

January 28, 2022

TRANSMITTAL VIA EMAIL 01/28/2022

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

SUBJECT: 2021 Annual Groundwater Monitoring and Corrective Action Report DE Karn Lined Impoundment Coal Combustion Residuals (CCR) Unit

Dear Ms. Babcock:

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule) (USEPA, April 2015, as amended). Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90-98), apply to the Consumers Energy Company (Consumers Energy) Lined Impoundment at the DE Karn Power Plant Site. Pursuant to the CCR Rule, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). On behalf of Consumers Energy, TRC has prepared this Annual Groundwater Monitoring Report for the Karn Lined Impoundment to cover the period of January 1, 2021 to December 31, 2021.

This 2021 Karn Lined Impoundment Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Appendix III to Part 257 of the CCR Rule) for the four quarterly groundwater monitoring events completed in 2021 for the Lined Impoundment. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring constituents to determine if concentrations in detection monitoring well samples exceed background levels.

After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. This alignment would ensure compliance with the CCR standards through a state-approved

DE Karn Lined Impoundment Annual Groundwater Monitoring and Corrective Action Report Ms. Lori Babcock January 28, 2022



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

On November 6, 2020 Consumers Energy submitted the Karn Lined Impoundment Hydrogeological Monitoring Plan (November 2020 HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and the four quarterly events completed in 2021were performed in accordance with the EGLE-approved HMP. This letter and four quarterly reports (Enclosures 2 through 5) collectively comprise the 2021 Annual Groundwater Monitoring and Corrective Action Report and meet the requirements of §257.90(e) as documented in the enclosed checklist (Enclosure 1).

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following SSIs over background limits:

- Sulfate in monitoring well DEK-MW-18001
- > Calcium in monitoring well OW-10; and
- ➤ Boron and pH in monitoring well OW-11.

As detailed in the Second Quarter 2021 Hydrogeological Monitoring Report (Enclosure 2), a source other than the Karn Lined Impoundment CCR Unit caused the SSIs. As such, Consumers Energy will continue with the detection monitoring program at the Karn Lined Impoundment in conformance with §257.90 - §257.94.

No corrective actions were performed in 2021. Per the November 2020 HMP, quarterly monitoring will be performed at the Karn Lined Impoundment in 2022. The next annual monitoring report will cover monitoring conducted in the 2022 calendar year and will be submitted no later than January 31, 2023.

Sincerely,

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

Principal Engineer

Landfill Operations Compliance

Phone: (517) 788-2982

Email: harold.registerjr@cmsenergy.com

DE Karn Lined Impoundment Annual Groundwater Monitoring and Corrective Action Report Ms. Lori Babcock January 28, 2022



cc: Mr. Phil Roycraft, EGLE Saginaw Bay District Office

Mr. Mike Quigg, EGLE Saginaw Bay District Office

Ms. Margie Ring, EGLE Lansing Office

Mr. Jim Arduin, EGLE Lansing Office

Mr. Caleb Batts, Consumers Energy

Ms. Darby Litz, TRC

Ms. Kristin Lowery, TRC

Mr. Jacob Krenz, TRC

Enclosures: 1) CCR Annual Groundwater Report Requirements: § 257.90(e). Checklist for the

Karn Lined Impoundment CCR Unit.

2) <u>First Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan. (TRC; April 30, 2021)</u>

3) <u>Second Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined</u> Impoundment CCR Unit, Essexville, Michigan. (TRC; July 29, 2021)

4) <u>Third Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined</u> Impoundment CCR Unit, Essexville, Michigan. (TRC; October 28, 2021)

5) <u>Fourth Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined</u> Impoundment CCR Unit, Essexville, Michigan. (TRC; January 28, 2022)

# CCR Annual Groundwater Report Requirements: § 257.90(e) Checklist for the Karn Lined Impoundment CCR Unit 2021 Annual Report

Requirement	Reference
At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:	
(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;	Figure 2 (2),(3),(4),(5)
(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;	Not Applicable - no installation or decomissioning
(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;	Section 3.2 (2),(3),(4),(5)
(4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and	Corrective Action Progress Report <sup>(1)</sup> ; Section 1.2 Program Summary <sup>(2),(3),(4),(5)</sup>
(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.	Certified ASD <sup>(3)</sup>
(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:  (i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program	
in § 257.94 or the assessment monitoring program in § 257.95;	Section 1.2 Program Summary (2),(3),(4),(5)
(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;	Section 1.2 Program Summary (2),(3),(4),(5)
(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to § 257.94(e):	Section 4.3 Alternate Source Demonstration <sup>(3),(4),(5)</sup> ; Certified ASD <sup>(3)</sup>
(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	Certified ASD <sup>(3)</sup> ; remaining in Detection Monitoring
(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Not Applicable; Detection Monitoring
(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:	Not Applicable; Detection Monitoring
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	Not Applicable; Detection Monitoring
(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Not Applicable; Detection Monitoring
(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Not Applicable; Detection Monitoring
(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Not Applicable; Detection Monitoring
(v) Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Not Applicable; Detection Monitoring
(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.	Not Applicable; Detection Monitoring

#### Notes:

- (1) 2021 Annual Groundwater Monitoring and Corrective Action Report Karn Lined Impoundment Coal Combustion Residuals CCR Unit. Consumers Energy. January 28, 2022.
- (2) First Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan.TRC. April 30, 2021.
- (3) Second Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan.TRC. July 29, 2021.
- (4) Third Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan.TRC. October 28, 2021.
- (5) Fourth Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan.TRC. January 28, 2022.



# First Quarter 2021 Hydrogeological Monitoring Report

**DE Karn Lined Impoundment CCR Unit** 

**Essexville, Michigan** 

April 2021

Darby Litz

Project Manager/Hydrogeologist

### **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

#### **Prepared By:**

TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

Graham Crockford, C Program Manager



#### **TABLE OF CONTENTS**

1.0	Intro	oduction	1
	1.1	Statement of Adherence to Approved Hydrogeological Monitoring Plan	1
	1.2	Program Summary	1
	1.3	Site Overview	2
	1.4	Geology/Hydrogeology	2
2.0	Seco	ond Collection System Monitoring	1
3.0	Grou	undwater Monitoring	2
	3.1	Monitoring Well Network	2
	3.2	March 2021 Detection Monitoring Event	2
		3.2.1 Data Quality Review	4
		3.2.2 Groundwater Flow Rate and Direction	4
4.0	Data	a Evaluation	6
	4.1	Statistical Evaluation of Trends	6
	4.2	Detection Monitoring Data Discussion	7
	4.3	Alternate Source Demonstration	7
5.0	Cond	clusions and Recommendations	8
TAB	I FS		
Table		Summary of Groundwater Elevation Data	
Table		Summary of Field Parameter Results: March 2021	
Table Table		Summary of Groundwater Sampling Results (Analytical): March 2021 Summary of Statistical Exceedances – March 2021	
FIGU	JRES		
Figur		Site Location Map	
Figur Figur		Site Layout Map Shallow Groundwater Contour Map - March 1, 2021	
APP	ENDI	ICES	
	ndix A		
	ndix E	· · · · · · · · · · · · · · · · · · ·	
	ndix (		
	endix [ endix E		



#### 1.0 Introduction

Pursuant to the Federal CCR Rule<sup>1</sup>, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

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

This First Quarter 2021 Karn Lined Impoundment Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. This Report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality (MDEQ) — Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Facility Monitoring Submittals, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (NREPA), also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

#### 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in 1<sup>st</sup> Quarter 2021 at the Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

<sup>&</sup>lt;sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended.



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

The Karn Lined Impoundment is currently in detection monitoring. This is the first report submitted utilizing the compliance monitoring approach outlined in the EGLE-approved HMP.

#### 1.3 Site Overview

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

#### 1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 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 80-90 ft bgs.

The DE Karn Power Plant site is bound by several surface water features (Figures 1 and 2): the Saginaw River to the west, Saginaw Bay (Lake Huron) to the north and east, and a discharge channel to the south. In general, shallow groundwater is encountered at a similar or slightly higher elevation relative to the surrounding surface water features. Groundwater flow in the upper aquifer is largely controlled by the surface water elevations of Saginaw River and Saginaw Bay. In the vicinity of the Karn Bottom Ash Pond and Karn Lined Impoundment, the shallow groundwater flow is generally radial, flowing outward from the pond area toward the surrounding surface water bodies.



## 2.0 Second Collection System Monitoring

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

The Average Daily Flow Rate for the period from December 10, 2020 – January 6, 2021 was calculated as 137.0 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD. Although this calculated flow rate does not constitute the average flow rates for the last three months per the definition of average daily flow rate under Part 115, Consumers provided a proactive notification and a preliminary written assessment of the flow rate exceedances to the EGLE January 15, 2021 and January 22, 2021, respectively. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. A written assessment that summarizes investigations and provides an update on remedial actions performed and planned on the leachate collection system is included in Appendix E.

In response to the exceedance of the SCS action flow rate (AFR), a sample was collected from the secondary leachate collection system sump (KLI-SCS) in March 2021 to compare leachate chemistry to groundwater chemistry. The secondary collection system sample was analyzed for the following constituents:

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

Water quality data collected for 1<sup>st</sup> Quarter 2021 are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored. Using the secondary collection system flow rates as a leak detection system was successful. The leak was identified last quarter, actions were promptly taken to address the leak, and the results of the mitigation efforts will continue to be monitored.

Consumers Energy continues to monitor the secondary collection system flow rates, record flow rates and head level on the secondary liner in the operating record and evaluate flowrate trends on a weekly basis. Now that Consumers Energy has completed evaluations and summarized work performed as required by April 30, 2021, written notifications of flow rates in the secondary collection system will be provided monthly and evaluations of the chemical characteristics of liquid in the secondary collection system will be reported quarterly. In addition, Consumers Energy continues to provide quarterly updates on remedial actions performed on the leachate collection system through the quarterly groundwater monitoring report required by the HMP.



### 3.0 Groundwater Monitoring

#### 3.1 Monitoring Well Network

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

#### 3.2 March 2021 Detection Monitoring Event

In accordance with the HMP, TRC conducted the first quarter 2021 monitoring event for the Karn Lined Impoundment on March 1 through 3, 2021. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.



Groundwater samples collected during the March 2021 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents:

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

Samples were also analyzed for constituents identified in Section 11519b(2) – Assessment Monitoring Constituents and the additional constituent's magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide additional evaluation of groundwater chemistry. Analytical results from the first quarter 2021 monitoring event are included in the attached laboratory reports (Appendix A).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix B).



Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of one field blank, one equipment blank, one field duplicate (OW-10), and field matrix spike/matrix spike duplicate samples collected at DEK-MW-18001.

#### 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

#### 3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the March 2021 groundwater monitoring events are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in March 2021 are generally within the range of 581 to 587 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected from the groundwater monitoring system of the former bottom ash pond in March 2021 demonstrate a reduction in groundwater elevation measurements by several feet when compared to measurement taken in June 2018. Groundwater at the facility is locally influenced by incidental infiltration from precipitation over the uncovered acreage. Monitoring Wells OW-11 and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as



#### illustrated in Figure 3.

The average hydraulic gradient observed on March 1, 2021 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0035 ft/ft. The gradients were calculated using the monitoring well pair DEK MW 15004/DEK-MW-15005, as well as the well water elevation difference and distance between DEK-MW-15003 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same dates as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.18 ft/day or 64 ft/year in March 2021 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

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



#### 4.0 Data Evaluation

Detection monitoring is continuing at the Karn Lined Impoundment in accordance with the HMP. The following section summarizes the statistical approach applied to assess the first quarter 2021 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria, the generic GSI criteria, and the site-specific mixing-zone GSI criteria. Mixing-zone criteria are provided for the Karn-Weadock complex in the December 23, 2015 mixing zone determination that consists of arsenic, boron, and selenium. As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017. Groundwater compliance is evaluated in accordance with the HMP to determine if a release from the Karn Landfill has occurred and drinking water and GSI criteria are provided as screening levels only.

#### 4.1 Statistical Evaluation of Trends

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

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas<sup>™</sup> Statistical Software (Sanitas<sup>™</sup>). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from April 2019 through March 2021 were analyzed using Mann-Kendall and Sen's Slope at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.



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

- Preliminary, unconfirmed increasing trends for boron, fluoride, and pH were observed in monitoring well OW-11.
- A preliminary, unconfirmed increasing trend was observed for calcium in monitoring well OW-10.
- A preliminary, unconfirmed increasing trend was observed for sulfate at DEK-MW-18001.

