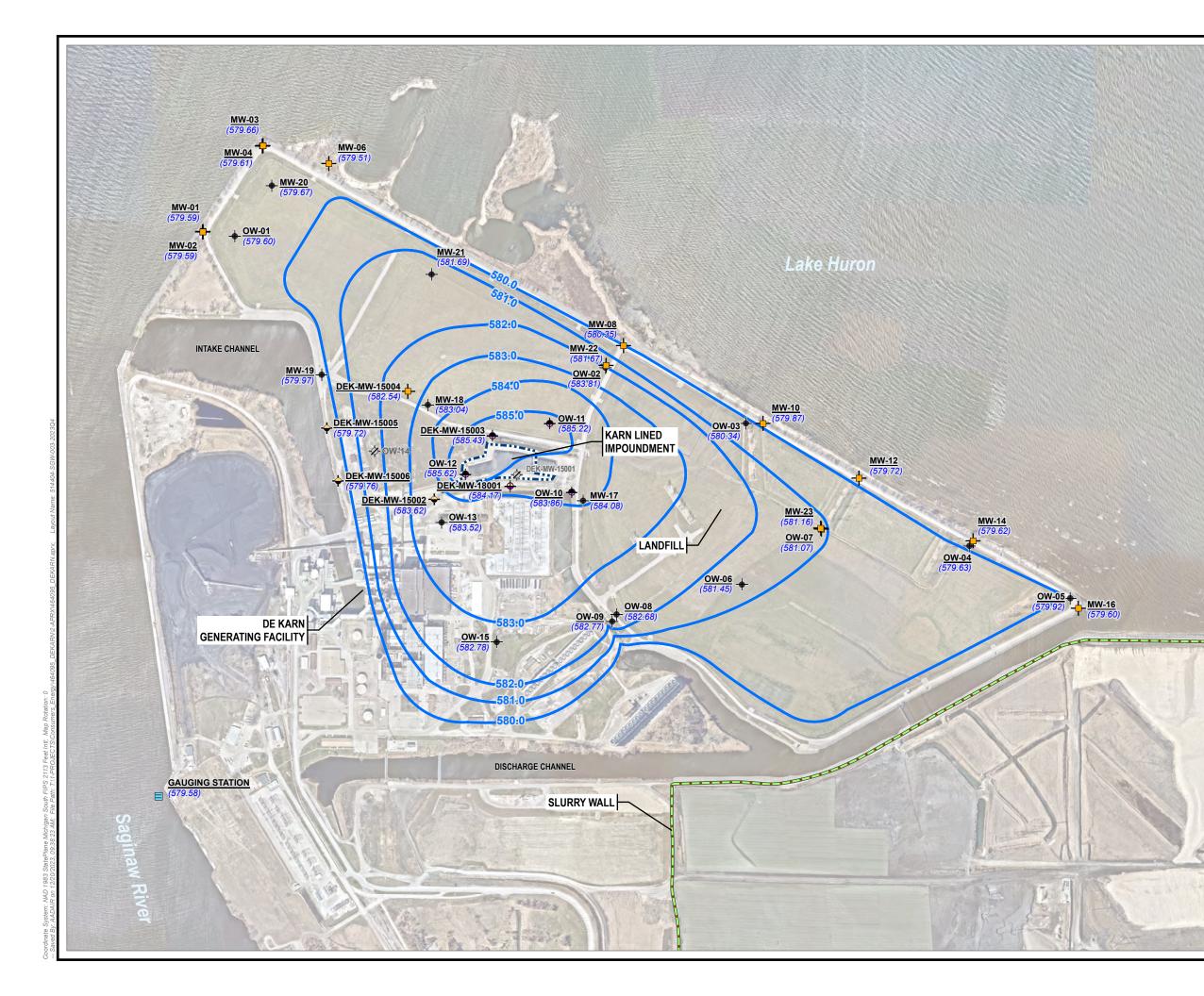
PROJECT: OJECT: CONSUMERS ENERGY COMPANY DE KARN AND JC WEADOCK POWER PLANTS ESSEXVILLE, MICHIGAN

800

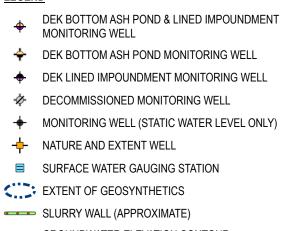
TITLE:

SITE LAYOUT MAP

DRAWN BY:	A. ADAIR	PROJ. NO.:	514404.0001
CHECKED BY:	A. WHALEY		
APPROVED BY:	D. LITZ	FIGL	JRE 2
DATE:	JANUARY 2024		
1	RC	A	1540 Eisenhower Place nn Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com
			16/005 DEKADN apry



LEGEND



← 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' 0	600	1,200)		
			FEET		
TITLE:	CONSUMERS EN DE KARN PO ESSEXVILLE OW GROUNDW OCTOB	WER PLAN E, MICHIGA	NT N		
DRAWN BY:	A. ADAIR	PROJ. NO.:	514404.0001		
CHECKED BY:	J. KRENZ				
APPROVED BY:	D. LITZ	FIGURE 3			
DATE:	JANUARY 2024				
	TRC	ANN AR	SENHOWER PLACE BOR, MI 48108-3284 HONE: 734.971.7080 464095 DEKARN appr		



Appendix A Data Quality Reviews

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

Groundwater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for total metals, anions, and total dissolved solids by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 23-0933R.

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

- MW-15002
 MW-15008
 MW-15016
- MW-15019

Each sample was analyzed for the following constituents:

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

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

Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

Review Summary

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

- The reviewed Appendix III, IV, and additional Part 115 constituents, as well as magnesium, potassium, and sodium will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One field blank (FB-Background) was collected. Total metals were not detected in this blank sample.
- Samples DUP-Background and MW-15008 were submitted as the field duplicate pair with this data set; all criteria were met.
- Laboratory duplicate and MS/MSD analyses were not performed on a sample from this data set.

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

Groundwater samples were collected by TRC for the October 2023 sampling event. Samples were analyzed for radium by Eurofins in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-193059-1.

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

- MW-15002 MW-15008 MW-15016
- MW-15019

Each sample was analyzed for the following constituents:

Analyte Group	Method
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

Data Usability Review Procedure

The analytical data were reviewed using the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary

- Results for radium-226 were reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out for all samples in this data set except MW-15002. Positive radium-226 results in the affected samples reflect the total alpha radium and should be considered potentially high biased, as summarized in the attached table. Associated samples 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.
- One equipment blank (EQ-BACKGROUND) was collected. Target analytes were not detected in the equipment blank sample.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from this data set.
- Laboratory duplicate analyses were performed on sample EQ-BACKGROUND for radium-226 and radium-228; all criteria were met.
- Samples DUP-BACKGROUND/MW-15008 were submitted as the field duplicate pair with this data set; all criteria were met.
- Carrier recoveries were within 40-110%.

Attachment A Summary of Data Non-Conformances for Groundwater Analytical Data Karn and Weadock Background Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-15008	10/2/2023		
MW-15016	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
MW-15019	10/2/2023		below the applicable screening criteria and are therefore deemed usable as reported.
DUP-BACKGROUND	10/2/2023		

Laboratory Data Quality Review Groundwater Monitoring Event October 2023 DE Karn Bottom Ash Pond

Groundwater samples were collected by TRC for the October 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 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) 23-0929, S54198.01(01), and 92711.

During the October 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
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. 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

- 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-DEK-BAP) and one equipment blank (EB-DEK-BAP) were collected with this data set. Total metals, nitrate, nitrite, ammonia, sulfide, TOC, and DOC were not detected in these blanks.

- Samples DUP-DEK-BAP-01 and DEK-MW-15002 were submitted as the field duplicate pair with this data set; all criteria were met.
- MS/MSD analyses were performed on sample FB-DEK-BAP for TOC and DOC; all criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review Groundwater Monitoring Event October 2023 DE Karn Bottom Ash Pond

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) 240-193137-1.

During the October 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
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.
- One equipment blank (EB-DEK-BAP) was collected. Target analytes were not detected in the equipment blank sample.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD and laboratory duplicate analyses were not performed on a sample from this data set.
- Samples DUP-DEK-BAP-01 and DEK-MW-15002 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 Bottom Ash Pond Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
DEK-MW-15002	10/4/2023		
DEK-MW-15005	10/5/2023	Radium 226	Results are potentially biased high due to not undergoing 21-day waiting period prior to analysis. The results are well below the applicable screening criteria and are therefore deemed usable as reported
DEK-MW-15006	10/5/2023		
DUP-DEK-BAP-01	10/4/2023		

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



Appendix B Statistical Evaluation of October 2023 Assessment Monitoring Sampling Event



Technical Memorandum

Date:	January 25, 2024	
То:	J.R. Register, Consumers Energy	
From:	Darby Litz, TRC Alex Eklund, TRC	
Project No.:	514404.0001.0000 Phase 002, Task 002	
Subject:	Statistical Evaluation of October 2023 Assessment Monitoring Sampling Event DE Karn Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan	

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

An assessment monitoring event was conducted on October 2 through 5, 2023. In accordance with §257.95, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix IV constituents are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 Groundwater Protection Standards technical memorandum, which was also included in the 2018 Annual Groundwater Monitoring Report (TRC, January 2019).

The statistical evaluation of the assessment monitoring event data indicates the following constituent is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the Karn Bottom Ash Pond:

Constituent	GWPS	#Downgradient Wells Observed
Arsenic	21 ug/L	2 of 4

The results of the assessment monitoring statistical evaluation for the downgradient wells are consistent with the results of the previous assessment monitoring data statistical evaluations, indicating that arsenic is the only constituent present at concentrations above the GWPS. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 -

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

§257.98.

Assessment Monitoring Statistical Evaluation

When the initial assessment monitoring event was completed in May 2018, the compliance well network at the Karn Bottom Ash Pond included six wells encircling the unit (DEK-MW-15002 through DEK-MW-15006 and DEK-MW-18001). Due to changes in groundwater flow direction on site, monitoring wells DEK-MW-15003 and DEK-MW-15004 are no longer located downgradient of the unit and were determined to be no longer indicative of groundwater conditions influenced by the Karn Bottom Ash Pond. Therefore, monitoring wells DEK-MW-15003 and DEK-MW-15003 and DEK-MW-15004 are no longer included for statistical analysis. Starting with the May 2021 statistical evaluation, the compliance well network includes DEK-MW-15002, DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001.

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

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

For each detected Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight sampling events (May 2020 through October 2023) were retained for further analysis. Arsenic in DEK-MW-15005, DEK-MW-15006, and DEK-MW-18001

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

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at the Karn Bottom Ash Pond had individual results exceeding the GWPS.

Groundwater data were then evaluated utilizing SanitasTM statistical software. SanitasTM is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the SanitasTM statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated for each of the CCR Appendix IV constituents using a using a per test³ 99 percent confidence level, i.e., a significance level (α) of 0.01. The following narrative describes the methods employed, the results obtained and the SanitasTM output files are included as an attachment.

The statistical data evaluation included the following steps:

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

The results of these evaluations are presented and discussed below.

Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the CCR assessment monitoring program. Initially, the assessment monitoring results were visually assessed for potential outliers or trends. No outliers were identified. Arsenic concentrations at DEK-MW-18001 appear to exhibit an upward trend on the time-series chart over the eight most recent sampling events (Attachment 1). This data set was tested further in Sanitas[™] utilizing Sen's Slope to estimate the average rate of change in concentration over time and utilizing the Mann-Kendall trend test to test for significance of the trend at the 98% confidence level. The trend test showed that arsenic concentration at DEK-MW-18001 is generally increasing with time, as evidenced by the positive Sen's Slope. Additionally, the increase in concentration at DEK-MW-18001 was shown to be statistically significant (Attachment 1). Confidence bands are identified by the UG as the appropriate method for calculating confidence intervals on trending data. A confidence band calculates upper and lower confidence limits at each point along the trend to reduce variability and create a narrower confidence interval. At least 8 to 10 measurements should be available when computing a confidence band around a linear regression, and as of the October 2023 event, eight semiannual sampling events have been completed post-CCR removal.

The Sanitas[™] software was used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent 8 sampling events. Eight independent sampling events

³ Confidence level is assessed for each individual comparison (i.e. per well and per constituent).

Technical Memorandum

provide the appropriate density of data as recommended per the UG yet are collected recently enough to provide an indication of current condition. The tests were run with a per-test significance of $\alpha = 0.01$. The software outputs are included in Attachment 1 along with data reports showing the values used for the evaluation. The percentage of non-detect observations for well/constituent pairs with a direct GWPS exceedance are also included in Attachment 1. Non-detect data was handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas[™] software generates an output that includes graphs of the confidence bands and parametric or non-parametric confidence intervals for each well, along with notes on data transformations, as appropriate. Due to the increasing trend, a confidence band was calculated for the arsenic data set at DEK-MW-18001. The arsenic data set at DEK-MW-15006 and DEK-15005 was found to be normally distributed. The confidence bands and interval tests compare the lower confidence limit to the GWPS. The statistical evaluation of the Appendix IV parameters shows exceedances for arsenic at two of the four monitoring locations (DEK-MW-15005 and DEK-MW-18001). The results of the assessment monitoring statistical evaluation for the other downgradient wells are consistent with the results of the previous assessment monitoring data statistical evaluations, indicating that arsenic is the only constituent present at concentrations above the GWPS. Consumers Energy will continue to evaluate corrective measures per §257.96 and §257.97. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

Attachments

 Table 1
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards

Attachment 1 Sanitas[™] Output Files

Table

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

				S	Sample Location:	DEK-MW-15002										
					Sample Date:	5/13/2020	10/6/2020	10/6/2020	5/3/2021	10/4/2021	5/3/2022	10/4/2022	10/4/2022	5/2/2023	10/4/2023	10/4/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS						downgradient	t				
Appendix III								Field Dup					Field Dup		Field Dup	
Boron	ug/L	NC	NA	619	NA	1,390	1,580	1,600	1,420	1,530	1,100	1,340	1,370	1,270	1,330	1,280
Calcium	mg/L	NC	NA	302	NA	170	126	122	148	73.1	105	70.2	68	122	69.4	71.7
Chloride	mg/L	250*	NA	2,440	NA	130	106	102	148	102	99.3	105	103	81.7	88	86.3
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	1,300	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	367	142	139	216	58.3	172	33.7	33.2	225	50.2	50.2
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	1,100	791	776	926	599	779	584	631	899	576	596
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.1	7.1		7.4	7.1	7.0	7.4		7.2		7.3
Appendix IV																
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	3	8	8	2	2	2	3	4	< 1	1	1
Barium	ug/L	2,000	NA	1,300	2,000	196	133	131	211	102	134	92	95	176	111	110
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1	1	1	< 1	1	1	1	1	< 1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	< 1,000	1,300	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	48	35	36	36	29	28	25	27	29	25	25
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Radium-226	pCi/L	NC	NA	NA	NA	0.673	< 0.430	< 0.577	0.582	1.47	< 0.423	0.219	0.287	0.431	0.342	0.272
Radium-228	pCi/L	NC	NA	NA	NA	0.899	1.06	< 0.577	0.811	2.29	< 0.530	1.81	2.70	< 1.5	< 0.878	1.13
Radium-226/228	pCi/L	5	NA	3.32	5	< 0.763	0.642	< 0.460	< 0.537	0.827	0.636	2.03	2.99	< 1.5	< 0.878	1.41
Selenium	ug/L	50	NA	2	50	< 1	< 1	1	< 1	3	1	< 1	1	< 1	< 1	< 1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

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

(SDWR) April 2012.

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

GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

				S	ample Location:	DEK-MW-15005										
	- 1		1	1	Sample Date:	5/13/2020	5/13/2020	10/7/2020	5/3/2021	5/3/2021	10/4/2021	5/3/2022	10/4/2022	5/2/2023	5/2/2023	10/5/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS						downgradien	t				
Appendix III							Field Dup			Field Dup					Field Dup	
Boron	ug/L	NC	NA	619	NA	863	858	847	926	948	991	787	911	856	864	957
Calcium	mg/L	NC	NA	302	NA	71.0	72.1	155	95.6	97.6	102	127	130	106	107	125
Chloride	mg/L	250*	NA	2,440	NA	48.0	47.5	52.7	65.2	65.1	82.3	141	138	86.7	87.4	89.2
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	18.9	18.9	102	50.8	50.2	57.2	151	130	189	189	290
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	419	425	687	534	561	546	909	894	767	764	892
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	8.1		7.7	7.6		7.1	7.1	7.5	7.4		7.7
Appendix IV																
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	34	34	42	45	44	68	54	54	32	32	48
Barium	ug/L	2,000	NA	1,300	2,000	127	127	248	173	170	192	305	312	228	224	267
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2	< 1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	20	20	45	38	39	41	36	36	27	28	27
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	< 5	8	8	7	12	8	8	8	7
Radium-226	pCi/L	NC	NA	NA	NA	< 0.469	< 0.335	0.621	0.291	< 0.187	1.12	0.620	0.544	0.355	0.417	0.512
Radium-228	pCi/L	NC	NA	NA	NA	1.34	0.662	0.875	0.722	0.650	2.06	1.08	3.11	< 0.755	< 0.785	1.11
Radium-226/228	pCi/L	5	NA	3.32	5	1.14	< 0.554	< 0.502	< 0.459	0.479	0.940	1.70	3.66	< 0.755	< 0.785	1.63
Selenium	ug/L	50	NA	2	50	< 1	< 1	< 1	1	1	2	1	1	1	< 1	< 1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

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

(SDWR) April 2012.

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

GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

	DEK-MW-15006														
					Sample Date:	5/13/2020	10/7/2020	5/3/2021	10/4/2021	10/4/2021	5/3/2022	5/3/2022	10/4/2022	5/2/2023	10/5/2023
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS					downg	gradient				
Appendix III										Field Dup		Field Dup			
Boron	ug/L	NC	NA	619	NA	1,090	1,220	938	1,050	1,080	893	888	871	944	1050
Calcium	mg/L	NC	NA	302	NA	70.4	106	115	117	117	65.0	65.5	83.8	127	143
Chloride	mg/L	250*	NA	2,440	NA	71.5	102	63.5	78.9	74.7	68.6	67.9	70.6	61.2	62.6
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	1,060	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	407	NA	316	296	324	209	196	173	168	254	385	446
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	833	1,010	790	712	708	597	609	720	847	926
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	8.1	7.7	7.5	7.3		7.4		7.8	7.5	7.7
Appendix IV															
Antimony	ug/L	6	NA	1	6	3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	NA	21	21	21	27	24	23	24	25	24	26	16	22
Barium	ug/L	2,000	NA	1,300	2,000	86	141	139	125	126	68	67	94	137	150
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	NA	3	100	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NA	1,000	4,000	< 1,000	1,060	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	40	180	180	15	22	21	19	19	16	15	18	19	18
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	100	6	100	18	11	9	7	7	6	6	7	7	7
Radium-226	pCi/L	NC	NA	NA	NA	< 0.370	0.629	0.353	0.797	0.832	< 0.449	0.395	0.242	0.324	0.452
Radium-228	pCi/L	NC	NA	NA	NA	1.01	1.12	1.16	1.50	1.35	0.870	< 0.502	1.43	< 0.894	< 0.666
Radium-226/228	pCi/L	5	NA	3.32	5	0.780	0.492	0.804	0.704	0.518	1.29	0.742	1.67	< 0.894	1.04
Selenium	ug/L	50	NA	2	50	< 1	< 1	< 1	2	2	< 1	1	1	1	< 1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.

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

Bold value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

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

				S	ample Location:	DEK-MW-18001								
	•				Sample Date:	5/14/2020	10/6/2020	5/3/2021	10/7/2021	5/3/2022	10/4/2022	5/3/2023	10/4/2023	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient								
Appendix III														
Boron	ug/L	NC	NA	619	NA	1,670	1,740	1,180	1,370	869	1,060	931	987	
Calcium	mg/L	NC	NA	302	NA	72.1	71.7	65.2	71.0	63.7	58.3	54.6	52.5	
Chloride	mg/L	250*	NA	2,440	NA	64.7	60.7	51.6	55.2	65.9	62.5	62.2	69.4	
Fluoride	ug/L	4,000	NA	1,000	NA	1,090	1,240	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250*	NA	407	NA	51.1	91.9	121	118	187	140	148	158	
Total Dissolved Solids	mg/L	500*	NA	4,600	NA	484	476	486	494	555	551	575	551	
pH, Field	SU	6.5 - 8.5*	NA	6.5 - 7.3	NA	7.7	7.6	7.3	7.4	7.6	7.6	7.6	7.4	
Appendix IV														
Antimony	ug/L	6	NA	1	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Arsenic	ug/L	10	NA	21	21	79	85	92	85	113	109	304	398	
Barium	ug/L	2,000	NA	1,300	2,000	130	136	135	135	164	135	152	155	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium	ug/L	100	NA	3	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Cobalt	ug/L	NC	6	15	15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	
Fluoride	ug/L	4,000	NA	1,000	4,000	1,090	1,240	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Lithium	ug/L	NC	40	180	180	27	26	25	24	22	23	20	19	
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Molybdenum	ug/L	NC	100	6	100	< 5	< 5	< 5	< 5	< 5	< 5	11	9	
Radium-226	pCi/L	NC	NA	NA	NA	< 0.608	< 0.473	0.189	0.873	0.294	0.264	0.268	0.148	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.676	0.591	0.828	1.85	0.592	1.67	0.599	< 0.581	
Radium-226/228	pCi/L	5	NA	3.32	5	< 0.676	0.463	0.639	0.979	0.885	1.93	0.868	< 0.581	
Selenium	ug/L	50	NA	2	50	< 1	1	< 1	2	2	< 1	1	< 1	
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

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

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in

TRC's Technical Memorandum dated October 15, 2018.

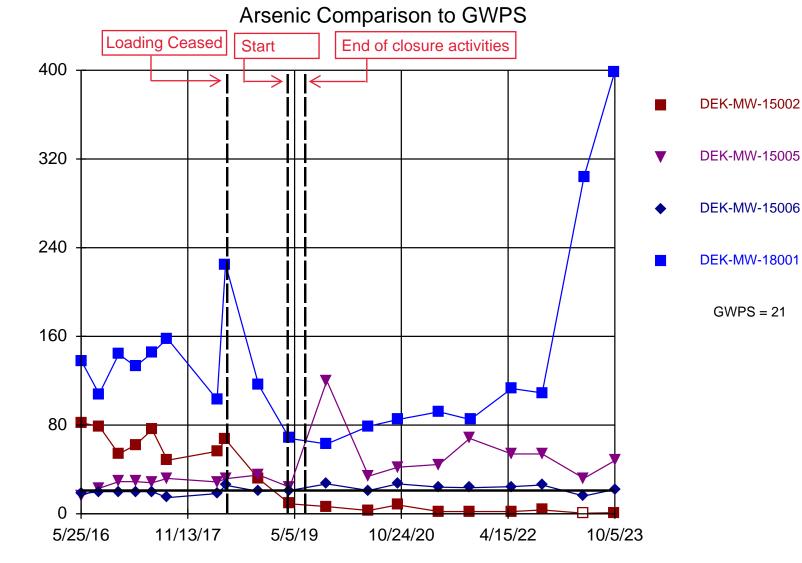
* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April 2012.

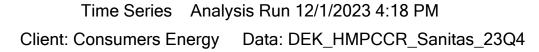
Bold value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the

GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.

Attachment 1 Sanitas™ Output Files

Sanitas[™] v.10.0.13 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.

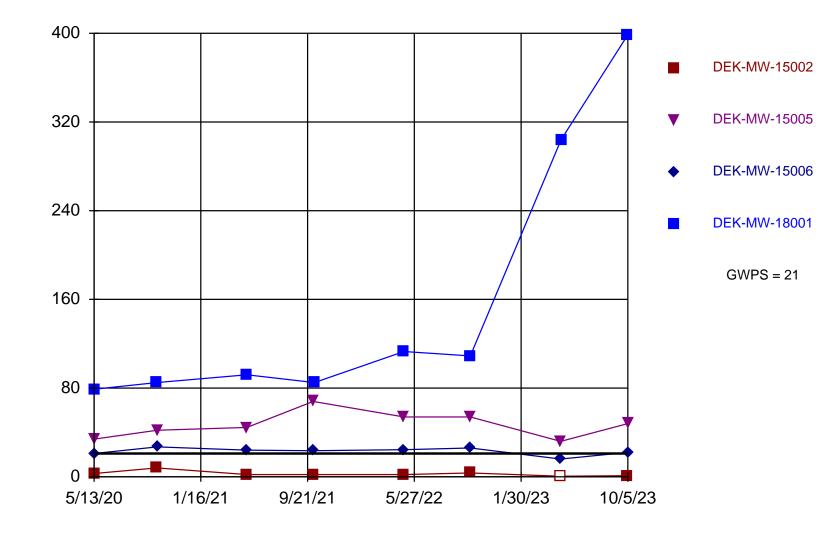




ng/L

Sanitas[™] v.10.0.13 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.

Arsenic Comparison to GWPS





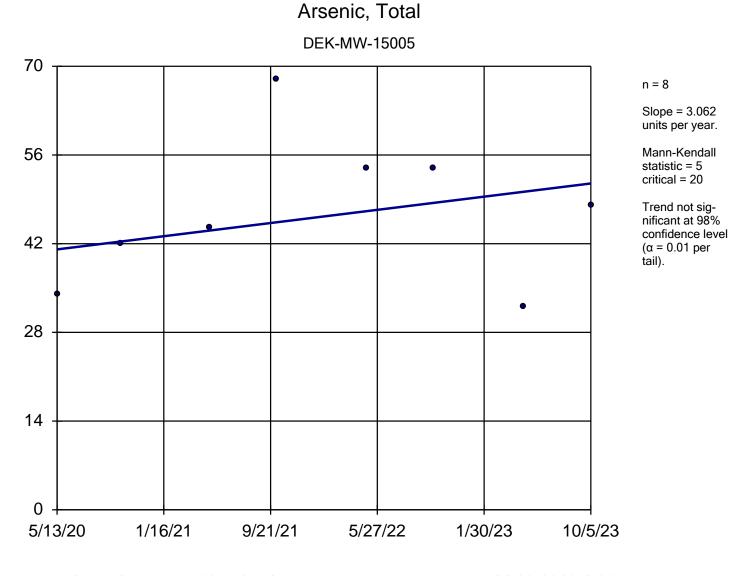
ng/L

Summary Report

Constituent: Arsenic, Total Analysis Run 11/29/2023 1:00 PM Client: Consumers Energy Data: DEK_HMPCCR_23Q4

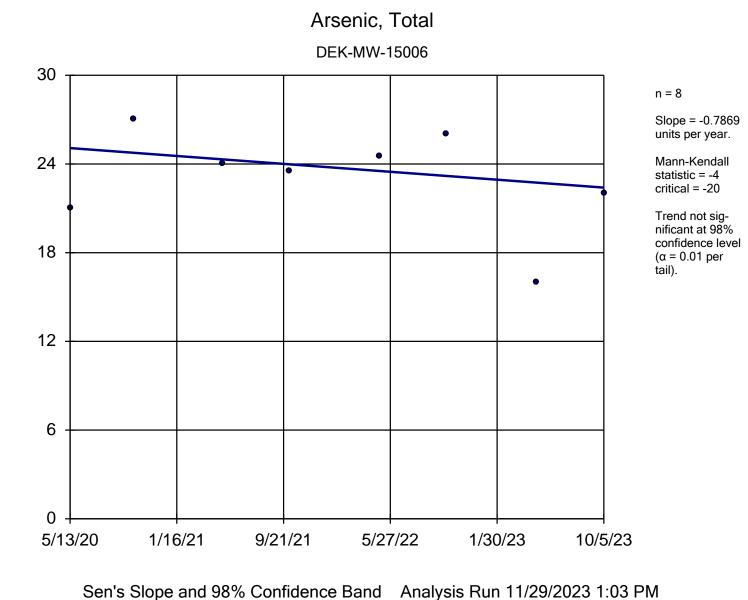
For observations made between 5/13/2020 and 10/5/2023, a summary of the selected data set:

Observations = 32 NDs = 3% Wells = 4 Minimum Value = 1 Maximum Value = 398 Mean Value = 57.75 Median Value = 29.5 Standard Deviation = 84 Coefficient of Variation = Skewness = 2.886									
<u>Well</u>	<u>#Obs.</u>	<u>NDs</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
DEK-MW-15002	8	12%	1	8	2.813	2	2.267	0.806	1.657
DEK-MW-15005	8	0%	32	68	47.06	46.25	11.74	0.2495	0.3824
DEK-MW-15006	8	0%	16	27	23	23.75	3.433	0.1493	-0.9682
DEK-MW-18001	8	0%	79	398	158.1	100.5	122.2	0.7731	1.265



Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 1:03 PM Client: Consumers Energy Data: DEK_HMPCCR_23Q4

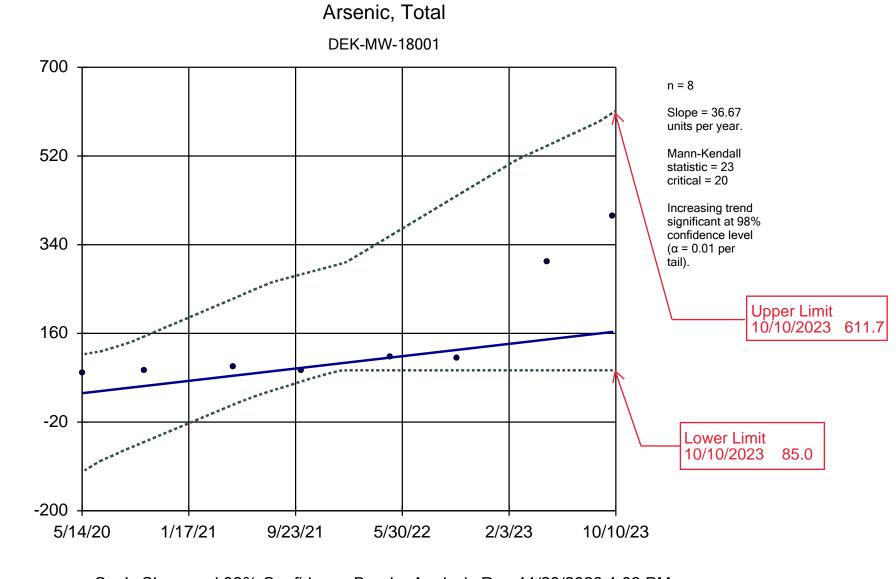
ng/L



Client: Consumers Energy Data: DEK_HMPCCR_23Q4

ng/L

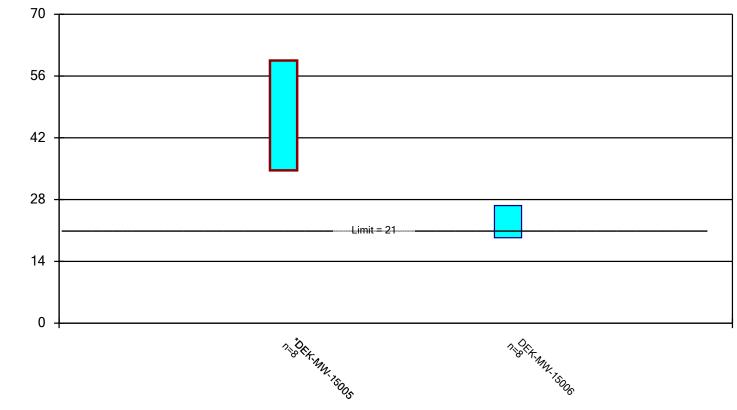
ng/L



Sen's Slope and 98% Confidence Band Analysis Run 11/29/2023 1:03 PM Client: Consumers Energy Data: DEK_HMPCCR_23Q4

Parametric Confidence Interval

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



Constituent: Arsenic, Total Analysis Run 11/29/2023 1:07 PM Client: Consumers Energy Data: DEK_HMPCCR_23Q4

Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 11/29/2023 1:07 PM

Client: Consumers Energy Data: DEK_HMPCCR_23Q4

DEK-MW-15005	DEK-MW-15006
34 (D)	21
42	27
44.5 (D)	24
68	23.5 (D)
54	24.5 (D)
54	26
32 (D)	16
48	22
47.06	23
11.74	3.433
59.51	26.64
34.62	19.36
	34 (D) 42 44.5 (D) 68 54 54 32 (D) 48 47.06 11.74 59.51



Appendix C Laboratory Analytical Reports



To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK BOTTOM ASH POND WELLS – 2023 Q4

CC: HDRegister, P22-521 BLSwanberg, P22-119 Darby Litz, Project Manager TRC Companies, Inc. 1540 Eisenhower Place Ann Arbor, MI 48108

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 23-0929

phone 517-788-1251

fax 517-788-2533

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond 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 accredidation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.