#### 4.2 Detection Monitoring Data Discussion

Although preliminary detection monitoring trends noted in Section 4.1 exist, the groundwater conditions do not conclusively indicate a release from the unit. Groundwater quality is generally consistent with previous monitoring events. The location of one of the two identified liner damage locations is approximately 40-ft upgradient from monitoring well OW-12. Detection monitoring constituent concentrations at OW-12 exhibit no statistically significant trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The three wells with noted preliminary trends are located much further away from where the release was likely to occur. Additionally, concentrations of several constituents observed at OW-11 are much higher than concentrations observed in the KLI-PCS and KLI-SCS, which support a source other than the Karn Lined Impoundment is affecting chemistry at OW-11. The preliminary trends at OW-10 and DEK-MW-18001 will continue to be evaluated to determine if they could be indication of a release from the unit, or if they could be attributed to another change in conditions, such as groundwater flow regime or redox conditions.

#### 4.3 Alternate Source Demonstration

At this time, Consumers Energy is not asserting an Alternate Source Demonstration (ASD), as there are no confirmed Statistically Significant Increases (SSI) from this reporting period.



#### 5.0 Conclusions and Recommendations

Consumers Energy will continue with the detection monitoring program at the Karn Lined Impoundment unit in conformance with the HMP. No SSIs over background limits were identified at the Karn Lined Impoundment during the March 2021 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in Q4 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts will continue to be monitored. The second quarter monitoring event is scheduled for the first week of May 2021.



#### 6.0 References

- AECOM. October 30, 2009. Potential Failure Mode Analysis (PFMA) Report. DE Karn Electric Generation Facility Ash Dike Risk Assessment Essexville, Michigan. Prepared for Consumers Energy Company
- Consumers Energy. December 19, 2017. Hydrogeological Monitoring Plan, Rev. 3. DE Karn Solid Waste Disposal Area.
- TRC. January 2019. 2018 Annual Groundwater Report for the DE Karn Power Plant Bottom Ash Pond CCR Unit, Essexville, Michigan. Prepared for Consumers Energy Company.
- TRC. November 2020. Karn Lined Impoundment Hydrogeological Monitoring Plan for the DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.
- 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).



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

	TOC		Screen Interval	March 1, 2021			
Well Location	Elevation (ft)	Geologic Unit of Screen Interval			Groundwater Elevation (ft)		
Background	<u> </u>	<u> </u>		(ft BTOC)	(11)		
MW-15002 <sup>(1)</sup>	587.71	Sand	580.9 to 570.9	5.99	581.72		
MW-15008 <sup>(1)</sup>	585.36	Sand with clay	578.7 to 568.7	4.00	581.36		
MW-15016 <sup>(1)</sup>	586.49	Sand	581.2 to 578.2	3.54	582.95		
MW-15019 <sup>(1)</sup>	586.17	Sand and Sand/Clay	579.5 to 569.5	4.77	581.40		
DEK Bottom Ash Pon		Cana and Cana/Clay	373.3 10 300.3		001.10		
DEK-MW-15002	590.87	Sand	578.3 to 575.3	5.84	585.03		
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.75	583.29		
DEK-MW-15005	589.72	Sand	572.3 to 567.3	8.70	581.02		
DEK-MW-15006	589.24	Sand	573.0 to 568.0	8.00	581.24		
DEK Bottom Ash Pon	ļ						
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.46	586.28		
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.23	585.24		
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	5.96	585.62		
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.45	586.45		
OW-12	603.07	Silty Sand	584.2 to 579.2	16.98	586.09		
DEK Nature and Exter	nt		•				
MW-01	597.02	Sand	573.0 to 570.0	16.10	580.92		
MW-03	597.30	Sand	569.8 to 566.8	16.40	580.90		
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	7.88	581.56		
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.00	581.78		
MW-10	596.97	Sand	582.5 to 572.5	15.80	581.17		
MW-12	598.60	Sand	583.9 to 573.9	17.59	581.01		
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	13.57	580.80		
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	14.91	580.89		
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.28	582.71		
MW-23	595.57	Ash/Sand	576.9 to 571.9	12.68	582.89		
DEK Static Water Leve							
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	16.40	580.94		
MW-04	598.01	NR	569.5 to 564.5	17.10	580.91		
MW-17	597.91	Sand	577.0 to 574.0	12.70	585.21		
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.40	583.82		
MW-19	597.28	NR	572.1 to 567.1	16.10	581.18		
MW-20	632.75	Sand	582.3 to 579.3	51.70	581.05		
MW-21	632.91	Sand	587.1 to 584.1	50.60	582.31		
OW-01	631.33	NR Fly Astr	572.5 to 567.5	50.50	580.83		
OW-02	598.01	Fly Ash	579.4 to 576.4	15.16	582.85		
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	16.50	581.44		
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	9.30	580.91		
OW-05	593.53	Sand	576.9 to 571.9	12.31	581.22		
OW-06	603.95	NR Ash	580.9 to 575.9	21.15	582.80		
OW-07 OW-08	596.41 593.93	Ash NR	583.3 to 580.3 581.0 to 576.0	13.96 10.41	582.45 583.52		
OW-09	593.45	NR NR	l	9.88	583.52		
OW-09 OW-13	588.52	NR NR		3.35	585.17		
OW-15	587.75	NR	572.8 to 567.8	2.55	585.20		

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

(1) Water level measurements during the August event were collected on August 10, 2020.

#### Summary of Field Parameter Results: March 2021 Karn Lined Impoundment – RCRA CCR Monitoring Program Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity				
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)				
Karn Lined Impound	Karn Lined Impoundment										
DEK-MW-15003	3/2/2021	0.99	25.5	7.8	340	14.3	2.0				
DEK-MW-18001	3/2/2021	1.18	49.7	7.0	629	8.2	3.8				
KLI-SCS	3/3/2021	4.10	169.7	7.8	1,412	8.2	34.5				
OW-10	3/2/2021	0.97	-62.4	7.0	712	10.1	21.1				
OW-11	3/2/2021	1.15	31.9	9.1	364	10.3	8.9				
OW-12	3/2/2021	0.97	-67.5	7.0	675	11.6	9.8				
KLI-PCS	3/1/2021	12.42	269.6	8.7	959	14.7	37.9				
SW-DITCH	3/1/2021	8.14	313.1	8.3	907	15.1	19.1				

#### Notes:

mg/L - Milligrams per Liter. mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius. NTU - Nephelmetric Turbidity Unit.

#### Summary of Groundwater Sampling Results (Analytical): March 2021 Karn Lined Impoundment – RCRA CCR Monitoring Program Essexville, Michigan

<b>_</b>							0 11 "	DEI/ 1884/ 45000	DEI/ 1884 40004	011/ 40	0111.40	0111.44	1/11.000	1/11 000	OW DITOU
							Sample Location:	DEK-MW-15003	DEK-MW-18001	OW-10	OW-12	OW-11	KLI-SCS	KLI-PCS	SW-DITCH
			1			Chuania Dasad	Sample Date:	3/2/2021	3/2/2021	3/2/2021	3/2/2021	3/2/2021	3/3/2021	3/1/2021	3/1/2021
				MI Non-		Chronic-Based	Acute-Based								
Constitutes	Llait	EPA MCL	MI Residential*	Residential*	MI GSI^	Mixing Zone GSI Criteria^	Mixing Zone GSI Criteria^			Downgradient				Supplemental	
Constituent	Unit	EPA WICL	ivii Residentiai	Residential	IVII GSI^	Chlena	Cillenar		í.			T			
Appendix III <sup>(1)</sup>															
Boron	ug/L	NC	500	500	NA	44,000	69,000	924	1,240	1,380	906	3,050	716	566	103
Calcium	mg/L	NC	NC	NC	500 <sup>EE</sup>	NC	NC	29.3	71.0	103	84.9	14.0	63.4	113	71.8
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	50.2	53.8	66.0	50.0	69.0	108	108	112
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	1,200	< 1,000	< 1,000	4,150	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	27.6	115	2.62	165	25.4	395	77.1	41.3
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	261	495	551	549	242	1,440	528	493
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	7.8	7.0	7.0	7.0	9.1	7.9	8.7	8.3
Appendix IV <sup>(1)</sup>															
Antimony	ug/L	6	6	6	2	NC	NC	< 1	< 1	< 1	< 1	1	1	< 1	< 1
Arsenic	ug/L	10	10	10	NA	100	680	504	98	3	121	711	4	5	2
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	44	143	135	84	42	87	1,090	225
Beryllium	ug/L	4	4	4	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5	5	2.5	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	NC	NC	< 1	< 1	1	< 1	< 1	1	12	2
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	1,200	< 1,000	< 1,000	4,150	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4	4	14	NC	NC	< 1	<1	< 1	< 1	<1	2	2	1
Lithium	ug/L	NC	170	350	440	NC	NC	20	24	29	32	12	< 10	< 10	< 10
Mercury	ug/L	2	2	2	0.20#	NC	NC	< 0.2	< 0.2	< 0.2 <sup>H</sup>					
Molybdenum	ug/L	NC	73	210	120	NC	NC	28	< 5	< 5	11	317	159	22	6
Selenium	ug/L	50	50	50	NA	55	120	< 1	< 1	1	< 1	2	5	1	1
Thallium	ug/L	2	2	2	2	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 115	(2)														
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	NC	NC	101	687	1,480	4,440	35	1,220	3,810	570
Copper	ug/L	1,000**	1,000E	1,000E	20	NC	NC	< 1	< 1	2	1	< 1	6	20	18
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	2	< 2	2	5	9	4
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	2	< 2	429	11	52	10
Zinc	ug/L	5,000**	2,400	5,000E	260	NC	NC	< 10	< 10	< 10	< 10	< 10	< 10	18	15

#### Notes:

Groundwater compliance is evaluated in accordance with the HMP to determine if a release from the unit has occurred and drinking water and GSI criteria are provided as screening levels only. ug/L - micrograms per liter; mg/L - milligrams per liter.

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

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

NC - no criteria; NA - not applicable.

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.
- \*\* Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using

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

chloride is 50 mg/L when the discharge is to the Great Lakes or connecting waters per footnote {FF}. Mixing Zone 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}.
- H Sample was analyzed out of hold time.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- <sup>(2)</sup> Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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.

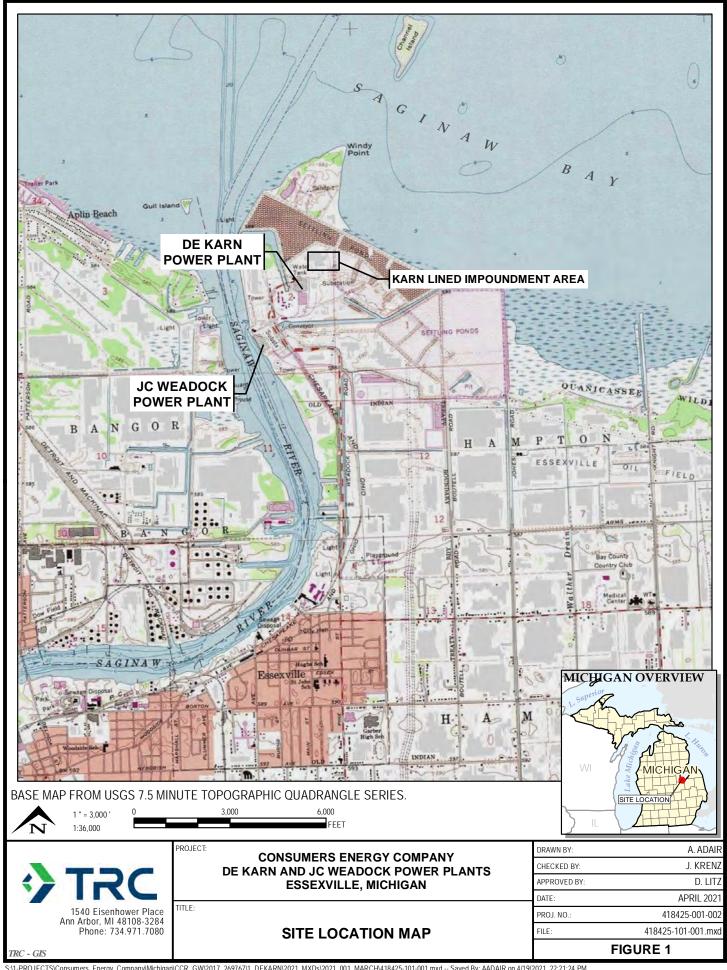
X:\WPAAM\PJT2\418425\0001\2021Q1\T418425.1-003 Page 1 of 1 April 2021

Summary of Statistical Exceedances – March 2021 Karn Lined Impoundment Essexville, Michigan

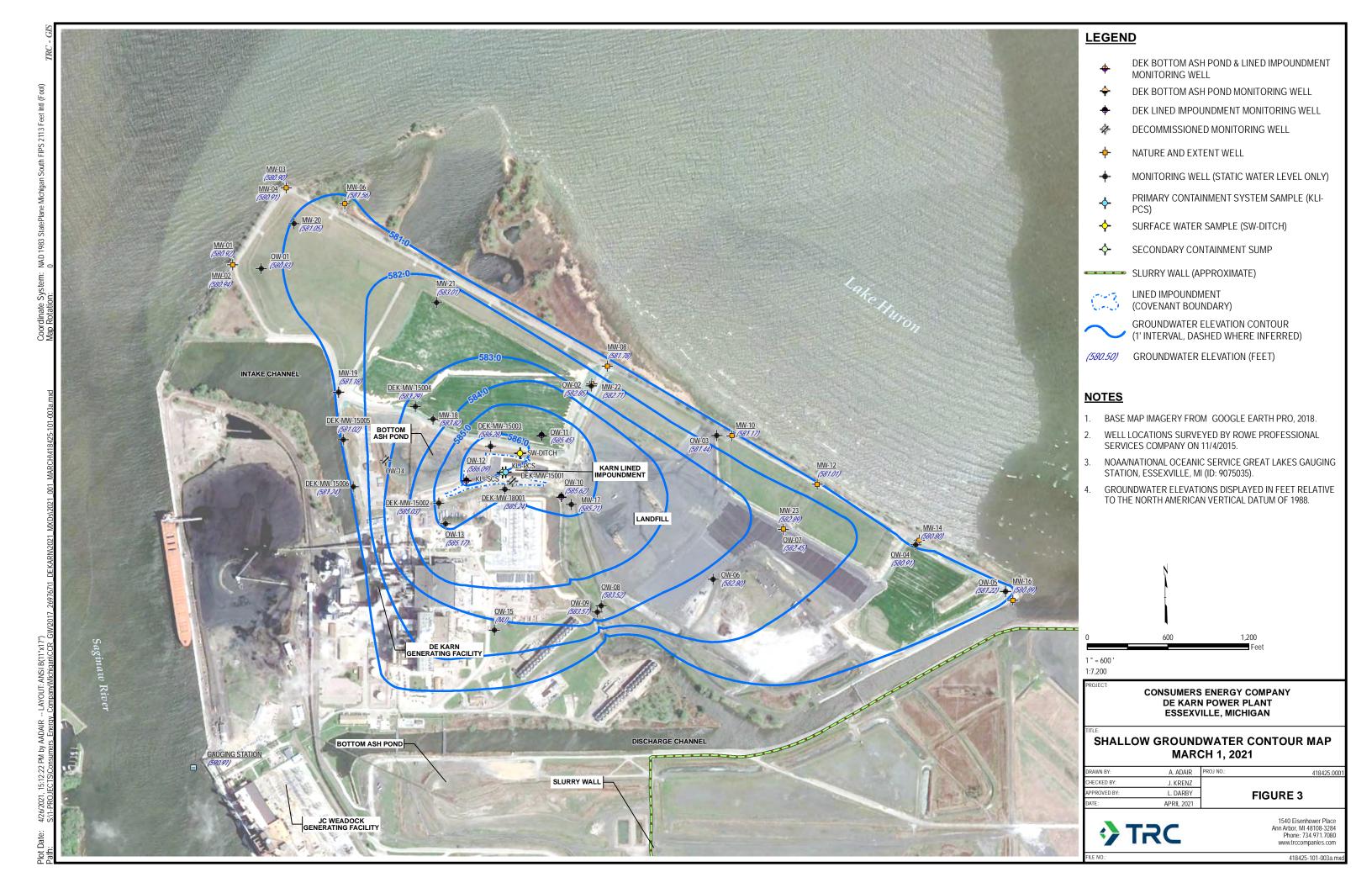
SUMMAR	N DEPARTMENT OF ENVIR Y OF STATISTICAL EXCEE Karn Lined Impoundment – '	Data is in unle	(X) ug/L ( ) mg/L ess otherwise	or stated				
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2020 ( <b>bold</b> >201)			
		No	Exce	edances				



# **Figures**









# **Appendix A Laboratory Analytical Reports**



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: March 17, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2021 Q1

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

**Chemistry Project: 21-0217** 

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 03/02/2021, for the 1<sup>st</sup> Quarter monitoring requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 03/04/2021.

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. <u>Sample Receipt</u>

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



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

Customer Name: Karn/Weadock Complex

Work Order ID: Q1-2021 DEK RCRA Bottom Ash Pond & Lined Impoundment

**Date Received:** 3/4/2021 **Chemistry Project:** 21-0217

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0217-01	DEK-MW-15003	Groundwater	03/02/2021 10:25 AM	DEK Bottom Ash Pond & Lined Impoundment
21-0217-02	DEK-MW-18001	Groundwater	03/02/2021 10:25 AM	DEK Bottom Ash Pond & Lined Impoundment
21-0217-03	DEK-MW-18001 MS	Groundwater	03/02/2021 10:25 AM	DEK Bottom Ash Pond & Lined Impoundment
21-0217-04	DEK-MW-18001 MSD	Groundwater	03/02/2021 10:25 AM	DEK Bottom Ash Pond & Lined Impoundment





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0217** 

Field Sample ID: **DEK-MW-15003**Lab Sample ID: 21-0217-01

Matrix: Groundwater

Collect Date: 03/02/2021

Report Date:

03/17/21

Collect Time: 10:25 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand  Parameter(s)  Result Flag Units					21-0217-01-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0310-08
Arsenic	504		ug/L	1	03/10/2021	AB21-0310-08
Barium	44		ug/L	5	03/10/2021	AB21-0310-08
Beryllium	ND		ug/L	1	03/10/2021	AB21-0310-08
Boron	924		ug/L	20	03/10/2021	AB21-0310-08
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0310-08
Calcium	29300		ug/L	1000	03/10/2021	AB21-0310-08
Chromium	ND		ug/L	1	03/10/2021	AB21-0310-08
Cobalt	ND		ug/L	6	03/10/2021	AB21-0310-08
Copper	ND		ug/L	1	03/10/2021	AB21-0310-08
Iron	101		ug/L	20	03/10/2021	AB21-0310-08
Lead	ND		ug/L	1	03/10/2021	AB21-0310-08
Lithium	20		ug/L	10	03/10/2021	AB21-0310-08
Magnesium	5060		ug/L	1000	03/10/2021	AB21-0310-08
Molybdenum	28		ug/L	5	03/10/2021	AB21-0310-0
Nickel	ND		ug/L	2	03/10/2021	AB21-0310-0
Potassium	4200		ug/L	100	03/10/2021	AB21-0310-08
Selenium	ND		ug/L	1	03/10/2021	AB21-0310-08
Silver	ND		ug/L	0.2	03/10/2021	AB21-0310-08
Sodium	45300		ug/L	1000	03/10/2021	AB21-0310-08
Thallium	ND		ug/L	2	03/10/2021	AB21-0310-08
Vanadium	ND		ug/L	2	03/10/2021	AB21-0310-0
Zinc	ND		ug/L	10	03/10/2021	AB21-0310-08
Mercury by EPA 7470A, Total,	Aqueous			Aliquot:	21-0217-01-C01-A02	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	03/10/2021	AB21-0310-1
Anions by EPA 300.0 CCR Rule	e Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0217-01-C02-A01	Analyst: DMV
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking :
Chloride	50200		ug/L	1000	03/10/2021	AB21-0311-0
Fluoride	ND		ug/L	1000	03/10/2021	AB21-0311-0
Sulfate	27600		ug/L	1000	03/10/2021	AB21-0311-0
Total Dissolved Solids by SM 2	2540C			Aliquot:	21-0217-01-C03-A01	Analyst: CE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	261		mg/L	10	03/04/2021	AB21-0305-0



#### **Analytical Report**

**Report Date:** 03/17/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0217** 

 Field Sample ID:
 DEK-MW-15003
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0217-01
 Collect Time:
 10:25 AM

Matrix: Groundwater

Alkalinity by SM 2320B	Aliquot:	Analyst: DLS			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity total	95000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity bicarbonate	95000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0217** 

Field Sample ID: **DEK-MW-18001**Lab Sample ID: 21-0217-02

Matrix: Groundwater

Collect Date: 03/02/2021

Report Date:

03/17/21

Collect Date: 03/02/2021 Collect Time: 10:25 AM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand			Aliquot: 21-0217-02-C01-A01		Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0310-08
Arsenic	98		ug/L	1	03/10/2021	AB21-0310-08
Barium	143		ug/L	5	03/10/2021	AB21-0310-08
Beryllium	ND		ug/L	1	03/10/2021	AB21-0310-08
Boron	1240		ug/L	20	03/10/2021	AB21-0310-08
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0310-08
Calcium	71000		ug/L	1000	03/10/2021	AB21-0310-08
Chromium	ND		ug/L	1	03/10/2021	AB21-0310-08
Cobalt	ND		ug/L	6	03/10/2021	AB21-0310-08
Copper	ND		ug/L	1	03/10/2021	AB21-0310-08
Iron	687		ug/L	20	03/10/2021	AB21-0310-08
Lead	ND		ug/L	1	03/10/2021	AB21-0310-08
Lithium	24		ug/L	10	03/10/2021	AB21-0310-08
Magnesium	13400		ug/L	1000	03/10/2021	AB21-0310-0
Molybdenum	ND		ug/L	5	03/10/2021	AB21-0310-08
Nickel	ND		ug/L	2	03/10/2021	AB21-0310-0
Potassium	4810		ug/L	100	03/10/2021	AB21-0310-0
Selenium	ND		ug/L	1	03/10/2021	AB21-0310-08
Silver	ND		ug/L	0.2	03/10/2021	AB21-0310-08
Sodium	70900		ug/L	1000	03/10/2021	AB21-0310-08
Thallium	ND		ug/L	2	03/10/2021	AB21-0310-0
Vanadium	ND		ug/L	2	03/10/2021	AB21-0310-0
Zinc	ND		ug/L	10	03/10/2021	AB21-0310-0
Mercury by EPA 7470A, Total, Aqueous					Aliquot: 21-0217-02-C01-A02	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking :
Mercury	ND		ug/L	0.2	03/10/2021	AB21-0310-1
Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous					Aliquot: 21-0217-02-C02-A01	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	53800		ug/L	1000	03/10/2021	AB21-0311-0
Fluoride	1200		ug/L	1000	03/10/2021	AB21-0311-0
Sulfate	115000		ug/L	1000	03/10/2021	AB21-0311-0
Total Dissolved Solids by SM 2	540C			Aliquot:	21-0217-02-C03-A01	Analyst: CE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	495		mg/L	10	03/04/2021	AB21-0305-09



#### **Analytical Report**

**Report Date:** 03/17/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0217** 

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0217-02
 Collect Time:
 10:25 AM

Matrix: Groundwater

Alkalinity by SM 2320B				Aliquot: 21-0217-02-C04-A01	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity total	190000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity bicarbonate	190000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: 21-0217

**DEK-MW-18001 MS** Field Sample ID:

Lab Sample ID: 21-0217-03 Matrix: Groundwater

Alkalinity total

Collect Date: 03/02/2021 Collect Time: 10:25 AM

Report Date:

03/17/21

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0217-03-C01-A01 Analyst: EB Parameter(s) Result Flag Units RL **Analysis Date** Tracking # Antimony 108 % 1 03/10/2021 AB21-0310-08 107 % Arsenic 1 03/10/2021 AB21-0310-08 **Barium** 106 % 5 03/10/2021 AB21-0310-08 Beryllium 100 % 1 03/10/2021 AB21-0310-08 **Boron** 112 % 20 03/10/2021 AB21-0310-08 Cadmium 107 % 0.2 03/10/2021 AB21-0310-08 Calcium 113 % 1000 03/10/2021 AB21-0310-08 Chromium 96 % 1 03/10/2021 AB21-0310-08 Cobalt 102 % 6 03/10/2021 AB21-0310-08 94 % 03/10/2021 AB21-0310-08 Copper 1 Iron 89 % 20 03/10/2021 AB21-0310-08 Lead 103 % 1 03/10/2021 AB21-0310-08 Lithium 98 % 10 03/10/2021 AB21-0310-08 Magnesium 110 % 1000 03/10/2021 AB21-0310-08 % Molybdenum 107 5 03/10/2021 AB21-0310-08 Nickel 95 % 2 03/10/2021 AB21-0310-08 104 % 100 03/10/2021 Potassium AB21-0310-08 Selenium 107 % 03/10/2021 AB21-0310-08 1 Silver 101 % 0.2 03/10/2021 AB21-0310-08 Sodium 112 % 1000 03/10/2021 AB21-0310-08 **Thallium** 101 % 2 03/10/2021 AB21-0310-08 Vanadium 105 % 2 03/10/2021 AB21-0310-08 96 % Zinc 10 03/10/2021 AB21-0310-08 Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0217-03-C01-A02 Analyst: TMR RL Parameter(s) Result Flag Units **Analysis Date** Tracking # 99.4 % 0.2 03/10/2021 AB21-0310-12 Mercury Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0217-03-C02-A01 Analyst: DMW Parameter(s) Result Flag Units RL **Analysis Date** Tracking # Chloride 105 % 03/10/2021 AB21-0311-01 1000 Fluoride 88 % 1000 03/10/2021 AB21-0311-01 Sulfate 101 % 1000 03/10/2021 AB21-0311-01 Alkalinity by SM 2320B Aliquot: 21-0217-03-C03-A01 Analyst: DLS Result Units Parameter(s) Flag RL Tracking # **Analysis Date** 94 % 03/09/2021 AB21-0309-16