23-0929 Page 1 of 44

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. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

Qualifier	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Н	The maximum recommended hold time was exceeded
Ι	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
Κ	Reporting limit raised due to matrix interference
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q4-2023 DEK Bottom Ash Pond WellsDate Received:10/5/2023Chemistry Project:23-0929

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0929-01	DEK-MW-15002	Groundwater	10/04/2023 15:17	DEK Bottom Ash Pond
23-0929-02	DEK-MW-15005	Groundwater	10/05/2023 09:20	DEK Bottom Ash Pond
23-0929-03	DEK-MW-15006	Groundwater	10/05/2023 08:10	DEK Bottom Ash Pond
23-0929-04	DUP-DEK-BAP-01	Groundwater	10/04/2023 00:00	DEK Bottom Ash Pond
23-0929-05	FB-DEK-BAP	Water	10/05/2023 08:10	DEK Bottom Ash Pond
23-0929-06	EB-DEK-BAP	Water	10/05/2023 09:45	DEK Bottom Ash Pond



Sample Site:	DEK Bottom Ash Pond
Field Sample ID:	DEK-MW-15002
Lab Sample ID:	23-0929-01
Matrix:	Groundwater

Laboratory Project:	23-0929
Collect Date:	10/04/2023
Collect Time:	03:17 PM

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

Metals by EPA 6020B: CCR Rule Appen	dix III-IV Total	Metals	s Exp	Aliquot #: 23-0	929-01-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	1		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	110		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	1280		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	71700		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	25		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19000		ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	189		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	7800		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	87400		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 #: 23-0	929-01-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, NO	03			Aliquot #: 23-0	929-01-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, CI, F, SO	4, Aqı	leous	Aliquo <u>t #: 2</u> 3-0	929-01-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	86300		ug/L	1000.0	10/11/2023	AB23-1010-02

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Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0929
Field Sample ID:	DEK-MW-15002	Collect Date:	10/04/2023
Lab Sample ID:	23-0929-01	Collect Time:	03:17 PM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous			ieous	Aliquot #: 23-0	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Fluoride	ND		ug/L	1000.0	10/11/2023	AB23-1010-02
Sulfate	50200		ug/L	1000.0	10/11/2023	AB23-1010-02
Nitrogen-Ammonia by SM4500NH3(h),	Groundwater	HL		Aliquot #: 23-0	929-01-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	6660		ug/L	25.0	10/11/2023	AB23-1011-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	929-01-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	596		mg/L	10.0	10/06/2023	AB23-1006-06
Alkalinity by SM 2320B				Aliquot #: 23-0	929-01-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	368000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Bicarbonate	368000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/09/2023	AB23-1009-08
Sulfide, Total by SM 4500 S2D				Aliquot #: 23-0	929-01-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	50		ug/L	20.0	10/07/2023	AB23-1009-11
Total Organic Carbon by SM 5310B, Aq	ueous			Aliquot #: 23-0929-01-C08-A01		Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4900		ug/L	1000.0	10/10/2023	AB23-1015-01
Dissolved Organic Carbon by SM 5310B, Aqueous				Aliquot #: 23-0	929-01-C09-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	5200		ug/L	1000.0	10/10/2023	AB23-1015-02



23-0929

10/05/2023

09:20 AM

Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15005	Collect Date:
Lab Sample ID:	23-0929-02	Collect Time:
Matrix:	Groundwater	

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

Metals by EPA 6020B: CCR R	ule Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	929-02-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	48	ug/L	1.0	10/10/2023	AB23-1010-09
Barium	267	ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Boron	957	ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND	ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	125000	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	1360	ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	27	ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	25400	ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	371	ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	7	ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	5	ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	8280	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	102000	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 #: 23-0)929-02-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 Aqueou	ıs, NO2, NO3		Aliquot #: 23-0)929-02-C02-A01	Analyst: TMR

Anions by EPA 300.0 Aqueous, NO2, NO3		Al	iquot #: 23-0	0929-02-C02-A01	Analyst: IMR
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, CI, F, SO4, Aqueous			Aliquot #: 23-0	929-02-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	89200	ug/L	1000.0	10/11/2023	AB23-1010-02

23-0929 10/05/2023 09:20 AM



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15005	Collect Date:
Lab Sample ID:	23-0929-02	Collect Time:
Matrix:	Groundwater	

Anions by EPA 300.0 CCR Rule	Analyte List, CI, F, S	504, Aql		Aliquot #: 23-0	929-02-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	290000		ug/L	1000.0	10/11/2023	AB23-1010-02
Nitrogen-Ammonia by SM4500N	H3(h), Groundwate	r HL		Aliquot #: 23-0	929-02-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	3730		ug/L	25.0	10/11/2023	AB23-1011-04
Total Dissolved Solids by SM 25	40C			Aliquot #: 23-0	929-02-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	892		mg/L	10.0	10/06/2023	AB23-1006-06
Alkalinity by SM 2320B				Aliquot #: 23-0929-02-C05-A01		Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	322000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Bicarbonate	322000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/09/2023	AB23-1009-08
Sulfide, Total by SM 4500 S2D				Aliquot #: 23-0	929-02-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	40		ug/L	20.0	10/07/2023	AB23-1009-11
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 23-0929-02-C08-A01		Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	3200		ug/L	1000.0	10/10/2023	AB23-1015-01
Dissolved Organic Carbon by SI	M 5310B, Aqueous			Aliquot #: 23-0	929-02-C09-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	3800		ug/L	1000.0	10/10/2023	AB23-1015-02



23-0929

10/05/2023

08:10 AM

Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15006	Collect Date:
Lab Sample ID:	23-0929-03	Collect Time:
Matrix:	Groundwater	

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

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	tal Metals Exp	Aliquot #: 23-0	929-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	22	ug/L	1.0	10/10/2023	AB23-1010-09
Barium	150	ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Boron	1050	ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND	ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	143000	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	1860	ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	18	ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19100	ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	537	ug/L	5.0	10/10/2023	AB23-1010-09
Molybdenum	7	ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	3	ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	7980	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	82900	ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND	ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	ND	ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND	ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueou	S		Aliquot #: 23-0	929-03-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 #: 23-0)929-03-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, CI, F, SO4, Aqueous			Aliquot #: 23-0	929-03-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	62600	ug/L	1000.0	10/11/2023	AB23-1010-02

23-0929 10/05/2023 08:10 AM



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:
Field Sample ID:	DEK-MW-15006	Collect Date:
Lab Sample ID:	23-0929-03	Collect Time:
Matrix:	Groundwater	

Units ıg/L ıg/L	RL 1000.0 1000.0	Analysis Date 10/11/2023	Tracking AB23-1010-02
0		10/11/2023	AB23, 1010 02
ıg/L	1000.0		AD23-1010-02
		10/11/2023	AB23-1010-02
	Aliquot #: 23-0	929-03-C03-A01	Analyst: CLE
Units	RL	Analysis Date	Tracking
ıg/L	25.0	10/11/2023	AB23-1011-04
	Aliquot #: 23-0	929-03-C04-A01	Analyst: LMO
Units	RL	Analysis Date	Tracking
ng/L	10.0	10/06/2023	AB23-1006-06
	Aliquot #: 23-0	929-03-C05-A01	Analyst: DLS
Units	RL	Analysis Date	Tracking
ıg/L	10000.0	10/09/2023	AB23-1009-08
ıg/L	10000.0	10/09/2023	AB23-1009-08
ıg/L	10000.0	10/09/2023	AB23-1009-08
	Aliquot #: 23-0	929-03-C07-A01	Analyst: Merit
Units	RL	Analysis Date	Tracking
ıg/L	20.0	10/07/2023	AB23-1009-11
	Aliquot #: 23-0	929-03-C08-A01	Analyst: BAL
Units	RL	Analysis Date	Tracking
ıg/L	1000.0	10/10/2023	AB23-1015-01
	Aliquot #: 23-0	929-03-C09-A01	Analyst: BAL
Units	RL	Analysis Date	Tracking
ıg/L	1000.0	10/10/2023	AB23-1015-02
	Units ng/L Units g/L g/L Units g/L Units g/L Units	Aliquot #: 23-0 Units RL ng/L 10.0 Aliquot #: 23-0 Units RL g/L 10000.0 g/L 10000.0 g/L 10000.0 g/L 10000.0 g/L 20.0 Aliquot #: 23-0 Aliquot #: 23-0 Units RL g/L 20.0 Aliquot #: 23-0 Aliquot #: 23-0 Units RL g/L 1000.0 Units RL g/L 1000.0 Aliquot #: 23-0 Aliquot #: 23-0 Units RL Miguot #: 23-0 Aliquot #: 23-0	Aliquot #: 23-0929-03-C04-A01 Units RL Analysis Date ng/L 10.0 10/06/2023 Aliquot #: 23-0929-03-C05-A01 Analysis Date Miquot #: 23-0929-03-C05-A01 Analysis Date Units RL Analysis Date g/L 10000.0 10/09/2023 g/L 10000.0 10/09/2023 g/L 10000.0 10/09/2023 g/L 20.00 10/09/2023 g/L 20.0 10/07/2023 g/L 20.0 10/07/2023 g/L RL Analysis Date g/L 20.0 10/07/2023 Hiquot #: 23-092-03-C08-A01 Analysis Date g/L 1000.0 10/10/2023 Hiquot #: 23-092-03-C09-A01 Analysis Date g/L RL Analysis Date g/L RL Analysis Date g/L RL Analysis Date



23-0929

10/04/2023

12:00 AM

Laboratory Project:

Collect Date:

Collect Time:

Sample Site:	DEK Bottom Ash Pond
Field Sample ID:	DUP-DEK-BAP-01
Lab Sample ID:	23-0929-04
Matrix:	Groundwater

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

Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals Exp	Aliquot #: 23-0	929-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	1	ug/L	1.0	10/10/2023	AB23-1010-09
Barium	111	ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND	ug/L	1.0	10/10/2023	AB23-1010-09
Boron	1330	ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND	ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	69400	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	25	ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19000	ug/L	1000.0	10/11/2023	AB23-1010-09
Manganese	190	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	7130	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	87000	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, Aq	ueous		Aliquot #: 23-0	929-04-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		AI	Aliquot #: 23-0929-04-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, CI, F, SO4, Aqueous			Aliquot #: 23-0	929-04-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	88000	ug/L	1000.0	10/11/2023	AB23-1010-02

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Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0929
Field Sample ID:	DUP-DEK-BAP-01	Collect Date:	10/04/2023
Lab Sample ID:	23-0929-04	Collect Time:	12:00 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous		Aliquot #: 23-0929-04-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	50200		ug/L	1000.0	10/11/2023	AB23-1010-02
Nitrogen-Ammonia by SM4500NH3(h),	Groundwater H	łL		Aliquot #: 23-0	929-04-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Ammonia	6490		ug/L	25.0	10/11/2023	AB23-1011-04
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	929-04-C04-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	576		mg/L	10.0	10/06/2023	AB23-1006-06
Alkalinity by SM 2320B				Aliquot #: 23-0	929-04-C05-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	356000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Bicarbonate	356000		ug/L	10000.0	10/09/2023	AB23-1009-08
Alkalinity Carbonate	ND		ug/L	10000.0	10/09/2023	AB23-1009-08
Sulfide, Total by SM 4500 S2D				Aliquot #: 23-0	929-04-C07-A01	Analyst: Merit
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Sulfide	60		ug/L	20.0	10/07/2023	AB23-1009-11
Total Organic Carbon by SM 5310B, Aq	ueous			Aliquot #: 23-0	929-04-C08-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	5100		ug/L	1000.0	10/10/2023	AB23-1015-01
Dissolved Organic Carbon by SM 5310B, Aqueous				Aliquot #: 23-0	929-04-C09-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	4900		ug/L	1000.0	10/10/2023	AB23-1015-02



Sample Site: **DEK Bottom Ash Pond** Field Sample ID: FB-DEK-BAP Lab Sample ID: 23-0929-05 Matrix: Water

Laboratory Project: 23-0929 Collect Date: 10/05/2023 Collect Time: 08:10 AM

10/11/2023

25.0

AB23-1011-04

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

Metals by EPA 6020B: CCR Rule Ap	opendix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	929-05-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	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, Aque	eous			Aliquot #: 23-0	929-05-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, NO	2, NO3			Aliquot #: 23-0	929-05-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), Groundwate	er HL		Aliquot #: 23-0	929-05-C03-A01	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking

ug/L

ND

Ammonia



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0929
Field Sample ID:	FB-DEK-BAP	Collect Date:	10/05/2023
Lab Sample ID:	23-0929-05	Collect Time:	08:10 AM
Matrix:	Water		

Sulfide, Total by SM 4500 S2D				Aliquot #: 23-0929-05-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 #: 23-0929-05-C05-A01		Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	ND		ug/L	1000.0	10/10/2023	AB23-1015-01
Dissolved Organic Carbon by SM 5310B, Aqueous			Aliquot #: 23-0	929-05-C06-A01	Analyst: BAL	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	ND		ug/L	1000.0	10/10/2023	AB23-1015-02



Field Sample ID: EB-DEK-BAP

23-0929-06

Water

Sample Site:

Matrix:

Lab Sample ID:

Laboratory Project: 23-0929 Collect Date: 10/05/2023 Collect Time: 09:45 AM

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

DEK Bottom Ash Pond

Metals by EPA 6020B: CCR Rule Ap	Aliquot #: 23-0	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, Aque	ous			Aliquot #: 23-0	929-06-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, NO	2, NO3			Aliquot #: 23-0	929-06-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
Nitrogen-Ammonia by SM4500NH3(h), Groundwate	er HL		Aliquot #: 23-0	929-06-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

23-0929 Page 15 of 44



Sample Site:	DEK Bottom Ash Pond	Laboratory Project:	23-0929
Field Sample ID:	EB-DEK-BAP	Collect Date:	10/05/2023
Lab Sample ID:	23-0929-06	Collect Time:	09:45 AM
Matrix:	Water		

Sulfide, Total by SM 4500 S2D	Aliquot #: 23-0929-06-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 531	0B, Aqueous			Aliquot #: 23-0)929-06-C05-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	ND		ug/L	1000.0	10/10/2023	AB23-1015-01
Dissolved Organic Carbon by SI	M 5310B, Aqueous			Aliquot #: 23-0)929-06-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	ND		ug/L	1000.0	10/10/2023	AB23-1015-02



Data Qualifiers

Exception Summary

No exceptions occurred.

CONSUMERS ENERGY Chemistry Department

1

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

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Proj	ect Log-In Number: 2	3-092	9			
Insp	ection Date: 10.05	.23	_ 1	Inspection By:	10	*
Sam	ple Origin/Project Nam	e: Q4-2	023 DEK	Bottom A	tsh Pond	wells
Ship	ment Delivered By: En	ter the type of	f shipment carrier			
	Pony	FedEx	UPS	USPS	Airb	orne
	Tracking Number:	T		Shipping Form A	ttached: Yes	No
Ship	ping Containers: Enter	the type and	number of shippi	ng containers received		
	Cooler X	Cardboard B	ox	Custom Case	Envelop	e/Mailer
	Loose/Unpackaged Containers			Other		
Con	dition of Shipment: En	ter the as-rece	ived condition of			
	Damaged Shipment Observed: None		1	Dented		cing
	Other	Carrie Surger				
Chin	ment Security: Enter if	Conv of the ch	inning container	were onened before ro	aceint	
Sub				And the second se		
	Shipping Containers	Received: G	pened	Sealed X		
Encl	losed Documents: Enter	the type of d	ocuments enclose	ed with the shipment.		
1	CoC X W	ork Request		Air Data Sheet	Other	
/ Tem	perature of Containers	: Measure the	temperature of s	everal sample containe	ors.	
	As-Received Tempe	rature Range	2.3-5.1	Samples Received	on Ice: Yes 🗙 N	lo
	M&TÉ # and Expira					
\ Nun	iber and Type of Conta	iners: Enter	the total number	of sample containers re	eceived.	
	Container Type	Water	Soil	Other	Broken	Leaking
	VOA (40mL or 60m)) 8	-			_
	Quart/Liter (g/p)					-
	9-oz (amber glass ja	r)	-			
	2-oz (amber glass)	24	-			
	125 mL (plastic)	24	-			
	24 mL vial (glass)	4				-
10.3.23 U	Other <u>40</u> mL	12				
	Other TO ML					

23-0929 Page 18 of 44

CHAIN OF CUSTODY



SAMPLING SITE / CUSTOMER:

 \dot{x}

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

PROJECT NUMBER:

	Page of
ESTED	OA REOUIREMENT:

	GAMPLING SITE / CUSTOMER: PROJECT NUMBER: SAP CC or WO#:						ANALYSIS REQUESTED					QA REQUIREMENT:										
		m Ash Pond W			23-0929	REQUESTER	R: Haro	ld F	legi	ster				(Atta	ch Lis	st if N	lore S	Space	is Ne	eeded)	QA REQUIREMENT	
SAMPLING TEAM: A. Whaley				TURNAROUND TIME REQUIRED:	ANDARD 🛛 O	THER_													uou	□ NPDES ⊠ TNI		
SENI	D REPORT TO:	Joseph Firlit			email:	phone:				-			1							uo	Carb	□ ISO 17025
(COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Other			CC	DNT	AIN	ERS	5	1						Carb	anic	□ 10 CFR 50 APP. B	
		TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air			P	RES	SER	VAT	IVE	als						anic	Org	□ INTERNAL INFO	
	LAB	SAMPLE COLI	LECTION	SIX	S = Soil / General Solid $WP = WipeO = Oil$ $WT = Gener$		TOTAL#			_		-	I Metals	SUI	Ammonia		Alkalinity	de	Total Organic Carbon	Dissolved Organic Carbon	OTHER	
SA	AMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC	ATION	TOT	None	ONH	NaOH NaOH	HCI	MeOI	Total	Anions	Amr	TDS	Alka	Sulfide	Tota	Diss	REMARKS	
2	23-0929-01	10Hhz	isiz	GW	DEK-MW-15002		9	4	1	1 1	2		x	x	x	x	x	x	x	x	1.000	
	-02	10/5/23	0920	GW	DEK-MW-15005		9	4	1	1 1	2		x	x	x	x	x	x	x	x		
	-03	1015/23	0810	GW	DEK-MW-15006		9	4	1	1 1	2		x	x	x	x	x	x	x	x		
	-04	10/4/23	-	GW	DUP-DEK-BAP-01		9	4	1	1 1	2		x	x	x	x	x	x	x	x		
	-05	10/5/23	0810	W	FB-DEK-BAP		6	2	1	1 1	2		x	x	x			x	x	x		
1		10/5/23	0415	W	EB-DEK-BAP		6	2	1	1	2		x	x	x			x	x	x		
										-												
										+					_							
11	QUISHED BY:	- hind			ГІМЕ: RE 15/23.12.40 Л ГІМЕ: RE	CEIVED BY:	N	2	,				Rec		on Ic	:e? 🗖					E#: LS028757 Due Date: 11-15-23	



2105 Pless Drive Brighton, Michigan 48114 Phone (810)229-7575 Fax (810)229-8650 E-mail bai-brighton@sbcglobal.net

October 11, 2023

Consumers Energy Company 135 W. Trail St. Jackson, MI 49201

Subject: Q4-2023 DEK Bottom Ash Pond Wells 23-0929

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 92711 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.







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 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03401 23-0929 Sample ID: 23-0929-01 DEK-MW-15002 Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon 5200 ug/L 1000 SM5310B RG Total Organic Carbon 4900 1000 SM5310B RG ug/L

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by

pohin L Williams

Analysis

Date

10/10/2023

10/10/2023

Date

10/11/2023



Total Organic Carbon

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: 10/05/2023 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03402 23-0929 Sample ID: 23-0929-02 DEK-MW-15005 Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon 3800 ug/L 1000 SM5310B RG

ug/L

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

3200

Released by

SM5310B

pohin L Williams

RG

Analysis

Date

10/10/2023

10/10/2023

Date

1000

10/11/2023

Page 1 of 1

23-0929 Page 22 of 44



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: 10/05/2023 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03403 23-0929 Sample ID: 23-0929-03 DEK-MW-15006 Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon 3200 ug/L 1000 SM5310B RG

Total Organic Carbon 2600 ug/L DL=Reported detection limit for analytical method requested. Some compounds require special

analytical methods to achieve EGLE designated target detection limits (TDL).

Released by

SM5310B

pohin L Williams

RG

Analysis

Date

10/10/2023

10/10/2023

Date

1000

10/11/2023

Page 1 of 1

23-0929 Page 23 of 44



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 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03404 23-0929 Sample ID: 23-0929-04 DUP-DEK-BAP-01 Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon 4900 ug/L 1000 SM5310B RG 1000 Total Organic Carbon 5100 SM5310B RG ug/L

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by

pohin L Williams

Analysis

Date

10/10/2023

10/10/2023

Date

10/11/2023



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: 10/05/2023 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03405 23-0929 Sample ID: 23-0929-05 FB-DEK-BAP Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon Not detected ug/L 1000 SM5310B RG Not detected Total Organic Carbon 1000 SM5310B RG ug/L

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by

pohin L Williams

Analysis

Date

10/10/2023

10/10/2023

Date

10/11/2023



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: 10/05/2023 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92711 Project Name: Q4-2023 DEK Bottom Ash Pond Wells BA Sample ID: Project Number: CU03406 23-0929 Sample ID: 23-0929-06 EB-DEK-BAP Parameters Result Units DL **Method Reference** Analyst **Organic Analysis** Dissolved Organic Carbon Not detected ug/L 1000 SM5310B RG Not detected Total Organic Carbon 1000 SM5310B RG ug/L

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve EGLE designated target detection limits (TDL).

Released by

pohin L Williams

Analysis

Date

10/10/2023

10/10/2023

Date

10/11/2023

CONTINUERS ENERGY COMPANY – LABORATORY SERVICES Constants	$ \begin{array}{ $					CHAIN	OF CU	CUSTOD	70			
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LAB SAMPLE COLLECTION E S-Gail Constantial WT - With water AT Mail and anticipied S-Gail Constantial WT - With water C <thc< th=""> C C <thc< th=""></thc<></thc<>	Induction Example for the field We wanter field We wanter field We wa					s Liquid		-	VATIVE			D INTERNAL INFO
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3-3-092-01 1004/203 151 GW DEK-MW-15002 2 N N Z*LC I -02 1005/2033 0910 GW DEK-MW-15005 2 N N Z*LC I -03 1005/2033 0810 GW DEK-MW-15006 2 N N Z*LC I -04 003 080 GW DEK-MP-1506 2 N N Z*LC I -04 004 GW DEK-MP-1506 2 N N N Z*LC I -05 1005/2033 0810 GW DEK-MP-1 2 N N N Z*LC I -06 1005/2033 0945 GW EB-DEK-BAP 2 N N N N Z*LC I Z*LC Z*LC Z*LC Z*LC Z*LC Z*LC I Z*LC Z*LC Z*LC	23-059-01 10042023 1517 6W DEK-MW-15002 2 N N Z*LO 1 -02 10052023 080 GW DEK-MW-15005 2 N N Z*LO 1 -03 10052023 0810 GW DEK-MW-15006 2 N N N Z*LO 1 -04 003 GW DEK-MW-15006 2 N N N Z*LO 1 -04 004 GW DEK-MP-1500 2 N N N N Y <td< td=""><td></td><td>DATE</td><td>TIME</td><td>-</td><td></td><td>1</td><td>DS⁷H DNH Duo_N</td><td>MeC HCI</td><td></td><td>53</td><td>REMARKS</td></td<>		DATE	TIME	-		1	DS ⁷ H DNH Duo _N	MeC HCI		53	REMARKS
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BRIGHTON ANALYTICAL, LLC

QUALITY ASSURANCE/QUALITY CONTROL

23-0929 Page 28 of 44

REPRESENTATIVE BATCH QUALITY CONTROL Accuracy & Precision

Analyst: RG

Parameter: TOC

Analysis Date: _____ 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

		SPIKE - ACC	CURACY		
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03405	TV=10000	ND	94/95	80 - 120	ND
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03405	9400	9500	1.10	<u><</u> 20	
		MISCELLA	NEOUS		<u>JL</u>
		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/\$M5310B/9060

		SPIKE - ACC	CURACY		
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03405	TV=10000	ND	95/95	80 - 120	ND
			<u>.</u>		
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03405	13400	13400	0.00	<u><</u> 20	
		MISCELLA	NEOUS		
		Standard ID #	%Recoveries		
Independent Secondar	y Reference Material:	WP-337	99		
Method Standard (Lab	. Control Spike):	#3046.8	90		

COMMENTS: _____



Report ID: S54198.01(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

Analytical Laboratory Report

Merit Laboratories, Inc. 2680 East Lansing Drive East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions: John Laverty (johnlaverty@meritlabs.com) Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S54198.01-S54198.06 Project: 23-0929 PR#23101280 Collected Date(s): 10/04/2023 - 10/05/2023 Submitted Date/Time: 10/06/2023 08:15 Sampled by: Unknown P.O. #: 4400114090

Table of Contents

Cover Page (Page 1) General Report Notes (Page 2) Report Narrative (Page 2) Laboratory Accreditations (Page 3) Qualifier Descriptions (Page 3) Glossary of Abbreviations (Page 3) Method Summary (Page 4) Sample Summary (Page 5)

Naya Mushah

Maya Murshak Technical Director



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



Laboratory Accreditations

Authority	Accreditation ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:201	7 #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
В	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
н	Sample submitted and run outside of holding time
1	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
М	Result reported to MDL not RDL
0	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
Т	No correction for total solids
х	Elevated reporting limit due to matrix interference
Υ	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
е	Reported value estimated due to interference
j	Analyte also found in associated method blank
р	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
х	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
1	



Method Summary

Method

SM4500-S2 D

Version Standard Method 4450 S2 D 2011



Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S54198.01	23-0929-01 (DEK-MW-15002)	Groundwater	10/04/23 15:17
S54198.02	23-0929-02 (DEK-MW-15005)	Groundwater	10/05/23 09:20
S54198.03	23-0929-03 (DEK-MW-15006)	Groundwater	10/05/23 08:10
S54198.04	23-0929-04 (DUP-DEK-BAP-01)	Groundwater	10/04/23 00:01
S54198.05	23-0929-05 (FB-DEK-BAP)	Groundwater	10/05/23 08:10
S54198.06	23-0929-06 (EB-DEK-BAP)	Groundwater	10/05/23 09:45



Lab Sample ID: S54198.01

Sample Tag: 23-0929-01 (DEK-MW-15002) Collected Date/Time: 10/04/2023 15:17 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:38, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.05	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S54198.02

Sample Tag: 23-0929-02 (DEK-MW-15005) Collected Date/Time: 10/05/2023 09:20 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:40, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.04	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S54198.03

Sample Tag: 23-0929-03 (DEK-MW-15006) Collected Date/Time: 10/05/2023 08:10 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:42, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.04	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S54198.04

Sample Tag: 23-0929-04 (DUP-DEK-BAP-01) Collected Date/Time: 10/04/2023 00:01 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:44, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	0.06	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S54198.05

Sample Tag: 23-0929-05 (FB-DEK-BAP) Collected Date/Time: 10/05/2023 08:10 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:46, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Sulfide	Not detected	0.02	0.005	mg/L	1	18496-25-8	



Lab Sample ID: S54198.06

Sample Tag: 23-0929-06 (EB-DEK-BAP) Collected Date/Time: 10/05/2023 09:45 Matrix: Groundwater COC Reference:

Sample Containers

#	Туре	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 09:48, 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:S54198

Client: CONSUMERS (Consumers Energy Company)

Project: 23-0929 PR#23101280

Submitted: 10/06/2023 08:15 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. Yes X No N/A	Samples are received at 4C +/- 2C Thermometer #	IR 6.3
02. X Yes No N/A	Received on ice/ cooling process begun	
03. Yes X No N/A	Samples shipped	
04. Yes X No N/A	Samples left in 24 hr. drop box	
05. Yes No X N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. X Yes No N/A	COC adequately filled out	
07. X Yes No N/A	COC signed and relinquished to the lab	
08. X Yes No N/A	Sample tag on bottles match COC	
09. Yes X No N/A	Subcontracting needed? Subcontacted to:	
Preservation		
Treservation		
10. X Yes No N/A	Do sample have correct chemical preservation	
	Do sample have correct chemical preservation Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A		
10. X Yes No N/A 11. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A 11. X Yes No N/A 12. Yes No N/A	Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A Bottle Conditions No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab?	
10. X Yes No N/A 11. X Yes No N/A 12. Yes No N/A Bottle Conditions N/A 13. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A Bottle Conditions N/A 13. X Yes No N/A 14. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A 13. X Yes No N/A 14. X Yes No N/A 15. Yes X No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A 12. Yes X No N/A 13. X Yes No N/A 14. X Yes No N/A 15. Yes X No N/A 16. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used Sufficient sample volume received	

Corrective action for all exceptions is to call the client and to notify the project manager.

Merit Laboratories Bottle Preservation Check

Lab Set ID: S54198 Submitted: 10/06/2023 08:15 Client: CONSUMERS (Consumers Energy Company) Project: 23-0929 PR#23101280 Attention: Emil Blaj Address: Consumers Energy Company 135 West Trail Street Jackson, MI 49201

Initial Preservation Check: 10/06/2023 09:44 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
S54198.01	125ml Plastic NaOH/Zn Acetate	>12			
S54198.02	125ml Plastic NaOH/Zn Acetate	>12			
S54198.03	125ml Plastic NaOH/Zn Acetate	>12			
S54198.04	125ml Plastic NaOH/Zn Acetate	>12			
S54198.05	125ml Plastic NaOH/Zn Acetate	>12			
S54198.06	125ml Plastic NaOH/Zn Acetate	>12			

1	1
_//	Merit
/	Laboratories, Inc.
/	/

REPORT TO

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

CHAIN OF CUSTODY RECORD

CONTACT NAME							70	CONT	CTNA			-					× SAN		
CONTACT NAME E	Emil Blaj									NE							X SAN	E	
COMPANY Con	sumers E	nergy						COMP	ANY										
ADDRESS 135 V	W. Trail S	street					1	DORE	SS										
Jackson	C			STATE MI ZI	P CODE 2	1920	1	CITY									STATE	ZIP CODE	
PHONE NO. 517-	788-5888		FAX NO. 517-788-2533	P.O. NO. 440011	4090		Ŧ	HONE	NO.				E-MAIL	ADDRESS				-	
E-MAIL ADDRESS	emil.blai	acmsen	ergy.com	QUOTE NO.			11				-	ANALV	SIS (ATTA	CHUISTI	EMORE	SPACE	E IS REQUIR		
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MATRIX CODE:	GW=GROUN SL=SLUDG		WW=WASTEWATER S=SOIL DRINKING WATER O=OIL WF	L=LIQUID : P=WIPE A=AIR	SD=SOLI W=WAS				ntaini servat			Sulfide					Detroit	_	v York
MERIT	YE	AR	SAMPLE TA		XIR	DF	¥	n d	°.	H	ER	Total					Other .		
LAB NO. FOR LAB USE ONLY	DATE	TIME	IDENTIFICATION-DESC	CRIPTION	MATRIX	# OF BOTTLES	NONE	ID H	H,SO.	MeOH	OTHER	Ĕ				-	Special I	nstructions	í
54198.01	10/04/23	1517	23-0929-01 (DEK-MW-15	002)	GW	1											preserved	with NaOH/	ZnAceta
.02	10/05/23	0920	23-0929-02 (DEK-MW-15	005)	GW	1						/					"		
.03	10/05/23	0810	23-0929-03 (DEK-MW-15	006)	GW	1						/					"		
.64	10/04/23		23-0929-04 (DUP-DEK-BA	AP-01)	GW	1	Π				,	/							
05	10/05/23	0810	23-0929-05 (FB-DEK-BAI	P)	GW	1			1		,	/					"		
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SIGNATURE/ORG	ANIZATION							_		_		YES	NOD						

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

INVOICE TO



To: JJFirlit, 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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 23-0930

phone 517-788-1251

fax 517-788-2533

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

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CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

<u>Qualifier</u>	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Н	The maximum recommended hold time was exceeded
Ι	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
Κ	Reporting limit raised due to matrix interference
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q4-2023 DEK Bottom Ash Pond & Lined ImpoundmentDate Received:10/5/2023Chemistry Project:23-0930

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	Site
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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-01	Collect Time:	06:12 AM
Matrix:	Groundwater		

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

dix III-IV Tot	al Metals	s Exp	Aliquot #: 23-0	930-01-C01-A01	Analyst: EB
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	1.0	10/10/2023	AB23-1010-09
398		ug/L	1.0	10/10/2023	AB23-1010-09
155		ug/L	5.0	10/10/2023	AB23-1010-09
ND		ug/L	1.0	10/10/2023	AB23-1010-09
987		ug/L	20.0	10/10/2023	AB23-1010-09
ND		ug/L	0.2	10/10/2023	AB23-1010-09
52500		ug/L	1000.0	10/11/2023	AB23-1010-09
ND		ug/L	1.0	10/10/2023	AB23-1010-09
ND		ug/L	6.0	10/10/2023	AB23-1010-09
ND		ug/L	1.0	10/10/2023	AB23-1010-09
720		ug/L	20.0	10/10/2023	AB23-1010-09
ND		ug/L	1.0	10/10/2023	AB23-1010-09
19		ug/L	10.0	10/10/2023	AB23-1010-09
9930		ug/L	1000.0	10/11/2023	AB23-1010-09
133		ug/L	5.0	10/10/2023	AB23-1010-09
9		ug/L	5.0	10/10/2023	AB23-1010-09
ND		ug/L	2.0	10/10/2023	AB23-1010-09
5680		ug/L	100.0	10/11/2023	AB23-1010-09
ND		ug/L	1.0	10/10/2023	AB23-1010-09
ND		ug/L	0.2	10/10/2023	AB23-1010-09
106000		ug/L	1000.0	10/11/2023	AB23-1010-09
ND		ug/L	2.0	10/10/2023	AB23-1010-09
ND		ug/L	2.0	10/10/2023	AB23-1010-09
ND		ug/L	10.0	10/10/2023	AB23-1010-09
			Aliquot #: 23-0	930-01-C01-A02	Analyst: CLE
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	0.2	10/11/2023	AB23-1011-01
03			Aliquot #: 23-0	930-01-C02-A01	Analyst: TMR
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	100.0	10/05/2023	AB23-1006-01
ND		ug/L	100.0	10/05/2023	AB23-1006-01
List, Cl, F, S	604, Aqu	ieous	Aliquot #: 23-0	930-01-C02-A02	Analyst: KDR
Result	Flag	Units	RL	Analysis Date	Tracking
69400		ug/L	1000.0	10/11/2023	AB23-1010-02
	Result ND 398 155 ND 987 ND 52500 ND 52500 ND 720 ND 720 ND 720 ND 19 9930 133 9 ND 5680 ND 5680 ND 106000 ND ND 106000 ND ND <t< td=""><td>Result Flag ND 398 155 ND 987 4 ND 987 ND 52500 ND 52500 ND 14 720 14 720 14 720 14 720 14 9930 133 9 100 5680 14 ND 15 ND 14 106000 14 ND 15 ND 100 ND 100 N</td><td>ND ug/L 398 ug/L 155 ug/L ND ug/L 987 ug/L ND ug/L 987 ug/L ND ug/L 52500 ug/L ND ug/L 930 ug/L 9930 ug/L 9930 ug/L 9930 ug/L 9 ug/L ND ug/L ND</td><td>Result Flag Units RL ND ug/L 1.0 398 ug/L 1.0 155 ug/L 5.0 ND ug/L 1.0 987 ug/L 20.0 ND ug/L 0.2 52500 ug/L 1.0 ND ug/L 1.0 19 ug/L 1.0 930 ug/L 100.0 133 ug/L 2.0 ND ug/L 1.0 ND <t< td=""><td>Result Flag Units RL Analysis Date ND ug/L 1.0 10/10/2023 398 ug/L 1.0 10/10/2023 155 ug/L 5.0 10/10/2023 ND ug/L 1.0 10/10/2023 987 ug/L 20.0 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 1.0 10/11/2023 ND ug/L 1.0 10/10/2023 9930 ug/L 1000.0 10/11/2023 9930 ug/L 1.0 10/10/2023 ND ug/L 1.0 10/10/2023 ND ug/L 1.00 10/11/2023 <td< td=""></td<></td></t<></td></t<>	Result Flag ND 398 155 ND 987 4 ND 987 ND 52500 ND 52500 ND 14 720 14 720 14 720 14 720 14 9930 133 9 100 5680 14 ND 15 ND 14 106000 14 ND 15 ND 100 ND 100 N	ND ug/L 398 ug/L 155 ug/L ND ug/L 987 ug/L ND ug/L 987 ug/L ND ug/L 52500 ug/L ND ug/L 930 ug/L 9930 ug/L 9930 ug/L 9930 ug/L 9 ug/L ND ug/L ND	Result Flag Units RL ND ug/L 1.0 398 ug/L 1.0 155 ug/L 5.0 ND ug/L 1.0 987 ug/L 20.0 ND ug/L 0.2 52500 ug/L 1.0 ND ug/L 1.0 19 ug/L 1.0 930 ug/L 100.0 133 ug/L 2.0 ND ug/L 1.0 ND <t< td=""><td>Result Flag Units RL Analysis Date ND ug/L 1.0 10/10/2023 398 ug/L 1.0 10/10/2023 155 ug/L 5.0 10/10/2023 ND ug/L 1.0 10/10/2023 987 ug/L 20.0 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 1.0 10/11/2023 ND ug/L 1.0 10/10/2023 9930 ug/L 1000.0 10/11/2023 9930 ug/L 1.0 10/10/2023 ND ug/L 1.0 10/10/2023 ND ug/L 1.00 10/11/2023 <td< td=""></td<></td></t<>	Result Flag Units RL Analysis Date ND ug/L 1.0 10/10/2023 398 ug/L 1.0 10/10/2023 155 ug/L 5.0 10/10/2023 ND ug/L 1.0 10/10/2023 987 ug/L 20.0 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 0.2 10/10/2023 987 ug/L 1.0 10/11/2023 ND ug/L 1.0 10/10/2023 9930 ug/L 1000.0 10/11/2023 9930 ug/L 1.0 10/10/2023 ND ug/L 1.0 10/10/2023 ND ug/L 1.00 10/11/2023 <td< td=""></td<>



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-01	Collect Time:	06:12 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analyte	Anions by EPA 300.0 CCR Rule Analyte List, CI, 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 H	IL		Aliquot #: 23-0	930-01-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 #: 23-0	930-01-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 #: 23-0	930-01-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 #: 23-0	930-01-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, Aq	ueous			Aliquot #: 23-0	930-01-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 5310	B, Aqueou <u>s</u>			Aliquot #: <u>23-0</u>	930-01-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

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Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-02	Collect Time:	06:12 AM
Matrix:	Groundwater		

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

Metals by EPA 6020B: CCR Rule Appen	dix III-IV Tota	I Metals	s Exp	Aliquot #: 23-0	930-02-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 #: 23-0	930-02-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, N	D 3			Aliquot #: 23-0	930-02-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, CI, F, S	04, Aqı	leous	Aliquot #: 23-0	930-02-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	104		%	1000.0	10/11/2023	AB23-1010-02



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-02	Collect Time:	06:12 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analyte	Eist, CI, F, SO	4, Aqı	leous	Aliquot #: 23-0	930-02-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 H	L		Aliquot #: 23-0	930-02-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 #: 23-0	930-02-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 #: 23-0	930-02-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, Aq	ueous			Aliquot #: 23-0	930-02-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 5310	B, Aqueous			Aliquot #: 23-0	930-02-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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-03	Collect Time:	06:12 AM
Matrix:	Groundwater		

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

Metals by EPA 6020B: CCR Rule Appen	dix III-IV Tota	al Metals	s Exp	Aliquot #: 23-0	930-03-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	Mercury by EPA 7470A, Total, Aqueous			Aliquot #: 23-0	930-03-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, NO	03			Aliquot #: 23-0	930-03-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, S	04 <u>,</u> Aqu	ieous	Aliquot #: 23-0	930-03-C02-A02	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	106		%	1000.0	10/11/2023	AB23-1010-02



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	23-0930
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	10/04/2023
Lab Sample ID:	23-0930-03	Collect Time:	06:12 AM
Matrix:	Groundwater		

Anions by EPA 300.0 CCR Rule Analyte	Elist, CI, F, SO	94, Aqı	ieous	Aliquot #: 23-0	930-03-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 #: 23-0	930-03-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 #: 23-0	930-03-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 #: <u>23-0</u>	930-03-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



Data	Qualifiers

Exception Summary

No exceptions occurred.