10000





A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment Laboratory Project: 21-0217

Field Sample ID: DEK-MW-18001 MSD

Lab Sample ID: 21-0217-04 Matrix: Groundwater

Parameter(s)

Alkalinity total

Collect Date: 03/02/2021

Report Date:

03/17/21

Collect Time: 10:25 AM

Metals by EPA 6020B: CCR Rule	Appendix III-14 10	tai metais		Aliquot:	21-0217-04-C01-A01	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	110		%	1	03/10/2021	AB21-0310-08
Arsenic	110		%	1	03/10/2021	AB21-0310-08
Barium	108		%	5	03/10/2021	AB21-0310-08
Beryllium	102		%	1	03/10/2021	AB21-0310-08
Boron	112		%	20	03/10/2021	AB21-0310-08
Cadmium	107		%	0.2	03/10/2021	AB21-0310-08
Calcium	123		%	1000	03/10/2021	AB21-0310-08
Chromium	97		%	1	03/10/2021	AB21-0310-08
Cobalt	101		%	6	03/10/2021	AB21-0310-08
Copper	95		%	1	03/10/2021	AB21-0310-08
Iron	97		%	20	03/10/2021	AB21-0310-08
Lead	102		%	1	03/10/2021	AB21-0310-08
Lithium	100		%	10	03/10/2021	AB21-0310-08
Magnesium	113		%	1000	03/10/2021	AB21-0310-08
Molybdenum	107		%	5	03/10/2021	AB21-0310-08
Nickel	96		%	2	03/10/2021	AB21-0310-08
Potassium	110		%	100	03/10/2021	AB21-0310-08
Selenium	108		%	1	03/10/2021	AB21-0310-08
Silver	102		%	0.2	03/10/2021	AB21-0310-08
Sodium	116		%	1000	03/10/2021	AB21-0310-08
Thallium	99		%	2	03/10/2021	AB21-0310-08
Vanadium	105		%	2	03/10/2021	AB21-0310-08
Zinc	97		%	10	03/10/2021	AB21-0310-08
Mercury by EPA 7470A, Total, A	queous			Aliquot:	21-0217-04-C01-A02	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	97.4		%	0.2	03/10/2021	AB21-0310-12
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0217-04-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	106		%	1000	03/10/2021	AB21-0311-01
Fluoride	85		%	1000	03/10/2021	AB21-0311-01
Sulfate	105		%	1000	03/10/2021	AB21-0311-01
Alkalinity by SM 2320B				Aliquot:	21-0217-04-C03-A01	Analyst: DLS

Flag

Units

%

RL

10000

**Analysis Date** 

03/09/2021

Tracking #

AB21-0309-16

Result

94





Data Qualifiers Exception Summary

No exceptions occured.

Report Date:

03/17/21

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

General Standard Operating Procedure

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

Project	Log-In Number:	21-02	7			
	A CONTRACTOR OF THE PARTY OF TH	0		Inspection By: (WH		
-				I Q1-2021		
Shipme	ent Delivered By: Ente		and the same of th			
				SUSPS_	Airb	orne
	Other/Hand Carry (wh Tracking Number: 18	om) 4334&	67157	_ Shipping Form At	tached: Yes	No
Shippin	ng Containers: Enter the	ne type and	number of sh	ipping containers received.		
	Cooler (1)			7.5 (1.5)		e/Mailer
	Loose/Unpackaged Co			Other		
Condit				n of the shipment container		
Condit	and a second second			The second second second		14./01
	all the state of the second of			Dented	Leal	king
	Other					
Shipme			and the beating	ners were opened before re		
	Shipping Containers R	eceived: O	pened	Sealed	-	
Enclose	ed Documents: Enter the	ne type of de	ocuments enc	losed with the shipment.		
	CoC _ Wo.	rk Request_		Air Data Sheet	Other	
Temper	rature of Containers: 1	Measure the	temperature	of several sample container	'S.	
	As-Received Tempera			and the second second of the second second		lo
	M&TE # and Expiration	on 6	15402			
Numbe				oer of sample containers re	ceived.	
	Container Type	Water	Soil	Other	Broken	Leaking
	VOA (40mL or 60mL)	8	_			_
	Quart/Liter (g/p)		_	1		
	9-oz (amber glass jar)		-		-	
	2-oz (amber glass)		_			
	125 mL (plastic)	8	_		_	
	24 mL vial (glass)		-			-
250	500 mL (plastic)	2	-			-
	Other		(2000)			-

# **CHAIN OF CUSTODY**



# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE: PROJECT NUMBER:						ANAL	YSIS RI	EQUESTE	)		Page 1 of 1					
DEK Bottom Ash Pond & LI - 2021 Q1			Q1	21-0217											SEND REPORT TO CDBatts	
AMPL	ING TEA	AM: Va	41+		DATE SHIPPED:	SI		ATTACHED?	s							HD Register, TRC
7	RC	- ray	Jav	ies	3/3/2021		CIRCLE ONE: YES NO		Total Metals	Suc	70	Alkalinity				PHONE:
CONT	E ROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION		DEPTH (ft)	# OF CONTAINERS	Tota	Anions	TDS	AIK				REMARKS
21-02	217-01	3/2/202	10:25em	GW	DEK-MW-15003			5	x	х	x	x				
	_		i 10:25am	GW	DEK-MW-18001			5	х	x	x	x				
	-03	3/2/2021	10:25 am	. GW	DEK-MW-18001 M	S		4	x	x		х				
+	-04	3/2/202	10:25 am	GW	DEK-MW-18001 M	SD		4	x	x		x				
Ħ																
-																
	-															
	-															
				-												
_																
ELINO	OUISHEI	D BY: (SIGNAT	TURE)	DATE/T	IME	RECEIVED BY	: (SIGNATUR	E)	153				co	MMENTS	S	
			ninga	3/	13/2021	Fed	ex		3.	016	5.2°	-				
ELINC	QUISHE	D BY: (SIGNA		DATE/T	7 5 7 1 7 1 2	RECEIVED BY										
+	ed	=>		3.	4-2021 1130		217 Page 13 c				OF	RIGINAL	TO LAB	COPY	Y TO	CUSTOMER



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: April 15, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2021 Q1

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 21-0218R2

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 03/02/2021 and 03/03/2021 for the 1<sup>st</sup> Quarter monitoring requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 03/04/2021.

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; one anomaly was 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.

NOTE: Metals container 21-0218-07-C01 was received empty. Since the volume was sufficient, a portion from the Anions container 21-0218-C02 was transferred into the metals container during sample receipt.

NOTE: The Karn Influent sample set was received on 03/04/2021 without being listed on a Chain of Custody and it was added to project 21-0218 as sample 21-0218-10 upon clarification & instructions from the sampling team lead.

#### II. Methodology

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

#### III. Results/Quality Control

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

NOTE: The original report was revised to include additional metal analytes. A subsequent revision to the report was requested to include Mercury. Since the samples were analyzed past the method recommended hold time, the results have been flagged accordingly.

#### **DEFINITIONS / QUALIFIERS**

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

<u>Acronym</u>	<u>Description</u>
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte

LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q1-2021 DEK RCRA Lined Impoundment Wells

**Date Received:** 3/4/2021 **Chemistry Project:** 21-0218

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0218-01	OW-10	Groundwater	03/02/2021 01:35 PM	DEK Lined Impoundment
21-0218-02	OW-12	Groundwater	03/02/2021 03:45 PM	DEK Lined Impoundment
21-0218-03	OW-11	Groundwater	03/02/2021 05:00 PM	DEK Lined Impoundment
21-0218-04	KLI-SCS	Groundwater	03/03/2021 08:50 AM	DEK Lined Impoundment
21-0218-05	KLI-PCS	Surface Water	03/01/2021 10:30 AM	DEK Lined Impoundment
21-0218-06	SW-DITCH	Surface Water	03/01/2021 10:00 AM	DEK Lined Impoundment
21-0218-07	DUP-KLI	Groundwater	03/02/2021 12:00 AM	DEK Lined Impoundment
21-0218-08	EB-KLI	Water	03/02/2021 01:35 PM	DEK Lined Impoundment
21-0218-09	FE-KLI	Water	03/02/2021 01:40 PM	DEK Lined Impoundment
21-0218-10	Karn Influent	Groundwater	03/03/2021 08:40 AM	DEK Lined Impoundment





A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: **OW-10**Lab Sample ID: 21-0218-01
Matrix: Groundwater

**Total Dissolved Solids** 

Collect Date: 03/02/2021

Report Date:

04/15/21

Collect Time: 01:35 PM

Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand			Aliquot:	21-0218-01-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	3		ug/L	1	03/10/2021	AB21-0319-05
Barium	135		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	1380		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	103000		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	1		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	2		ug/L	1	03/10/2021	AB21-0319-05
Iron	1480		ug/L	20	03/10/2021	AB21-0319-05
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05
Lithium	29		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	17300		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	301		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	ND		ug/L	5	03/10/2021	AB21-0319-05
Nickel	2		ug/L	2	03/10/2021	AB21-0319-05
Potassium	4610		ug/L	100	03/10/2021	AB21-0319-05
Selenium	1		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	62800		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	2		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total, A	queous			Aliquot:	21-0218-01-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aqu	eous	Aliquot:	21-0218-01-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	66000		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate	2620		ug/L	1000	03/11/2021	AB21-0311-01
Total Dissolved Solids by SM 25	40C			Aliquot:	21-0218-01-C03-A01	Analyst: CET
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #

mg/L

21-0218R2 Page 5 of 26

10

03/04/2021

AB21-0305-09

551



**Report Date:** 04/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

 Field Sample ID:
 OW-10
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0218-01
 Collect Time:
 01:35 PM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot:	21-0218-01-C04-A01	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #	
Alkalinity Total	366000	ug/L	10000	03/09/2021	AB21-0309-16	
Alkalinity Bicarbonate	366000	ug/L	10000	03/09/2021	AB21-0309-16	
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16	



Report Date:

04/15/21

03/02/2021

03:45 PM



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: 21-0218

Field Sample ID: **OW-12** Collect Date: Lab Sample ID: 21-0218-02 Collect Time:

Matrix: Groundwater

Metals by EPA 6020B: CCR Rule Appe	ndix III-IV To	tal Metals	Expand	Aliquot:	21-0218-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	121		ug/L	1	03/10/2021	AB21-0319-05
Barium	84		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	906		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	84900		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	ND		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	1		ug/L	1	03/10/2021	AB21-0319-05
Iron	4440		ug/L	20	03/10/2021	AB21-0319-05
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05
Lithium	32		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	29200		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	130		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	11		ug/L	5	03/10/2021	AB21-0319-05
Nickel	ND		ug/L	2	03/10/2021	AB21-0319-05
Potassium	6730		ug/L	100	03/10/2021	AB21-0319-05
Selenium	ND		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	48600		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	ND		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot:	21-0218-02-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0218-02-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	50000		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate	165000		ug/L	1000	03/11/2021	AB21-0311-01
Total Dissolved Solids by SM 2540C				Aliquot:	21-0218-02-C03-A01	Analyst: CET
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	549 <u>21-0</u>	)218R2 Page	mg/L 7 of 26	10	03/04/2021	AB21-0305-09



**Report Date:** 04/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

 Field Sample ID:
 OW-12
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0218-02
 Collect Time:
 03:45 PM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	188000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	188000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: **OW-11**Lab Sample ID: 21-0218-03
Matrix: Groundwater

Parameter(s)

**Total Dissolved Solids** 

Collect Date: 03/02/2021

Report Date:

04/15/21

Collect Time: 05:00 PM

Metals by EPA 6020B: CCR R			-		21-0218-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	1		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	711		ug/L	1	03/10/2021	AB21-0319-05
Barium	42		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	3050		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	14000		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	ND		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	ND		ug/L	1	03/10/2021	AB21-0319-05
Iron	35		ug/L	20	03/10/2021	AB21-0319-05
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05
Lithium	12		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	2020		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	5		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	317		ug/L	5	03/10/2021	AB21-0319-05
Nickel	2		ug/L	2	03/10/2021	AB21-0319-05
Potassium	4920		ug/L	100	03/10/2021	AB21-0319-05
Selenium	2		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	60800		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	429		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total	, Aqueous			Aliquot:	21-0218-03-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Ru	ıle Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0218-03-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	69000		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	4150		ug/L	1000	03/11/2021	AB21-0311-0
Sulfate	25400		ug/L	1000	03/11/2021	AB21-0311-01
Total Dissolved Solids by SM	2540C			Aliquot:	21-0218-03-C03-A01	Analyst: CET

Result

242

Flag

21-0218R2 Page 9 of 26

Units

mg/L

RL

10

**Analysis Date** 

03/04/2021

Tracking #

AB21-0305-09



Report Date: 04/15/21

Collect Date:

Collect Time:

21-0218

03/02/2021

05:00 PM

**Laboratory Services** A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** 

Laboratory Project: Field Sample ID: **OW-11** Lab Sample ID: 21-0218-03

Matrix: Groundwater

Alkalinity by SM 2320B			,		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	65800	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	32100	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	33700	ug/L	10000	03/09/2021	AB21-0309-16





A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: KLI-SCS
Lab Sample ID: 21-0218-04
Matrix: Groundwater

Parameter(s)

**Total Dissolved Solids** 

Collect Date: 03/03/2021

Report Date:

04/15/21

Collect Time: 08:50 AM

Metals by EPA 6020B: CCR Rule Appe			•	Aliquot:	21-0218-04-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	1		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	4		ug/L	1	03/10/2021	AB21-0319-05
Barium	87		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	716		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	63400		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	1		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	6		ug/L	1	03/10/2021	AB21-0319-05
Iron	1220		ug/L	20	03/10/2021	AB21-0319-05
Lead	2		ug/L	1	03/10/2021	AB21-0319-05
Lithium	ND		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	20000		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	20		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	159		ug/L	5	03/10/2021	AB21-0319-05
Nickel	5		ug/L	2	03/10/2021	AB21-0319-05
Potassium	3840		ug/L	100	03/10/2021	AB21-0319-05
Selenium	5		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	328000		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	11		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total, Aqueou	s			Aliquot:	21-0218-04-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Rule Analyt	e List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0218-04-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	108000		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate	395000		ug/L	1000	03/11/2021	AB21-0311-01
Total Dissolved Solids by SM 2540C					21-0218-04-C03-A01	Analyst: CET

Flag

21-0218R2 Page 11 of 26

Units

mg/L

RL

10

**Analysis Date** 

03/04/2021

Tracking #

AB21-0305-09

Result

1440



Report Date: 04/15/21

21-0218

**Laboratory Services** A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** 

Laboratory Project: Field Sample ID: KLI-SCS Collect Date: 03/03/2021 Lab Sample ID: 21-0218-04 Collect Time: 08:50 AM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot:	21-0218-04-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	376000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	376000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: KLI-PCS
Lab Sample ID: 21-0218-05
Matrix: Surface Water

**Total Dissolved Solids** 

Collect Date: 03/01/2021

Report Date:

04/15/21

Collect Time: 10:30 AM

Antimony	Metals by EPA 6020B: CCR	Rule Appendix III-IV To	tal Metals	Expand	Aliquot:	21-0218-05-C01-A02	Analyst: EB
Arsenic 5 ug/L 1 03/10/2 Barium 1090 ug/L 5 03/10/2 Beryllium ND ug/L 1 03/10/2 Boron 566 ug/L 20 03/10/2 Cadmium ND ug/L 0.2 03/10/2 Calcium 113000 ug/L 1000 03/10/2 Calcium 113000 ug/L 1000 03/10/2 Chromium 12 ug/L 1 03/10/2 Cobalt ND ug/L 6 03/10/2 Copper 20 ug/L 1 03/10/2 Lead 2 ug/L 1 03/10/2 Lithium ND ug/L 5 03/10/2 Magnesium 24400 ug/L 1000 03/10/2 Manganese 44 ug/L 5 03/10/2 Molybdenum 22 ug/L 5 03/10/2 Nickel 9 ug/L 5 03/10/2 Nickel 9 ug/L 1 00 03/10/2 Selenium 1 ug/L 1 00 03/10/2 Sodium 70100 ug/L 1 000 03/10/2 Thallium ND ug/L 2 03/10/2 Vanadium 52 ug/L 2 03/10/2 Vanadium 52 ug/L 5 03/10/2 Vanadium 52 ug/L 1 00 03/10/2 Vanadium 52 ug/L 1 00 03/10/2 Vanadium 52 ug/L 2 03/10/2 Vanadium 52 ug/L 2 03/10/2 Vanadium 52 ug/L 2 03/10/2 Vanadium 52 ug/L 1 00 03/10/2 Vanadium 59 ug/L 1 10 03/10/2	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Barium         1090         ug/L         5         03/10/2           Beryllium         ND         ug/L         1         03/10/2           Boron         566         ug/L         20         03/10/2           Cadmium         ND         ug/L         10.2         03/10/2           Calcium         113000         ug/L         1000         03/10/2           Chromium         12         ug/L         1         03/10/2           Cobalt         ND         ug/L         6         03/10/2           Copper         20         ug/L         1         03/10/2           Iron         3810         ug/L         20         03/10/2           Lead         2         ug/L         1         03/10/2           Lead         2         ug/L         10         03/10/2           Magnesium         24400         ug/L         10         03/10/2           Magnesium         24400         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Nickel         9         ug/L	Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Beryllium	Arsenic	5		ug/L	1	03/10/2021	AB21-0319-05
Boron   566   ug/L   20   03/10/2	Barium	1090		ug/L	5	03/10/2021	AB21-0319-05
Cadmium         ND         ug/L         0,2         03/10/2           Calcium         113000         ug/L         1000         03/10/2           Chromium         12         ug/L         1         03/10/2           Cobalt         ND         ug/L         6         03/10/2           Copper         20         ug/L         1         03/10/2           Iron         3810         ug/L         20         03/10/2           Lead         2         ug/L         1         03/10/2           Lead         2         ug/L         10         03/10/2           Magnesium         24400         ug/L         1000         03/10/2           Manganese         44         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         1         03/10/2           Sodium         70100         ug/L         1         03/10/2           Vanadium         52         ug/L	Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Calcium       113000       ug/L       1000       03/10/2/2         Chromium       12       ug/L       1       03/10/2/2         Cobalt       ND       ug/L       6       03/10/2/2         Copper       20       ug/L       1       03/10/2/2         Iron       3810       ug/L       20       03/10/2         Lead       2       ug/L       1       03/10/2         Lithium       ND       ug/L       10       03/10/2         Magnesium       24400       ug/L       10       03/10/2         Manganese       44       ug/L       5       03/10/2         Molybdenum       22       ug/L       5       03/10/2         Nickel       9       ug/L       2       03/10/2         Potassium       3410       ug/L       1       03/10/2         Selenium       1       ug/L       1       03/10/2         Sodium       70100       ug/L       0.2       03/10/2         Sodium       70100       ug/L       10       03/10/2         Vanadium       52       ug/L       2       03/10/2         Zinc       18       ug/L       10 </td <td>Boron</td> <td>566</td> <td></td> <td>ug/L</td> <td>20</td> <td>03/10/2021</td> <td>AB21-0319-05</td>	Boron	566		ug/L	20	03/10/2021	AB21-0319-05
Chromium         12         ug/L         1         03/10/2/2           Cobalt         ND         ug/L         6         03/10/2/2           Copper         20         ug/L         1         03/10/2/2           Iron         3810         ug/L         20         03/10/2           Lead         2         ug/L         1         03/10/2           Lead         2         ug/L         10         03/10/2           Lithium         ND         ug/L         10         03/10/2           Magnesium         24400         ug/L         1000         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Vanadium         52         ug/L         2         03/10/2           Vanadium         52	Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Cobalt         ND         ug/L         6         03/10/2/2           Copper         20         ug/L         1         03/10/2/2           Iron         3810         ug/L         20         03/10/2           Lead         2         ug/L         1         03/10/2           Lithium         ND         ug/L         10         03/10/2           Magnesium         24400         ug/L         1000         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         100         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         10         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous	Calcium	113000		ug/L	1000	03/10/2021	AB21-0319-05
Copper         20         ug/L         1         03/10/22           Iron         3810         ug/L         20         03/10/22           Lead         2         ug/L         1         03/10/22           Lithium         ND         ug/L         10         03/10/22           Magnesium         24400         ug/L         1000         03/10/22           Manganese         44         ug/L         5         03/10/22           Molybdenum         22         ug/L         5         03/10/22           Nickel         9         ug/L         2         03/10/22           Potassium         3410         ug/L         100         03/10/22           Selenium         1         ug/L         1         03/10/22           Silver         ND         ug/L         0.2         03/10/22           Sodium         70100         ug/L         1000         03/10/22           Vanadium         52         ug/L         2         03/10/22           Zinc         18         ug/L         10         03/10/22           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-00           Parameter(s)         Result         Fla	Chromium	12		ug/L	1	03/10/2021	AB21-0319-05
Iron	Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Lead         2         ug/L         1         03/10/2           Lithium         ND         ug/L         10         03/10/2           Magnesium         24400         ug/L         1000         03/10/2           Manganese         44         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-CO           Parameter(s)         Result         Flag         Units         RL         Analysis I           Mercury         <	Copper	20		ug/L	1	03/10/2021	AB21-0319-05
Lithium         ND         ug/L         10         03/10/2           Magnesium         24400         ug/L         1000         03/10/2           Manganese         44         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-CO           Parameter(s)         Result         Flag         Units         RL         Analysis I           Mercury         ND         H         ug/L         0.2         04/12/2           <	Iron	3810		ug/L	20	03/10/2021	AB21-0319-05
Magnesium         24400         ug/L         1000         03/10/2           Manganese         44         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis	Lead	2		ug/L	1	03/10/2021	AB21-0319-05
Manganese         44         ug/L         5         03/10/2           Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL	Lithium	ND		ug/L	10	03/10/2021	AB21-0319-05
Molybdenum         22         ug/L         5         03/10/2           Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Sodium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis I           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis I           Chloride         108000         ug/L         1000         03/11/2	Magnesium	24400		ug/L	1000	03/10/2021	AB21-0319-05
Nickel         9         ug/L         2         03/10/2           Potassium         3410         ug/L         100         03/10/2           Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L	Manganese	44		ug/L	5	03/10/2021	AB21-0319-05
Potassium   3410   ug/L   100   03/10/2	Molybdenum	22		ug/L	5	03/10/2021	AB21-0319-05
Selenium         1         ug/L         1         03/10/2           Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Nickel	9		ug/L	2	03/10/2021	AB21-0319-05
Silver         ND         ug/L         0.2         03/10/2           Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Potassium	3410		ug/L	100	03/10/2021	AB21-0319-05
Sodium         70100         ug/L         1000         03/10/2           Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/2           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Selenium	1		ug/L	1	03/10/2021	AB21-0319-05
Thallium         ND         ug/L         2         03/10/2           Vanadium         52         ug/L         2         03/10/2           Zinc         18         ug/L         10         03/10/2           Mercury by EPA 7470A, Total, Aqueous           Parameter(s)         Result         Flag         Units         RL         Analysis Induct: 21-0218-05-C0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis Induct: 21-0218-05-C0           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Vanadium         52         ug/L         2         03/10/20           Zinc         18         ug/L         10         03/10/20           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis         Analysis           Mercury         ND         H         ug/L         0.2         04/12/20           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/20           Fluoride         ND         ug/L         1000         03/11/20           Sulfate         77100         ug/L         1000         03/11/20	Sodium	70100		ug/L	1000	03/10/2021	AB21-0319-05
Zinc         18         ug/L         10         03/10/20           Mercury by EPA 7470A, Total, Aqueous         Result         Flag         Units         RL         Analysis           Parameter(s)         ND         H         ug/L         0.2         04/12/20           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/20           Fluoride         ND         ug/L         1000         03/11/20           Sulfate         77100         ug/L         1000         03/11/20	Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis         ND         H         ug/L         0.2         04/12/20           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/20           Fluoride         ND         ug/L         1000         03/11/20           Sulfate         77100         ug/L         1000         03/11/20	Vanadium	52		ug/L	2	03/10/2021	AB21-0319-05
Parameter(s)         Result         Flag         Units         RL         Analysis           Mercury         ND         H         ug/L         0.2         04/12/20           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/20           Fluoride         ND         ug/L         1000         03/11/20           Sulfate         77100         ug/L         1000         03/11/20	Zinc	18		ug/L	10	03/10/2021	AB21-0319-05
Mercury         ND         H         ug/L         0.2         04/12/20           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/20           Fluoride         ND         ug/L         1000         03/11/20           Sulfate         77100         ug/L         1000         03/11/20	Mercury by EPA 7470A, Tota	al, Aqueous			Aliquot:	21-0218-05-C01-A03	Analyst: TMR
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot: 21-0218-05-C0           Parameter(s)         Result         Flag         Units         RL         Analysis         R           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Parameter(s)         Result         Flag         Units         RL         Analysis           Chloride         108000         ug/L         1000         03/11/2           Fluoride         ND         ug/L         1000         03/11/2           Sulfate         77100         ug/L         1000         03/11/2	Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Chloride       108000       ug/L       1000       03/11/20         Fluoride       ND       ug/L       1000       03/11/20         Sulfate       77100       ug/L       1000       03/11/20	Anions by EPA 300.0 CCR R	Rule Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0218-05-C02-A01	Analyst: DMW
Fluoride ND ug/L 1000 03/11/20 Sulfate 77100 ug/L 1000 03/11/20					RL	Analysis Date	Tracking #
Fluoride ND ug/L 1000 03/11/20 Sulfate 77100 ug/L 1000 03/11/20	Chloride	108000		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate 77100 ug/L 1000 03/11/20	Fluoride			-		03/11/2021	AB21-0311-01
Total Dissolved Solids by SM 2540C				•		03/11/2021	AB21-0311-01
	Fotal Dissolved Solids by Sl	M 2540C			Aliquot:	21-0218-05-C03-A01	Analyst: CET
•	-		Flag	Units		Analysis Date	Tracking #