CONSUMERS ENERGY Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Pro	oject Log-In Number: 2	3-0930					
Ins	pection Date: 10.05	23	-	Inspection By	· UMO	_	1
Sau	mple Origin/Project Nam	e: 64-202	3 DEK Bo	Hom As	h fond	+Lined	Impound
Shi	ipment Delivered By: En	ter the type of	shipment carrie	r,			
	Pony	FedEx	UPS		USPS	Airt	oorne
	Other/Hand Carry (w						
	Tracking Number:					hed: Yes	
Shi	ipping Containers: Enter	the type and i	number of shipp	ing containers	received.		
	Cooler_X	Cardboard B	ox	Custom Ca	se	Envelop	e/Mailer
	Loose/Unpackaged (Containers					
Co	ndition of Shipment: Ent	er the as-rece	ived condition o	f the shipment	container.		
	Damaged Shipment	Observed: No	\sim	Dente	ed	Leal	, king
	Other						
Shi	ipment Security: Enter if						
	Shipping Containers						
En	closed Documents: Enter	the type of do	ocuments enclos	ed with the shi	pment.		
	CoC 🗶 W	ork Request _		Air Data Sh	eet	Other	
Ter	mperature of Containers:	Measure the	temperature of s	everal sample	containers.		
	As-Received Temper	rature Range	3.2-4.5"	Samples R	eceived on Id	ce: Yes X N	lo
	M&TE # and Expira						
Nu	mber and Type of Conta	iners: Enter t	he total number	of sample con	tainers receiv	ved.	
	Container Type	Water	Soil	Other	<u></u>	Broken	Leaking
	VOA (40mL or Onl.) (e	-				
	Quart/Liter (g/p)						
	9-oz (amber glass jar	.)	-				
	2-oz (amber glass)	10	-				
	125 mL (plastic)	12_					
	24 mL vial (glass)	-	-				
10.05 .23		1	-				
10.05 .23	Other <u>40 mL</u>	Le Le	1			_	

amber Boroscilicate vial

PH Ship Lot # : 20 55 22 exp. 2 28990 Bage 12 of 32

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Consumers	Energy
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CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Page	of 1
1 ago	01 1

SAMPLIN	G SITE / CU	JSTOMER:			PROJECT NUMBER:	SAP CC or W	VO#:						ANALYSIS R					YSIS REQUESTED					
Q4-2023 I	DEK Botto	m Ash Pond &	Lined Imp	ound.	23-0930	23-0930 REQUESTER: H		old	Regi	iste	r			(Attach List if More Sp				Space	e is N	eeded	ed) QA REQUIREMENT:		
SAMPLIN	G TEAM:				TURNAROUND TIME REQUIRED:	ANDARD 🛛 O	THER_															□ NPDES ⊠ TNI	
SEND RE	PORT TO:	Joseph Firlit			email:	phone:														Irbon		□ ISO 17025	
COP	Y TO:	Harold Regi	ster		MATRIX CODES: GW = Groundwater OX = Othe			C	ONT	AI	NER	s							arbon	iic Ca		□ 10 CFR 50 APP. B	
		TRC			WW = Wastewater SL = Sludg W = Water / Aqueous Liquid A = Air				PRE	SER	VA	TIVE	olo				11		nic C	Organ		□ INTERNAL INFO	
LA		SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = Wip	e eral Waste	al Waste		5	10	H	H	Cuber Testal Matele	Anions	Ammonia		Alkalinity	ide	Total Organic Carbon	Dissolved Organic Carbon		OTHER	
SAMP	LE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LO	CATION	TO	None	HNO ₃	H2SC	NaO	MeOH	Total	Ani	Ami	TDS	Alka	Sulfide	Tota	Diss		REMARKS	
23-09	930-01	15/4/53	Old?	GW	DEK-MW-18001		9	4	1	1	1 2		x	x	x	x	x	x	x	x			
	-02	11 11	503	GW	DEK-MW-18001 MS		8	3	1	1	1 2		x	x	x		x	x	x	x			
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2105 Pless Drive Brighton, Michigan 48114 Phone (810)229-7575 Fax (810)229-8650 E-mail bai-brighton@sbcglobal.net

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 To: Submit Date: 10/06/2023 Consumers Energy Company Report Date: 10/11/2023 135 W. Trail St. Jackson, MI 49201 BA Report Number: 92712 Project Name: Q4-2023 DEK Bottom Ash Pond & Lined Impound BA Sample ID: Project Number: CU03407 23-930 Sample ID: 23-930-01 DEK-MW-18001 Analysis Parameters Result Units DL **Method Reference** Date Analyst **Organic Analysis** Dissolved Organic Carbon 5400 ug/L 1000 SM5310B RG 10/10/2023 Total Organic Carbon 4800 1000 SM5310B RG ug/L 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

pohin L Williams

Date

10/11/2023

Page 1 of 1



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: Submit Date: Report Date:				13	onsumers Energy Compan 35 W. Trail St. Jokson, MI 49201	у	
BA Report Number:	92712	Projec	ct Name: Q4-20	23 DEK Bo	ttom Ash Pond & Lined	Impound	
BA Sample ID:	CU03408	Projec	ct Number: 23-9.	30			
		Sample ID:	23-930-02 DEK	K-MW-1800	1 MS		Analysis
Paramet	ters	Result	Units	DL	Method Reference	Analyst	Date
Organic Analysis Dissolved Organic C Total Organic Carbo		80% 83%	ug/L ug/L		SM5310B SM5310B	RG RG	10/10/2023 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

Contin L Williams

Date

10/11/2023

Page 1 of 1



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: Submit Date: Report Date:				13	onsumers Energy Compan 35 W. Trail St. ckson, MI 49201	у	
BA Report Number:	92712	Projec	t Name: Q4-20	23 DEK Bot	ttom Ash Pond & Lined 1	Impound	
BA Sample ID:	CU03409	Projec	t Number: 23-93	30			
		Sample ID:	23-930-03 DEK	C-MW-1800	1 MSD		Analysis
Paramet	ters	Result	Units	DL	Method Reference	Analyst	Date
Organic Analysis Dissolved Organic C Total Organic Carbo		81% 81%	ug/L ug/L		SM5310B SM5310B	RG RG	10/10/2023 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

Contin L Williams

Date

10/11/2023

Page 1 of 1

23-0930 Page 17 of 32

Pace is Needed)					CHAIN	OF CU	S	CUSTODY	X				
STONE: FRONCET NIANBER: SAP CC or WOH: AMAL Prod & Linded Inground: AMAL Prod & Linded Ingrue an Ab Prod & Linded Inground: 23-0930 BROUGESTER: Emil Big AMAL Prod Activity REQUESTER: Ind Ab Prod & Linded Inground: 23-0930 BROUGESTER: Emil Big AMAL Prod Activity REQUESTER: Ind Ab Prod & Linded Inground: Contractions AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Ab Prod & Linded Ingrammerers Mark Torres AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Ab Prod Activity Requesters Mark Torres AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Ab Prod Activity Requesters Mark Torres AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Ab Prod Activity Requesters AMAL Prod Activity Requesters AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Ab Activity Requesters Mark Torres AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Activity Requesters Mark Torres AMAL Prod Activity Requesters AMAL Prod Activity Requesters Ind Activity Requesters Mark Torres AMAL Prod Activity Requesters AMAL Prod	Sis	Energy Count on Us*		CO	VSUMERS ENERGY CO 135 WEST TRAIL ST., J	IMPANY – IACKSON, MI 49	LAE 9201	30RA ⁷ (517)	FOR' 788-125	Y SE	RVICES		
TUREAROUND THE REQUIRED. TUREAROUND THE REQUIRED. TUREAROUND THE REQUIRED. CONTANTE	/ CL	JSTOMER: m Ash Pond &	Lined Imp	pound.	PROJECT NUMBER: 23-0930	SAP CC or WO: REQUESTER: 1	#: Emil Bl	aj.		(Att	ANAL YSIS REQUESTED ach List if More Space is Needed)	QA REQUIREMENT:	
Enril Bilgi □214R □484R □ 3DAYS □STANOARD & OTHER Enril Bilgi monthend Bilgi@menergy.com plone:	N.				TURNAROUND TIME REQUIRED:							□ NPDES	
Enril Blaj enril:Enril Blaj@emsenergy.com phone: Marker Condition: Autre Marker Condition: Autre Constructions Autre Constructions Autre Constructions Autre Constructions Autre Marker Coll Marker Coll Constructions Autre Constructions Autre Constructions Autre Constructions Autre Constructions Autre Constructions Autre Date Truct Truction Truction Truction Truction Truction Inourazio 6012 GW DEK-MW-18001 2 N N N N Inourazio 6012 GW DEK-MW-18001 2 N					□ 48 HR □ 3 DAYS		ER			u		INI 🛛	
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Market Control of the second state of the second st					MATRIX CODES: GW = Groundwater $OX = Other$		Ö	ONTAINE	RS			🗆 10 CFR 50 APP. B	
SAMPLE COLLECTION X 3-Self Orderatised WT= elevent Wate Tage 0 1 0					WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air	υ	_	PRESERVA	VTIVE		2	□ INTERNAL INFO	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		SAMPLE COLI	ECTION		S = Soil / General Solid WP = Wipe O = Oil WT = Gene	eral Waste		H۱ ۲۵ ۲۵	HO		1	□ OTHER	
1004/2023 0612 GW DEK-MW-18001 2 2 X </td <td>Q</td> <td>DATE</td> <td>TIME</td> <td>TAM</td> <td></td> <td>CATION</td> <td></td> <td>O^BN S⁷H DNH</td> <td>DoM</td> <td></td> <td>0</td> <td>REMARKS</td>	Q	DATE	TIME	TAM		CATION		O ^B N S ⁷ H DNH	DoM		0	REMARKS	
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BRIGHTON ANALYTICAL, LLC

QUALITY ASSURANCE/QUALITY CONTROL

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REPRESENTATIVE BATCH QUALITY CONTROL Accuracy & Precision

Analyst: RG

Parameter: TOC

Analysis Date: 10/10/2023

Method Reference: EPA 415.1/SM5310B/9060

		SPIKE - ACC	URACY		
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	<u><</u> 20	
		MISCELLAN	IEOUS		
		Standard ID #	%Recoveries		
Independent Seconda	ary Reference Material:	WP-337	99		
Method Standard (La	b. 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 - ACC	CURACY		
Laboratory ID	Spike level PPB	Background PPB	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration
CU03407	TV=10000	5400	81/81	80 - 120	ND
Laboratory ID	Observed A PPB	Observed B PPB	RPD (%)	Acceptable Range(%)	
CU03407	13400	13400	0.00	<u><</u> 20	
		MISCELLA	NEOUS		
		Standard ID #	%Recoveries		
Independent Secondar	ry Reference Material:	WP-337	99		
Method Standard (Lal	o. Control Spike):	#3046.8	90		

COMMENTS: _____



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

Analytical Laboratory Report

Merit Laboratories, Inc. 2680 East Lansing Drive East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions: John Laverty (johnlaverty@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

Table of Contents

Cover Page (Page 1) General Report Notes (Page 2) Report Narrative (Page 2) Laboratory Accreditations (Page 3) Qualifier Descriptions (Page 3) Glossary of Abbreviations (Page 3) Method Summary (Page 4) Sample Summary (Page 5)

Naya Mushah

Maya Murshak Technical Director



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



Laboratory Accreditations

Authority	Accreditation ID
Michigan DEQ	#9956
DOD ELAP & ISO/IEC 17025:20	17 #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 200	
Qualifier	Description
!	Result is outside of stated limit criteria
В	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
Н	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
Μ	Result reported to MDL not RDL
0	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
Т	No correction for total solids
Х	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
е	Reported value estimated due to interference
j	Analyte also found in associated method blank
р	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
1	



Method Summary

Method

SM4500-S2 D

Version Standard Method 4450 S2 D 2011



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



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

#	Туре	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	



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

#	Туре	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



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

#	Туре	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

Client: CONSUMERS (Consumers Energy Company)

Project: 23-0930 PR#23101280

Submitted: 10/06/2023 08:15 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. Yes X No N/A	Samples are received at 4C +/- 2C Thermometer #	IR 6.3
02. X Yes No N/A	Received on ice/ cooling process begun	
03. Yes X No N/A	Samples shipped	
04. Yes X No N/A	Samples left in 24 hr. drop box	
05. Yes No X N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. X Yes No N/A	COC adequately filled out	
07. X Yes No N/A	COC signed and relinquished to the lab	
08. X Yes No N/A	Sample tag on bottles match COC	
09. Yes X No N/A	Subcontracting needed? Subcontacted to:	
Preservation		
Treservation		
10. X Yes No N/A	Do sample have correct chemical preservation	
	Do sample have correct chemical preservation Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A		
10. X Yes No N/A 11. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A 11. X Yes No N/A 12. Yes No N/A	Completed pH checks on preserved samples? (no VOAs)	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A Bottle Conditions No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab?	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A Bottle Conditions 13. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A Bottle Conditions N/A 13. X Yes No N/A 14. X Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used	
10. X Yes No N/A 11. X Yes No N/A 12. Yes X No N/A 13. X Yes No N/A 14. X Yes No N/A 15. Yes X No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used	
10. X Yes No N/A 11. X Yes No N/A 11. Yes No N/A 12. Yes No N/A 12. Yes No N/A 13. Yes No N/A 14. Yes No N/A 15. Yes No N/A 16. Yes No N/A	Completed pH checks on preserved samples? (no VOAs) Did any samples need to be preserved in the lab? All bottles intact Appropriate analytical bottles are used Merit bottles used Sufficient sample volume received	

Corrective action for all exceptions is to call the client and to notify the project manager.

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			

REPOR				CHAIN	OF	CL	JST	OD	YR	ECC	DRI	D					INVOID	ETC
CONTACT NAME E	mil Blaj						CONTACT NAME SAME											
	sumers E						C	COMPA	INY									
ADDRESS 135 W							11	DORE	SS									
Jackson				STATE MI ZIP C	ODE 2	4920	1 0	CITY								STATE	ZIP CODE	
PHONE NO. 517-788-5888 FAX NO. 517-788-2533 P.O. NO. 4400114090			P	HONE	NO.				E-MAIL	ADDRESS								
E-MAIL ADDRESS	mil.blaj@	2)cmsen	ergy.com	QUOTE NO.								ANALYS	SIS (ATTA	CH LIST IF	MORE SP	ACE IS REQUI	RED)	
PROJECT NO./NAM				SAMPLER(S) - PLEASE P	RINT/SI	GN NA	ME			N//			TT			Certifica	ations	
				YS STANDARD	То	HER	-	-	-	101	Ť					Оню		king Wal
						_						0				DoD	NPD	ES
MATRIX G	W=GROUN	DWATER	WW=WASTEWATER S=SO	L L=LIQUID SD	=SOL	D		# Co	ntaine	rs &	13	Sulfide					Locations	
	SL=SLUDGE	_	DRINKING WATER 0=OIL V		1	STE		1	ervati	TT						Detroit		York
MERIT LAB NO. FOR LAB USE ONLY	DATE	TIME	IDENTIFICATION-DE		MATRIX	# OF BOTTLE	NONE	HNO,	H,SO.	MeOH	CTHER	Total				Other Special	Instructions	
54195.01	10/04/23	0612	23-0930-01 (DEK-MW-1	8001)	GW	1			1		1	/				preserved	l with NaOH/2	ZnAceta
02	10/04/23	0612	23-0930-02 (DEK-MW-18	8001 Field MS)	GW	1			1		1	/				"		
.03	10/04/23	0612	23-0930-03 (DEK-MW-18	8001 Field MSD)	GW	1			1		V	/				n		
																Please spi	ike MS/MSD a	and repo
																spike conc	centration and/o	or recove
							\square											
							\square	1	11									
		_					4	-		11	1							
								-		11	1							
					1		\downarrow	+		11	1							
							11	-			1							
RELINQUISHED BY SIGNATURE/ORGA		tion	NSUMERS ENERGY	Sampler DATE					UISHE	D BY:	ZATIO	N					DATE	TIME
RECEIVED BY: SIGNATURE/ORGA		1	h Min	10/5/23	_	350		RECEN	ED BY:								DATE	TIME
RELINQUISHED BY SIGNATURE/ORGA	9		- Carry -	DATE	-	TIME		SEAL	-			SEAL INTAC	T NO 🗆	INITIALS	NOTES	E TEMP. O	N ARRIVAL	_
SIGNATURE/ORGANIZATION RECEIVED BY: DATE TIME SIGNATURE/ORGANIZATION				SEAL NO. SEAL INTACT INITIALS 6.3														



To: JJFirlit, Karn/Weadock

From: EBlaj, T-258

Date: October 20, 2023

Subject: RCRA GROUNDWATER MONITORING – DEK-JCW BACKGROUND WELLS – 2023 Q4

CC: HDRegister, P22-521 BLSwanberg, P22-119 Darby Litz, Project Manager TRC Companies, Inc. 1540 Eisenhower Place Ann Arbor, MI 48108

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 23-0933R

phone 517-788-1251 *fax* 517-788-2533

TRC Environmental, Inc. conducted groundwater monitoring at the Karn/Weadock Background Wells area during the week of 10/02/2023 for the 4th Quarter requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 10/05/2023.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. <u>Methodology</u>

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. <u>Results/Quality Control</u>

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

DEFINITIONS / QUALIFIERS

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

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

SM Standard Methods Compendium

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<u>Qualifier</u>	Description
*	Generic data flag, applicable description added in the corresponding notes section
В	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
Η	The maximum recommended hold time was exceeded
Ι	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
Μ	The precision for duplicate analysis was not met; RPD outside acceptance criteria
Ν	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
Х	Other notation required; comment listed in sample notes and/or case narrative



Customer Name:Karn/Weadock ComplexWork Order ID:Q4-2023 DEK-JCW Background WellsDate Received:10/5/2023Chemistry Project:23-0933

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
23-0933-01	MW-15002	Groundwater	10/04/2023 09:13	DEK JCW Background
23-0933-02	MW-15008	Groundwater	10/02/2023 11:51	DEK JCW Background
23-0933-03	MW-15016	Groundwater	10/04/2023 09:49	DEK JCW Background
23-0933-04	MW-15019	Groundwater	10/02/2023 12:36	DEK JCW Background
23-0933-05	DUP-Background	Groundwater	10/02/2023 00:00	DEK JCW Background
23-0933-06	FB- Background	Water	10/02/2023 12:36	DEK JCW Background



Analyst: EB

Sample Site:	DEK JCW Background
Field Sample ID:	MW-15002
Lab Sample ID:	23-0933-01
Matrix:	Groundwater

Laboratory Project:	23-0933
Collect Date:	10/04/2023
Collect Time:	09:13 AM

Aliquot #: 23-0933-01-C01-A01

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

			-	Allquot #. 23-0	933-01-C01-A01	Allalyst. ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	2		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	968		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	205		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	245000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	2		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	2		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	30400		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	27		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	38200		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	5		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	7540		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	1680000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	11		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueo	ous			Aliquot #: 23-0	933-01-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	yte List, Cl, F, S	SO4, Aqı	ieous	Aliquot #: 23-0	933-01-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	3170000		ug/L	1000.0	10/14/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-01-C03-A01	Analyst: LMO
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	5430		mg/L	10.0	10/11/2023	AB23-1011-02

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Sample Site: **DEK JCW Background** Field Sample ID: MW-15008 Lab Sample ID: 23-0933-02 Matrix: Groundwater

Laboratory Project: 23-0933R Collect Date: 10/02/2023 Collect Time: 11:51 AM

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

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Exp	Aliquot #: 23-0	933-02-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	2		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	94		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	157		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	126000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	2		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	22500		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	20		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	19600		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	3		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	3600		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	222000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	5		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueou	IS			Aliquot #: 23-0	933-02-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	te List, Cl, F,	SO4, Aqı	leous	Aliquot #: 23-0	933-02-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	387000		ug/L	1000.0	10/13/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	89000		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-02-C03-A01	Analyst: SLI
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1160		mg/L	10.0	10/05/2023	AB23-1006-05

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Sample Site:	DEK JCW Background
Field Sample ID:	MW-15016
Lab Sample ID:	23-0933-03
Matrix:	Groundwater

Laboratory Project:	23-0933
Collect Date:	10/04/2023
Collect Time:	09:49 AM

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

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV Tot	al Metal	s Exp	Aliquot #: 23-0	933-03-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	28		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	154		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	533		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	244000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	22500		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	54		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	43100		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	8		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	9840		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	109000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot #: 23-0	933-03-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule Analy	e List, Cl, F, S	SO4, Aqı	leous	Aliquot #: 23-0	933-03-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	239000		ug/L	1000.0	10/13/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	149000		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2540C				Aliquot #: 23-0	933-03-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1340		mg/L	10.0	10/05/2023	AB23-1006-05

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Analyst: EB

Sample Site:	DEK JCW Background
Field Sample ID:	MW-15019
Lab Sample ID:	23-0933-04
Matrix:	Groundwater

Laboratory Project:	23-0933R
Collect Date:	10/02/2023
Collect Time:	12:36 PM

Aliquot #: 23-0933-04-C01-A01

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

				Allquot #. 23-0	933-04-C01-A01	Allalyst. ED
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Arsenic	1		ug/L	1.0	10/10/2023	AB23-1010-09
Barium	373		ug/L	5.0	10/10/2023	AB23-1010-09
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Boron	275		ug/L	20.0	10/10/2023	AB23-1010-09
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Calcium	162000		ug/L	1000.0	10/11/2023	AB23-1010-09
Chromium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Iron	21800		ug/L	20.0	10/10/2023	AB23-1010-09
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Lithium	14		ug/L	10.0	10/10/2023	AB23-1010-09
Magnesium	38200		ug/L	1000.0	10/11/2023	AB23-1010-09
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09
Nickel	3		ug/L	2.0	10/10/2023	AB23-1010-09
Potassium	2350		ug/L	100.0	10/11/2023	AB23-1010-09
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09
Sodium	214000		ug/L	1000.0	10/11/2023	AB23-1010-09
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Vanadium	ND		ug/L	2.0	10/10/2023	AB23-1010-09
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09
Mercury by EPA 7470A, Total, A	queous			Aliquot #: 23-0	933-04-C01-A02	Analyst: CLE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aqı	leous	Aliquot #: 23-0	933-04-C02-A01	Analyst: KDR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	368000		ug/L	1000.0	10/13/2023	AB23-1011-03
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03
Sulfate	101000		ug/L	1000.0	10/12/2023	AB23-1011-03
Total Dissolved Solids by SM 2	540C			Aliquot #: 23-0	933-04-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1400		mg/L	10.0	10/05/2023	AB23-1006-05

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23-0933R

10/02/2023

12:00 AM

Sample Site:	DEK JCW Background	Laboratory Project:
Field Sample ID:	DUP-Background	Collect Date:
Lab Sample ID:	23-0933-05	Collect Time:
Matrix:	Groundwater	

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

Metals by EPA 6020B: CCR Rule Appe		tal Metals	ѕ Ехр	Aliquot #: 23-0	933-05-C01-A01	Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Arsenic	2		ug/L	1.0	10/10/2023	AB23-1010-09	
Barium	92		ug/L	5.0	10/10/2023	AB23-1010-09	
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Boron	154		ug/L	20.0	10/10/2023	AB23-1010-09	
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Calcium	121000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Chromium	1		ug/L	1.0	10/10/2023	AB23-1010-09	
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09	
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Iron	22200		ug/L	20.0	10/10/2023	AB23-1010-09	
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Lithium	19		ug/L	10.0	10/10/2023	AB23-1010-09	
Magnesium	18800		ug/L	1000.0	10/11/2023	AB23-1010-09	
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09	
Nickel	2		ug/L	2.0	10/10/2023	AB23-1010-09	
Potassium	3500		ug/L	100.0	10/11/2023	AB23-1010-09	
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Sodium	210000		ug/L	1000.0	10/11/2023	AB23-1010-09	
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Vanadium	5		ug/L	2.0	10/10/2023	AB23-1010-09	
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09	
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot #: 23-0	933-05-C01-A02	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10	
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqı	leous	Aliquot #: 23-0	933-05-C02-A01	Analyst: KDR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Chloride	390000		ug/L	1000.0	10/13/2023	AB23-1011-03	
Fluoride	ND		ug/L	1000.0	10/12/2023	AB23-1011-03	
Sulfate	89900		ug/L	1000.0	10/12/2023	AB23-1011-03	
Total Dissolved Solids by SM 2540C			Aliquot #: 23-0	933-05-C03-A01	Analyst: SLK		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	

10.0

10/05/2023

AB23-1006-05

Total Dissolved Solids

23-0933 Page 9 of 13

mg/L

1220



Field Sample ID: FB- Background

23-0933-06

Water

Sample Site:

Matrix:

Lab Sample ID:

Analyst: EB

Laboratory Project: 23-0933R Collect Date: 10/02/2023 Collect Time: 12:36 PM

Aliquot #: 23-0933-06-C01-A01

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

DEK JCW Background

				Anquot #: 20 0			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Antimony	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Arsenic	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Barium	ND		ug/L	5.0	10/10/2023	AB23-1010-09	
Beryllium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Boron	ND		ug/L	20.0	10/10/2023	AB23-1010-09	
Cadmium	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Calcium	ND		ug/L	1000.0	10/11/2023	AB23-1010-09	
Chromium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Cobalt	ND		ug/L	6.0	10/10/2023	AB23-1010-09	
Copper	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Iron	ND		ug/L	20.0	10/10/2023	AB23-1010-09	
Lead	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Lithium	ND		ug/L	10.0	10/10/2023	AB23-1010-09	
Magnesium	ND		ug/L	1000.0	10/11/2023	AB23-1010-09	
Molybdenum	ND		ug/L	5.0	10/10/2023	AB23-1010-09	
Nickel	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Potassium	ND		ug/L	100.0	10/11/2023	AB23-1010-09	
Selenium	ND		ug/L	1.0	10/10/2023	AB23-1010-09	
Silver	ND		ug/L	0.2	10/10/2023	AB23-1010-09	
Sodium	ND		ug/L	1000.0	10/11/2023	AB23-1010-09	
Thallium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Vanadium	ND		ug/L	2.0	10/10/2023	AB23-1010-09	
Zinc	ND		ug/L	10.0	10/10/2023	AB23-1010-09	
Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 23-0	933-06-C01-A02	Analyst: CLE	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking	
Mercury	ND		ug/L	0.2	10/12/2023	AB23-1011-10	



Data Qualifiers

Exception Summary

No exceptions occurred.

CONSUMERS ENERGY Chemistry Department

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

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project	Log-In Number: 23	-093	3				
Inspecți	on Date: 10.05.	23		Inspection By:	LMO	100	×
Sample	Origin/Project Name:	Q4-20	23 JCW-	DEK Bac	kgroun	d Well	s
	nt Delivered By: Ente						
	Pony F				TISPS	Airb	orne
	Other/Hand Carry (wh						
	Tracking Number:						
Shippin	g Containers: Enter th	ne type and i	number of ship	ping containers re	ceived.		
	Cooler 🗙 🔿	Cardboard B	ox	Custom Case	88	Envelope	e/Mailer
	Loose/Unpackaged Co						
Conditio	on of Shipment: Enter	the as-rece	ived condition	of the shipment c	ontainer.		
	Damaged Shipment O	bserved: No	one ×	Dented		Leak	cing
	Other						0
Shipmer	nt Security: Enter if a	ny of the shi	ipping containe	ers were opened b	efore receipt.		
	Shipping Containers R			Second Second	N		
Fneloso	d Documents: Enter t						
						01	
	CoC > Wo					Other	
Temper	ature of Containers: N	Measure the	temperature of	f several sample c	ontainers.		
	As-Received Tempera	ture Range	2.0.3.4	Samples Rec	eived on Ice:	Yes K N	0
	M&TE # and Expiration	on 15028	157 11.	15.23			
Number	and Type of Contain	ers: Enter t	the total numbe	er of sample conta	iners received	d.	
	Container Type	Water	Soil	Other		Broken	Leaking
	VOA (40mL or 60mL)						
	Quart/Liter (g/p)		_				
	9-oz (amber glass jar)		_				_
	2-oz (amber glass)		_		_		_
	125 mL (plastic)	11	_				
	24 mL vial (glass)				_		-
	500 mL (plastic)	5					
	Other						

pH strup Lot #: 205522 exp. 2.15.25

10.05

23-0933 Page 12 of 13

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

	1
Page	of

SAMPLING SITE / CUSTOMER: Q4-2023 JCW-DEK Background Wells				PROJECT NUMBER:	SAP CC or WO#: REQUESTER: Harold Register								ANALYSIS REQUESTED							at an an a tract
				23-0933									(Atta	ich L	ist if N)	QA REQUIREMENT:			
SAMPLING TEAM:				TURNAROUND TIME REQUIRED: □ 24 HR □ 48 HR □ 3 DAYS □ STANDARD ☑ OTHER																□ NPDES ⊠ TNI
SEND REPORT TO:	Joseph Firlit			email: phone:															□ ISO 17025	
COPY TO:	Harold Regis	ter		MATRIX CODES: GW = Groundwater OX = Other			CONTAINERS					1								□ 10 CFR 50 APP. B
TRC			WW = Wastewater SL = Sludge W = Water / Aqueous Liquid A = Air		PRESERVATIVE					IVE	als								INTERNAL INFO	
LAB	SAMPLE COL	LECTION	RIX	S = Soil / General Solid WP = Wipe O = Oil WT = Gene	neral Waste	TOTAL#						Total Metals	SUC					OTHER		
SAMPLE ID	DATE	TIME	MATRIX	FIELD SAMPLE ID / LOC			None	ONH	Hoso4	HCI	MeOl	Tota	Anions	TDS						REMARKS
23-0933-01	10-4-23	0913	GW	MW-15002		3	2	1				x	x	x		1				
-02	10-2-23	1151	GW	MW-15008		3	2	1				x	x	x						
-03	10-4-23	0949	GW	MW-15016		3	2	ĩ				x	x	x						
-04	10-2-23	1236	GW	MW-15019		3	2	1				x	x	x						
-05	10-2-23	-	GW	DUP-Background		3	2	1				x	x	x						
-06	10-2-23	1236	w	FB- Background		ī						x								
		-																		
									1											
									1											
																			1	
RELINQUISHED BY:	hy		date/ јо-	TIME: RE 5-23/0730	ECEIVED BY:	_						CO	MME	ENTS	:					
RELINQUISHED BY: DATE/TIME: RECEIVED BY: 23-0933 Page 13 of 13								Received on Ice? Yes No M&TE #: LSO 28757 Temperature: A.O-3.6 °C Cal. Due Date: II-15-23												



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 11/7/2023 5:31:55 PM

JOB DESCRIPTION

Karn/Weadock CCR Groundwater Monitoring

JOB NUMBER

240-193137-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



Eurofins Cleveland

Job Notes

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

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

Authorization

Sroohs

Generated 11/7/2023 5:31:55 PM 1

5

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

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Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

3

Qualifiers

_		
R	а	d
	-	-

Rad Qualifier	Qualifier Description	
U	Result is less than the sample detection limit.	
Glossary	· · · · · · · · · · · · · · · · · · ·	5
Abbreviation	These commonly used abbreviations may or may not be present in this report.	6
a N D	Listed under the "D" column to designate that the result is reported on a dry weight basis	
%R	Percent Recovery	
CFL CFU	Contains Free Liquid	
	Colony Forming Unit	8
CNF DER	Contains No Free Liquid	
DER Dil Fac	Duplicate Error Ratio (normalized absolute difference)	9
DIFAC	Dilution Factor	
DL, RA, RE, IN	Detection Limit (DoD/DOE) Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC NA, KE, IN	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)	1
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
MPN	Most Probable Number	
MQL	Method Quantitation Limit	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
NEG	Negative / Absent	
POS	Positive / Present	
PQL	Practical Quantitation Limit	
PRES	Presumptive	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	
TEQ	Toxicity Equivalent Quotient (Dioxin)	
TNTC	Too Numerous To Count	

Job ID: 240-193137-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-193137-1

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 10/9/2023 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 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-15002 (240-193137-1), DEK-MW-15005 (240-193137-2), DEK-MW-15006 (240-193137-3), DUP-DEK-BAP-01 (240-193137-4), EB-DEK-BAP (240-193137-5), (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-15002 (240-193137-1), DEK-MW-15005 (240-193137-2), DEK-MW-15006 (240-193137-3), DUP-DEK-BAP-01 (240-193137-4),

EB-DEK-BAP (240-193137-5), (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: 240-193137-1

		Laboratory	
Radium-226 (GFPC)	EPA	EET SL	
Radium-228 (GFPC)	EPA	EET SL	
Combined Radium-226 and Radium-228	TAL-STL	EET SL	5
Preparation, Precipitate Separation (Standard In-Growth)	None	EET SL	J
Preparation, Precipitate Separation	None	EET SL	
95:			
	Combined Radium-226 and Radium-228 Preparation, Precipitate Separation (Standard In-Growth) Preparation, Precipitate Separation	Combined Radium-226 and Radium-228 TAL-STL Preparation, Precipitate Separation (Standard In-Growth) None Preparation, Precipitate Separation None s: None	Combined Radium-226 and Radium-228 TAL-STL EET SL Preparation, Precipitate Separation (Standard In-Growth) None EET SL Preparation, Precipitate Separation None EET SL

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: 240-193137-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193137-1	DEK-MW-15002	Water	10/04/23 15:17	10/09/23 08:00
240-193137-2	DEK-MW-15005	Water	10/05/23 09:20	10/09/23 08:00
240-193137-3	DEK-MW-15006	Water	10/05/23 08:10	10/09/23 08:00
240-193137-4	DUP-DEK-BAP-01	Water	10/04/23 00:00	10/09/23 08:00
240-193137-5	EB-DEK-BAP	Water	10/05/23 09:45	10/09/23 08:00

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Client Sample ID: DEK-MW-15002 Lab Sample ID: 240-193137-1 Date Collected: 10/04/23 15:17 Matrix: Water Date Received: 10/09/23 08:00 Method: EPA 903.0 - Radium-226 (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) RL MDC Unit Prepared Analyzed Dil Fac Radium-226 0.272 0.123 0.126 1.00 0.137 pCi/L 10/10/23 12:33 10/24/23 09:19 Carrier %Yield Qualifier Limits Dil Fac Prepared Analyzed Ba Carrier 93.4 30 - 110 10/10/23 12:33 10/24/23 09:19 1 Method: EPA 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert. Analyte (2**σ**+/-) (2**σ**+/-) MDC Unit Prepared Analyzed **Result Qualifier** RL Dil Fac Radium-228 0.595 0.604 1.00 0.847 pCi/L 10/10/23 12:35 10/16/23 12:05 1.13 1 Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 30 - 110 10/10/23 12:35 10/16/23 12:05 93.4 1 76.6 30 - 110 10/10/23 12:35 10/16/23 12:05 Y Carrier 1 Method: TAL-STL Ra226 Ra228 - Combined Radium-226 and Radium-228 Total Count Uncert. Uncert. Dil Fac

AnalyteResultQualifier(2σ+/-)(2σ+/-)RLMDCUnitPreparedAnalyzedCombined Radium1.410.6080.6175.000.847pCi/L11/07/23 15:48

226 + 228

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

1.63

0.423

0.437

5.00

0.471 pCi/L

Combined Radium

226 + 228

Job ID: 240-193137-1

11/07/23 15:48

1

Client Sample ID: DEK-MW-15005 Lab Sample ID: 240-193137-2 Date Collected: 10/05/23 09:20 Matrix: Water Date Received: 10/09/23 08:00 Method: EPA 903.0 - Radium-226 (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) RL MDC Unit Prepared Analyzed Dil Fac Radium-226 0.512 0.145 0.152 1.00 0.144 pCi/L 10/10/23 12:33 10/24/23 09:19 Carrier %Yield Qualifier Limits Dil Fac Prepared Analyzed Ba Carrier 93.9 30 - 110 10/10/23 12:33 10/24/23 09:19 1 Method: EPA 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert. Analyte (2**σ**+/-) (2**σ**+/-) MDC Unit Prepared Analyzed **Result Qualifier** RL Dil Fac Radium-228 0.397 0.410 1.00 0.471 pCi/L 10/10/23 12:35 10/16/23 12:05 1.11 1 Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 30 - 110 10/10/23 12:35 10/16/23 12:05 93.9 1 81.9 30 - 110 10/10/23 12:35 10/16/23 12:05 Y Carrier 1 Method: TAL-STL Ra226 Ra228 - Combined Radium-226 and Radium-228 Total Count Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) RL MDC Unit Prepared Analyzed Dil Fac

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Lab Sample ID: 240-193137-3 Client Sample ID: DEK-MW-15006 Date Collected: 10/05/23 08:10 Matrix: Water Date Received: 10/09/23 08:00 Method: EPA 903.0 - Radium-226 (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) RL MDC Unit Prepared Analyzed Dil Fac Radium-226 0.452 0.129 0.135 1.00 0.107 pCi/L 10/10/23 12:33 10/24/23 09:20 Carrier Qualifier Limits Dil Fac %Yield Prepared Analyzed Ba Carrier 89.7 30 - 110 10/10/23 12:33 10/24/23 09:20 1 Method: EPA 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert. Result Qualifier Analyte (2**σ**+/-) (2**σ**+/-) MDC Unit Prepared Analyzed RL Dil Fac Radium-228 0.593 U 0.430 0.434 1.00 0.666 pCi/L 10/10/23 12:35 10/16/23 12:05 1 Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 30 - 110 10/10/23 12:35 10/16/23 12:05 89.7 1 30 - 110 10/10/23 12:35 10/16/23 12:05 Y Carrier 84.9 1 Method: TAL-STL Ra226 Ra228 - Combined Radium-226 and Radium-228 Total Count Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) RL MDC Unit Prepared Analyzed Dil Fac 11/07/23 15:48 **Combined Radium** 1.04 0.449 0.455 5.00 0.666 pCi/L 1

226 + 228

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

oate Collected: 10/04/2 oate Received: 10/09/23									Matrix	: Wate
- Method: EPA 903.0 - R	Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	0.342		0.132	0.135	1.00	0.126	pCi/L	10/10/23 12:33	10/24/23 09:20	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	91.2		30 - 110					10/10/23 12:33	10/24/23 09:20	
Analyte	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-228	0.205	U	0.501	0.501	1.00	0.878	pCi/L	10/10/23 12:35	10/16/23 12:05	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Carrier Ba Carrier	% Yield 91.2	Qualifier	Limits 30 - 110					Prepared 10/10/23 12:35	Analyzed 10/16/23 12:05	-
		Qualifier								
Ba Carrier Y Carrier	91.2 71.8		30 - 110 30 - 110	and Radium	1-228			10/10/23 12:35	10/16/23 12:05	
Ba Carrier Y Carrier	91.2 71.8		30 - 110 30 - 110	and Radium _{Total}	1-228			10/10/23 12:35	10/16/23 12:05	
Ba Carrier Y Carrier	91.2 71.8		30 - 110 30 - 110 Radium-226		1-228			10/10/23 12:35	10/16/23 12:05	
Ba Carrier	91.2 71.8 2 26_Ra228 •		30 - 110 30 - 110 Radium-226 Count	Total	1-228 RL	MDC	Unit	10/10/23 12:35	10/16/23 12:05	
Ba Carrier Y Carrier Method: TAL-STL Ra2	91.2 71.8 2 26_Ra228 •	Combined	30 - 110 30 - 110 Radium-226 Count Uncert.	Total Uncert.		MDC 0.878		10/10/23 12:35 10/10/23 12:35	10/16/23 12:05 10/16/23 12:05	Dil Fa

+ 228

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

	EB-DEK-B	AP						Lab Samp	le ID: 240-19	3137-5
ate Collected: 10/05/	23 09:45							-	Matrix	c: Water
ate Received: 10/09/2	23 08:00									
Method: EPA 903.0 -	Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.00153	U	0.0453	0.0453	1.00	0.0966	pCi/L	10/10/23 12:33	10/24/23 09:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.1		30 - 110					10/10/23 12:33	10/24/23 09:20	1
	Radium-228	(GFPC)	Count	Total						
		Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Analyte		Qualifier	Uncert.	Uncert.	RL 1.00	MDC 0.544	Unit pCi/L	Prepared 10/10/23 12:35	Analyzed 10/16/23 12:05	Dil Fac
Analyte Radium-228	Result 0.119	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)				··		1
Analyte Radium-228 Carrier	Result 0.119	Qualifier U	Uncert. (2σ+/-) 0.308	Uncert. (2σ+/-)				10/10/23 12:35	10/16/23 12:05	Dil Fac 1 Dil Fac 1
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.119 %Yield	Qualifier U	Uncert. (2σ+/-) 0.308 <i>Limits</i>	Uncert. (2σ+/-)				10/10/23 12:35 Prepared	10/16/23 12:05 Analyzed	1
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.119 %Yield 94.1 81.5	Qualifier U Qualifier	Uncert. (2σ+/-) 0.308 <u>Limits</u> 30 - 110 30 - 110	Uncert. (2σ+/-) 0.308	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	1
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.119 %Yield 94.1 81.5	Qualifier U Qualifier	Uncert. (2σ+/-) 0.308 <u>Limits</u> 30 - 110 30 - 110 Radium-226	Uncert. (2σ+/-) 0.308	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	1
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.119 %Yield 94.1 81.5	Qualifier U Qualifier	Uncert. (2σ+/-) 0.308 <u>Limits</u> 30 - 110 30 - 110 Radium-226 Count	Uncert. (2σ+/-) 0.308 and Radiun Total	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	1
Analyte Radium-228 Carrier Ba Carrier	Result 0.119 %Yield 94.1 81.5 a226_Ra228 -	Qualifier U Qualifier	Uncert. (2σ+/-) 0.308 <u>Limits</u> 30 - 110 30 - 110 Radium-226	Uncert. (2σ+/-) 0.308	1.00		pCi/L	10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	1

+ 228

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

			Percent Yield (Acceptance Limits)	
		Ва		
Lab Sample ID	Client Sample ID	(30-110)		5
240-193137-1	DEK-MW-15002	93.4		
240-193137-2	DEK-MW-15005	93.9		6
240-193137-3	DEK-MW-15006	89.7		
240-193137-4	DUP-DEK-BAP-01	91.2		
240-193137-5	EB-DEK-BAP	94.1		
LCS 160-631370/2-A	Lab Control Sample	101		8
MB 160-631370/1-A	Method Blank	101		0
				0
Tracer/Carrier Legend				3

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water Prep Type: Total/NA Percent Yield (Acceptance Limits) Ва Υ (30-110) Lab Sample ID **Client Sample ID** (30-110) 240-193137-1 DEK-MW-15002 93.4 76.6 240-193137-2 DEK-MW-15005 93.9 81.9 240-193137-3 DEK-MW-15006 89.7 84.9 240-193137-4 DUP-DEK-BAP-01 91.2 71.8 EB-DEK-BAP 240-193137-5 94.1 81.5 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

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: M	B 100-0	515/0/1	-A							Chefit Sa	mple ID: Metho	
Matrix: Water											Prep Type:	
Analysis Batch: 6	33137			•							Prep Batch:	: 631370
			MD	Count	Total							
A		MB		Uncert.	Uncert.	Ы		11	-		A	D!!
Analyte Radium-226		-0.01000	Qualifier	(2σ+/-) 0.0400	(2σ+/-) 0.0400	RL 1.00	0.0929			Prepared 10/23 12:33	Analyzed 10/24/23 09:19	Dil Fa
Raululli-220		-0.01000	0	0.0400	0.0400	1.00	0.0929	pci/L	10/	10/23 12.33	10/24/23 09.19	
		MB	МВ									
Carrier		%Yield	Qualifier	Limits						Prepared	Analyzed	Dil Fac
Ba Carrier		101		30 - 110					10/1	10/23 12:33	10/24/23 09:19	1
Lab Sample ID: LO	CS 160-	631370/	2-4						Client	t Samnlo II	D: Lab Control	Sample
Matrix: Water	00 100-	001010/							onen	t oumpie i	Prep Type: "	
Analysis Batch: 6	33137										Prep Batch:	
						Total						
			Spike	LCS	LCS	Uncert.					%Rec	
Analyte			Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-226			11.3	10.93		1.13	1.00	0.0948	pCi/L	97	75 - 125	_
	LCS I	LCS										
Carrier	%Yield 0		Limits									
			30 - 110	-								
lethod: 904.0 - Lab Sample ID: Mi			(GFPC)							Client Sa	mple ID: Metho Prep Type: ⁻	
Ba Carrier Iethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6	Radiui B 160-6		(GFPC)	Count	Total					Client Sa		Total/N/
lethod: 904.0 - Lab Sample ID: M Matrix: Water	Radiui B 160-6	31371/1	(GFPC) -A	Count	Total					Client Sa	Prep Type:	Total/NA
lethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6	Radiui B 160-6	31371/1 MB	(GFPC) -A MB	Uncert.	Uncert.	RI	MDC	Unit			Prep Type: ⁻ Prep Batch:	Total/NA : 631371
lethod: 904.0 - Lab Sample ID: M Matrix: Water	Radiui B 160-6	31371/1 MB	(GFPC) -A MB Qualifier					Unit pCi/L		Client Sa	Prep Type:	Total/NA
lethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte	Radiui B 160-6	MB Result 0.2227	(GFPC) -A MB Qualifier U	Uncert. (2σ+/-)	Uncert. (2σ+/-)					Prepared	Prep Type: Prep Batch: Analyzed	Total/NA : 631371
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6 Analyte Radium-228	Radiui B 160-6	MB Result 0.2227 MB	(GFPC) -A MB Qualifier U MB	Uncert. (2σ+/-) 0.292	Uncert. (2σ+/-)				10/1	Prepared 10/23 12:35	Prep Type: Prep Batch: Analyzed 10/16/23 12:05	Total/NA : 631371
lethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte	Radiui B 160-6	MB Result 0.2227	(GFPC) -A MB Qualifier U MB	Uncert. (2σ+/-)	Uncert. (2σ+/-)				10/1 F	Prepared	Prep Type: Prep Batch: Analyzed	Total/NA 631371
lethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier	Radiui B 160-6	MB <u>Result</u> 0.2227 MB %Yield	(GFPC) -A MB Qualifier U MB	Uncert. (2σ+/-) 0.292 Limits	Uncert. (2σ+/-)				10/1 F 10/1	Prepared 10/23 12:35 Prepared	Prep Type: Prep Batch: Analyzed 10/16/23 12:05 Analyzed	Dil Fac Dil Fac 1 Dil Fac
lethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)				10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05	Total/NA : 631371
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)				10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Prep Type: Prep Batch: Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 D: Lab Control	Total/NA : 631371
Iethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC Matrix: Water	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)				10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Prep Type: T Prep Batch: Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: T	Total/NA : 631371 Dil Fac Dil Fac Dil Fac
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)	1.00			10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Prep Type: Prep Batch: Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 D: Lab Control	Total/NA : 631371 Dil Fac Dil Fac Dil Fac
Iethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC Matrix: Water	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110	Uncert. (2σ+/-) 0.293	1.00			10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 Prep Type: Prep Type: Prep Batch:	Total/NA : 631371 Dil Fac 1 Dil Fac 1 Sample Total/NA
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6: Analyte Radium-228 Carrier Ba Carrier Y Carrier Y Carrier Lab Sample ID: LC Matrix: Water Analysis Batch: 6:	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier 2-A	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 LCS	Uncert. (2σ+/-) 0.293	1.00 Total Uncert.	0.488	pCi/L	10/1 F 10/1 10/2 10/2 Clien	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: Prep Batch: %Rec	Total/NA : 631371 Dil Fac 1 Dil Fac 1 Sample Total/NA
Iethod: 904.0 - Lab Sample ID: M Matrix: Water Analysis Batch: 6 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC Matrix: Water	Radiui B 160-6 32123	MB Result 0.2227 MB %Yield 101 84.9	(GFPC) -A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110	Uncert. (2σ+/-) 0.293	1.00			10/1 F 10/1 10/1 Clien	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 Prep Type: Prep Type: Prep Batch:	Total/NA : 631371 Dil Fac Dil Fac Sample Total/NA
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6: Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LC Matrix: Water Analysis Batch: 6: Analyte	Radiui B 160-6 32123 CS 160- 32123	MB Result 0.2227 MB %Yield 101 84.9 631371/	(GFPC) -A MB Qualifier U MB Qualifier 2-A Spike Added	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488 RL	pCi/L MDC	10/1 F 10/1 10/1 Clien	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: " Prep Batch: %Rec Limits	Total/NA : 631371 Dil Fac Dil Fac Dil Fac
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6: Analyte Radium-228 Carrier Ba Carrier Y Carrier Y Carrier Lab Sample ID: LC Matrix: Water Analysis Batch: 6: Analyte Radium-228	Radiui B 160-6 32123 CS 160- 32123 JLCS 1	MB Result 0.2227 MB %Yield 101 84.9 631371/	(GFPC) -A MB Qualifier U MB Qualifier 2-A Spike Added 7.79	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488 RL	pCi/L MDC	10/1 F 10/1 10/1 Clien	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: " Prep Batch: %Rec Limits	Total/NA : 631371 Dil Fac 1 Dil Fac 1 Sample Total/NA
lethod: 904.0 - Lab Sample ID: Mi Matrix: Water Analysis Batch: 6: Analyte Radium-228 Carrier Ba Carrier Y Carrier Y Carrier Lab Sample ID: LC Matrix: Water Analysis Batch: 6: Analyte Radium-228	Radiui B 160-6 32123 CS 160- 32123	MB Result 0.2227 MB %Yield 101 84.9 631371/	(GFPC) -A MB Qualifier U MB Qualifier 2-A Spike Added	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488 RL	pCi/L MDC	10/1 F 10/1 10/1 Clien	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: " Prep Batch: %Rec Limits	Total/NA : 631371 Dil Fac 1 Dil Fac 1 Sample Total/NA

QC Association Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Rad

Prep	Batc	h: 63	1370
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Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193137-1	DEK-MW-15002	Total/NA	Water	PrecSep STD	
240-193137-2	DEK-MW-15005	Total/NA	Water	PrecSep STD	
240-193137-3	DEK-MW-15006	Total/NA	Water	PrecSep STD	
240-193137-4	DUP-DEK-BAP-01	Total/NA	Water	PrecSep STD	
240-193137-5	EB-DEK-BAP	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	
Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193137-1	DEK-MW-15002	Total/NA	Water	PrecSep_0	
240-193137-2	DEK-MW-15005	Total/NA	Water	PrecSep_0	
240-193137-3	DEK-MW-15006	Total/NA	Water	PrecSep_0	
		T / 1/414	Water	PrecSep 0	
240-193137-4	DUP-DEK-BAP-01	Total/NA	vvalei	Flecoep_0	
	DUP-DEK-BAP-01 EB-DEK-BAP	Total/NA Total/NA	Water	PrecSep_0	
240-193137-4 240-193137-5 MB 160-631371/1-A				•=	

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193137-1

Matrix: Water

Lab Sample ID: 240-193137-1

5

Lab Sample	ID: 240-193137-3
	Matrix: Water

Lab Sample ID: 240-193137-4

Matrix: Water

Date Collected: 10/04/23 15:17 Date Received: 10/09/23 08:00

Client Sample ID: DEK-MW-15002

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:19
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632123	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48
Client Samp	le ID: DEK-N	IW-15005						Lab Sample ID: 240-193137-2
ate Collected	I: 10/05/23 09:2	0						Matrix: Wate
ate Received	: 10/09/23 08:00)						

	Batch	Batch		Dilution	Batch			Prepared	
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed	
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33	1
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:19	
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35	
Total/NA	Analysis	904.0		1	632123	FLC	EET SL	10/16/23 12:05	4
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48	

Client Sample ID: DEK-MW-15006 Date Collected: 10/05/23 08:10

Date Received: 10/09/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Ргер Туре	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:20
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632123	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Client Sample ID: DUP-DEK-BAP-01

Date Received: 10/09/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:20
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Date Collected: 10/04/23 00:00

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Matrix: Water

Lab Sample ID: 240-193137-5

Client Sample ID: EB-DEK-BAP Date Collected: 10/05/23 09:45 Date Received: 10/09/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Ргер Туре	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:20
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

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

Laboratory: Eurofins St. Louis

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

uthority	Program	Identification Number	Expiration Date
laska (UST)	State	20-001	05-06-25
NAB	Dept. of Defense ELAP	L2305	04-06-25
NAB	Dept. of Energy	L2305.01	04-06-25
NAB	ISO/IEC 17025	L2305	04-06-25
rizona	State	AZ0813	12-08-23
alifornia	Los Angeles County Sanitation Districts	10259	06-30-22 *
alifornia	State	2886	06-30-24
onnecticut	State	PH-0241	03-31-25
orida	NELAP	E87689	06-30-24
- RadChem Recognition	State	n/a	06-30-24
linois	NELAP	200023	11-30-23
wa	State	373	12-01-24
entucky (DW)	State	KY90125	12-31-23
entucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
ouisiana	NELAP	04080	06-30-22 *
ouisiana (All)	NELAP	04080	06-30-24
ouisiana (DW)	State	LA011	12-31-23
aryland	State	310	09-30-24
assachusetts	State	M-MO054	06-30-24
I - RadChem Recognition	State	9005	06-30-24
issouri	State	780	06-30-25
evada	State	MO000542020-1	07-31-24
ew Jersey	NELAP	MO002	06-30-24
ew Mexico	State	MO00054	06-30-24
ew York	NELAP	11616	03-31-24
orth Carolina (DW)	State	29700	07-31-24
orth Dakota	State	R-207	06-30-24
klahoma	NELAP	9997	08-31-24
regon	NELAP	4157	09-01-24
ennsylvania	NELAP	68-00540	02-28-24
outh Carolina	State	85002001	06-30-24
exas	NELAP	T104704193	07-31-24
S Fish & Wildlife	US Federal Programs	058448	07-31-24
SDA	US Federal Programs	P330-17-00028	05-18-26
tah	NELAP	MO000542021-14	07-31-24
irginia	NELAP	10310	06-15-25
/ashington	State	C592	08-30-24
/est Virginia DEP	State	381	12-31-23

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

🐝 eurofins 🖕 Environment Testing	COC No 240-112530-29052 1	Page Dane 1 of 1		des:		C - Zn Acetate P - Na204S D - Nitric Acid Q - Na2S03 E - NaHS04 D - Na2S03		I - Ice J - DI Water	K - EDTA L - EDA	Other:	redmuN let	ビ Special Instructions/Note:	2	r r	7	22	2			y		Archive For			23 1420 Company	bas	Date/Time & - 4- 2		Ver 01/16/2019
20/27-0	Carner Tracking No(s)	State of Origin	alvsis Requested																	240-193137 Chain of Custody		Compre Disposal (A ree may be assessed it samples are retained longer than 1 month) Return To Client Disposal By Lab Archive For Mon	Special Instructions/QC Requirements:	Method of Shipment	10/6/			Cooler Temperature(s) °C and Other Remarks:	
Chain of Custody Record	Lab PM Brooks, Kris M	E-Mail Kris Brooks@et eurofinsus com				a	(.bC	228_GF 20 (Yi	Matrix (W-water, (W-water, (W-water, (e)) (Filtered (e)) (Raz26Ra, (e))	BT=Tissue, A=Air) IL G S tion Code: XXD I	X NN	Water WN X X	Water N N	Water NNX X	Water VN X X	Water			Samula Dier		Special Instru	Time:	Company Received	Company Received by		Cooler Ten	
	Sampler A. Whale.	Phone 7:24-7 10-47-29		Due Date Requested:	TAT Requested (days):	\Box	PO# 199812	# OM	Eurofins Project # 24024154	#MOS		Prese	10/4/23 1517 6		30810 6	1	10/5/23 0945 6					B 🗌 Unknown 🔲 Radiological	EDD	Date:	Date/Time 10/6/23 M2C	16/6/25 1432			
Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone (330) 497-9396 Phone (330) 497-0772	Client Information		nental Corporation.			State, Zp MI, 48108-7080	l) 734-971-9022(Fax)	ccompanies.com	sct Name n/Weadock CCR DEK Bottom Ash Pond	Site			DEK-MW-15002	DEK-MW-15005	DEK-MW-15006	DUP-DEK-BAP-01	EB-DEK-BAP				Possible Hazard Identification	Avon-Hazard	TRUN	linquished by:	they is here	reinquistieu by Control 108 Reinnuisched by Control 108 Re		Custody Seals Intact: Custody Seal No.:	

	Sample Receipt Form/Na	rrative		ogin # :_		
Barberton Facility	Envina LI				Cooler unp	acked by:
	107 20	Site Name	10 9-22	-		acked by.
Cooler Received on		A	10-9-23		////	1//
FedEx: 1 st Grd Exp		Client Drop Off			r/	
Receipt After-hours: Dr			Storage Locat	tion		
Eurofins Cooler #			Box Other			
Packing material use COOLANT:	ed: Bubble Wrap Foar Wet Ice Blue Ice I		None Othe · None	er		
1. Cooler temperature u	pon receipt		See Multiple Coo	oler Form		
IR GUN #	(CF <u>-0./</u> °C)	Observed Coole	r Temp. <u>0.6</u>	°C Corre	cted Coole	r Temp. <u><i>O</i>, 5</u> ∘C
2. Were tamper/custody	v seals on the outside of the	cooler(s)? If Ye	s Quantity	Yes No		Tests that are not
-Were the seals on	the outside of the cooler(s)	signed & dated?		YON NO	D NA	checked for pH by
-Were tamper/custo	ody seals on the bottle(s) or	bottle kits (LLH	g/MeHg)?	Yes M		Receiving:
-Were tamper/custo	ody seals intact and uncomp	romised?		Yes No	NA	-
3. Shippers' packing slip	attached to the cooler(s)?			Yes No	$\overline{\mathcal{P}}$	VOAs
4. Did custody papers ac	company the sample(s)?			Yes No	>	Oil and Grease
5. Were the custody pap	ers relinquished & signed in	n the appropriate	place?	No No)	тос
6. Was/were the person(s) who collected the sample	es clearly identifi	ed on the COC?	Ves No		
7. Did all bottles arrive i	n good condition (Unbroke	n)?		Xer No)	
8. Could all bottle labels	(ID/Date/Time) be reconci	led with the CO	C?	No No)	Δ
9. For each sample, does	the COC specify preservat	ives (Y /N), # of	containers (Y/N), a	and sample	e type of gr	ab/comp(X/N)?
0. Were correct bottle(s)	used for the test(s) indicate	ed?	•	R No)	
1. Sufficient quantity rec	eived to perform indicated	analyses?		Xe No		
	samples and all listed on the	-		Yes No		
	17 have been checked at the		ratory.	~ ~		
	mple(s) at the correct pH up			Yes No	NA pH	Strip Lot# HC316719
4. Were VOAs on the C				Yes Mc	-	1
15. Were air bubbles >6	mm in any VOA vials?	🕨 🖕 Larger th	nan this.	Yes X) NA	
	k present in the cooler(s)?			Yes 😡	1	
7. Was a LL Hg or Me I				_Yes No		
Contacted PM	Date	by	via Vert	bal Voice	Mail Othe	r
Concerning				,		
18. CHAIN OF CUSTO	DY & SAMPLE DISCRE	PANCIES 🛛	additional next pa	ige Sai	nples proce	essed by:
9. SAMPLE CONDITI			41	L - L 4' '		•
	we					
					broken con	
sample(s)		were receive	ed with bubble >6	mm in dia	meter. (Not	hty PM)
0. SAMPLE PRESERV	ATION					
ample(s)			wei	re further	preserved in	n the laboratory.
ime preserved:	Preservative(s) addee	/Lot number(s):				
I					a 1	
OA Sample Preservation	- Date/Time VOAs Frozen	1:				

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	<u>Con</u> pH	<u>tainer</u> <u>Temp</u>	<u>Preservative</u> <u>Added (mls)</u> <u>Lot #</u>
DEK-MW-15002	240-193137-A-1	Plastic 1 liter - Nitric Acid	<2		
DEK-MW-15002	240-193137-В-1	Plastic 1 liter - Nitric Acid	<2		
DEK-MW-15005	240-193137-A-2	Plastic 1 liter - Nitric Acid	<2		
DEK-MW-15005	240-193137-В-2	Plastic 1 liter - Nitric Acid	<2		
DEK-MW-15006	240-193137-A-3	Plastic 1 liter - Nitric Acid	<2		
DEK-MW-15006	240-193137-В-3	Plastic 1 liter - Nitric Acid	<2		
DUP-DEK-BAP-01	240-193137-A-4	Plastic 1 liter - Nitric Acid	<2		
DUP-DEK-BAP-01	240-193137-В-4	Plastic 1 liter - Nitric Acid	<2		
EB-DEK-BAP	240-193137-A-5	Plastic 1 liter - Nitric Acid	<2		
EB-DEK-BAP	240-193137-B-5	Plastic 1 liter - Nitric Acid	<2		

ofins Cleveland	Van Buren Avenue
Eurofii	180 S. Va

Chain of Custody Record



🛟 eurofins

								j.			Environment Testing	Testing
Client Information (Sub Contract Lab)	Sampler:			Lab PM Brook:	Lab PM: Brooks, Kris M			Carrier Tracking No(s)	king No(s):	COC No: 240-174949	4949.1	Γ
Client Contact: Shipping/Receiving	Phone:			E-Mail: Kris.B	E-Mail: Kris.Brooks@et.eurofinsus.com	eurofinsus	com	State of Origin: Michigan	jin:	Page: Page 1	of 1	
Company: TestAmerica Laboratories, Inc.					Accreditation	Accreditations Required (See note)	ee note):			Job #: 240-193137-1	3137-1	
Address: 13715 Rider Trail North,	Due Date Requested: 10/23/2023	ed:					Analysis	Analysis Requested		Preser	Preservation Codes: M - Hexane	Γ
Crity. Earth City	TAT Requested (days):	ays):					-			B - NaO		
State, Zp: MO, 63045	†									D - Nitric	D - Nitric Acid P - Na204S E - NatSO4 R - Na2SO3 E - NatSO4	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	:# Od					şei				F - MeO G - Amc	H S - H2SO4 hlor T - TSP Dodecahydrate	iydrate
Email:	:# OM				(ON	nget L						
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				10 88	sT brist				K - EDTA	A W - PH 4-5 Y - Trizma Z - other (specify)	
Site	SSOW#:				N ds	_				of con		
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=orab)	Matrix (Wawater, S=solid, O=wasta/oll, BT=Tissue, A=Ak)	benefiti bleit M/SW mnohe M/SW mohe M/SW mohe M/SW	04.0/PrecSep_(Total Number	Snarial Instructions Motor	
	X	X	Preserva	Preservation Code:	X	-	100 100 100					
DEK-MW-15002 (240-193137-1)	10/4/23	15:17 Fastern		Water	×	××				2 TVA Pro	TVA protocol - Ra-226+228 action limit at	limit at
DEK-MW-15005 (240-193137-2)	10/5/23	09:20 Factorn		Water	×	××				2 TVA prot	TVA protocol - Ra-226+228 action limit at	limit at
DEK-MW-15006 (240-193137-3)	10/5/23	08:10 Eactorn		Water	×	×				2 TVA prote	TVA protocol - Ra-226+228 action limit at	limit at
DUP-DEK-BAP-01 (240-193137-4)	10/4/23	Eastern		Water	×	×				and the second second	DUP DUPL. TVA protocol - Ra-226+228 action limit at	limit at
EB-DEK-BAP (240-193137-5)	10/5/23	09:45 Eastern		Water	×	×				2 TVA Pro	TVA protocol - Ra-226+228 action limit at 5.0 pc//L	limit at
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract 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/sets/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 in the State of Origin listed above for analysis/sets/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 states 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	nent Testing North Cent above for analysis/test Central, LLC attention ir	ral, LLC places s/matrix being a nmediately. If a	the ownership nalyzed, the s ill requested a	o of method, and amples must be ccreditations ar	alyte & accred s shipped bacl e current to da	tation compli- to the Eurofi ate, return the	ance upon our ns Environmer signed Chain	subcontract laborato t Testing North Cen of Custody attesting	nies. This sample tral, LLC laborator to said compliance	shipment is forwa y or other instruction e to Eurofins Envir	rded under chain-of-custody. ons will be provided. Any chai onment Testing North Central	f the ges to LLC.
Possible Hazard Identification					Sample	Disposal	(A fee may	be assessed i	f samples are	retained long	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Deliverable Requested: 1, 11, 11, 1V, Other (specify)	Primary Deliverable Rant	able Rank: 2			Special	Return To Client al Instructions/OC	Special Instructions/OC Requirements	Disposal By Lab	Lab	Archive For	Months	Τ
Const. Mit Dulinguist La Lun								. 1				
current vir retirinquismed by:	Data (Time)	Date:			Time:			Method	Method of Shipment:			
	20211	11 8	S	Lempany HILL	/ C Rece	Received by:	1	edex	Date/Time:		Company	
Ralinguested by	Dàte/Time:	ł		Company	Rece	Received	Vin	att.	Date	1 0 2023054	Set O Company	Γ
	Date/Time:			Company	Rece	Received by:			Date/Time:		Company	Γ
Custody Seals Intact: Custody Seal No.: A Yes A No					Cool	ar Temperatur	Cooler Temperature(s) °C and Other Remarks:	her Remarks:			-	Τ
					14	13	11 12	9 10	8	6	2 3 4 5	-1

Client: TRC Environmental Corporation.