10

mg/L

21-0218R2 Page 13 of 26

03/04/2021

AB21-0305-09

528



Report Date: 04/15/21

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Lined Impoundment** Sample Site:

Laboratory Project: 21-0218 Field Sample ID: KLI-PCS Collect Date: 03/01/2021 Lab Sample ID: 21-0218-05 Collect Time: 10:30 AM

Matrix: Surface Water

Alkalinity by SM 2320B			Aliquot: 2	21-0218-05-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	182000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	182000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: SW-DITCH
Lab Sample ID: 21-0218-06

Collect Date: 03/01/2021
Collect Time: 10:00 AM

Report Date:

04/15/21

Matrix: Surface Water

Metals by EPA 6020B: CCR Rule Appe	naix iii-iv 10	ital Wetals	⊏xpana	Aliquot:	21-0218-06-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	2		ug/L	1	03/10/2021	AB21-0319-05
Barium	225		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	103		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	71800		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	2		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-0
Copper	18		ug/L	1	03/10/2021	AB21-0319-0
Iron	570		ug/L	20	03/10/2021	AB21-0319-0
Lead	1		ug/L	1	03/10/2021	AB21-0319-0
Lithium	ND		ug/L	10	03/10/2021	AB21-0319-0
Magnesium	20800		ug/L	1000	03/10/2021	AB21-0319-0
Manganese	37		ug/L	5	03/10/2021	AB21-0319-0
Molybdenum	6		ug/L	5	03/10/2021	AB21-0319-0
Nickel	4		ug/L	2	03/10/2021	AB21-0319-0
Potassium	3080		ug/L	100	03/10/2021	AB21-0319-0
Selenium	1		ug/L	1	03/10/2021	AB21-0319-0
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-0
Sodium	64900		ug/L	1000	03/10/2021	AB21-0319-0
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-0
Vanadium	10		ug/L	2	03/10/2021	AB21-0319-0
Zinc	15		ug/L	10	03/10/2021	AB21-0319-0
Mercury by EPA 7470A, Total, Aqueou	S			Aliquot:	21-0218-06-C01-A03	Analyst: TMF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-0
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqu	eous	Aliquot:	21-0218-06-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking :
Chloride	112000		ug/L	1000	03/11/2021	AB21-0311-0
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-0
Sulfate	41300		ug/L	1000	03/11/2021	AB21-0311-0
Total Dissolved Solids by SM 2540C				Aliquot:	21-0218-06-C03-A01	Analyst: CE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	493 21-02	218R2 Page	mg/L 15 of 26	10	03/04/2021	AB21-0305-09



Report Date: 04/15/21

21-0218

03/01/2021

10:00 AM

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Lined Impoundment** Sample Site:

Laboratory Project: Field Sample ID: SW-DITCH Collect Date: Lab Sample ID: 21-0218-06 Collect Time:

Matrix: Surface Water

Alkalinity by SM 2320B			Aliquot:	21-0218-06-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	205000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	205000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16





A CENTURY OF EXCELLENCE

Sample Site: Laboratory Project: **DEK Lined Impoundment** 21-0218

Field Sample ID: DUP-KLI Lab Sample ID: 21-0218-07 Matrix: Groundwater Collect Date: 03/02/2021

Report Date:

04/15/21

Collect Time: 12:00 AM

Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tai Metals	Expand	Aliquot:	21-0218-07-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	2		ug/L	1	03/10/2021	AB21-0319-05
Barium	135		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	1640		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	128000		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	1		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	2		ug/L	1	03/10/2021	AB21-0319-05
Iron	1470		ug/L	20	03/10/2021	AB21-0319-05
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05
Lithium	29		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	20600		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	294		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	ND		ug/L	5	03/10/2021	AB21-0319-05
Nickel	3		ug/L	2	03/10/2021	AB21-0319-05
Potassium	6730		ug/L	100	03/10/2021	AB21-0319-05
Selenium	1		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	75400		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	3		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total, Aqueou	ıs			Aliquot:	21-0218-07-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	eous	Aliquot:	21-0218-07-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	66100		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate	2120		ug/L	1000	03/11/2021	AB21-0311-01
Total Dissolved Solids by SM 2540C				Aliquot:	21-0218-07-C03-A01	Analyst: CE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	589	210D2 Dogo	mg/L	10	03/04/2021	AB21-0305-09

21-0218R2 Page 17 of 26



**Report Date:** 04/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

 Field Sample ID:
 DUP-KLI
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0218-07
 Collect Time:
 12:00 AM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot:	21-0218-07-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	370000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Bicarbonate	370000	ug/L	10000	03/09/2021	AB21-0309-16
Alkalinity Carbonate	ND	ug/L	10000	03/09/2021	AB21-0309-16



Report Date:

04/15/21



# Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

 Field Sample ID:
 EB-KLI
 Collect Date:
 03/02/2021

 Lab Sample ID:
 21-0218-08
 Collect Time:
 01:35 PM

Matrix: Water

Metals by EPA 6020B: CCR	Rule Appendix III-IV To	tal Metals	Expand	Aliquot:	21-0218-08-C01-A02 Analy		
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05	
Arsenic	ND		ug/L	1	03/10/2021	AB21-0319-05	
Barium	ND		ug/L	5	03/10/2021	AB21-0319-05	
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05	
Boron	ND		ug/L	20	03/10/2021	AB21-0319-05	
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05	
Calcium	ND		ug/L	1000	03/10/2021	AB21-0319-05	
Chromium	ND		ug/L	1	03/10/2021	AB21-0319-05	
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05	
Copper	ND		ug/L	1	03/10/2021	AB21-0319-05	
Iron	ND		ug/L	20	03/10/2021	AB21-0319-05	
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05	
Lithium	ND		ug/L	10	03/10/2021	AB21-0319-05	
Magnesium	ND		ug/L	1000	03/10/2021	AB21-0319-05	
Manganese	ND		ug/L	5	03/10/2021	AB21-0319-05	
Molybdenum	ND		ug/L	5	03/10/2021	AB21-0319-05	
Nickel	ND		ug/L	2	03/10/2021	AB21-0319-05	
Potassium	ND		ug/L	100	03/10/2021	AB21-0319-05	
Selenium	ND		ug/L	1	03/10/2021	AB21-0319-05	
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05	
Sodium	ND		ug/L	1000	03/10/2021	AB21-0319-05	
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05	
Vanadium	ND		ug/L	2	03/10/2021	AB21-0319-05	
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05	
Mercury by EPA 7470A, Tot	al, Aqueous			Aliquot:	21-0218-08-C01-A03	Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05	





# Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0218** 

Field Sample ID: **FB-KLI**Lab Sample ID: 21-0218-09

Matrix: Water

Laboratory Project: **21-0**Collect Date: 03/02/2

Collect Date: 03/02/2021 Collect Time: 01:40 PM

Report Date:

04/15/21

Metals by EPA 6020B: CCF	R Rule Appendix III-IV 10	otal Metals	Expand	Aliquot:	21-0218-09-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	ND		ug/L	1	03/10/2021	AB21-0319-05
Barium	ND		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	ND		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	ND		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	ND		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	ND		ug/L	1	03/10/2021	AB21-0319-05
Iron	ND		ug/L	20	03/10/2021	AB21-0319-05
Lead	ND		ug/L	1	03/10/2021	AB21-0319-05
Lithium	ND		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	ND		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	ND		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	ND		ug/L	5	03/10/2021	AB21-0319-05
Nickel	ND		ug/L	2	03/10/2021	AB21-0319-05
Potassium	ND		ug/L	100	03/10/2021	AB21-0319-05
Selenium	ND		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	ND		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	ND		ug/L	2	03/10/2021	AB21-0319-05
Zinc	ND		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, To	tal, Aqueous			Aliquot:	21-0218-09-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05





# Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** 

Field Sample ID: Karn Influent
Lab Sample ID: 21-0218-10
Matrix: Groundwater

Laboratory Project:

Collect Date: 03/03/2021

04/15/21

21-0218

Collect Time: 08:40 AM

Report Date:

Metals by EPA 6020B: CCR Ru	ie Appenaix III-IV 10	tai wetais	⊏xpand	Aliquot:	21-0218-10-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	03/10/2021	AB21-0319-05
Arsenic	234		ug/L	1	03/10/2021	AB21-0319-05
Barium	178		ug/L	5	03/10/2021	AB21-0319-05
Beryllium	ND		ug/L	1	03/10/2021	AB21-0319-05
Boron	2160		ug/L	20	03/10/2021	AB21-0319-05
Cadmium	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Calcium	154000		ug/L	1000	03/10/2021	AB21-0319-05
Chromium	ND		ug/L	1	03/10/2021	AB21-0319-05
Cobalt	ND		ug/L	6	03/10/2021	AB21-0319-05
Copper	10		ug/L	1	03/10/2021	AB21-0319-05
Iron	1580		ug/L	20	03/10/2021	AB21-0319-05
Lead	2		ug/L	1	03/10/2021	AB21-0319-05
Lithium	63		ug/L	10	03/10/2021	AB21-0319-05
Magnesium	46800		ug/L	1000	03/10/2021	AB21-0319-05
Manganese	425		ug/L	5	03/10/2021	AB21-0319-05
Molybdenum	14		ug/L	5	03/10/2021	AB21-0319-05
Nickel	3		ug/L	2	03/10/2021	AB21-0319-05
Potassium	8750		ug/L	100	03/10/2021	AB21-0319-05
Selenium	1		ug/L	1	03/10/2021	AB21-0319-05
Silver	ND		ug/L	0.2	03/10/2021	AB21-0319-05
Sodium	37500		ug/L	1000	03/10/2021	AB21-0319-05
Thallium	ND		ug/L	2	03/10/2021	AB21-0319-05
Vanadium	ND		ug/L	2	03/10/2021	AB21-0319-05
Zinc	31		ug/L	10	03/10/2021	AB21-0319-05
Mercury by EPA 7470A, Total,	Aqueous			Aliquot:	21-0218-10-C01-A03	Analyst: TMR
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking #
Mercury	ND	Н	ug/L	0.2	04/12/2021	AB21-0412-05
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0218-10-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	47200		ug/L	1000	03/11/2021	AB21-0311-01
Fluoride	ND		ug/L	1000	03/11/2021	AB21-0311-01
Sulfate	218000		ug/L	1000	03/11/2021	AB21-0311-01
Alkalinity by SM 2320B				Aliquot:	21-0218-10-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity Total	371000	218 <b>P</b> 2 Page	ug/L	10000	03/11/2021	AB21-0311-07

21-0218R2 Page 21 of 26



**Report Date:** 04/15/21

21-0218

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** 

Groundwater

Field Sample ID: Karn Influent Lab Sample ID: 21-0218-10

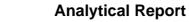
Matrix:

Collect Date: 03/03/2021

Laboratory Project:

Collect Time: 08:40 AM

Alkalinity by SM 2320B				21-0218-10-C04-A01	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #	
Alkalinity Bicarbonate	371000	ug/L	10000	03/11/2021	AB21-0311-07	
Alkalinity Carbonate	ND	ug/L	10000	03/11/2021	AB21-0311-07	





**Report Date:** 04/15/21

	Data Qualifiers	Exception Summary
Н	Maximum recommended holding time exceeded	No exceptions occured.