Login Number: 193137 List Number: 2

Creator: Pinette, Meadow L

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

Job Number: 240-193137-1

List Source: Eurofins St. Louis

List Creation: 10/10/23 11:23 AM



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 11/7/2023 2:58:30 PM

JOB DESCRIPTION

Karn/Weadock CCR Groundwater Monitoring

JOB NUMBER

240-193136-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203



Eurofins Cleveland

Job Notes

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

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

Authorization

Sroohs

Generated 11/7/2023 2:58:30 PM

1

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

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Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

3

Qualifiers

	-	-
R	а	0

U Result is Glossary Abbreviation These of Listed u %R Percent CFL Contain	er Description is less than the sample detection limit. commonly used abbreviations may or may not be present in this report. under the "D" column to designate that the result is reported on a dry weight basis t Recovery ns Free Liquid	4 5 6
U Result is Glossary Abbreviation These of Listed u %R Percent CFL Contain	is less than the sample detection limit.	5 6
Abbreviation These of Listed u m Listed u %R Percent CFL Contain	under the "D" column to designate that the result is reported on a dry weight basis t Recovery ns Free Liquid	5 6
Abbreviation These of Listed u m Listed u %R Percent CFL Contain	under the "D" column to designate that the result is reported on a dry weight basis t Recovery ns Free Liquid	
nListed u%RPercentCFLContain	under the "D" column to designate that the result is reported on a dry weight basis t Recovery ns Free Liquid	
%R Percent CFL Contain	t Recovery ns Free Liquid	
CFL Contain	ns Free Liquid	
CFU Colony	Forming Unit	
CNF Contain	ns No Free Liquid	ð
DER Duplicat	te Error Ratio (normalized absolute difference)	
Dil Fac Dilution		9
DL Detection	on Limit (DoD/DOE)	
DL, RA, RE, IN Indicate	es a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC Decision	n Level Concentration (Radiochemistry)	
EDL Estimate	ted Detection Limit (Dioxin)	
LOD Limit of	Detection (DoD/DOE)	
LOQ Limit of	Quantitation (DoD/DOE)	
MCL EPA rec	commended "Maximum Contaminant Level"	
MDA Minimur	m Detectable Activity (Radiochemistry)	13
MDC Minimur	m Detectable Concentration (Radiochemistry)	
MDL Method	I Detection Limit	
ML Minimur	m Level (Dioxin)	
MPN Most Pr	robable Number	
MQL Method	I Quantitation Limit	
NC Not Cal	culated	
ND Not Det	tected at the reporting limit (or MDL or EDL if shown)	
NEG Negativ	/e / Absent	
POS Positive	e / Present	
PQL Practica	al Quantitation Limit	
PRES Presum	iptive	
QC Quality	Control	
RER Relative	e Error Ratio (Radiochemistry)	
RL Reportin	ing Limit or Requested Limit (Radiochemistry)	
RPD Relative	e Percent Difference, a measure of the relative difference between two points	
TEF Toxicity	r Equivalent Factor (Dioxin)	
TEQ Toxicity	r Equivalent Quotient (Dioxin)	
TNTC Too Nur	merous To Count	

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

Method Description

Radium-226 (GFPC)

Radium-228 (GFPC)

EPA = US Environmental Protection Agency

Combined Radium-226 and Radium-228

Preparation, Precipitate Separation

Preparation, Precipitate Separation (Standard In-Growth)

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

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

Method

903.0

904.0

Ra226_Ra228

PrecSep STD

Protocol References:

None = None

Laboratory References:

PrecSep_0

Job ID: 240-193136-1

Laboratory

EET SL

EET SL

EET SL

EET SL

EET SL

Protocol

TAL-STL

EPA

EPA

None

None

1
5
8
9

Sample Summary

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job	ID:	240-	1931	36-1

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

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) Count Total Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) 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 Dil Fac Analyzed Ba Carrier 90.7 30 - 110 10/10/23 12:33 10/24/23 09:22 1 Method: EPA 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (2**σ**+/-) (2**σ**+/-) MDC Unit Prepared Analyzed RL 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 74.4 30 - 110 10/10/23 12:35 10/16/23 12:04 Y Carrier 1 Method: TAL-STL Ra226 Ra228 - Combined Radium-226 and Radium-228 Total Count

			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226	0.434	U	0.360	0.361	5.00	0.581 pCi/L		11/07/23 15:48	1	
+ 000										

+ 228

Tracer/Carrier Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Job ID: 240-193136-1

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

			Percent Yield (Acceptance
		Ва	
ab Sample ID	Client Sample ID	(30-110)	
240-193136-1	DEK-MW-18001	90.7	
_CS 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

Percent Yield (Acceptance Limits) Ва Υ (30-110) (30-110) Lab Sample ID **Client Sample ID** 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

5

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-	631370/1	I -A							Client Sa	mple ID: Metho	d Blank
Matrix: Water										Prep Type: 1	Total/N/
Analysis Batch: 633137										Prep Batch:	63137
			Count	Total							
	MB	MB	Uncert.	Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	P	Prepared	Analyzed	Dil Fa
Radium-226	-0.01000	U	0.0400	0.0400	1.00	0.0929	pCi/L	10/1	10/23 12:33	10/24/23 09:19	
	МВ	МВ									
Carrier	%Yield	Qualifier	Limits					F	Prepared	Analyzed	Dil Fa
Ba Carrier	101		30 - 110					10/1	10/23 12:33	10/24/23 09:19	1
Lab Sample ID: LCS 160	0-631370/	12-∆						Client	t Sample II	D: Lab Control	Sample
Matrix: Water								Chon	c oumpion	Prep Type: 1	
Analysis Batch: 633137										Prep Batch:	
					Total					. top Batoli	
		Spike	LCS	LCS	Uncert.					%Rec	
Analyte		Added	Result		(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-226		11.3	10.93		1.13	1.00	0.0948	pCi/L	97	75 - 125	
LCS	LCS										
Carrier %Yield		Limits									
Ba Carrier 101 lethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water	um-228 631371/1	30 - 110 (GFPC)	-						Client Sa	mple ID: Metho Prep Type: 1	Fotal/N
	um-228 631371/1	30 - 110 (GFPC)	Count Uncert.	Total Uncert.					Client Sa		Fotal/N
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water	um-228 631371/1 MB	<u>30 - 110</u> (GFPC)			RL	MDC	Unit	P	Client Sa	Prep Type: 1	Fotal/N/ 63137
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123	um-228 631371/1 MB	30 - 110 (GFPC) I-A MB Qualifier	Uncert.	Uncert.		MDC 0.488				Prep Type: 7 Prep Batch:	Fotal/NA 631371 Dil Fac
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160 Matrix: Water Analysis Batch: 632123 Analyte	um-228 631371/1 MB Result	30 - 110 (GFPC) I-A MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)					Prepared	Prep Type: 7 Prep Batch: Analyzed	Fotal/NA 631371 Dil Fac
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160 Matrix: Water Analysis Batch: 632123 Analyte	um-228 631371/1 MB Result 0.2227	30 - 110 (GFPC) I-A MB Qualifier U MB	Uncert. (2σ+/-)	Uncert. (2σ+/-)				10/1	Prepared	Prep Type: 7 Prep Batch: Analyzed	Fotal/NA 631371 Dil Fac
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228	LIM-228 631371/1 MB Result 0.2227 <i>MB</i>	30 - 110 (GFPC) I-A MB Qualifier U MB	Uncert. (2σ+/-) 0.292	Uncert. (2σ+/-)				10/1 F	Prepared 10/23 12:35	Prep Type: 1 Prep Batch: Analyzed 10/16/23 12:05	Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier	Um-228 631371/1 MB Result 0.2227 MB %Yield	30 - 110 (GFPC) I-A MB Qualifier U MB	Uncert. (2σ+/-) 0.292 Limits	Uncert. (2σ+/-)				10/1 F 10/1	Prepared 10/23 12:35 Prepared	Prep Type: 1 Prep Batch: Analyzed 10/16/23 12:05 Analyzed	Dil Fac
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) I-A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)				10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed	Total/N/ 63137 Dil Fa Dil Fa Sample Fotal/N/
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) I-A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110	Uncert. (2σ+/-)				10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 Prep Type:	Fotal/NA 631371 Dil Fac Dil Fac Sample Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) I-A MB Qualifier U MB Qualifier	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 30 - 110	Uncert. (2σ+/-) 0.293	1.00			10/1 F 10/1 10/1	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 Prep Type:	Fotal/NA 631371 Dil Fac Dil Fac Sample Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) -A MB Qualifier U MB Qualifier 22-A Spike Added	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488	pCi/L MDC	10/1 F 10/1 10/1 Client	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: T Prep Batch: %Rec Limits	Fotal/NA 631371 Dil Fac Dil Fac Sample Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) I-A MB Qualifier U MB Qualifier 22-A Spike	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 30 - 110	Uncert. (2σ+/-) 0.293	1.00 Total Uncert.	0.488	pCi/L	10/1 F 10/1 10/1 Client	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: T Prep Batch: %Rec	Fotal/NA 63137 Dil Fau Dil Fau Dil Fau Sample Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123 Analyte Radium-228	LIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 D-631371/	30 - 110 (GFPC) -A MB Qualifier U MB Qualifier 22-A Spike Added	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488	pCi/L MDC	10/1 F 10/1 10/1 Client	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: T Prep Batch: %Rec Limits	Fotal/NA 631371 Dil Fac Dil Fac Sample Fotal/NA
Ba Carrier 101 Iethod: 904.0 - Radiu Lab Sample ID: MB 160- Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Carrier Ba Carrier Y Carrier Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123 Analyte Radium-228 Lab Sample ID: LCS 160 Matrix: Water Analysis Batch: 632123 Analyte Radium-228 LCS	JIM-228 -631371/1 MB Result 0.2227 MB %Yield 101 84.9 0-631371/	30 - 110 (GFPC) -A MB Qualifier U MB Qualifier 22-A Spike Added	Uncert. (2σ+/-) 0.292 Limits 30 - 110 30 - 110 30 - 110 LCS Result	Uncert. (2σ+/-) 0.293	Total Uncert. (2σ+/-)	0.488	pCi/L MDC	10/1 F 10/1 10/1 Client	Prepared 10/23 12:35 Prepared 10/23 12:35 10/23 12:35 t Sample II	Analyzed 10/16/23 12:05 Analyzed 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 10/16/23 12:05 D: Lab Control Prep Type: T Prep Batch: %Rec Limits	Fotal/NA 631371 Dil Fac 1 Dil Fac 1 Sample Fotal/NA

QC Association Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Lab Control Sample

Job ID: 240-193136-1

Rad

Prep Batch: 631370

LCS 160-631371/2-A

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	
ren Batch: 6313/1					
Prep Batch: 631371	Client Sample ID	Pren Type	Matrix	Method	Pren Batcl
Lab Sample ID 240-193136-1	Client Sample ID DEK-MW-18001	Prep Type Total/NA	Matrix Water	Method PrecSep 0	Prep Batcl

Total/NA

Water

PrecSep_0

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

Client Sample ID: DEK-MW-18001 Date Collected: 10/04/23 06:12 Date Received: 10/09/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared
Ргер Туре	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Laboratory References:

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

Job ID: 240-193136-1

Lab Sample ID: 240-193136-1 Matrix: Water 5 6 7 8 9

10

Accreditation/Certification Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Groundwater Monitoring

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
NAB	Dept. of Defense ELAP	L2305	04-06-25
NAB	Dept. of Energy	L2305.01	04-06-25
NAB	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
II - RadChem Recognition	State	n/a	06-30-24
linois	NELAP	200023	11-30-23
owa	State	373	12-01-24
Kentucky (DW)	State	KY90125	12-31-23
(entucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
ouisiana	NELAP	04080	06-30-22 *
ouisiana (All)	NELAP	04080	06-30-24
ouisiana (DW)	State	LA011	12-31-23
laryland	State	310	09-30-24
assachusetts	State	M-MO054	06-30-24
II - RadChem Recognition	State	9005	06-30-24
lissouri	State	780	06-30-25
levada	State	MO000542020-1	07-31-24
lew Jersey	NELAP	MO002	06-30-24
lew Mexico	State	MO00054	06-30-24
lew York	NELAP	11616	03-31-24
lorth Carolina (DW)	State	29700	07-31-24
lorth Dakota	State	R-207	06-30-24
Dklahoma	NELAP	9997	08-31-24
Dregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-24
exas	NELAP	T104704193	07-31-24
JS Fish & Wildlife	US Federal Programs	058448	07-31-24
JSDA	US Federal Programs	P330-17-00028	05-18-26
Jtah	NELAP	MO000542021-14	07-31-24
/irginia	NELAP	10310	06-15-25
Vashington	State	C592	08-30-24
Vest Virginia DEP	State	381	12-31-23

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

Eurofins Cleveland	MICHIGAN				K			
		ain of Custody Record	stody R	ecord	\sim	(-0)	🔅 eurofins	
вагрепоп, ОН 44203 Phone (330) 497-9396 Phone (330) 497-0772			•				En	Environment Testing
Client Information	-	ASK	Lab Pl Broo	Lab PM Brooks, Kris M		Carrier Tracking No(s)	COC No: 240-112531-29053.1	
Dient Contact: Jacob Krenz	904	330	E-Mail Kris.	E-Mail Kris.Brooks@et.eurofinsus.com	sus.com	State of Origin.	Page 1 of 1	
Company. TRC Environmental Corporation.		PWSID:			alvsis	Requested	# qor	
Address 1540 Eisenhower Place	Due Date Requested:			age of the second se			ığ.	accord
tity Ann Arbor	TAT Requested (days):	-		0.00				lone sNaO2
State, Zp. MI, 48108-7080	Compliance Project: A Ye	A Yes A No					D Nitric Acid D - N	P - Na2O4S Q - Na2SO3 R - Na2S2O3
топе. 734-971-7080(Теl) 734-971-9022(Fax)	PO# 199812			(1			5	2SO4 SP Dodecahydrate
maił JKrenz@trccompanies.com	# OM			OF NO			J - Di Water	ICAA ICAA
Project Name Karn/Weadock CCR DEK Bottom Ash Pond & lined Well	Eurofins Project # 24024154	-		bC			K-EDTA Y- L-EDA Z-	v - pri 4-3 Y - Trizma Z - other (specify)
Site	#MOSS			SS8 GEI			Other:	
			Matrix (w=water. s=solid.	Filtered 5 M ms Res26Re3 - Standard			Number o	
Sample Identification	Sample Date Time		<u> </u>	903.0			To Special Instructions/Note:	tions/Note:
	1	+	Preservation Code:				X	
DEK-MW-18001	(inc) Edulat	0	Water	++>2			4	
			Water					
		-						Τ
					240-193136 C	240-193136 Chain of Custody		
		-						
Possible Hazard Identification	Poison B	Leoinoloited	1	Sample Disposal (A f	sal (A fee may be	assessed if samples are r	than 1 mo	(h)
ested: I, II, III, IV, Other (specify) 7 RC	12	1 adioiodice	5	Special Instruct	Requirem	uisposai by Lab ents:	Archive For M	Months
Empty Kit Relinquished by:	Date:			Time		Method of Shipment		T
Reinquished by	Date/Time 16 17 3	W70	Company	Recorded	X	Date/Time	IN3/	12 LUN
telinquished by COLFCE	0123	NJZ	Fright	Received by	J MM	Date/Tyme	8an	Company
Zelinquished by:		-	Company	Received by.		Date/Time		Company
Custody Seals Intact: Custody Seal No.: A Yes A No				Cooler Tempe	Cooler Temperature(s) °C and Other Remarks.	lemarks:		
				1	1	2 2 2 1		Ver. 01/16/2019
				3 4	1 2	9 0	4 5 6	

Eurofins – Cleveland Sample Receipt Form/Narrative Login	# :
Barberton Facility	Cooler unpacked by:
Client <u>TAC Environmental</u> Site Name Cooler Received on 10-7-23 Opened on 10-9-23	Cooler unpacked by.
	Other
Receipt After-hours: Drop-off Date/Time Storage Location	
Eurofins Cooler # C Foam Box Client Cooler Box Other	
 Packing material used: Bubble Wrap Foam Plastic Bag None Other COOLANT: Wetlee Blue Ice Dry Ice Water None Cooler temperature upon receipt See Multiple Cooler For IR GUN # (CF °C) Observed Cooler Temp 6 °C Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity Vere the seals on the outside of the cooler(s) signed & dated? Vere tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yee Vere tamper/custody seals intact and uncompromised? Yee Shippers' packing slip attached to the cooler(s)? Yee Were the custody papers relinquished & signed in the appropriate place? Yee Was/were the person(s) who collected the samples clearly identified on the COC? Did all bottle labels (ID/Date/Time) be reconciled with the COC? Yee For each sample, does the COC specify preservatives (YAN), # of containers (YNN), and s Were correct bottle(s) used for the test(s) indicated? Yee 	Corrected Cooler Temp. Solution NA Solution NA Soluti
14. Were VOAs on the COC? Ye 15. Were air bubbles >6 mm in any VOA vials? Larger than this. 16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Ye	8 No NA pH Strip Lot# HC316719 s 120 s 120 NA s 128 s 128
Contacted PM Date by via Verbal V	/oice 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 hold	
Sample(s)	d in a broken container. in diameter. (Notify PM)
20. SAMPLE PRESERVATION	
Sample(s)	rther preserved in the laboratory.
Sample(s) were fu Time preserved: Preservative(s) added/Lot number(s):	refer preserved in the laboratory.
VOA Sample Preservation - Date/Time VOAs Frozen:	

Login Container Summary Report

Temperature readings:			Container Preservative	
Client Sample ID	<u>Lab ID</u>	Container Type	pH Temp Added (mls) Lot #	
DEK-MW-18001	240-193136-A-1	Plastic 1 liter - Nitric Acid	<2	5
DEK-MW-18001	240-193136-B-1	Plastic 1 liter - Nitric Acid	<2	

🐝 eurofins Environment Testing	COC No ⁻ 240-112531-29053.1 Page	Page 1 of 1 Job #	Preservation Codes:	A - HCL M - Hexane B - NaOH N - None C - ZI Acetate D - ASNAO2 D - Nitro Actd		H - Ascorbic Acid I - Ice J - DI Water	K - EDTA L - EDA	Other:	Vaenuk letc	F Special Instructions/Note:						tetained longer than 1 month)	Archive For Months		1420 Company	900	D-G-XS Company		Ver: 01/16/2019
5-0} D; Q	Carrier Tracking State of Ongin	lveie Red					teid fi	1 Targe	bлеbnest2 - 0.АО						240-193136 Chain of Custody	ee may be	return to culent · Jisposal By Lab Special Instructions/QC Requirements:	Method of Shipment	Date/Time	Received by W DateITyme	Date/Time 10-9-2.	Cooler Temperature(s) °C and Other Remarks:	
Chain of Custod	risy P.J.	FUT	Due Date Requested:	1# 1	Compliance Project: ∆ Yes ∆ No PO # 199812	<u>, or No</u>	es ot (y) as	Sample Type Sample (C=comp, Time C=-comp,	fion Code: XX r	5	Water					DD rankowi radiological	Date: Time:	Date Time Date Time The Received	Detertime Compary Recei	Company	Coole	
Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone (330) 497-9396 Phone (330) 497-0772	Client Information	mental Corporation.	Address 1540 Eisenhower Place)) 734-971-9022(Fax)		Project Name Karn/Weadock CCR DEK Bottom Ash Pond & lined Well 2		Sample Identification		DEK-MW-18001					Possible Hazard Identification	, III, IV, Other (specify) 7DC	linquished by:	Relinquished by Relinquished by Relinquished by	SUNK -	Custody Seals Infact Custody Seal No.		

Eurofins – Cleveland Sample Receipt Form/Narrative Login Barberton Facility	#:
Client TRC Environmental Site Name	Cooler unpacked by:
	man
	11/1/1
FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier	Other
Receipt After-hours: Drop-off Date/TimeStorage Location	V
COOLANT: Weller Blue Ice Dry Ice Water None . Cooler temperature upon receipt	lorm.
IR GUN # (CF°C) Observed Cooler Temp°C	Contraction De San
IR GUN # (CF °C) Observed Cooler Temp °C °C	Corrected Cooler Temp.
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity A	es No
-Were the seals on the outside of the cooler(s) signed & dated?	No NA Tests that are not checked for pH by
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Y	es No Receiving:
-Were tamper/custody seals intact and uncompromised? Y	es No (NA)
	es No VOAs
	So Oil and Grease
. Were the custody papers relinquished & signed in the appropriate place?	No TOC
	es No
. Did all bottles arrive in good condition (Unbroken)?	🛱 No
	No 🔿
For each sample, does the COC specify preservatives $(\sqrt[Y]{N})$, # of containers $(\sqrt[Y]{N})$, and	sample type of grab/comp(X/N)?
	No No
1. Sufficient quantity received to perform indicated analyses?	No No
2. Are these work share samples and all listed on the COC?	es 🕼
If yes, Questions 13-17 have been checked at the originating laboratory.	
	No NA pH Strip Lot# HC316719
	es No
5. Were air bubbles >6 mm in any VOA vials? 🚺 🖕 Larger than this. Ye	es No NA
	es 😡
7. Was a LL Hg or Me Hg trip blank present? Ye	es NB
ontacted PM Date by via Verbal	Voice Mail Other
oncerning	
8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES	Samples processed by:
O. SAMPLE CONDITION ample(s)	ding time had expired.
	ed in a broken container.
ample(s) were receive	
ample(s) were received with bubble >6 mm	in diameter. (Notify PM)
	in diameter. (Notify PM)
were received with bubble >6 mm O. SAMPLE PRESERVATION	

-

Login Container Summary Report

10/9/2023	Logi	n Container Summary	Report	240-193136	1
	5-		•		
Temperature readings:					
Client Sample ID	Lab ID	Container Type	<u>Container</u> <u>pH Tem</u> r	<u>Preservative</u> <u>Added (mls)</u> Lot #	
DEK-MW-18001	240-193136-A-1	Plastic 1 liter - Nitric Acid	<2		5
DEK-MW-18001	240-193136-B-1	Plastic 1 liter - Nitric Acid	<2		6
					8
					9

urofins Cleveland	0 S. Van Buren Avenue
	180 S

Chain of Custody Record



🖧 eurofins

Client Information Same (a.w.) Book (a.w.) Book (a.w.) Book (a.w.) Const (a.w.) Const (a.w.	Barberton, OH 44203 Phone: 330-497-9396 Fax: 330-497-0772			, , , ,			5			¥.	W.				Environment Testing
Control Train KitAli None Constrained Examination Example or orino Examinatio		Sampler.			Lab Ph Brool	A. S. Kris N				Cami	ar Tracking I	:(s)o	COC No: 240-172	1949 1	
Lubrationes. Inc. Lubrationes. Inc. <thlubrationes. inc.<="" th=""> Lubrationes. Inc.</thlubrationes.>	Client Contact: Shipping/Receiving	Phone:			E-Mail: Kris F	trooks@	et euro		Ę	State	of Origin:		Page:	1.0101	
Trail Notif. Table Semanter. Trail Notif. Trail Notif. Trail Notif. Intrinsional Contraction M Requested (tay): M Requested (ta): M Requested (t	company: TestAmerica Laboratories, Inc.					Accreditatio	upaRequ	red (See	note):						
Art Requested (days): Art Requested (days): Art Requested (days): NO R: NO R: NO R: NO R: NO R: Sample Sample Art Requested (days): NO R: NO R: NO R: NO R: NO R: NO R: NO R: Sample Sample Article R: Sample Article R: <td< td=""><td>Address: 13715 Rider Trail North,</td><td>Due Date Requested: 11/7/2023</td><td></td><td></td><td></td><td></td><td></td><td></td><td>nalveie</td><td>Doutoe</td><td>1</td><td></td><td>Preserv:</td><td>- log</td><td></td></td<>	Address: 13715 Rider Trail North,	Due Date Requested: 11/7/2023							nalveie	Doutoe	1		Preserv:	- log	
District Sample Solution Sample Solution Sample Solution Sample Solution Sample Solution Sample Solution Sample Solution 001 242-208-6757(Fast) POIE No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E No.E <td>City Earth City State Zin</td> <td>TAT Requested (days</td> <td></td> <td>A - HCL B - NaOF C - Zn Ac</td> <td></td> <td>4 - Hexane 4 - None 5 - AsNaO2 5 - Na2O4S</td>	City Earth City State Zin	TAT Requested (days											A - HCL B - NaOF C - Zn Ac		4 - Hexane 4 - None 5 - AsNaO2 5 - Na2O4S
08-3666(Tel) 314.208.475/(Fax) Ore is Name. 09-3666(Tel) 314.208.475/(Fax) Vol. is Nov. is Vol. is Vol. is Nov. is Vol. is Vol. is Nov. is 210241.54 Isolandard Target List Nov. is 210241.54 Isolandard Target List Solandard Target List 210241.54 Nov. isola 210241.54 Solandard Target List Sample Data Solandard Target List Novelandard Target List Solandard Target List Novelandard Target List Calcono, Isola Sample Data Sample Data Sample Data Sample Data Novelandard Target List Novelandard Target List Novelandard Target List Novelandard Target Sample Orego Novelandard Target Calconon <td< td=""><td>MO. 63045 Phone: 6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>D - Nitric E - NaHS</td><td></td><td>2 - Na2SO3 7 - Na2S2O3</td></td<>	MO. 63045 Phone: 6												D - Nitric E - NaHS		2 - Na2SO3 7 - Na2S2O3
Wo II Wo II Montater M	98-8566(Tel)	# 0				38.7							G - Amch		- H2SO4 - TSP Dodecahvdrate
Protect #: Mediatock Drefet #: 2002d15d Protect #: Mediatock 2002d15d SSOW: Sample Sample C=500 Mit SSOURCED Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample	Email:	#OM				(0)							and the second second		J - Acetone / - MCAA
Soow# Soow# Soow#	Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				e or j									V - pH 4-5 ^ Trizma
Sample Sample Sample Sample Carbon Sample Sample Sample Carbon Sample Sample Sample Carbon Sample Sample Sample	Site:	:#MOSS				aD (N		Dd							- omer (specify)
The servation Code: X	Sample Identification - Client ID (Lab ID)	L				WSW WOUN		12256Ra228_GF							
10/4/23 06:12 Water X				Preservatic		X		,		1000	State State	the lot of the second			nctions/Note:
	DEK-MW-18001 (240-193136-1)		-		Water	×	-	×					-	ocol - Ra-2	6+228 action limit a
											-		1.0 0.0		
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			-			_					_		123		
	Possible Hazard Identification					Sampl	e Disp	osal (A	fee may	be asses	sed if san	ples are ret	ained longe	r than 1 n	onth)
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed	Jeliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable	Rank: 2			Specia	l Instru	to Uller ctions/C	C Requi	UISPOS ements:	al By Lab		Archive For		Months
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed Inconfirmed Disposal By Lab Archive For Months Deleverable Requested: I, II, II, IV, Other (specify) Primary Deliverable Rank: 2 Special Instructions/OC Requirements:	Empty Kit Relinquished by:	Da	:0		F	ime				- Г	Anthod of St	inment:			
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed Inconfirmed	Conto			8 (7		eived by:					ate/Time:			Vacuto
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed Inconfirmed	CAEKE	Date/Time:	5115	\int	TAN Muban	Rec	aiy60	-	d'	34				C	ompany
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed Inconfirmed Inconfirmed Inconfirmed Deliverable Requested: I. II. III. IV, Other (specify) Primary Deliverable Rank: 2 Special Instructions/GC Requirements: Inconfirmed Incomply (it Relinquished by: Inter Inconfirmed Inter Incomply (it Relinquished by: Inter Incomply (it Relinquished by: Inter Interview of by: Interview of by: Interview of by: Interview of by:		Date/Time:		8	mpany	Rec	eived by.	- -	1			4		T	отралу
Ossible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Inconfirmed Inconfirmed Disposal By Lab Archive For Months Inconfirmed Deliverable Requested: 1, II, IV, Other (specify) Primary Deliverable Rank: 2 Special Instructions/GC Requirements: Archive For Months Innovision by Kit Relinquished by: Date: Date: Innovision Meeture of Simment Meeture of Simment Innovision by: Meeture of Simmer Innovision of Simmert Meeture of Simment Meeture Company Innovision by: Meeture of Simmert Meeture of Simmert Meeture of Simmert Meeture Company Innovision by: Meeture of Simmert Meeture of Simmert Meeture Date/Time: Company Innovision by: Meeture of Simmert Meeture of Simmert Meeture of Simmert Meeture Company Innovision by: Meeture of Simmert Meeture of Simmert Meeture of Simmert Company Company	Custody Seals Intact: Custody Seal No.: A Yes A No					ŝ	ler Temp	erature(s)	°C and Ot	Cooler Temperature(s) °C and Other Remarks:	1				

Client: TRC Environmental Corporation.

Login Number: 193136 List Number: 2

Creator: Pinette, Meadow L

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



Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Darby Litz TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080 Generated 11/7/2023 2:58:27 PM

JOB DESCRIPTION

Karn/Weadock CCR Background Well

JOB NUMBER

240-193059-1

Eurofins Cleveland 180 S. Van Buren Avenue Barberton OH 44203







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 <u>Kris.Brooks@et.eurofinsus.com</u> (330)966-9790

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Receipt Checklists	25

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Background Well

Qualifiers

Qualifiers		3
Rad		
Qualifier	Qualifier Description	
U	Result is less than the sample detection limit.	
Glossary		5
Abbreviation	These commonly used abbreviations may or may not be present in this report.	6
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	
%R	Percent Recovery	7
CFL	Contains Free Liquid	
CFU	Colony Forming Unit	0
CNF	Contains No Free Liquid	0
DER	Duplicate Error Ratio (normalized absolute difference)	0
Dil Fac	Dilution Factor	9
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)	13
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
MPN	Most Probable Number	
MQL	Method Quantitation Limit	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
NEG	Negative / Absent	
POS	Positive / Present	
PQL	Practical Quantitation Limit	
PRES	Presumptive	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	
TEQ	Toxicity Equivalent Quotient (Dioxin)	
TNTC	Too Numerous To Count	

Job ID: 240-193059-1

Laboratory: Eurofins Cleveland

Narrative

Job Narrative 240-193059-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 10/6/2023 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.4°C

Gas Flow Proportional Counter

Method 903.0: Radium-226 batch 631370

Based upon client request, Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative.

MW-15008 (240-193059-2), MW-15016 (240-193059-3), MW-15019 (240-193059-4), DUP-BACKGROUND (240-193059-5), EQ-BACKGROUND (240-193059-6), (LCS 160-631370/2-A), (MB 160-631370/1-A) and (240-193059-B-6-A DU)

Method 903.0: Radium-226 prep batch 160-631370:

The following sample has activity above the RL. The sample was re-counted after 21 days of in-growth. The re-count results are above the RL and are reported as is. MW-15002 (240-193059-1)

Method 904.0: Radium-228 batch 631371

The sample duplicate (DUP) precision (DER) is outside the control limits. However the original sample and DUP activity is below the MDC / RL making the measurement of precision less critical. The lab does not believe this discrepancy to have a negative impact on the data being reported.

(240-193059-B-6-B DU)

Method 904.0: Radium-228 batch 631371

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

MW-15002 (240-193059-1), MW-15008 (240-193059-2), MW-15016 (240-193059-3), MW-15019 (240-193059-4), DUP-BACKGROUND (240-193059-5), EQ-BACKGROUND (240-193059-6), (LCS 160-631371/2-A), (MB 160-631371/1-A) and (240-193059-B-6-B DU)

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

Rad

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

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Background Well

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ob ID: 240-193059-1	
Laboratory	
EET SL	
EET SL EET SL	5
EET SL	
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Eurofins Cleveland

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 Refe EPA = US None = No	Environmental Protection Agency		

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 Background Well

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-193059-1	MW-15002	Water	10/04/23 09:13	10/06/23 08:00
240-193059-2	MW-15008	Water	10/02/23 11:51	10/06/23 08:00
240-193059-3	MW-15016	Water	10/04/23 09:49	10/06/23 08:00
240-193059-4	MW-15019	Water	10/02/23 12:36	10/06/23 08:00
240-193059-5	DUP-BACKGROUND	Water	10/02/23 00:00	10/06/23 08:00
240-193059-6	EQ-BACKGROUND	Water	10/04/23 10:02	10/06/23 08:00

Client Sample ID: MW-15002

Lab Sample ID: 240-193059-1 Matrix: Water

Method: EPA 903.0) - Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	1.18		0.208	0.233	1.00	0.112	pCi/L	10/10/23 12:33	11/06/23 08:01	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	91.2	<u> </u>	30 - 110 Count	Total				Prepared 10/10/23 12:33	Analyzed 11/06/23 08:01	
Carrier Ba Carrier Method: EPA 904.0 Analyte	91.2 91.2	<u> </u>	30 - 110	Total Uncert. (2σ+/-)	RL	MDC	Unit			
Ba Carrier Method: EPA 904.0	91.2 91.2	(GFPC)	30 - 110 Count Uncert.	Uncert.	RL 1.00	MDC 0.777		10/10/23 12:33	11/06/23 08:01	
Ba Carrier Method: EPA 904.0 Analyte	91.2 91.2 91.2 91.2 91.2 91.2 91.2 91.2	(GFPC)	30 - 110 Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				10/10/23 12:33 Prepared	11/06/23 08:01	Dil Fa
Ba Carrier Method: EPA 904.0 Analyte Radium-228 Carrier	91.2 91.2 91.2 91.2 91.2 91.2 91.2 91.2	(GFPC) Qualifier	30 - 110 Count Uncert. (2σ+/-) 0.754	Uncert. (2σ+/-)				10/10/23 12:33 Prepared 10/10/23 12:35	11/06/23 08:01 Analyzed 10/16/23 12:05	Dil Fa
Ba Carrier Method: EPA 904.0 Analyte Radium-228	91.2) - Radium-228 	(GFPC) Qualifier	30 - 110 Count Uncert. (2σ+/-) 0.754 Limits	Uncert. (2σ+/-)				10/10/23 12:33 Prepared 10/10/23 12:35 Prepared	Analyzed 10/16/23 12:05 Analyzed	Dil Fa Dil Fa

			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	4.48		0.782	0.846	5.00	0.777	pCi/L		11/07/23 15:17	1
226 + 228										

Client Sample ID: MW-15008

Job ID: 240-193059-1

Lab Sample ID: 240-193059-2

Method: EPA 903.	0 - Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	0.352		0.139	0.143	1.00	0.145	pCi/L	10/10/23 12:33	10/24/23 09:20	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	91.2		30 - 110					10/10/23 12:33	10/24/23 09:20	
			Count	Total						
		Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL		Unit	Prepared	Analyzed	Dil Fa
	Result	Qualifier	Uncert.	Uncert.	RL 1.00		Unit pCi/L	Prepared 10/10/23 12:35	Analyzed 10/16/23 12:05	Dil Fa
Radium-228	1.67	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						Dil Fa
Radium-228 Carrier	1.67		Uncert. (2σ+/-) 0.597	Uncert. (2σ+/-)				10/10/23 12:35	10/16/23 12:05	
Radium-228 Carrier Ba Carrier	1.67 %Yield		Uncert. (2σ+/-) 0.597 <i>Limits</i>	Uncert. (2σ+/-)				10/10/23 12:35 Prepared	10/16/23 12:05 Analyzed	
Analyte Radium-228 Carrier Ba Carrier Y Carrier Method: TAL-STL	1.67 %Yield 91.2 80.4	Qualifier	Uncert. (2σ+/-) 0.597 Limits 30 - 110 30 - 110	Uncert. (2σ+/-) 0.617	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	
Radium-228 Carrier Ba Carrier	1.67 %Yield 91.2 80.4	Qualifier	Uncert. (2σ+/-) 0.597 Limits 30 - 110 30 - 110	Uncert. (2σ+/-) 0.617	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	
Radium-228 Carrier Ba Carrier Y Carrier	1.67 %Yield 91.2 80.4	Qualifier	Uncert. (2σ+/-) 0.597 <u>Limits</u> 30 - 110 30 - 110 Radium-226	Uncert. (2σ+/-) 0.617	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:05 Analyzed 10/16/23 12:05	

(2**σ+/-**) Analyte **Result Qualifier** (2**σ**+/-) MDC Unit Prepared Analyzed Dil Fac RL **Combined Radium** 0.613 0.633 5.00 0.736 pCi/L 11/07/23 15:17 2.02 1 226 + 228

0.620 U

0.448

0.449

5.00

0.700 pCi/L

Client Sample ID: MW-15016

Lab Sample ID: 240-193059-3 Matrix: Water

11/07/23 15:17

1

Method: EPA 903.	0 - Radium-226	(GFPC)								
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	0.182		0.0977	0.0991	1.00	0.107	pCi/L	10/10/23 12:33	10/24/23 09:22	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	94.1		30 - 110					10/10/23 12:33	10/24/23 09:22	
Method: EPA 904.	0 - Radium-228	(GFPC)	Count Uncert.	Total Uncert.						
Method: EPA 904.	0 - Radium-228	(GFPC)	Count	Total						
Analyte	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC		Prepared	Analyzed	Dil Fa
Analyte		Qualifier	Uncert.	Uncert.	RL	MDC 0.700	Unit pCi/L	Prepared 10/10/23 12:35	Analyzed	Dil Fa
Analyte Radium-228	Result 0.438	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)				··		Dil Fa
Analyte Radium-228 Carrier	Result 0.438	Qualifier U	Uncert. (2σ+/-) 0.437	Uncert. (2σ+/-)				10/10/23 12:35	10/16/23 12:04	
Analyte Radium-228 Carrier Ba Carrier	Result 0.438 %Yield	Qualifier U	Uncert. (2σ+/-) 0.437 Limits	Uncert. (2σ+/-)				10/10/23 12:35 Prepared	10/16/23 12:04 Analyzed	
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.438 %Yield 94.1 74.4	Qualifier U Qualifier	Uncert. (2σ+/-) 0.437 <u>Limits</u> 30 - 110 30 - 110	Uncert. (2σ+/-) 0.438	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:04 Analyzed 10/16/23 12:04	
Analyte Radium-228 Carrier Ba Carrier Y Carrier	Result 0.438 %Yield 94.1 74.4	Qualifier U Qualifier	Uncert. (2σ+/-) 0.437 <u>Limits</u> 30 - 110 30 - 110	Uncert. (2σ+/-) 0.438	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:04 Analyzed 10/16/23 12:04	
Analyte Radium-228 Carrier Ba Carrier	Result 0.438 %Yield 94.1 74.4	Qualifier U Qualifier	Uncert. (2σ+/-) 0.437 <u>Limits</u> 30 - 110 30 - 110 I Radium-226	Uncert. (2σ+/-) 0.438 and Radiun	1.00			10/10/23 12:35 Prepared 10/10/23 12:35	10/16/23 12:04 Analyzed 10/16/23 12:04	

+ 228

Combined Radium 226

Client Sample ID: MW-15019

Lab Sample ID: 240-193059-4 Matrix: Water 4 5 7 8 9 10 11 12 13 14

		(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.543		0.167	0.174	1.00	0.126	pCi/L	10/10/23 12:33	10/24/23 09:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier										
Method: EPA 904.(81.9 <mark>0 - Radium-228</mark>	(GFPC)	30 - 110	Total				10/10/23 12:33	10/24/23 09:22	1
		(GFPC)	30 - 110 Count Uncert.	Total Uncert.				10/10/23 12:33	10/24/23 09:22	1
	0 - Radium-228	(GFPC) Qualifier	Count		RL	MDC	Unit	10/10/23 12:33 Prepared	10/24/23 09:22	1 Dil Fac
Method: EPA 904.(0 - Radium-228		Count Uncert.	Uncert.	RL 1.00		Unit pCi/L			1 1
Method: EPA 904.(Analyte	0 - Radium-228		Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				Prepared	Analyzed	1 Dil Fac 1 Dil Fac
Method: EPA 904.(Analyte Radium-228	0 - Radium-228	Qualifier	Count Uncert. (2σ+/-) 0.565	Uncert. (2σ+/-)				Prepared 10/10/23 12:35	Analyzed 10/16/23 12:04	1

		Uncert.	Uncert.						
Analyte	Result Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac	
Combined Radium	1.77	0.589	0.603	5.00	0.758 pCi/L		11/07/23 15:48	1	
226 + 228									

Client Sample ID: DUP-BACKGROUND

Lab Sample ID: 240-193059-5

	1	

Method: EPA 903.0) - Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Radium-226	0.454		0.148	0.154	1.00	0.120	pCi/L	10/10/23 12:33	10/24/23 09:22	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Carrier Ba Carrier Method: EPA 904.(88.5		30 - 110					Prepared 10/10/23 12:33	Analyzed	
Ba Carrier Method: EPA 904.(88.5) - Radium-228		30 - 110 Count Uncert.	Total Uncert. (2σ+/-)	RL	MDC	Unit	·	10/24/23 09:22	
Ba Carrier	88.5) - Radium-228	(GFPC) Qualifier	30 - 110 Count		RL 1.00	MDC 0.776		10/10/23 12:33		
Ba Carrier Method: EPA 904.(Analyte	88.5 D - Radium-228 	(GFPC) Qualifier	30 - 110 Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				10/10/23 12:33 Prepared	10/24/23 09:22 Analyzed	Dil Fa
Ba Carrier Method: EPA 904.0 Analyte Radium-228	88.5 D - Radium-228 	(GFPC) Qualifier U	30 - 110 Count Uncert. (2σ+/-) 0.498	Uncert. (2σ+/-)				10/10/23 12:33 Prepared 10/10/23 12:35	10/24/23 09:22 Analyzed 10/16/23 12:04	Dil Fa

Uncert. Uncert. Analyte **Result Qualifier** (2**σ**+/-) (2**σ+/-**) RL MDC Unit Prepared Analyzed Dil Fac **Combined Radium** 0.520 0.525 5.00 0.776 pCi/L 11/07/23 15:48 1.07 1 226 + 228

Lab Sample ID: 240-193059-6 Matrix: Water 4

5	
7	
8	
9	
13	

Client Sample ID: EQ-BACKGROUND Date Collected: 10/04/23 10:02 Date Received: 10/06/23 08:00

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0139	U	0.0579	0.0579	1.00	0.112	pCi/L	10/10/23 12:33	10/24/23 09:22	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier Method: EPA 904.	94.9 0 - Radium-228	(GFPC)	30 - 110 Count Uncert.	Total Uncert.				10/10/23 12:33	10/24/23 09:22	
		(GFPC)	Count					10/10/23 12:33	10/24/23 09:22	
	0 - Radium-228	(GFPC) Qualifier	Count		RL	MDC	Unit	10/10/23 12:33	10/24/23 09:22 Analyzed	Dil Fac
Method: EPA 904.	0 - Radium-228	Qualifier	Count Uncert.	Uncert.	RL 1.00	MDC 0.584	Unit pCi/L			Dil Fac
Method: EPA 904.	0 - Radium-228	Qualifier	Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				Prepared	Analyzed	
Method: EPA 904. Analyte Radium-228	0 - Radium-228	Qualifier	Count Uncert. (2σ+/-) 0.368	Uncert. (2σ+/-)				Prepared 10/10/23 12:35	Analyzed 10/16/23 12:04	1

			Count	TOLAT							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Combined Radium 226	0.407	U	0.373	0.374	5.00	0.584	pCi/L		11/07/23 15:48	1	
+ 228											

+ 228

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

			Percent Yield (Acceptance Limits)	
		Ва		1
Lab Sample ID	Client Sample ID	(30-110)		
240-193059-1	MW-15002	91.2		
240-193059-2	MW-15008	91.2		
240-193059-3	MW-15016	94.1		
240-193059-4	MW-15019	81.9		
240-193059-5	DUP-BACKGROUND	88.5		
240-193059-6	EQ-BACKGROUND	94.9		
240-193059-6 DU	EQ-BACKGROUND	95.4		
LCS 160-631370/2-A	Lab Control Sample	101		
MB 160-631370/1-A	Method Blank	101		
Tracer/Carrier Legend				

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

				Percent Yield (Acceptance Limits)
		Ва	Y	
Lab Sample ID	Client Sample ID	(30-110)	(30-110)	
240-193059-1	MW-15002	91.2	80.7	
240-193059-2	MW-15008	91.2	80.4	
240-193059-3	MW-15016	94.1	74.4	
240-193059-4	MW-15019	81.9	84.1	
240-193059-5	DUP-BACKGROUND	88.5	81.1	
240-193059-6	EQ-BACKGROUND	94.9	71.4	
240-193059-6 DU	EQ-BACKGROUND	95.4	79.3	
LCS 160-631371/2-A	Lab Control Sample	101	84.9	
MB 160-631371/1-A	Method Blank	101	84.9	

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

Method: 903.0 - Radium-226 (GFPC)

Lab Sample		631370/1	- A							Client Sa	mple ID: Method	
Matrix: Wate											Prep Type: To	
Analysis Bat	ch: 633137			Count	Total						Prep Batch:	63137
		МВ	MD	Count Uncert.	Uncert.							
Analyte			Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit		Prepared	Analyzed	Dil Fa
Radium-226		-0.01000		0.0400	0.0400	1.00	0.0929			10/23 12:33	10/24/23 09:19	
Addulli-220		-0.01000	0	0.0400	0.0400	1.00	0.0929	poi/L	10/	10/23 12.33	10/24/23 09.19	
		MB	МВ									
Carrier		%Yield	Qualifier	Limits					F	Prepared	Analyzed	Dil F
Ba Carrier		101		30 - 110					10/	10/23 12:33	10/24/23 09:19	
_ab Sample	ID: LCS 160	-631370/	'2-A						Clien	t Sample I	D: Lab Control S	Samp
Matrix: Wate											Prep Type: To	
Analysis Bat	ch: 633137										Prep Batch:	
-						Total						
			Spike	LCS	LCS	Uncert.					%Rec	
Analyte			Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-226			11.3	10.93		1.13	1.00	0.0948	pCi/L	97	75 - 125	
	LCS	LCS										
Carrier	%Yield	Qualifier	Limits									
Ba Carrier	101		30 - 110	-								
Lab Sample	D· 240-193	159-6 DU	I						Clier	nt Sample	ID: EQ-BACKGF	
Matrix: Wate										it oumpio	Prep Type: To	
Analysis Bat											Prep Batch:	
···· , ··· -··						Total						
	Sample	e Sample		DU	DU	Uncert.						R
Analyte	Resul	t Qual		Result	Qual	(2σ+/-)	RL	MDC	Unit		RER	Lir
Radium-226	0.0139	Ū		-0.03237	U	0.0368	1.00	0.102	pCi/L		0.49	
	DU	DU										
Carrier	%Yield	Qualifier	Limits									
Ba Carrier	95.4		30 - 110	-								

Lab Sample ID: MB 160-631371/1-A **Client Sample ID: Method Blank** Matrix: Water Prep Type: Total/NA Analysis Batch: 632123 Prep Batch: 631371 Count Total MB MB Uncert. Uncert. (2**σ**+/-) Dil Fac Analyte Result Qualifier (2**σ**+/-) RL MDC Unit Prepared Analyzed 10/10/23 12:35 Radium-228 0.2227 0.292 0.293 1.00 0.488 pCi/L 10/16/23 12:05 U 1 MB MB Carrier %Yield Qualifier Limits Prepared Dil Fac Analyzed Ba Carrier 101 30 - 110 10/10/23 12:35 10/16/23 12:05 1 Y Carrier 84.9 30 - 110 10/10/23 12:35 10/16/23 12:05 1

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

Lab Sample I Matrix: Water	ID: LCS 160-63137 r	71/2-A						Clien	t Sample I	D: Lab Control S Prep Type: To	
Analysis Bat	ch: 632123									Prep Batch: 6	31371
					Total						
		Spike	LCS	LCS	Uncert.					%Rec	
Analyte		Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-228		7.79	8.365		1.15	1.00	0.475	pCi/L	107	75 - 125	
	LCS LCS										
Carrier	%Yield Qualifie	er Limits									
Ba Carrier	101	30 - 110									
Y Carrier	84.9	30 - 110									
l ah Sampio I	ID: 240-193059-6 I							Clior	at Samplo	ID: EQ-BACKGR	
Matrix: Water		50						oner	it Gample	Prep Type: To	
Analysis Bat										Prep Batch: 6	
Analysis Dati	CII. 032123				Total					Frep Batch. 0	51571
	Sample Samp	ble	DU	DU	Uncert.						RER
Analyte	Result Qual		Result		(2σ+/-)	RL	MDC	Unit		RER	Limit
Radium-228	0.393 U		-0.09251		0.193	1.00	0.416			0.86	1
	DU DU										
Carrier	DU DU %Yield Qualifie	er Limits									
Carrier Ba Carrier		er <u>Limits</u> 30 - 110									

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Background Well

Rad

Prep Batch: 631370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-193059-1	MW-15002	Total/NA	Water	PrecSep STD	
240-193059-2	MW-15008	Total/NA	Water	PrecSep STD	
240-193059-3	MW-15016	Total/NA	Water	PrecSep STD	
240-193059-4	MW-15019	Total/NA	Water	PrecSep STD	
240-193059-5	DUP-BACKGROUND	Total/NA	Water	PrecSep STD	
240-193059-6	EQ-BACKGROUND	Total/NA	Water	PrecSep STD	
MB 160-631370/1-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-631370/2-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
240-193059-6 DU	EQ-BACKGROUND	Total/NA	Water	PrecSep STD	
rep Batch: 631371					
rep Batch: 631371					
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
Lab Sample ID	Client Sample ID MW-15002	Prep Type Total/NA	Matrix Water	Method PrecSep_0	Prep Batch
Lab Sample ID 240-193059-1	· · · · · · · · · · · · · · · · · · ·				Prep Batch
Lab Sample ID 240-193059-1 240-193059-2	MW-15002	Total/NA	Water	PrecSep_0	Prep Batch
Lab Sample ID 240-193059-1 240-193059-2 240-193059-3	MW-15002 MW-15008	Total/NA Total/NA	Water Water	PrecSep_0 PrecSep_0	Prep Batch
rep Batch: 631371 Lab Sample ID 240-193059-1 240-193059-2 240-193059-3 240-193059-4 240-193059-5	MW-15002 MW-15008 MW-15016	Total/NA Total/NA Total/NA	Water Water Water	PrecSep_0 PrecSep_0 PrecSep_0	Prep Batch
Lab Sample ID 240-193059-1 240-193059-2 240-193059-3 240-193059-4 240-193059-5	MW-15002 MW-15008 MW-15016 MW-15019	Total/NA Total/NA Total/NA Total/NA	Water Water Water Water	PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0	Prep Batch
Lab Sample ID 240-193059-1 240-193059-2 240-193059-3 240-193059-4 240-193059-5 240-193059-6	MW-15002 MW-15008 MW-15016 MW-15019 DUP-BACKGROUND	Total/NA Total/NA Total/NA Total/NA Total/NA	Water Water Water Water Water	PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0	Prep Batch
Lab Sample ID 240-193059-1 240-193059-2 240-193059-3 240-193059-4	MW-15002 MW-15008 MW-15016 MW-15019 DUP-BACKGROUND EQ-BACKGROUND	Total/NA Total/NA Total/NA Total/NA Total/NA Total/NA	Water Water Water Water Water Water	PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0 PrecSep_0	Prep Batch

Matrix: Water

Matrix: Water

Lab Sample ID: 240-193059-1

5 12

Lab Sample ID: 240-193059-3

Lab Sample ID: 240-193059-4

Matrix: Water

Matrix: Water

Client Sample ID: MW-15002 Date Collected: 10/04/23 09:13 Date Received: 10/06/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	635431	SCB	EET SL	11/06/23 08:01
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17
Client Samp	le ID: MW-15	5008						Lab Sample ID: 240-193059-2

Client Sample ID: MW-15008

Date Collected: 10/02/23 11:51 Date Received: 10/06/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared	
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed	
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33	
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:20	
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35	
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:05	
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17	

Client Sample ID: MW-15016 Date Collected: 10/04/23 09:49

Date Received: 10/06/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:17

Client Sample ID: MW-15019

Date Collected: 10/02/23 12:36

Date Received: 10/06/23 08:00

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22
Total/NA	Prep	PrecSep_0			631371	KAC	EET SL	10/10/23 12:35
Total/NA	Analysis	904.0		1	632125	FLC	EET SL	10/16/23 12:04
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48

Dilution

Factor

1

1

1

Run

Batch

Number Analyst

631370 KAC

633137 FLC

631371 KAC

632125 FLC

635692 CAH

Lab

EET SL

EET SL

EET SL

EET SL EET SL

Batch

Туре

Prep

Prep

Analysis

Analysis

Analysis

Batch

903.0

904.0

Method

PrecSep STD

PrecSep_0

Ra226_Ra228

Lab Sample ID: 240-193059-5 Matrix: Water

Prepared

or Analyzed

10/10/23 12:33

10/24/23 09:22

10/10/23 12:35

10/16/23 12:04

11/07/23 15:48

Lab Sample ID

5

	8
: 240-193059-6	
Matrix: Water	9

Client Sample ID: EQ-BACKGROUND Date Collected: 10/04/23 10:02 Date Received: 10/06/23 08:00

_	Batch	Batch		Dilution	Batch			Prepared	
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed	
Total/NA	Prep	PrecSep STD			631370	KAC	EET SL	10/10/23 12:33	1
Total/NA	Analysis	903.0		1	633137	FLC	EET SL	10/24/23 09:22	1
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	4
Total/NA	Analysis	Ra226_Ra228		1	635692	CAH	EET SL	11/07/23 15:48	

Laboratory References:

Prep Type

Total/NA

Total/NA

Total/NA

Total/NA

Total/NA

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

12 13

Accreditation/Certification Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Background Well

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
llinois	NELAP	200023	11-30-23
owa	State	373	12-01-24
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
_ouisiana	NELAP	04080	06-30-22 *
∟ouisiana (All)	NELAP	04080	06-30-24
_ouisiana (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
JS Fish & Wildlife	US Federal Programs	058448	07-31-24
JSDA	US Federal Programs	P330-17-00028	05-18-26
Jtah	NELAP	MO000542021-14	07-31-24
Virginia	NELAP	10310	06-15-25
Vashington	State	C592	08-30-24
West Virginia DEP	State	381	12-31-23

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

Eurofins Cleveland 180 S. Van Buren Avenue Barberton, OH 44203 Phone (330) 497-9396 Phone (330) 497-0772	CHIGAN _{Cha}	chain c	of Cus	ଛାଳ of Custody Record	ecord	-		5) [`C	*	🔅 eurofins	Environment Testing	esting
Client Information	Sampler. Sale	t Krent		Lab PM Brook	Lab PM: Brooks, Kris M			Carrier Tracking No(s)	king No(s).	<u>~ C</u>	COC No 240-112524-33282	1282.1	Γ
Client Contact: Jacob Krenz	Phone: 734-39	395-9804	100	E-Ma Kris	E-Mail Kris. Brooks@et. eurofinsus.	et.eurofins	us.com	State of Origin	UI	a a	Page Page 1 of 1		
Company TRC Environmental Corporation			DISMA				Analvsis	Requested		or	dot #		Γ
Address 1540 Eisenhower Place	Due Date Requested:	ij							F	-	Preservation Codes	1	Τ
City. Ann Arbor	TAT Requested (days):	ys):								< ⊡ ∪	A - HCL B - NaOH C - Zn Acetate	N - None O - AsNaO2	
State, Zip MI, 48108-7080	Compliance Project:	Δ Yes	A No						_		D - Nitric Acid E - NaHSO4	P - Na204S Q - Na2SO3 R - Na2S2O3	
Phone. 734-971-7080(Tel) 734-971-9022(Fax)	PO# 199813				(1						F - MeOH G - Amchlor H - Ascochic Acid	S - H2SO4 T - TSP Dodecahydrate	Irate
Email JKrenz@trccompanies com	* OM				or No				_		I - Ice J - DI Water		
Project Name Kam/Weadock CCR Background Well	Eurofins Project # 24024154								_		- EDTA - EDA	vv - pH 4-5 Y - Trizma Z - other (specify)	_
Site	**MOSS				as as						Other:		_
Samole Identification	Samole Date	Sample	Sample Type (C=comp,	Matrix (w-water. S=solid. O=wasteroli,	ield Filtered 5 Perform MS/M M3.0, Ra226Ra2	0.40 - Standard				aedmuN leto			
		X	Preserva	Preservation Code:	X	1-					special	Special Instructions/Note:	
MW-15002	10-4-23	0913	3	Water	NN	××				4			
MW-15008	10-1-23	11511		Water	-					2			
MW-15016	10-11-23	6949		Water	×	×				2			
MW-15019	10-2-23	1236		Water	×	×				2		λро	
DUP-Background	10-2-23	1		Water	×	×				8		Cust	
EQ-Backgroud	10-4-23	1002	~	Water	メント	×				8		jo u	
				Water								СРа	
												6908	
												40-19	
												5	
Possible Hazard Identification					Samp	e Dispos	al (A fee may	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	f samples a	re retained	longer than	1 month)	Т
Deliverable Requested: 1, II, IV, Other (specify)	Poison B Unknown		Radiological		Specia	Return To Client	Return To Client Disj	Disposal By Lab	Lab	Archive For	e For	Months	Т
Empty Kit Relinquished by:		Date:			Time			Metho	Method of Shipment				Т
	Date/Time:	145	6	Company	Re	Received by	KINDY A	No Co	Date/Time.	9/2/2	2 1455	Company	4
Reinquished by TIM M.C.	Date/Time: 05	103		Company TTT+A		Received by.		The second secon	Date/Time	- 22	Polo	Company	
τ Ι	Date/Time			Company		Received by:	1		Date/Time			Company	
Custody Seals Intact: Custody Seal No.: A Yes A No					8	oler Tempera	Cooler Temperature(s) ^e C and Other Remarks.	her Remarks.					Г
					14	13	11 12	9 10	8	0 7	5	Ver 01/16/2019	

Eurofins - Cleveland Sample Receipt Form/Narrative Login # :
Barberton Facility
Client \underline{TRC} \underline{FNV} . \underline{Carp} Site Name Cooler unpacked by: Cooler Received on $\underline{10-6-33}$ Opened on $\underline{10-6-33}$
FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other Receipt After-hours: Drop-off Date/Time Storage Location
Packing material used: Bubble Wrep Foam Plastic Bag None Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None
1. Cooler temperature upon receipt \Box See Multiple Cooler Form IR GUN # (CF °C) Observed Cooler Temp °C Corrected Cooler Temp °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity I was No
-Were the seals on the outside of the cooler(s) signed & dated? Were the seals on the outside of the cooler(s) signed & dated? Tests that are not checked for pH by
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes We Receiving:
-Were tamper/custody seals intact and uncompromised? Yes No No 3. Shippers' packing slip attached to the cooler(s)? Yes No VOAs
3. Shippers' packing slip attached to the cooler(s)? Yes VOAs 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?
7. Did all bottles arrive in good condition (Unbroken)?
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
9. For each sample, does the COC specify preservatives (Y/N) , # of containers (Y/N) , and sample type of grab/comp (Y/N) ?
10. Were correct bottle(s) used for the test(s) indicated?
11. Sufficient quantity received to perform indicated analyses? Yes No 12. Are these work share samples and all listed on the COC? 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 🔊 NA
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes 🕅
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.
Sample(s)
VOA Sample Preservation - Date/Time VOAs Frozen:

Login Container Summary Report

_	5
_	
_	
-	8
-	
-	9
_	
-	
-	

Temperature readings: _____

			Container Preservative 3
<u>Client Sample ID</u>	Lab ID	Container Type	pH Temp Added (mls) Lot #
MW-15002	240-193059-A-1	Plastic 1 liter - Nitric Acid	<2
MW-15002	240-193059-B-1	Plastic 1 liter - Nitric Acid	<2 5
MW-15008	240-193059-A-2	Plastic 1 liter - Nitric Acid	<2 6
MW-15008	240-193059-B-2	Plastic 1 liter - Nitric Acid	<2 7
MW-15016	240-193059-A-3	Plastic 1 liter - Nitric Acid	<2
MW-15016	240-193059-B-3	Plastic 1 liter - Nitric Acid	<2 8
MW-15019	240-193059-A-4	Plastic 1 liter - Nitric Acid	<2 9
MW-15019	240-193059-B-4	Plastic 1 liter - Nitric Acid	<2
DUP-BACKGROUND	240-193059-A-5	Plastic 1 liter - Nitric Acid	<2 10
DUP-BACKGROUND	240-193059-B-5	Plastic 1 liter - Nitric Acid	<2 11
EQ-BACKGROUND	240-193059-A-6	Plastic 1 liter - Nitric Acid	<2
EQ-BACKGROUND	240-193059-B-6	Plastic 1 liter - Nitric Acid	<2 12
			13

Eurofins Cleveland	180 S. Van Buren Avenue	Sarberton OH 44203
Eurofin	180 S. Van	Barberton

Chain of Custody Record



🔆 eurofins

Phone: 330-497-9396 Fax: 330-497-0772					; ;))						Environment Testing
Client Information (Sub Contract Lab)	Sampler:			Lab PM Brook:	Lab PM: Brooks, Kris M			Carrier Tracking No(s)	g No(s):	COC No: 240-174889 1	
Client Contact: Shipping/Receiving	Phone:			E-Mail Kris.E	E-Mail: Kris.Brooks@et.eurofinsus.com	eurofins	us.com	State of Ongin: Michigan		Page: Page 1 of 1	
company: TestAmerica Laboratories, Inc.		:			Accreditations Required (See note):	Required	(See note):			Job #: 240.102050 1	
Address: 13715 Rider Trail North,	Due Date Requested: 11/6/2023	:peq:					Analvsis F	Analvsis Requested		Preservation Codes	odes: M Hormoo
City: Earth City	TAT Requested (days):	ays):				E				A - HCL B - NaOH	M - Nexane N - None O - AsNaO2
State, Zp: MO, 63045	T									C - Zn Acetate D - Nitric Acid E - NaHSO4	P - Na204S Q - Na2S03
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	# 04					18				F - MeOH G - Amchlor	R - Na2S203 S - H2SO4 T - TSP Dodocabudrato
Email:	# OM				(01	1964 FJ				H - Ascorbic Acid I - Ice .I - DI Water	U - Acetone V - MCAA
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				1.10 88	eT brei					W - pH 4-5 Y - Trizma 7 - other (second
Site:	SSOW#:				Nas				uco ji	Other:	z - ouer (specify)
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=crab)	Matrix (www.exer, 5==olid, 0=wastaioli, BT=Tissue, Amake)	103.0/Precsep_9 903.0/Precsep_9 9	04.0/PrecSep_0			otal Number o		
	X	X	Preservation Code:		X	-					Special Instructions/Note:
MW-15002 (240-193059-1)	10/4/23	09:13 Factern		Water	×	×			~		IVA protocol - Ra-226+228 action limit at
MW-15008 (240-193059-2)	10/2/23	11:51 Eastern		Water	×	×			8	1/1- 4	D. D. DUTL. IVA protocol - Ra-226+228 action limit at
MW-15016 (240-193059-3)	10/4/23	09:49 Eastern		Water	×	×			2	-	TVA protocol - Ra-226+228 action limit at
MW-15019 (240-193059-4)	10/2/23	12:36 Eastern		Water	×	×			2		TVA protocol - Ra-226+228 action limit at
DUP-BACKGROUND (240-193059-5)	10/2/23	Eastern		Water	×	×			3	-	TVA protocol - Ra-226+228 action limit at
EQ-BACKGROUND (240-193059-6)	10/4/23	10:02 Eastern		Water	×	× ×			2		TVA protocol - Ra-226+228 action limit at
						-					
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC pla laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix bei accreditation status should be brought to Eurofins Environment Testing North Central. LLC attention immediately.	nent Testing North Cent above for analysis/test Central, LLC attention ir	ဗီမီ	the ownership inalyzed, the sa ill requested ac	of method, anal amples must be creditations are	yte & accredi shipped back current to da	ation comp to the Eur e, return th	liance upon our sub fins Environment T e signed Chain of (contract laboratorie: esting North Central Justody attesting to	 This sample shipme LLC laboratory or oth said compliance to Eur 	ent is forwarded unde ler instructions will be rofins Environment Te	ces the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the ng 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 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					Sample	Disposa	I (A fee may b	e assessed if s	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	ned longer than	1 month)
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Ran	able Rank: 2			Special	al Instructions/QC	Special Instructions/QC Requirements:	Disposal By Lab nents:]	Archive For	Months
Empty Kit Relinquished by:		Date:			Time:			Method of	Method of Shipment:		
12 June 10 Jun	2010	アニム		Company	/ Recei	Received by:	14	Maka	Date/Time:		Company
Relinquighed by: FEAPY	Date/Time:			ompany	Recent	JAA.	D	227	Pater Fine: 0 9 7	212209110	Company
(I	Date/Time:			Company	Rece	Received by:	HIX+	d	2	5	Company
Custody Seals Intact: Custody Seal No.:					Coole	Temperat	Cooler Temperature(s) °C and Other Remarks:	Remarks:			T

Client: TRC Environmental Corporation.

Login Number: 193059 List Number: 2

Creator: Pinette, Meadow L

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

List Source: Eurofins St. Louis

List Creation: 10/09/23 01:16 PM



Technical Memorandum

Date:	January 29, 2024
То:	J.R. Register, Consumers Energy
From:	Darby Litz, TRC Kristin Lowery, TRC
Project No.:	514404.0001.0000 Phase 2 Task 2
Subject:	Second Semiannual 2023 Nature and Extent Data Summary, DE Karn Bottom Ash Pond, Consumers Energy, Essexville, Michigan

Introduction

In response to the United States Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) Coal Combustion Residual rule ("CCR Rule") promulgated on April 17, 2015, as amended, Consumers Energy Company (Consumers Energy) has conducted groundwater monitoring at the DE Karn Bottom Ash Pond CCR Unit. During the statistical evaluation of the initial assessment monitoring event (May 2018) for the Karn Bottom Ash Pond, arsenic was present in one or more downgradient monitoring well(s) at statistically significant levels exceeding the Groundwater Protection Standards (GWPSs)¹.

The CCR Rule 40 CFR §257.96(a) requires that an owner or operator initiate an assessment of corrective measures (ACM) to prevent further release, to remediate any releases, and to restore impacted areas to original conditions if any Appendix IV constituent has been detected at a statistically significant level exceeding a GWPS. The *Assessment of Corrective Measures* (ACM) (TRC, September 2019) was initiated on April 14, 2019 and was certified and submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on September 11, 2019 in accordance with the schedule in §257.96.

Per §257.95(g)(1), in the event that the facility determines, pursuant to §257.93(h), that there is a statistical exceedance of the GWPSs for one or more of the Appendix IV constituents, the facility must characterize the nature and extent of the release of CCR as well as any site conditions that may affect the remedy selected. Installation of additional monitoring wells at locations downgradient of the Karn Bottom Ash Pond groundwater monitoring system was not necessary or feasible due to the presence of existing monitoring wells sampled under the groundwater surface water interface (GSI) Compliance Monitoring Program administered under a Michigan-approved Hydrogeological Monitoring Plan (HMP) (Consumers Energy, 2019), and the proximity of the surface water bodies. Monitoring wells designated for nature and extent characterization are shown on Figures 1 and 2 and data collected over the past year (March 2023 through October 2023) from these nature and extent groundwater monitoring wells are included in Tables 1 and 2.

¹ TRC. 2019. Statistical Evaluation of Initial Assessment Monitoring Sampling Event, DE Karn Bottom Ash Pond, Consumers Energy Company, Essexville, Michigan. January 14.

Approach

Given the proximity of the Karn Bottom Ash Pond to the Karn Landfill at the Karn property, the nature and extent of contamination was assessed from a site-wide perspective rather than on a per CCR unit basis. The nature and extent of groundwater impacted by a release from the Karn Bottom Ash Pond overlaps with groundwater impacted by operation of the Karn Landfill. Additionally, looking at impacted groundwater on a site-wide basis was more practical from a risk mitigation standpoint, given:

- The likely age of the release(s);
- A long operational history of ash management;
- The historical use of CCR as fill; and
- The influence of geochemistry on several of the Appendix IV constituent concentrations in groundwater.

Groundwater Nature and Extent Relative to Groundwater Protection Standards

As discussed in the ACM, the nature and extent of contamination (e.g. arsenic) in groundwater relative to GWPSs has been defined per the RCRA CCR Rule requirements based on the site-specific hydrogeology. Current data continue to support that although arsenic concentrations exceed the GWPS in on-site groundwater monitoring locations, arsenic is delineated within the limits of the property owned by Consumers Energy and there are currently no adverse effects on human health or the environment from either surface water or groundwater due to CCR management at the Karn Bottom Ash Pond. The property is owned and operated by Consumers Energy and groundwater is not used for drinking water. There are no on-site drinking water wells and there are no surface water potable water intakes within 3 miles of the site, so the drinking water pathway is not complete.

The distribution of arsenic relative to the Karn Bottom Ash Pond groundwater monitoring system in the shallow water-bearing unit as compared to the GWPS is presented in Figure 1. Three categories were assigned to groundwater data collected from March 2023 to October 2023, as follows:

- White No Exceedances: all concentrations were below the GWPS
- Yellow Two or More Exceedances: individual observations above the GWPS²
- Orange Statistically Significant GWPS Exceedances³

The highest concentrations of arsenic observed in the vicinity of the Karn Bottom Ash Pond have been observed at DEK-MW-15003, a monitoring well located to the north of the bottom ash pond and associated with the shifted "highest" elevation of mounded groundwater relative to the Karn Bottom Ash Pond. Although historically the point source discharge of sluiced bottom ash into the Karn Bottom Ash Pond 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

² Although an exceedance is defined as a single detection above the GWPS, confidence intervals will be used to determine compliance per the CCR Rule using the Karn Bottom Ash Pond monitoring well network. Compliance with the GWPSs established under § 257.95(h) will be achieved by demonstrating that concentrations of constituents listed in Appendix IV to this part have not exceeded the GWPSs for a period of three consecutive years using the statistical procedures and performance standards in § 257.93(f) and (g).

³ Lower confidence limit is above the GWPS based upon most recent assessment monitoring statistical evaluation using the eight most recent sampling events (May 2020 through October 2023).

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hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the pooled area is no longer present. The groundwater elevation data collected from the groundwater monitoring system of the former bottom ash pond this event demonstrate a reduction in groundwater elevation measurements by several feet when compared to groundwater elevations measured prior to June 2018.

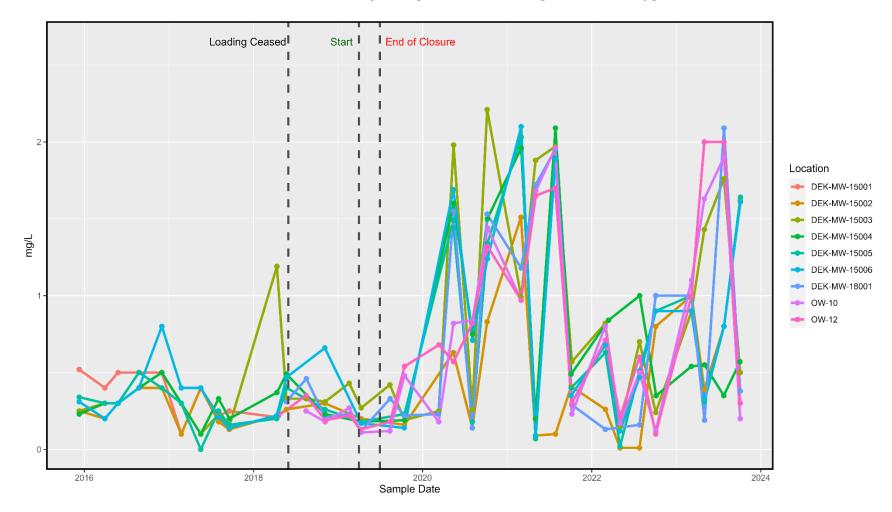
Data show that groundwater quality is continuing to change after sluicing to the Karn Bottom Ash Pond ceased in June 2018, when the bottom ash and transport water was diverted to the Karn Lined Impoundment. Arsenic has been the only constituent to have triggered corrective action. TRC used Sanitas[™] to compare groundwater data collected while the pond was still in operation ("background" for the purposes of the statistical comparison, December 2015 to June 2018) to data collected once hydraulic loading ceased ("compliance" for the purposes of the statistical comparison, June 2018 to present), as shown by the time-series charts and Welch's t-test results (Attachment A).

Mean arsenic concentrations in groundwater at DEK-MW-15002, DEK-MW-15003, and DEK-MW-18001⁴ from June 2018 to present are lower than concentrations observed while the pond was in operation (prior to June 2018), indicating that the discontinuation of hydraulic loading to the Karn Bottom Ash Pond and the completed source removal of CCR was successful in removing a source of arsenic. However, attainment of the GWPS at all the Bottom Ash Pond downgradient monitoring wells may not be feasible due to influences other than the former pond, such as the presence and former operation of the nearby Karn Landfill. Mean arsenic concentrations in groundwater at DEK-MW-15004, DEK-MW-15005, and DEK-MW-15006 from June 2018 to present are higher than concentrations observed while the pond was in operation and arsenic concentrations in groundwater at DEK-MW-18001 have increased since October 2022 and are currently higher than the groundwater concentrations observed while the pond was in operation. These changes in arsenic concentrations following CCR removal at the Karn Bottom Ash Pons demonstrate that there are other influences on groundwater conditions besides the operation of the former pond.

Redox conditions, which affect contaminant transport, are still stabilizing in the Bottom Ash Pond Area following removal activities and will continue to be evaluated further. As shown on the charts below, the dissolved oxygen concentration and oxidation-reduction potential (ORP) showed highly variable results following CCR removal activities.

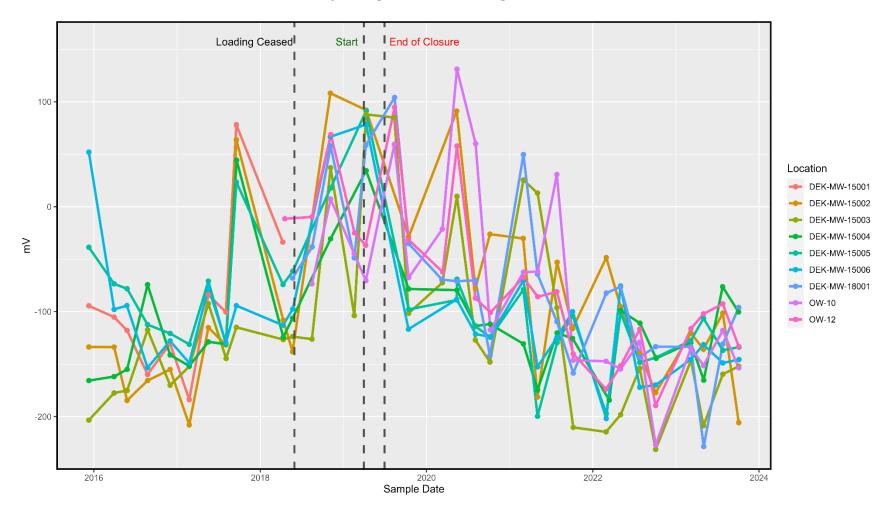
⁴ Monitoring well DEK-MW-18001 was installed in May 2018, following decommissioning of monitoring well DEK-MW-15001. DEK-MW-15001 is located approximately 80 feet northwest of DEK-MW-18001 and was decommissioned due to the installation of the Karn Lined Impoundment. Due to the close proximity of the wells, data collected at DEK-MW-15001 from 2015 to April 2018 is used as the "background" for DEK-MW-18001.

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Groundwater Chemistry Changes Post-Dewatering - Dissolved Oxygen

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Groundwater Chemistry Changes Post-Dewatering - Oxidation-Reduction Potential

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Specifically, dissolved oxygen transitioned from the suboxic/anoxic state of 0.5 mg/L or less to an oxic state of greater than 1.5 mg/L immediately following CCR removal. In the same time period, the electric potential transitioned from a moderately negative electric potential near -100 mV to a moderately positive electric potential of +100 mV. The observed trends for these two key field-measured parameters demonstrate that the preferred equilibrium redox state (e.g. preferred redox couple chemistry) also shifted during the time period immediately following CCR removal. Recent data indicate that trends in the redox conditions may be stabilizing at values similar to pre-dewatering conditions based on measurements of dissolved oxygen in the anoxic range of 0.5 - 1.0 mg/L and negative electric potential. Groundwater quality in the Karn Bottom Ash Pond area will continue to be evaluated in support of conceptual site model refinement and remedy selection.

Groundwater Nature and Extent Relative to GSI

The drinking water pathway is not complete. Due to the presence of the surrounding surface water bodies, another relevant pathway is the groundwater surface water interface pathway. Monitoring performed under the Michigan-approved GSI Compliance Monitoring Program demonstrates protection of human health and the environment with criteria determined to be protective at the potential point of exposure. Transect/porewater GSI compliance sampling data collected quarterly show that biogeochemical conditions are contributing to the reduction of arsenic in groundwater as observed in transect push-point samples located along the water's edge of Saginaw Bay, where arsenic concentrations are generally much lower than the arsenic concentrations observed in the perimeter dike wells. Compliance with water quality criteria is demonstrated on a quarterly basis by evaluating the total chronic loading based on contribution from each GSI compliance sample location with respect to the total flux observed in the state-authorized site-specific mixing zone, per the HMP.

The distribution of arsenic in the shallow water-bearing unit as compared to the mixing zone GSI criteria is presented in Figure 2. Three categories were assigned to the data from March 2023 to October 2023, as follows:

- White No Exceedances: all concentrations were below the mixing zone GSI criteria
- Light Blue Two consecutive exceedances of the chronic mixing zone GSI criterion
- Dark Blue Two consecutive exceedances of the acute mixing zone GSI criterion

Groundwater monitoring locations along the DE Karn Intake Channel and boundary between the coal ash management areas and the power plant complex (DEK-MW-15002, DEK-MW-15005, DEK-MW-15006,) document contaminant concentrations of arsenic are less than the authorized mixing zone-based chronic concentration of 100 ug/L. Total chronic loading (i.e., mass flux), calculated from concentrations observed in transect groundwater samples collected from push-point samplers advanced at locations T1-3GSI through T6-3GSI, remains below the chronic mixing zone GSI criterion, indicating current conditions are protective of the GSI pathway.

Summary

The nature and extent of arsenic in the shallow water-bearing unit is defined in accordance with the Federal CCR rule. Risk from potential exposure to groundwater is managed. The drinking water pathway is not complete. Monitoring performed under the Michigan-approved GSI Compliance Monitoring Program demonstrates protection of human health and the environment with criteria

determined to be protective at the potential point of exposure (i.e., state-authorized site-specific mixing zone criteria).

Attachments

- Table 1Summary of Groundwater Sampling Results (Analytical): DE Karn Nature and Extent
Monitoring Wells
- Table 2Summary of Groundwater Sampling Results (Analytical): DE Karn Nature and Extent
GSI Monitoring Locations
- Figure 1 Nature and Extent Summary: GWPS Exceedances
- Figure 2 Nature and Extent Summary: GSI Pathway Compliance
- Attachment A Statistical Evaluation

Tables

[Sa	mple Location:		DEK-M	W-15003		1	DEK-M	W-15004			MM	/-01	
									Sample Date:	3/8/2023	5/2/2023	7/26/2023	10/4/2023	3/7/2023	5/3/2023	7/25/2023	10/3/2023	3/6/2023	5/1/2023	7/24/2023	10/2/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^		I	•			I		•		I		•
Appendix III																					
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000	816	701	678	716	972	931	925	942	5,270	5,650	5,670	5,660
Calcium	mg/L	NA	NC	NC	500 ^{EE}	NC	NC	NC	NC	29.2	24.4	24.1	25.0	72.8	81.8	80.1	74.8	83.3	82.4	98.2	119
Chloride	mg/L	NA	250 ^E	250 ^E	50	320,000	640,000	NC	NC	58.7	58.9	59.0	58.7	68.4	66.7	69	69.1	93.3	84.8	86.9	82.1
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000				
Sulfate	mg/L	NA	250 ^E	250 ^E	500 ^{EE}	600,000	1,200,000	NC	NC	41.8	50.2	49.5	52.4	267	273	253	241	3.26	< 1	35.5	78.1
Total Dissolved Solids	mg/L	NA	500 ^E	500 ^E	500	NC	NC	NC	NC	282	285	261	284	684	701	722	666				
pH, Field	su	NA	6.5 - 8.5 [⊑]	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC	8.0	8.0	8.2	8.2	7.4	7.3	7.5	7.2	8.1	8.4	8.1	8.2
Appendix IV																					
Antimony	ug/L	6	6.0	6.0	2.0	1,100	2,300	NC	NC	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1				
Arsenic	ug/L	21 ¹	10	10	10	340	680	100	680	401	418	441	435	168	134	146	155	6	6	5	6
Barium	ug/L	2,000	2,000	2,000	1,200	3,400	6,800	NC	NC	44	36	33	41	151	162	152	154				
Beryllium	ug/L	4	4.0	4.0	33	300	600	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1				
Cadmium	ug/L	5	5.0	5.0	2.5	12	24	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Chromium	ug/L	100	100	100	11	16	32	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1	1	< 1	1
Cobalt	ug/L	15	40	100	100	370	740	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6				
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000				
Lead	ug/L	15	4.0	4.0	14	250	500	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1				
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC	21	20	20	21	36	40	38	37	78	91	94	110
Mercury	ug/L	2	2.0	2.0	0.20#	1.4	2.8	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC	23	28	31	27	12	10	11	8	< 5	< 5	< 5	< 5
Radium-226/228	pci/L	5	NC	NC	NC	NC	NC	NC	NC				0.526								
Selenium	ug/L	50	50	50	5.0	62	120	55	120	1	1	1	< 1	< 1	< 1	< 1	1	3	3	3	3
Thallium	ug/L	2	2.0	2.0	2.0	47	94	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2				
MI Part 115 Parameters																					
Iron	ug/L	NA	300E	300 ^E	500,000 ^{EE}	NC	NC	NC	NC	178	89	177	139	3,780	4,250	3,960	4,160	208	142	283	329
Copper	ug/L	NA	1,000 ^E	1,000 ^E	20	33	66	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	1	1				
Nickel	ug/L	NA	100	100	120	1,000	2,100	NC	NC	3	< 2	< 2	< 2	3	2	2	2				
Silver	ug/L	NA	34	98	0.2	0.54	1.1	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Vanadium	ug/L	NA	4.5	62	27	79	160	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2
Zinc	ug/L	NA	2,400	5,000 ^E	260	260	520	NC	NC	< 10	< 10	< 10	< 10	15	< 10	10	< 10				

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

- Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

- If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.

^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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for arsenic, boron, and selenium.

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

¹ - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated January 14, 2019.

								Sa	mple Location:		MM	/-03			MV	V-06			MV	V-08	
									Sample Date:	3/6/2023	5/1/2023	7/24/2023	10/2/2023	3/6/2023	5/1/2023	7/24/2023	10/2/2023	3/6/2023	5/1/2023	7/24/2023	10/2/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^	0/0/2020	0/ 1/2020	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		0,0,2020	0, 1,2020		10,2,2020	0,0,2020	0, 112020	.,	10/2/2020
Appendix III																					
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000	8,570	9,000	9,540	9,350	458	621	551	484	4,520	4,230	4,130	4,550
Calcium	mg/L	NA	NC	NC	500 ^{EE}	NC	NC	NC	NC	129	133	137	138	104	174	94.7	102	154	165	159	165
Chloride	mg/L	NA	250 ^E	250 ^E	50	320,000	640,000	NC	NC	86.6	75	75.5	77.5	14.1	18.9	15.4	17	59.2	52.5	56.4	57.9
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC												
Sulfate	mg/L	NA	250 ^E	250 ^E	500 ^{EE}	600,000	1,200,000	NC	NC	< 1	< 1	< 1	< 1	78.2	255	83.3	100	275	317	277	311
Total Dissolved Solids	mg/L	NA	500 ^E	500E	500	NC	NC	NC	NC												
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC	7.5	8.0	7.9	8.0	7.3	7.3	7.3	7.4	7.2	7.4	7.1	7.1
Appendix IV																					
Antimony	ug/L	6	6.0	6.0	2.0	1,100	2,300	NC	NC												
Arsenic	ug/L	21 ¹	10	10	10	340	680	100	680	3	3	3	4	112	95	159	163	113	94	89	108
Barium	ug/L	2,000	2,000	2,000	1,200	3,400	6,800	NC	NC												
Beryllium	ug/L	4	4.0	4.0	33	300	600	NC	NC												
Cadmium	ug/L	5	5.0	5.0	2.5	12	24	NC	NC												
Chromium	ug/L	100	100	100	11	16	32	NC	NC	2	2	1	2	2	2	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	40	100	100	370	740	NC	NC												
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC												
Lead	ug/L	15	4.0	4.0	14	250	500	NC	NC												
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC	87	102	95	95	33	52	32	34	102	117	113	120
Mercury	ug/L	2	2.0	2.0	0.20#	1.4	2.8	NC	NC												
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC	6	< 5	< 5	< 5	< 5	< 5	6	< 5	19	17	17	16
Radium-226/228	pci/L	5	NC	NC	NC	NC	NC	NC	NC												
Selenium	ug/L	50	50	50	5.0	62	120	55	120	2	2	2	2	< 1	1	1	< 1	< 1	2	2	2
Thallium	ug/L	2	2.0	2.0	2.0	47	94	NC	NC												
MI Part 115 Parameters																					
Iron	ug/L	NA	300E	300E	500,000EE	NC	NC	NC	NC	630	522	292	403	1,570	2,800	1,180	1,500	9,800	9,640	9,360	11,200
Copper	ug/L	NA	1,000 ^E	1,000 ^E	20	33	66	NC	NC												
Nickel	ug/L	NA	100	100	120	1,000	2,100	NC	NC												
Silver	ug/L	NA	34	98	0.2	0.54	1.1	NC	NC												
Vanadium	ug/L	NA	4.5	62	27	79	160	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Zinc	ug/L	NA	2,400	5,000E	260	260	520	NC	NC												

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

- Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

- If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.

^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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for ars

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

¹ - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated January 14, 2019.

								Sa	mple Location:		MM	/-10			MV	V-12			MV	V-14	
									Sample Date:	3/7/2023	5/1/2023	7/24/2023	10/2/2023	3/7/2023	5/1/2023	7/24/2023	10/2/2023	3/7/2023	5/1/2023	7/24/2023	10/2/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^				•		•	•			•	I	•
Appendix III																					
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000	3,920	3,390	3,750	3,050	4,000	3,970	3,950	4,040	2,760	2,740	2,130	2,930
Calcium	mg/L	NA	NC	NC	500 ^{EE}	NC	NC	NC	NC	214	243	259	272	196	192	190	184	159	176	301	188
Chloride	mg/L	NA	250 ^E	250 ^E	50	320,000	640,000	NC	NC	44.2	31.4	30.3	23.4	66.8	55.1	53.7	58.1	67	68.4	64.3	80.1
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC												
Sulfate	mg/L	NA	250 ^E	250 ^E	500EE	600,000	1,200,000	NC	NC	353	528	528	650	285	249	226	229	121	223	1080	310
Total Dissolved Solids	mg/L	NA	500 ^E	500 ^E	500	NC	NC	NC	NC												
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC	7.1	7.3	7.0	7.1	7.3	7.5	7.1	7.3	7.2	7.4	6.9	7.1
Appendix IV																					
Antimony	ug/L	6	6.0	6.0	2.0	1,100	2,300	NC	NC												
Arsenic	ug/L	21 ¹	10	10	10	340	680	100	680	504	350	427	458	489	353	419	602	503	123	45	110
Barium	ug/L	2,000	2,000	2,000	1,200	3,400	6,800	NC	NC												
Beryllium	ug/L	4	4.0	4.0	33	300	600	NC	NC												
Cadmium	ug/L	5	5.0	5.0	2.5	12	24	NC	NC												
Chromium	ug/L	100	100	100	11	16	32	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	6
Cobalt	ug/L	15	40	100	100	370	740	NC	NC												
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC												
Lead	ug/L	15	4.0	4.0	14	250	500	NC	NC												
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC	137	130	128	124	120	118	117	116	73	84	109	97
Mercury	ug/L	2	2.0	2.0	0.20#	1.4	2.8	NC	NC												
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC	< 5	10	10	13	< 5	6	5	< 5	< 5	9	16	11
Radium-226/228	pci/L	5	NC	NC	NC	NC	NC	NC	NC												
Selenium	ug/L	50	50	50	5.0	62	120	55	120	< 1	2	1	1	2	7	3	2	3	17	43	41
Thallium	ug/L	2	2.0	2.0	2.0	47	94	NC	NC												
MI Part 115 Parameters																					
Iron	ug/L	NA	300E	300E	500,000EE	NC	NC	NC	NC	6,920	7,940	7,550	11,000	3,410	2,010	2,060	4,240	3,250	633	348	1,830
Copper	ug/L	NA	1,000⋿	1,000⋿	20	33	66	NC	NC												
Nickel	ug/L	NA	100	100	120	1,000	2,100	NC	NC												
Silver	ug/L	NA	34	98	0.2	0.54	1.1	NC	NC												
Vanadium	ug/L	NA	4.5	62	27	79	160	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2
Zinc	ug/L	NA	2,400	5,000E	260	260	520	NC	NC												

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

^A - Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

- If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.

^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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for ars

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

¹ - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated January 14, 2019.

								Sar	mple Location:		MM	V-16			OV	V-10	
									Sample Date:	3/7/2023	5/1/2023	7/24/2023	10/3/2023	3/8/2023	5/2/2023	7/26/2023	10/4/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^		1						
Appendix III																	
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000	1,520	1,710	1,910	1,840	1,430	998	1,010	1,200
Calcium	mg/L	NA	NC	NC	500EE	NC	NC	NC	NC	356	371	372	345	123	98.8	113	105
Chloride	mg/L	NA	250 ^E	250 ^E	50	320,000	640,000	NC	NC	159	123	95.6	85.2	74.4	56.9	51.8	73.2
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC					< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	NA	250E	250 ^E	500EE	600,000	1,200,000	NC	NC	1,130	1,180	1,310	1,270	11.3	8.28	29.1	2.66
Total Dissolved Solids	mg/L	NA	500E	500 ^E	500	NC	NC	NC	NC					673	517	560	580
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC	7.4	7.6	7.2	7.3	7.3	7.3	7.1	7.2
Appendix IV																	
Antimony	ug/L	6	6.0	6.0	2.0	1,100	2,300	NC	NC					< 1	< 1	< 1	< 1
Arsenic	ug/L	21 ¹	10	10	10	340	680	100	680	2	2	2	2	2	3	2	2
Barium	ug/L	2,000	2,000	2,000	1,200	3,400	6,800	NC	NC					166	146	163	176
Beryllium	ug/L	4	4.0	4.0	33	300	600	NC	NC					< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	12	24	NC	NC					< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	16	32	NC	NC	< 1	1	1	< 1	< 1	1	< 1	1
Cobalt	ug/L	15	40	100	100	370	740	NC	NC					< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC					< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	15	4.0	4.0	14	250	500	NC	NC					< 1	< 1	< 1	< 1
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC	149	144	148	158	31	26	31	29
Mercury	ug/L	2	2.0	2.0	0.20#	1.4	2.8	NC	NC					< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC	19	23	24	29	< 5	< 5	< 5	< 5
Radium-226/228	pci/L	5	NC	NC	NC	NC	NC	NC	NC								< 0.745
Selenium	ug/L	50	50	50	5.0	62	120	55	120	5	10	31	28	1	2	3	2
Thallium	ug/L	2	2.0	2.0	2.0	47	94	NC	NC					< 2	< 2	< 2	< 2
MI Part 115 Parameters																	
Iron	ug/L	NA	300E	300E	500,000EE	NC	NC	NC	NC	233	154	194	358	3,590	3,660	2,170	1,640
Copper	ug/L	NA	1,000E	1,000E	20	33	66	NC	NC					2	2	2	2
Nickel	ug/L	NA	100	100	120	1,000	2,100	NC	NC					< 2	3	< 2	2
Silver	ug/L	NA	34	98	0.2	0.54	1.1	NC	NC					< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NA	4.5	62	27	79	160	NC	NC	< 2	< 2	< 2	< 2	3	3	4	4
Zinc	ug/L	NA	2,400	5,000E	260	260	520	NC	NC					< 10	< 10	< 10	< 10

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

- ^A Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- # If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.

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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for ars

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

1 - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated Janurary 14, 2019.

								Sar	mple Location:		OM	V-11			OV	V-12	
									Sample Date:	3/8/2023	5/2/2023	7/26/2023	10/4/2023	3/8/2023	5/2/2023	7/26/2023	10/4/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^		1						
Appendix III																	
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000	3,690	3,400	3,100	3,410	1,060	1,340	818	1,040
Calcium	mg/L	NA	NC	NC	500EE	NC	NC	NC	NC	5.77	6.42	5.8	7.8	64.8	124	66.5	89
Chloride	mg/L	NA	250 ^E	250 ^E	50	320,000	640,000	NC	NC	59.5	56.1	59.2	57.1	59.7	59.4	49.6	56.8
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC	2,900	2,960	1,970	2,620	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	NA	250E	250 ^E	500EE	600,000	1,200,000	NC	NC	17.4	17.6	18.5	17.9	142	265	151	197
Total Dissolved Solids	mg/L	NA	500 ^E	500 ^E	500	NC	NC	NC	NC	233	224	216	208	522	820	510	646
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC	9.8	9.7	9.7	9.8	7.2	7.1	7.1	7.2
Appendix IV																	
Antimony	ug/L	6	6.0	6.0	2.0	1,100	2,300	NC	NC	3	3	2	1	< 1	< 1	< 1	< 1
Arsenic	ug/L	21 ¹	10	10	10	340	680	100	680	769	837	778	907	79	62	114	112
Barium	ug/L	2,000	2,000	2,000	1,200	3,400	6,800	NC	NC	21	24	18	25	100	168	96	130
Beryllium	ug/L	4	4.0	4.0	33	300	600	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	12	24	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	16	32	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	ug/L	15	40	100	100	370	740	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	9,800	20,000	NC	NC	2,900	2,960	1,970	2,620	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	15	4.0	4.0	14	250	500	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC	< 10	< 10	< 10	< 10	33	44	32	34
Mercury	ug/L	2	2.0	2.0	0.20#	1.4	2.8	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC	158	157	151	138	13	7	17	14
Radium-226/228	pci/L	5	NC	NC	NC	NC	NC	NC	NC				< 0.496				0.600
Selenium	ug/L	50	50	50	5.0	62	120	55	120	3	5	4	3	< 1	1	< 1	< 1
Thallium	ug/L	2	2.0	2.0	2.0	47	94	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
MI Part 115 Parameters																	
Iron	ug/L	NA	300E	300E	500,000EE	NC	NC	NC	NC	86	90	42	52	4,950	8,580	5,690	7,750
Copper	ug/L	NA	1,000E	1,000 [⊨]	20	33	66	NC	NC	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/L	NA	100	100	120	1,000	2,100	NC	NC	2	2	2	< 2	2	3	< 2	< 2
Silver	ug/L	NA	34	98	0.2	0.54	1.1	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NA	4.5	62	27	79	160	NC	NC	1,020	743	840	334	< 2	< 2	< 2	< 2
Zinc	ug/L	NA	2,400	5,000E	260	260	520	NC	NC	13	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

- [^] Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.
- # If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway

per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.

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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for ars

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

1 - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated Janurary 14, 2019.

								Sa	mple Location:		T1-3	3GSI			T2-3	3GSI			T3-	3GSI	
									Sample Date:	3/6/2023	5/3/2023	7/25/2023	10/3/2023	3/6/2023	5/3/2023	7/25/2023	10/3/2023	3/6/2023	5/3/2023	7/25/2023	10/3/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^			•								•	
Appendix III																					
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000		22	64	< 20		2,280	5,640	3,700		46	645	3500
Calcium	mg/L	NA	NC	NC	500EE	NC	NC	NC	NC		58.9	55.5	43.2		142	235	141		123	160	180
Chloride	mg/L	NA	250 ^E	250E	50	320,000	640,000	NC	NC		44.5	35.4	51		28.3	52.1	59.1		23.8	32.2	60.5
Sulfate	mg/L	NA	250E	250E	500EE	600,000	1,200,000	NC	NC		34.7	33.5	27.2		118	290	39.2		119	82.5	44
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC		7.8	7.1	7.71		7.2	6.7	6.9		7.2	6.9	6.9
Appendix IV																					
Arsenic	ug/L	21 ¹	10	10	10	340	680	100²	680		1	25	2		1	< 1	< 1		< 1	< 1	3
Chromium	ug/L	100	100	100	11	16	32	NC	NC		< 1	1	< 1		2	1	1		1	1	2
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC		< 10	< 10	< 10		46	128	97		12	55	117
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC		< 5	25	6		< 5	< 5	< 5		< 5	< 5	< 5
Selenium	ug/L	50	50	50	5.0	62	120	NC	NC		1	1	1		2	1	1		1	1	2
MI Part 115 Parameters																					
Iron	ug/L	NA	300 ^E	300E	500,000 ^{EE}	NC	NC	NC	NC		119	2,460	23		< 20	87	75		1,870	261	127
Vanadium	ug/L	NA	4.5	62	27	260	520	NC	NC		< 2	< 2	< 2		2	< 2	< 2		< 2	< 2	< 2

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

^{^^} - Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for arsenic, boron, and selenium.

Result Indicates an exceedance of acute-based GSI criteria.

All metals were analyzed as total unless otherwise specified.

Transect samples were unable to be collected during the first quarter 2023 event due to site conditions.

1 - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated Janurary 14, 2019.

² - Compliance demonstrated on a mass flux basis.

								Sa	mple Location:		T4-3	BGSI			T5-3	3GSI			T6-	3GSI	
									Sample Date:	3/6/2023	5/3/2023	7/25/2023	10/3/2023	3/6/2023	5/3/2023	7/25/2023	10/3/2023	3/6/2023	5/3/2023	7/25/2023	5/3/2023
Constituent	Unit	GWPS*	MI Residential**	MI Non- Residential**	MI GSI^	MI AMV***	MI FAV***	Chronic MZ^^	Acute MZ^^											•	
Appendix III																					
Boron	ug/L	NA	500	500	4,000	34,000	69,000	44,000	69,000		355	528	288		223	278	1,500		35	97	< 20
Calcium	mg/L	NA	NC	NC	500EE	NC	NC	NC	NC		56.1	61.9	90.2		172	72.4	78.6		69.4	51.7	58.5
Chloride	mg/L	NA	250 ^E	250E	50	320,000	640,000	NC	NC		37.8	29	15.1		45.7	43	48.5		34.9	59.6	37.3
Sulfate	mg/L	NA	250E	250E	500EE	600,000	1,200,000	NC	NC		17	2.1	59.2		438	30.7	6.03		87.3	14.8	20.4
pH, Field	su	NA	6.5 - 8.5 ^E	6.5 - 8.5 ^E	6.5 - 9.0	NC	NC	NC	NC		7.8	7.3	7.3		7.6	7.4	7.5		8.2	7.8	7.7
Appendix IV																					
Arsenic	ug/L	21 ¹	10	10	10	340	680	100 ²	680		17	6	65		349	505	375		1	< 1	< 1
Chromium	ug/L	100	100	100	11	16	32	NC	NC		1	< 1	1		1	1	1		1	< 1	2
Lithium	ug/L	180	170	350	440	910	1,800	NC	NC		25	33	32		30	29	41		11	11	14
Molybdenum	ug/L	100	73	210	120	29,000	58,000	NC	NC		< 5	< 5	< 5		< 5	< 5	< 5		< 5	6	< 5
Selenium	ug/L	50	50	50	5.0	62	120	NC	NC		2	< 1	< 1		2	1	1		< 1	2	< 1
MI Part 115 Parameters																					
Iron	ug/L	NA	300E	300E	500,000 ^{EE}	NC	NC	NC	NC		151	183	133		224	66	471		84	93	376
Vanadium	ug/L	NA	4.5	62	27	260	520	NC	NC		< 2	< 2	< 2		< 2	< 2	< 2		< 2	< 2	< 2

Notes:

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

SU - standard units; pH is a field parameter.

NA - not applicable.

NC - no criteria.

-- - not analyzed.

* - GWPS (Groundwater Protection Standard) is the higher of the Maximum Contaminant Level (MCL)/Regional Screening Level from 83 FR 36435 (RSL) and Upper Tolerance Limit (UTL) as established in TRC's Technical Memorandum dated October 15, 2018.

** - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2020, updated October 12, 2023.

^ - 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}.

*** - Aquatic Maximum (AMV) and Final Acute Values (FAV) are taken from EGLE Rule 323.1057 Part 4 - Water Quality Standards (Rule 57), March 15, 2018. Hardness-dependent criteria calculated using site-specific hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018). Chromium AMV & FAV criteria are based on hexavalent chromium.

[^] - Mixing Zone (MZ) GSI Criteria from Michigan Department of Environmental Quality (MDEQ) approval letter dated December 23, 2015.

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}.

BOLD font denotes concentrations detected above the GWPS.

Result Indicates an exceedance of applicable GSI criteria; the chronic-based mixing zone criteria (Chronic MZ) replaces the MI GSI critera for ars

Result Indicates an exceedance of acute-based GSI criteria.

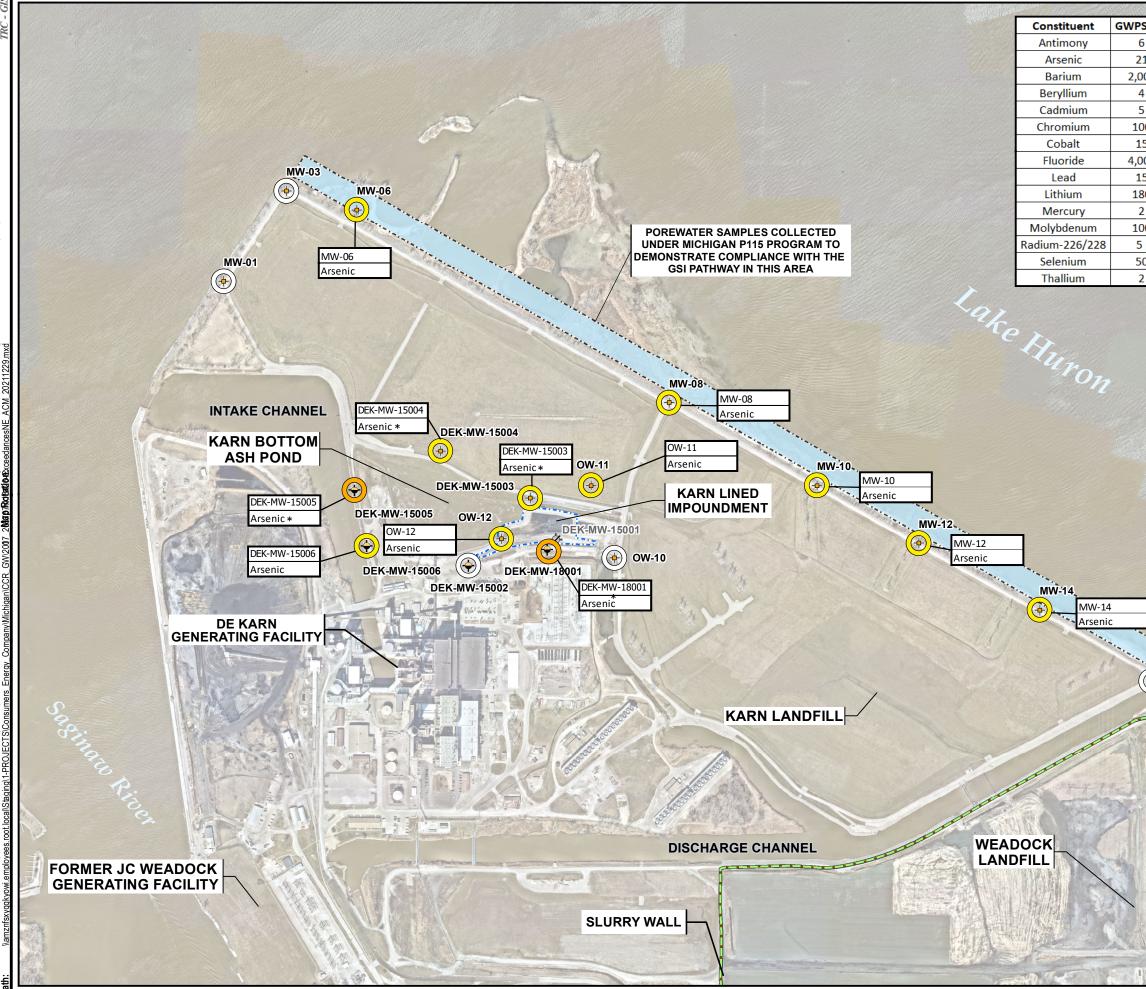
All metals were analyzed as total unless otherwise specified.

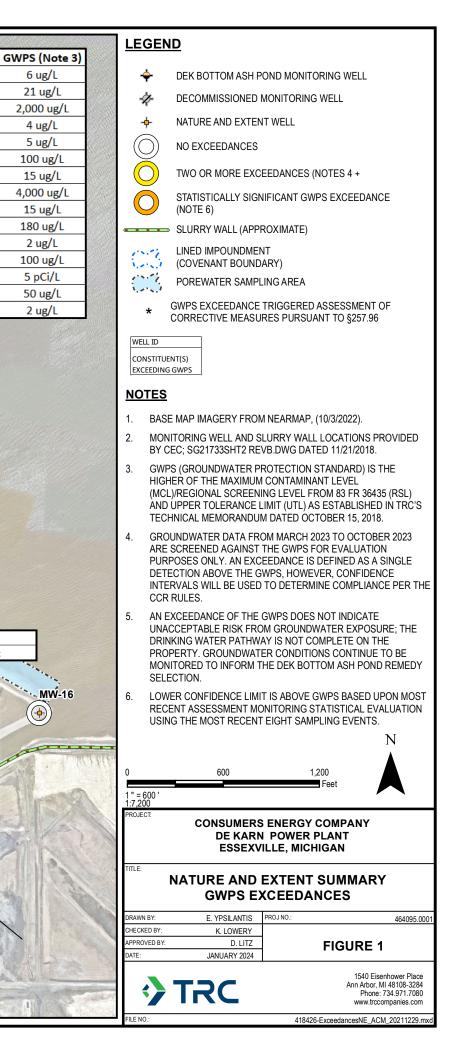
Transect samples were unable to be collected during the first quarter 2023 event due to site conditions.

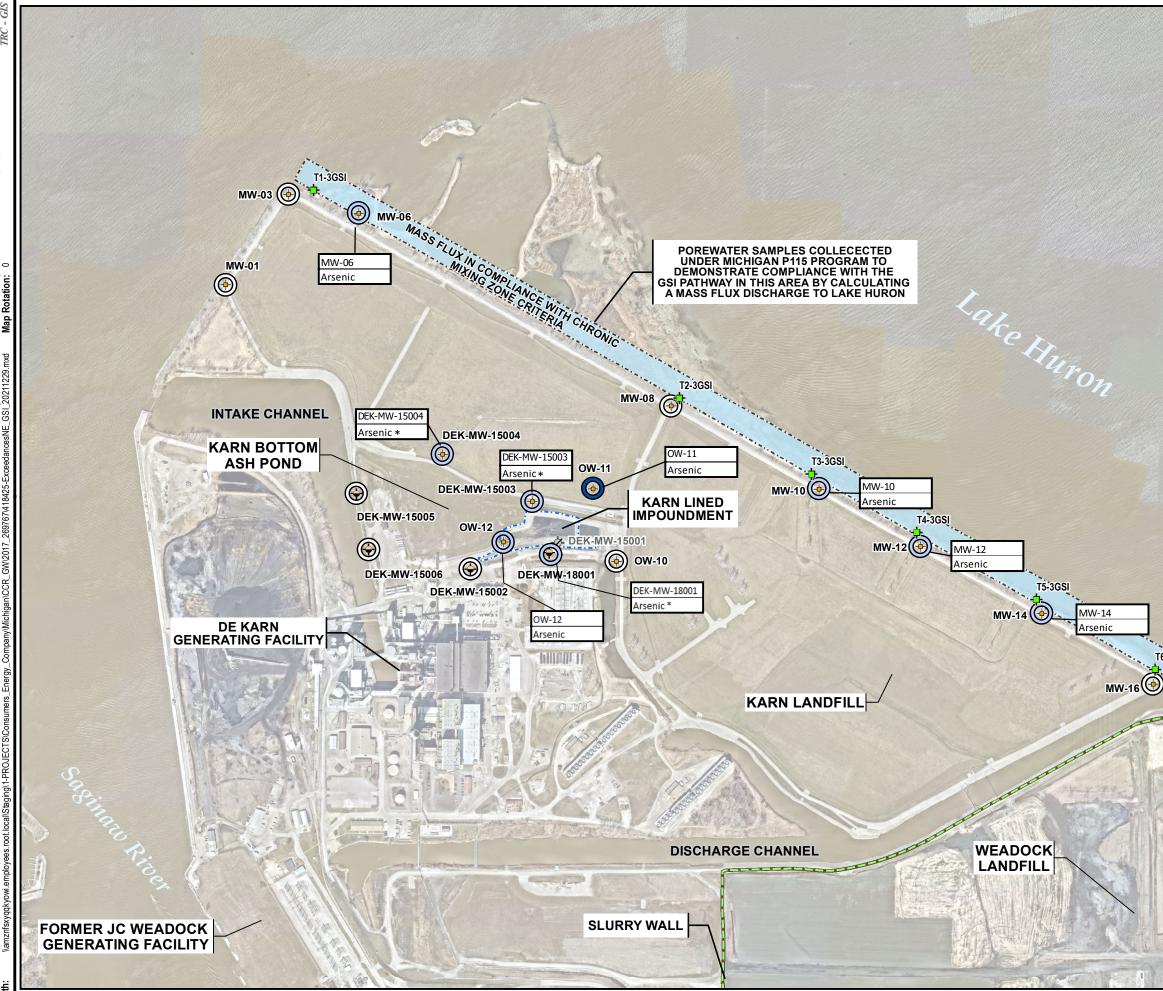
1 - Constituent triggered an Assessment of Corrective Measures for the Karn Bottom Ash Pond as described in TRC's letter report dated Janurary 14, 2019.

² - Compliance demonstrated on a mass flux basis.

Figures







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LEGEND

- ✦ DEK BOTTOM ASH POND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- + NATURE AND EXTENT WELL
 - GSI TRANSECT LOCATION/POREWATER SAMPLE
 - NO EXCEEDANCES

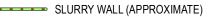


+ 0

> TWO OR MORE DATA POINTS EXCEED CHRONIC MIXING ZONE GSI CRITERION (100 UG/L) (NOTES 3 + 4)



TWO OR MORE DATA POINTS EXCEED ACUTE MIXING ZONE GSI CRITERION (FAV, 680 UG/L) (NOTES 3 + 4)





LINED IMPOUNDMENT (COVENANT BOUNDARY)

POREWATER SAMPLING AREA



* GROUNDWATER PROTECTION STANDARD (GWPS) EXCEEDANCE TRIGGERED ASSESSMENT OF CORRECTIVE MEASURES PURSUANT TO §257.96

NOTES

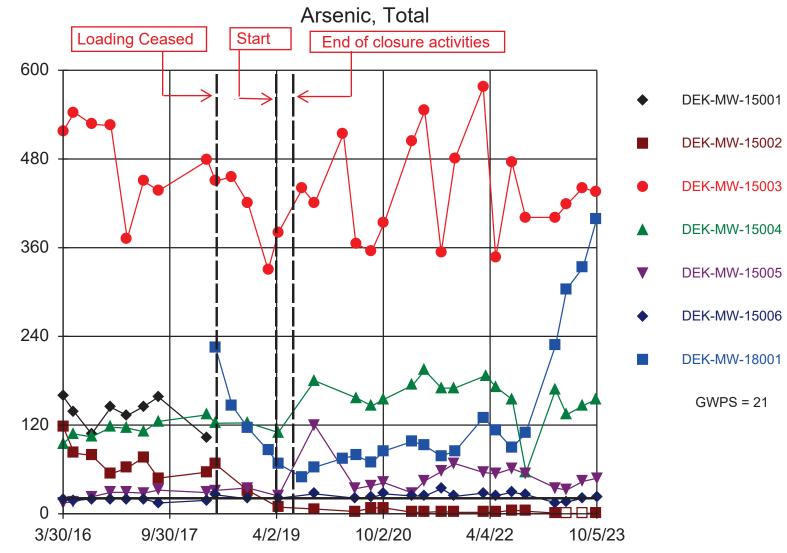
T6-3GSI

- 1. BASE MAP IMAGERY FROM NEARMAP, (10/3/2022).
- 2. MONITORING WELL AND SLURRY WALL LOCATIONS PROVIDED BY CEC; SG21733SHT2 REVB.DWG DATED 11/21/2018.
- 3. MIXING ZONE GROUNDWATER SURFACE WATER INTERFACE (GSI) CRITERIA FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY (MDEQ) APPROVAL LETTER DATED DECEMBER 23, 2015.
- 4. GROUNDWATER CONCENTRATION DATA FROM MARCH 2023 THROUGH OCTOBER 2023 ARE SCREENED AGAINST THE MIXING ZONE CRITERIA. AN EXCEEDANCE IS DEFINED AS TWO DETECTIONS ABOVE CRITERIA. COMPLIANCE WITH THE CHRONIC MIXING ZONE CRITERIA CAN BE DEMONSTRATED ON A MASS FLUX BASIS.

0 1 " = 600 ' 1:7,200	600	1,200 Fee	t 🗼
PROJECT:		ENERGY COM POWER PLAN .LE, MICHIGA	T
	IC NATURE	AND EXTE	NT SUMMARY
	GSI PATHW	AY COMPL	
DRAWN BY:	GSI PATHW		
DRAWN BY: CHECKED BY:			IANCE
	E. YPSILANTIS	PROJ NO.:	IANCE
CHECKED BY:	E. YPSILANTIS K. LOWERY	PROJ NO.:	464095.000
CHECKED BY: APPROVED BY: DATE:	E. YPSILANTIS K. LOWERY D. LITZ	PROJ NO.:	464095.0001

Attachment A Statistical Evaluation

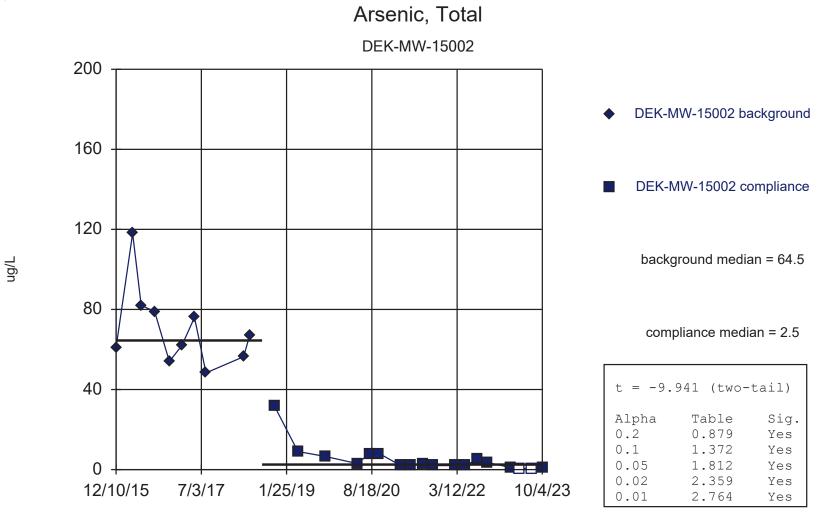
Sanitas[™] v.10.0.13 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



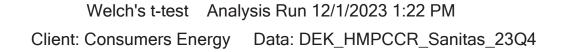
Time Series Analysis Run 12/1/2023 12:53 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q4

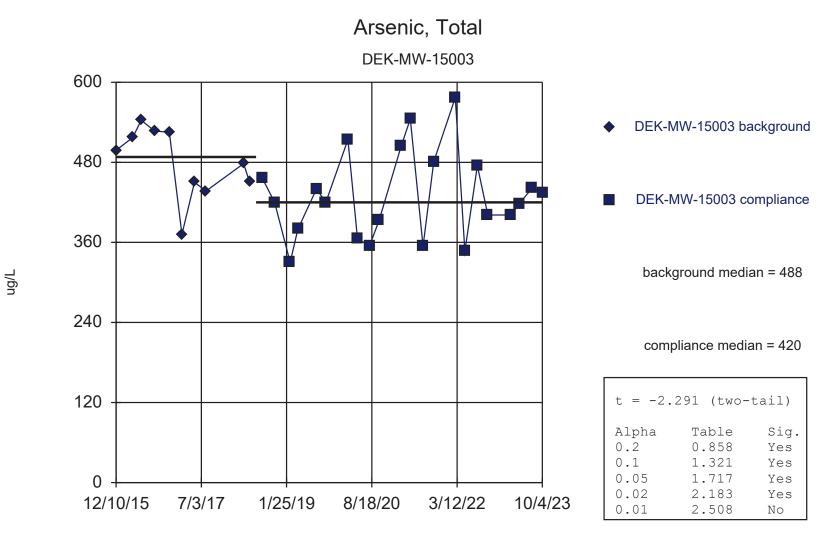
ng/L

Sanitas[™] v.10.0.13 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.

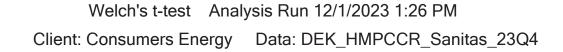


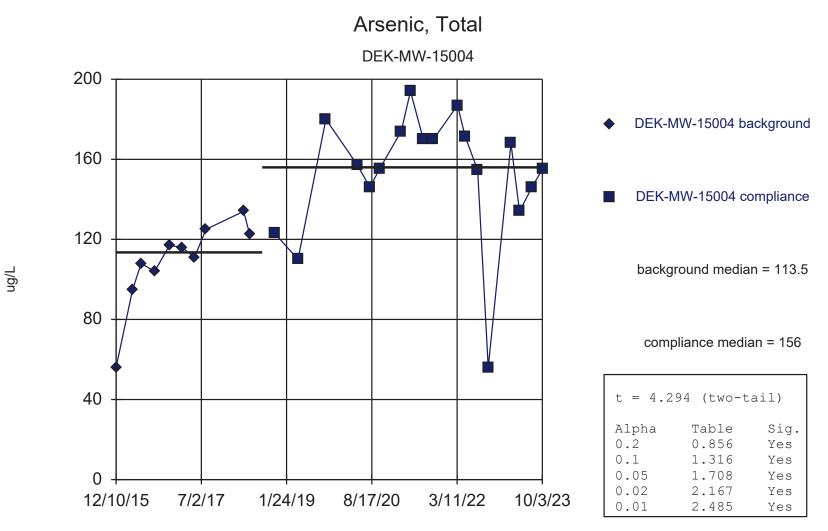
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8668, critical = 0.842.



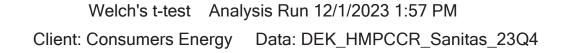


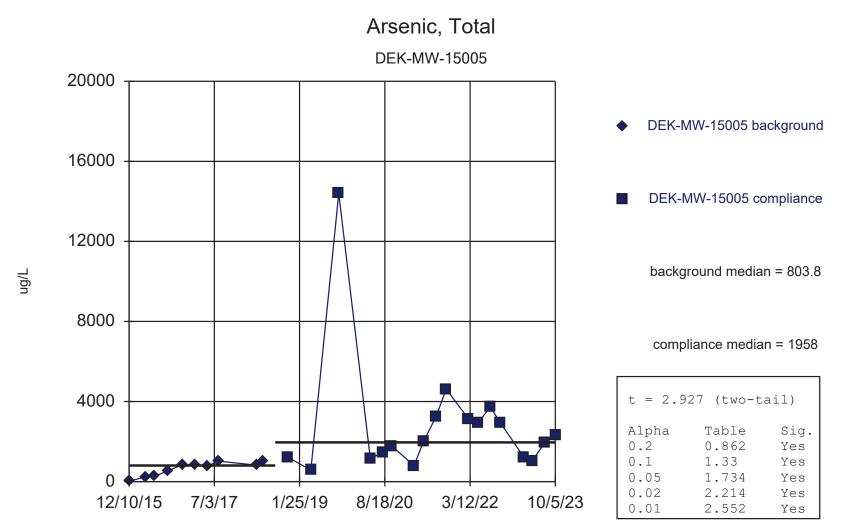
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9262, critical = 0.842.





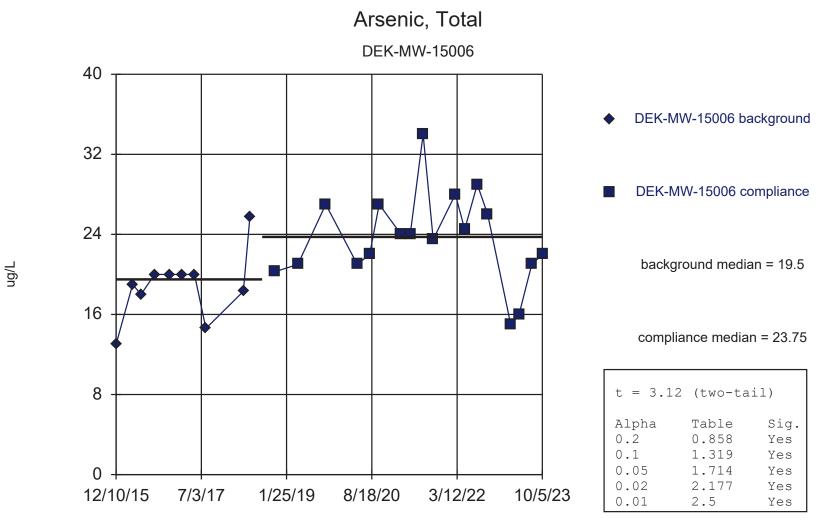
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.852, critical = 0.842.



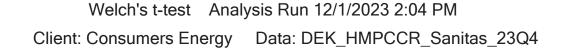


Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8767 after square transformation, critical = 0.842.

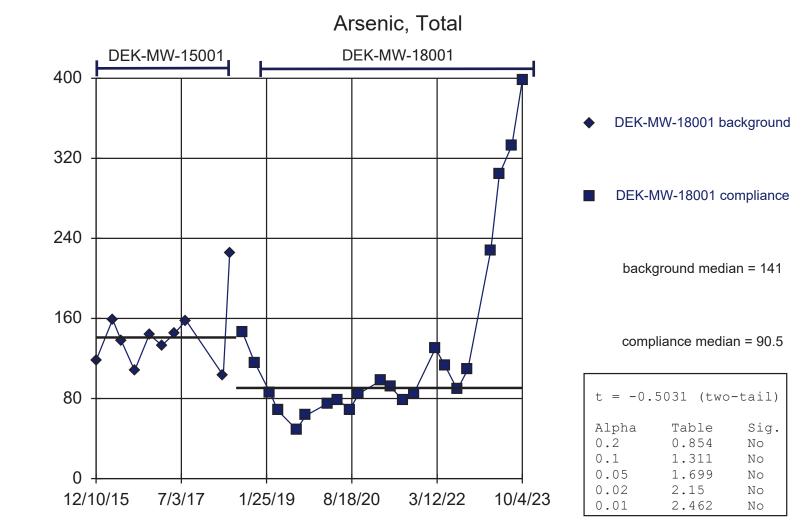
Welch's t-test Analysis Run 12/1/2023 2:01 PM Client: Consumers Energy Data: DEK_HMPCCR_Sanitas_23Q4



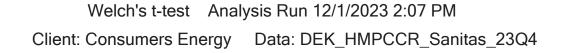
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8992, critical = 0.842.



ng/L



Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8737, critical = 0.842.



Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 1:25 PM

	DEK-MW-15002	DEK-MW-15002
12/10/2015	61	
3/30/2016	118	
5/26/2016	82	
8/24/2016	79	
12/1/2016	54	
2/23/2017	62	
5/18/2017	76	
8/3/2017	48.3	
4/12/2018	56.4	
5/23/2018	67	
11/5/2018		31.7
4/11/2019		9
10/15/2019		6.5
5/13/2020		3
8/3/2020		8
10/6/2020		8 (D)
3/1/2021		2
5/3/2021		2
7/28/2021		3 (D)
10/4/2021		2
3/1/2022		2 (D)
5/3/2022		2
7/26/2022		5
10/4/2022		3.5 (D)
3/8/2023		1 (D)
5/2/2023		<1
7/26/2023		<1 (D)
10/4/2023		1 (D)

Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 1:55 PM

	DEK-MW-15003	DEK-MW-15003
12/10/2015	498	
3/30/2016	517	
5/26/2016	543	
8/24/2016	527	
12/1/2016	525	
2/23/2017	372	
5/18/2017	450	
8/4/2017	437	
4/12/2018	478	
5/23/2018	450	
8/16/2018		456
11/6/2018		420
2/18/2019		330
4/11/2019		380
8/13/2019		440
10/15/2019		420
3/11/2020		514 (D)
5/14/2020		365
8/3/2020		355
10/6/2020		393
3/2/2021		504
5/3/2021		545
7/27/2021		354
10/7/2021		481
2/28/2022		577
5/3/2022		346.5 (D)
7/26/2022		475
10/4/2022		401
3/8/2023		401
5/2/2023		418
7/26/2023		441
10/4/2023		435

Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 1:59 PM

	DEK-MW-15004	DEK-MW-15004
12/10/2015	56	
3/30/2016	95	
5/26/2016	108	
8/24/2016	104	
12/1/2016	117	
2/23/2017	116	
5/18/2017	111	
8/3/2017	125 (D)	
4/12/2018	134	
5/23/2018	122.5 (D)	
11/6/2018		123
4/11/2019		110
10/15/2019		180
5/14/2020		157
8/4/2020		146
10/7/2020		155
3/2/2021		174
5/3/2021		194
7/28/2021		170
10/4/2021		170
3/14/2022		187
5/4/2022		171.5 (D)
7/27/2022		154.5 (D)
10/6/2022		56
3/7/2023		168
5/3/2023		134
7/25/2023		146
10/3/2023		155

Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 2:04 PM

DEX.MW-1500DEX.MW-1500121026533020161535260101652620102321102023212101232230201232302012323020123242010232420102324201023242010232420102324201031.911/20182425202031.911/20182425302030.011/202030.027202131.927202132.027202134.027202154.0272021 <th></th> <th></th> <th></th>			
SN3021615S26201616S26201616S124201623S121201729S123201729S130201721.9S14201828.7 ()S14201821.9S14201824.0 ()S141201924.0 ()S14201934.0 ()S142020134.0 ()S142020134.0 ()S142020134.0 ()S142020134.0 ()S142020144.0 ()S142020150.0 ()S142020151.0 ()S142020151.0 ()S142020151.0 ()S142020151.0 ()S142020151.0 ()S142020151.0 ()S142020151.0 ()S142021151.0		DEK-MW-15005	DEK-MW-15005
S262016I6B24201623B24201623J21201629Z23201729S18201731.9F11201828.7 (N)F1201831.7T14201824.0114201940.0S13202030.0F13202030.0S13202030.0S13202036.0S13202136.0S13202141.0S13202157.0	12/10/2015	5	
P24201629121/12016292232017295/120217295/1202173194/11/201882 (7)11/6/20183111/1201924 (7)11/1201924 (7)11/120193011/1201931011/1201931011/1201934 (7)11/1201934	3/30/2016	15	
<table-row> <table-row> 12/12016 29 2232017 29 5/18/2017 28 8/3017 31.9 4/11/2018 28.7 (>) 5/24/2018 31.7 11/6/2018 24 (b) 11/1/2019 24 (b) 11/1/2019 24 (b) 11/1/2019 35 5/13/2021 34 (b) 5/3/2021 38 (b) 10/1/2020 38 (b) 5/3/2021 38 (b) 10/1/2020 415 (b) 10/1/2021 36 5/3/2021 415 (b) 10/1/2021 57 5/3/2021 57 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2021 51 5/3/2</table-row></table-row></table-container>	5/26/2016	16	
2232017 29 5/182017 28 8/2017 31.9 4/112018 28.7(D) 5/2017 31.7 11/62018 29 11/162018 24 (D) 11/162019 21 (D) 5/13/2020 34 (D) 5/3/2020 34 (D) 5/3/2021 34 (D) 5/3/2021 34 (D) 5/3/2021 32 (D) 5/3/2021 44 (S (D) 7/28/201 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2021 54 5/3/2022 54 5/3/2023 54 5/3/2024 54 5/3/2023 54 5/3/2024 54 5/3/2024 54 5/3/2024 <	8/24/2016	23	
5/182017 28 8/302017 31.9 4/11/2018 28.7 (O) 5/2014 31.7 11/62018 3 1/1/2019 24 (D) 1/1/1/2019 34 (D) 1/1/1/2019 38 (D) 1/1/1/2020 38 (D) 1/1/1/2021 38 (D) 1/1/2021 38 (D) 1/1/2021 38 (D) 1/1/2021 42 (D) 5/3/2021 43 (D) 1/1/2021 63 1/1/2021 61 1/1/2021 61 1/1/2021 61 1/1/2021 61 1/1/2021 52/2023 52 1/1/2021 61 1/1/2021 54 1/1/2021 54 1/1/2021 52 1/1/2021 54 1/1/2021 54 1/1/2021 54 1/1/2021 54 1/1/2021 54 1/1/2021 54 1/1/2021 54 1/1/2021 54 <tr< td=""><td>12/1/2016</td><td>29</td><td></td></tr<>	12/1/2016	29	
8/3/2017 31.9 4/11/2018 28.7 (D) 5/24/2018 31.7 11/6/2018 5 4/11/2019 24 (D) 10/15/2019 210 (D) 5/13/2020 30 (D) 5/13/2020 34 (D) 10/17/2020 38 (D) 10/17/2021 42 5/3/2021 415 (D) 5/3/2021 57 10/4/2021 57 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 54 10/4/2021 52	2/23/2017	29	
4111201828.7 (D)524201831.711/62018541/11201924 (D)10/152019120 (D)10/15201934 (D)51/3202034 (D)10/1202032 (D)10/120204210/1202145 (D)53/20215710/120216810/120215410/120216110/120216110/120216110/120216110/120216110/120216110/120215110/120215210/120216110/120216110/1202154<t< td=""><td>5/18/2017</td><td>28</td><td></td></t<>	5/18/2017	28	
5/24/2018 31.7 11/6/2018 35 4/11/2019 24 (D) 10/15/2019 120 (D) 5/13/2020 34 (D) 8/3/2020 38 (D) 10/7/2020 42 3/2/2021 42 3/2/2021 45 (D) 5/3/2021 57 10/4/2021 57 10/4/2021 64 5/3/2024 61 (D) 10/4/2024 54 5/3/2025 54 10/4/2021 54 5/3/2023 54 10/4/2024 54 5/3/2023 54 10/4/2024 54 5/3/2023 54 5/3/2023 52 5/3/2023 52 5/3/2023 52 5/3/2023 52 5/3/2023 52 5/3/2023 52 5/3/2023 52 5/3/2023 52	8/3/2017	31.9	
11/6/2018354/11/201924(D)10/15/201930(D)5/13/202036(D)10/720204210/7202028(D)5/3/202145.07/28/2021510/4/2021685/3/20226410/4/20216110/4/20216110/4/20226110/4/20226110/4/20226110/4/20236310/4/20246110/4/20256110/4/20256110/4/20266110/4/20276310/4/20266110/4/20276310/4/20266110/4/20276310/4/20286110/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296310/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/20296410/4/2	4/11/2018	28.7 (D)	
4/11/201924 (D)10/15/201932 (D)5/3/202038 (D)10/7/20204210/7/202128 (D)5/3/202144.5 (D)10/4/20215710/4/2021685/3/20225410/20226410/20225410/20235410/20245410/2024	5/24/2018	31.7	
10/15/20191205/13/202034 (D)8/3/202038 (D)10/7/2020423/2/2021805/3/202144.5 (D)7/28/20215710/4/2021683/1/2022545/3/2021541/26/2023545/3/2021541/26/2023523/1/2022541/26/2023543/1/2024543/1/2025543/1/2025543/1/2025543/1/2024	11/6/2018		35
5/13/202034 (D)8/3/202038 (D)10/7/2020423/2/202128 (D)5/3/202144.5 (D)7/28/20215710/4/2021683/1/2022565/3/2022547/26/202361 (D)10/4/2021545/3/2021545/3/2022545/3/2023355/2/202332 (D)7/26/203444	4/11/2019		24 (D)
8/3/202038 (D)10/7/2020423/2/202128 (D)5/3/202144.5 (D)7/28/20215710/4/2021683/1/2022565/3/2022547/26/202261 (D)10/4/2021543/7/2023355/2/202344	10/15/2019		120 (D)
107/2020423/2/202128 (D)5/3/202144.5 (D)7/28/20215710/4/2021683/1/2022565/3/2022547/26/202361 (D)10/4/2021543/1/2023545/2/202332 (D)5/2/202344	5/13/2020		34 (D)
3/2/202128 (D)5/3/202144.5 (D)7/28/20215710/4/2021685/3/2022547/26/202361 (D)10/4/2024543/7/2023545/2/202332 (D)5/2/202344	8/3/2020		38 (D)
5/3/202144.5 (D)7/28/20215710/4/2021683/1/2022565/3/2022547/26/202261 (D)10/4/2022543/7/2023355/2/202332 (D)7/26/202344	10/7/2020		42
7/28/20215710/4/2021683/1/2022565/3/2022547/26/202261 (D)10/4/2022543/7/2023355/2/202332 (D)7/26/202344	3/2/2021		28 (D)
10/4/2021 68 3/1/2022 56 5/3/2022 54 7/26/2022 61 (D) 10/4/2022 54 3/7/2023 54 5/2/2023 32 (D) 7/26/2023 44	5/3/2021		44.5 (D)
3/1/2022 56 5/3/2022 54 7/26/2022 61 (D) 10/4/2022 54 3/7/2023 35 5/2/2023 32 (D) 7/26/2023 44	7/28/2021		57
5/3/2022 54 7/26/2022 61 (D) 10/4/2022 54 3/7/2023 35 5/2/2023 32 (D) 7/26/2023 44	10/4/2021		68
7/26/2022 61 (D) 10/4/2022 54 3/7/2023 35 5/2/2023 32 (D) 7/26/2023 44	3/1/2022		56
10/4/2022 54 3/7/2023 35 5/2/2023 32 (D) 7/26/2023 44	5/3/2022		54
3/7/2023 35 5/2/2023 32 (D) 7/26/2023 44	7/26/2022		61 (D)
5/2/202332 (D)7/26/202344	10/4/2022		54
7/26/2023 44	3/7/2023		35
	5/2/2023		32 (D)
10/5/2023 48	7/26/2023		44
	10/5/2023		48

Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 2:06 PM

	DEK-MW-15006	DEK-MW-15006
12/10/2015	13	
3/30/2016	19	
5/25/2016	18	
8/24/2016	20	
12/1/2016	20	
2/23/2017	20	
5/18/2017	20	
8/3/2017	14.6	
4/11/2018	18.3	
5/24/2018	25.7	
11/5/2018		20.25 (D)
4/11/2019		21
10/15/2019		27
5/13/2020		21
8/4/2020		22
10/7/2020		27
3/2/2021		24
5/3/2021		24
7/28/2021		34
10/4/2021		23.5 (D)
3/1/2022		28
5/3/2022		24.5 (D)
7/26/2022		29
10/4/2022		26
3/7/2023		15
5/2/2023		16
7/26/2023		21
10/5/2023		22

Constituent: Arsenic, Total (ug/L) Analysis Run 12/1/2023 2:09 PM

	DEK-MW-18001	DEK-MW-18001
12/10/2015	118	
3/30/2016	159	
5/26/2016	138	
8/24/2016	108	
12/1/2016	144	
2/23/2017	133	
5/18/2017	145	
8/3/2017	158	
4/10/2018	103	
5/23/2018	225	
8/17/2018		146
11/6/2018		116
2/18/2019		85.5 (D)
4/10/2019		68
8/14/2019		49
10/15/2019		63
3/9/2020		75
5/14/2020		79
8/3/2020		69
10/6/2020		85
3/2/2021		98
5/3/2021		92
7/27/2021		78
10/7/2021		85
3/1/2022		130
5/3/2022		113
7/26/2022		89
10/4/2022		109
3/7/2023		228
5/3/2023		304
7/26/2023		333
10/4/2023		398