CONSUMERS ENERGY

### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM	
Project Log-In Number: 21-0218  Inspection Date: 03 04 2021 Inspection By: CUT  Sample Origin/Project Name: DEK LT — Q1-2021	
Shipment Delivered By: Enter the type of shipment carrier.  Pony FedEx UPS USPS Airborne  Other/Hand Carry (whom)  Tracking Number: 794334057157	
Shipping Containers: Enter the type and number of shipping containers received.  Cooler ( ) Cardboard Box Custom Case Envelope/Maıler  Loose/Unpackaged Containers Other	
Condition of Shipment: Enter the as-received condition of the shipment container.  Damaged Shipment Observed: None Dented Leaking  Other	_
Shipment Security: Enter if any of the shipping containers were opened before receipt.  Shipping Containers Received: Opened Sealed  Enclosed Documents: Enter the type of documents enclosed with the shipment.  CoC Work Request Air Data Sheet Other	
Temperature of Containers: Measure the temperature of several sample containers.  As-Received Temperature Range 3-4-5-2 Samples Received on Ice: Yes No  M&TE # and Expiration 0 6402    1.4-21  Number and Type of Containers: Enter the total number of sample containers received.	
Number and Type of Containers: Enter the total number of sample containers received.    Container Type   Water   Soil   Other   Broken   Leaking	g
VOA (40mL or 60m). 14  Quart/Liter (g/p)  9-oz (amber glass jar)  2-oz (amber glass)  125 mL (plastic)  24 mL vial (glass)	_ _ _
250500 mL (plastic)	_

CONSUMERS ENERGY

### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 2 OF 2 REVISION 3

	Conorta Standard Oportaming 17000daro	ATTACHMENT A
TITLE: SAMPLE LOG	-IN – SHIPMENT INSPECTION FORM	
Container Damage List or Exc Project Log-In Number: Inspection Date:	eption Report (required if leaking, damaged or exce 21 - 0218 1 Inspection By: LUH	ption containers are found)
Sample Container Damage Lis	ting: List all sample containers that were found to b sample labels or are not accounted for on the C	
Sample/Container ID_	Damage/Exception Report	
21-0218-07-(0)	Metals Sample bot	•
	<b>^</b> \ '	
	Contains No sam	pic.
4		
_		
	1	
,		
, y		

# **CHAIN OF CUSTODY**



# **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPL	ING SITI	E			PROJECT NUMBER	<del>, , , , , , , , , , , , , , , , , , , </del>					ANAL	YSIS F	EQUE	STED	_		Page 1 of 1
DEK Lined Impoundment – 2021 Q1												-	SEND REPORT TO CDBatts				
SAMPL	ING TEA	M /	caty r Ja		DATE SHIPPED SITE SKETCHED ATTACHED?  CIRCLE ONE			als							-	HD Register, TRC	
	TRO	_	Ja	VIER	3/3/2021		YES	NO	Total Metals	Anions	70	Alkalinıty			ı		PHONE
	E ROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION	/LOCATION	DEPTH (ft)	# OF CONTAINERS	Tota	Ani	TDS	Alk					REMARKS
21-0	218-01	3/2/2021	1:35 pm	GW	OW-10	***************************************		5	Х	x	х	х					
	-02	3/2/2021	3:45 <sub>Pm</sub>	GW	0W-12171	WH		5	х	x	х	x		:			
	-03	3/2/2021	5:00 pm	GW	OW-12171	3-42021		5	х	х	Х	х					
	-04	3/3/2021	8:50am	GW	KLI-SCS			5	х	Х	Х	х					
17974	-05	3/1/21	10.30ay	n GW	KLI-PCS			5	x	х	х	x					
	-06	3/1/21	10:00am	GW	SW-DITCH			5	х	Х	х	х					
	-07	3/2/202		GW	DUP-KLI			5	х	х	х	х					
		1	1:35 pm	W	EB-KLI			1	х								
1			1:40pm		FB-KLI			1	х								
	-10	3/3/2021	0840	W	Karn_Influent			5	x	X		X					
								Karn_Influent sh wells as Sulfate,									
*	aty	BY (SIGNA	nga	DATE/T	ME 13/2021	RECEIVED BY	-		3.(	2-5. U	2°C	)		COM	L MENT	rs.	
RELING	QUISHEI	O BY (SIGNA	FURE)	DATE/T		RECEIVED BY	(SIGNATUR	E)	#01	GAC	2						
Fed EX 3/4[2021 1130 KERTAHANSEN ORIGINAL TO LAB COPY TO CUSTOM						USTOMER											
		· · · · · · · · · · · · · · · · · · ·		1	- 200	21-02	18R2 Page 2	26 of 26	<u> </u>			2011 17				- 100	O T OTTALLE



# **Appendix B Field Notes**

# TRC

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Compliance
PROJECT NUMBER:	418425.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	3/1/21 TO 3/3/21
DATES OF TIELDWORK.	First Quarter Supplementary CCR Sampling
PURPOSE OF FIELDWORK:	
	Katy Reminga, Javier Jasso
WORK PERFORMED BY:	<u> </u>
WORN PERFORMED BY:	

SIGNED STATE

CHECKED BY D



**REVISED 04/2019** 

# **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021 G	W Comp DATE:	3/1/20al	TIME ARRIVED: 7: 15 am				
PROJECT NUMBER:	418425.0001.00	00 AUTHOI	R; Katy Reminga, Javier Jass	TIME LEFT: (0:00 pyn				
		•						
		WEATHE	R					
TEMPERATURE: 30	°F WIND: W	indy MPH	VISIBILITY:	cioudy				
- "	WOR	RK/SAMPLING	PERFORMED					
- Recorde	d water teve	15 for	he Karn Lan	ndfill and				
kam	lined impo	<u>undment</u>	, ,					
4 3 1 5 1	· · · · · · · · · · · · · · · · · · ·		M. ( ) ( 00 )					
- Collected	a sample	M DAK -	MW-15002	<u>-</u>				
			<u>.</u>					
PROBI	LEMS ENCOUNTERED		CORRECTIVE ACTION TAKEN					
<del></del>	1/4		. /4					
	N/A		N/A					
			·					
		<u>.                                    </u>		*.				
		COMMUNICA						
NAME	REPRESENTING	١ ، ١	SUBJECT / COMMEN					
C. Batt	CEC	check 1	h/out; salety to	ain ing				
· · · · · · · · · · · · · · · · · · ·								
		·						
	N. (50710.4	TION DEDUCED						
WASTE MATRIX	QUANTITY	TION DERIVED	WASTE SUMMARY  COMMENTS					
	40.00							
NI/A	1 /A	1	11					
<del>-/\//</del> /		<del>- /\</del>	/ v <sup>A</sup>					
Katt R.	eminga 83/1	<b>9</b> /2021	And	2/8/2				
SIGNED	J	DATE	CHECKED BY	DATE DATE				



# **GENERAL NOTES**

<u> </u>				
PROJECT NAME:	CEC Karn LF: 2021 GW	Complian DATE:	3/1/2021	TIME ARRIVED: 0715
PROJECT NUMBER:			OR: 5. Knowe	TIME LEFT: 1500
	· · · · · · · · · · · · · · · · · · ·			
<u> </u>	<u> </u>	WEATH	IER	
TEMPERATURE: 33	°F WIND:	15-20 MPH	l Visibii	ITY: cloudy
		ORK / SAMPLING		
0715-Arrive to	site and check	1/2 4/5	ecurity. recieved	annual Sufety
or. entation	from G. Batt	<b>5</b> .		•
8800- Begin aires	sment of transer	ct con all this	n) and took	pictures, report to PM
0400- Surt and	Bootherwer for	sumples an	d pep for samp	· ling
1106 - timished s	myseling Surface	c water CKL	I-PCS) and Ditch	worth of KLI
1115- begin sumy 1345- Finished su	oling mr-18 a	N MW-19		·····
1345- finished su	mply mp-18 a	ml Mr-19		
1600 Hakked wa	1500 - FA	nish water for	els and organize tea	m for event, offsite
PROBL	EMS ENCOUNTERE	D	CORRECT	IVE ACTION TAKEN
<del>-</del>				
				<u> </u>
		COMMUNIC	ATION	
NAME	REPRESENTING		SUBJECT / COM	IMENTS
C. Batts	CEC	check in	Pout; Sufety	trashing
			/ / /	
	INVESTIG	ATION DERIVE	D WASTE SUMMARY	
WASTE MATRIX	QUANTITY		COMMENT	
lyge nater	NA	maded	to around	
<del></del>		1 1 2 2 2 2	10 GIBUOM	
	<del></del>			
10/1	7			
Jul Il	3/8/	2 [	Katy Remi	inga 3/17/2021
signed	1	DATE	CHECKED BY	DATE



REVISED 04/2019

# **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021 G	W Comp	DATE: "3	12/31	TIME ARRIVED: 1400				
PROJECT NUMBER:	418425.0001.00	000	AUTHOR:	Katy Reminga, Javier Jass	TIME LEFT: 1655				
			-						
			WEATHER						
TEMPERATURE: 34	°F WIND:	<del>35</del>	MPH	VISIBILITY:	Clear				
		RK / SA	MPLING PE	RFORMED					
DEK-MW -	15006,15	७०५	Du0+	62, 15004, F	BHOY				
				•					
			<u></u>						
PROBL	PROBLEMS ENCOUNTERED CORRECTIVE ACTION TAKEN								
	<u></u>				· ·				
		CON	MUNICATION						
NAME	REPRESENTING		<u></u>	SUBJECT / COMMEN	ITS				
		ATION D	DERIVED W	ASTE SUMMARY					
WASTE MATRIX	QUANTITY		•	COMMENTS					
	<u> </u>				7.				
	3/5/21			Tal (k	3/8/21				
SIGNED	·	DATE	1	CHECKED BY	DATE				



# **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021	GW Comp DATE:	3/21	12021	TIME ARRIVE	D: 8:15am
PROJECT NUMBER:	418425.0001.0	0000 AUTH	OR: Katy R	leminga, Javier Jas	s TIME LEFT:	6-00pm
						· 
		WEATH	ER			
TEMPERATURE:	°F WIND:	Lf MPH	•	VISIBILITY	· Ilear	·
	Wo	RK/SAMPLING	PERFOR	MED		
o collected	sample D Sample o		on 4	10W-12	EK-1800   EB, D	I DEK-1500: UP, FB
			_			
PROB	LEMS ENCOUNTERE	)		CORRECTIVE	ACTION TAKEN	N
		COMMUNIC	ATION			<u> </u>
NAME	REPRESENTING		S	ÚBJECT / COMME	NTS	
					,	
	INVESTIG	SATION DERIVE	D WASTE S	SUMMARY		
WASTE MATRIX	QUANTITY			COMMENTS		
Katy Rem	inga 3/02/2	2.02.1 DATE	CHEC	well ked by	Juz	3/8/21 DATE

REVISED 04/2019



#### **GENERAL NOTES**

PROJECT NAME:	CEC Karn LF: 2021 GW Co	mplian DATE: 3/	3/2021	TIME ARRIVI	=D: 8°,00¢
PROJECT NUMBER:	418425.0000.000	0 AUTHOR:	KR	TIME LEFT:	4-301
		WEATHER			1
EMPERATURE: 34	°F WIND:	<u>и</u> мрн	VISIBI	LITY: Clear	
	WOR	K/SAMPLING PER	FORMED		
· collected	samples a	Kli-SCS	<del>.</del>		
	sample a	Kli - infli	<u>uent</u>		
· collected	sample (a)	60-NO			
· collected	sample a	MM-99	<u>,</u>		
a Clasinon	d camatic la	Feder			
· Shippe	d samples la	, reug			
···	-				
PROBL	EMS ENCOUNTERED		CORRECT	IVE ACTION TAKE	N
				**********	
		COMMUNICATIO	N		
NAME	REPRESENTING		SUBJECT / COM	MENTS	
2,1					
	INVESTIGATION.	HON DEDIVED WA	OTE GUILLABY		
WASTE MATRIX	QUANTITY	FION DERIVED WA	STE SUMMARY COMMEN	TS	
		<del></del>			
of link	1 2 1 2 2 2 1	2/2021		2/	3/8/21
1\UX4! [\	emiriaa 3/3	3/a621	Land	jang	
SIGNED	, ,	DATE	CHECKED BY	1/	DATE



### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	
PROJECT NO.:	418425.0001.0000	SAMPLER NAME: Katy Reminga, Javier Jasso
WATER LEVEL MEASURE	MENTS COLLECTED WITH:	
HERON	DIPPER-T	TRC A2
NAME AND MODEL OF INST	RUMENT	SERIAL NUMBER (IF APPLICABLE)
PRODUCT LEVEL MEASU	REMENTS COLLECTED WIT	Ή:
	NA	NA
NAME AND MODEL OF INST	RUMENT	SERIAL NUMBER (IF APPLICABLE)
DEPTH TO BOTTOM OF V	VELL MEASUREMENTS COL	LECTED WITH:
HERON	DIPPER-T	TRC A2
NAME AND MODEL OF INST	RUMENT	SERIAL NUMBER (IF APPLICABLE)
PURGING METHOD		
PERISTA	LTIC PUMP	TRC A2
NAME AND MODEL OF PUMI	P OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
SAMPLING METHOD		
PERISTA	ALTIC PUMP	TRC A2
NAME AND MODEL OF PUM	P OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)
GEOTECH DIS	POSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTE	ERATION DEVICE	FILTER TYPE AND SIZE
DEDICATED	POLY TUBING	☑ LOW-FLOW SAMPLING EVENT
TUBING TYPE		
PURGE WATER DISPOSA	L METHOD	
☑ GROUND [	] DRUM   POTW	□ POLYTANK □ OTHER
DECONTAMINATION AND	FIELD BLANK WATER SOU	RCE
STORE	BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE		DI WATER SOURCE
	3(1/4	Jul Kny 3/8/21
SIGNED	DATE	CHECKEO BY DATE
V/ISED 04/2010		//

# \_ **→ > T**RC

									~
PROJECT NAME:	CEC Karn LF: 2021 GW Co	mpliance	BAP/LI	MODEL: VSI	pro	plus	SAMPLER:	KR, JJ	B)
PROJECT NO.:	418425.0000.0000/4184	25.000		SERIAL #: Ren	tal		DATE: 3/1/	2021	
PH	CALIBRATION CHECK				SPEC	IFIC CONDU	, . CTIVITY CALIBE	RATION C	HECK
pH 7	pH 4 / 10			] [ (	CAL, RE	ADING	TEMPERATURE	Π	I
(LOT#): ØGI 113	(LOT#): 061001	CAL.		(LOT #):	0011	175		CAL.	
(EXP. DATE): Sco/22	(EXP. DATE): Sep/22	RANGE	TIME .		ATE): 9		(°CELSIUS)	RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			1 1	-	ING/STANDARD	,,		
7.00 /7.00	4.00/4.00	WITHIN RANGE	0930	14	13	1 1413	18.0	WITHIN RANGE	9928
1	1	□ WITHIN RANGE				1		□ WITHIN RANGE	-
1	1	☐ WITHIN RANGE				1		☐ WITHIN RANGE	
1	1	☐ WITHIN RANGE			·	/		WITHIN RANGE	
ORP	CALIBRATION CHECK					D.O. CAL	BRATION CHEC		
CAL. READING	TEMPERATURE			] [ (	CAL. RE	EADING	TEMPERATURE	I	
(LOT #):		CAL.				•		CAL.	
(EXP. DATE):	(°CELSIUS)	RANGE	TIME				(°CELSIUS)	RANGE	TIME
POST-CAL. READING / STANDARD		1		POST-CA	L. READIN	O /SATURATED AIR	,,		
232 / 232	19.1	WITHIN RANGE	0933	8.	11 .	18.41	18.6	☐ WITHIN	0937
1		☐ WITHIN RANGE		1 ("		/		□ WITHIN RANGE	.,,,
1		☐ WITHIN RANGE				/		□ WITHIN RANGE	
1		☐ WITHIN RANGE		1		1		□ WITHIN RANGE	
TURBIDI	TY CALIBRATION CHEC	K		<u> </u>			COMMENTS		
CALIBRATION	READING (NTU)			□ AU	TOCAL :	SOLUTION	STANDARD	SOLUTION (	(S)
(LOT#): A9317	(LOT #):	CAL.	TIME	(LOT#):			LIST LOT NUMBERS A	ND EXPIRATI	ON DATES
(EXP. DATE): 11/2	(EXP. DATE):	RANGE	TIME	(EXP. DA	TE):		UNDER CALIB		
POST-CAL, READING / STANDARD	POST-CAL. READING / STANDARD	1		CALIE	RATED F	PARAMETERS	CALIBRATIO	N RANGES (1	)
10.1 / 10.0	1	WITHIN RANGE	0941		рΗ		pH: +/- 0.2 S.L	J.	
1	1	□ WITHIN RANGE		]   -	CON	D	COND: +/- 1% OF	CAL STAN	IDARD
1	1	☐ WITHIN RANGE			ORP		ORP: +/- 25 mV		
	1	☐ WITHIN RANGE			D.O.		D.O.: VARIES		
	NOTES				TURI	В	TURB: +/- 5% OF	CAL. STAN	DARD
							(1) 6.1.155.17.61.5		
							<sup>(1)</sup> CALIBRATION RAN THE MODEL OF THE V		
			-	<u> </u>				<u> </u>	
				]					
PI	ROBLEMS ENCOUNTERED					CORRECTA	/E ACTIONS		
				,				•	
100	01	- <u></u>			· ,	0		7/000:	
for fr	1/8	1/21			aty	Remis	nga 3/1	7/2021	
SIGNED	$\mathcal{O}$	DATE		CH	FCKED	RA	-		DATE

# **⊘ TRC**

PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	V Complian	ce	MODEL: DIC	D	5>	\$AMPLI	ER:	KR, JJ	-
PROJECT NO.:	418425.0001.0000			SERIAL#: T	RC A2	2	DATE:	3/2	<b>p</b> /	
PH	CALIBRATION CHECK	,			SPEC	CIFIC CONDU				HECK
(LOT#): 66K CLU ( (EXP. DATE): 1/6 Y  POST-CAL. READING/STANDARD	pH 4 / 10 (LOT #) 6 [ 6 0 ] (EXP. DATE): Q 10	CAL. RANGE	TIME	(LOT#); (EXP. D/	CAL. R OGA NTE): Û	EADING	TEMPE	RATURE		TIME
70 / 7ce	44 / Her	WITHIN	IUV	-		11417	<i>\</i> \	N		1410
1	/	□ WITHIN RANGE		' `	٠,	1		•	WITHIN RANGE	•
1	1	□ WITHIN RANGE		]		1			□ WITHIN RANGE	
1	1	WITHIN RANGE				1			☐ WITHIN RANGE	
ORP	CALIBRATION CHECK	184102		<u> </u>		D.O. CAL	IBRATIO	N CHE		
CAL. READING	TEMPERATURE				CAL. R	EADING	TEMPE	RATURE		
(LOT#) LOK (CCO) (C (EXP. DATE): 4/2 (	(°CELSIUS)	CAL. RANGE	TIME				(°CE	LSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	-	Marrian		· -		NG /SATURATED AIR			THE WITTER	
200 / 200	گچ <i>د</i>		NE	<i>8</i> -	<b>C</b> (	1 45	.ə.	<u>).                                    </u>	WITHIN RANGE	1410
/		□ WITHIN RANGE				1			□ WITHIN RANGE	
/		☐ WITHIN RANGE				1		,	☐ WITHIN RANGE	
1		□ WITHIN RANGE				1			☐ WITHIN RANGE	
	ITY CALIBRATION CHEC	CK .		, <u></u>			COMM			
(LOT #): A 431	READING (NTU)	_			TOCAL	. SOLUTION	☑ S1	ANDARD	SOLUTION (	S)
(EXP. DATE): IT A	(LOT#): (EXP. DATE):	CAL. RANGE	TIME	(LOT #): (EXP. DA					AND EXPIRATI BRATION CHE	
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	WITHIN		CALIE		PARAMETERS			ON RANGES <sup>(1</sup>	)
0 / 0	/	WITHIN	dy ic		pН		pH:	+/- 0.2 S.	U.	
200 1 20e	/	WITHIN	146		CO	ND	COND:	+/- 1% O	F CAL. STAN	DARD
/	/	□ WITHIN RANGE			OR	P	ORP:	+/- 25 m\	/	
1	/	☐ WITHIN RANGE		<b>]</b>	D,C	),	D.O.:	VARIES		
	NOTES			.   -	TUF	₹В	TURB:	+/- 5% O	F CAL. STAN	DARD
					_				NGES ARE SPI WATER QUAL	
F	ROBLEMS ENCOUNTERED					CORRECTION	VE ACTION	s		
F	PROBLEMS ENCOUNTERED					CORRECT	VE ACTION	s		
SIGNED	3 ( /)	DATE		·	HEGRE	L G	Z.	s	3/8/	21 DATE

# \_\_ **;** TRC

PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	V Complian	ce	MODE	- Prodss	SAMPLER:	KR, JJ	
PROJECT NO.:	418425.0001.0000			SERIAL	#: TRC A2	DATE: 3/0	2/2021	]
PH	CALIBRATION CHECK				SPECIFIC CONDU	CTIVITY CALIBE	RATION CHECK	
pH 7 (LOT #): DG A SII (EXP. DATE): JJM 2.2 POST-CAL. READING/STANDARD	pH 4/10 (LOT#): OG 1001 (EXP. DATE): SCP + / 22 POST-CAL READING/STANDARD	CAL. RANGE	TIME		CAL. READING (LOT #): OGJ971 (EXP. DATE): OCH 12 POST-CAL. READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE TIME	
7.60 17.60	4.00 14.9	WITHIN RANGE  WITHIN RANGE	9:050		1413 / 1413	15.30	WITHIN RANGE	an
1	1	WITHIN RANGE			/		WITHIN RANGE WITHIN RANGE	-
ORP	CALIBRATION CHECK			-	D.O. CAL	BRATION CHEC	K	-
CAL. READING (LOT #): 19 H   102 750 (EXP. DATE): 4   1 1, 1	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME		CAL. READING  POST-CAL. READING /SATURATED AIR	TEMPERATURE	CAL. RANGE TIME	
264.01764.1	- 6.51 W	WITHIN RANGE WITHIN RANGE	q: <u>1</u> 1.	m	8-00 15-80-	0.16	WITHIN RANGE	m
. /		WITHIN RANGE WITHIN RANGE	<del></del>	-			WITHIN RANGE WITHIN RANGE	
TURBIC	ITY CALIBRATION CHEC	K		-		COMMENTS	<u> </u>	_
CALIBRATION	READING (NTU)				AUTOCAL SOLUTION	☑ STANDARD	SOLUTION (S)	]
(LOT #): (EXP. DATE):	(LOT #): (EXP. DATE):	CAL. RANGE	TIME		(LOT #): (EXP. DATE):		ND EXPIRATION DATES RATION CHECK	3
POST-CAL, READING / STANDARD	POST-CAL, READING / STANDARD	,			CALIBRATED PARAMETERS	CALIBRATIO	N RANGES <sup>(1)</sup>	]
9.21 /10.0	1 1	MITHIN	9:05a	, yr	□ pH □ COND	pH: +/- 0.2 S.U	J. CAL. STANDARD	
,	1	RANGE WITHIN RANGE		1	☐ ORP	ORP: +/- 25 mV		
1	1	WITHIN RANGE		1	□ D.O.	D.O.: VARIES		
	NOTES			,	☐ TURB	TURB: +/- 5% OF	CAL. STANDARD	
						(1) CALIBRATION RAN	GES ARE SPECIFIC TO	
							VATER QUALITY METER	
	PROBLEMS ENCOUNTERED			<u> </u>	CORRECTION	VE ACTIONS		7
								_
Kall Rar	ninga 3/02/	/2021 DATE			CHECKED BY	They	3/8/21 DATE	_

# **☆ TRC**

										_
PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	V Complian	ce	MODEL	751	Pro DSS	SAMPLER:	KR, JJ		1
PROJECT NO.:	418425.0001.0000			SERIAL	#: TF	RC A2	DATE: 3/2	120		
PH	CALIBRATION CHECK					SPECIFIC COND	UCTIVITY CALIB	RATION C	HECK	
pH 7 (LOT #): OGA SII (EXP. DATE): SUN - 32 POST-GAL. READING/STANDARD	pH 4/10 (LOT #): OGALODI (EXP. DATE): C-PDY-22 POST-CAL READING/STANDARD	CAL. RANGE	TIME		(LOT #): (EXP. DA	CAL READING UGJ972 TED: OCH   21 TED: OCH   21 TED: OCH   21 TED: OCH   32 TED: OCH	TEMPERATURE	CAL. RANGE	TIME	
7.00 / 7.00	4.00 / 4.00	WITHIN	7.300	IN .	141	3 / 1413	1800	WITHIN	7:40	an
/	/	☐ WITHIN RANGE				/		□ WITHIN RANGE		
	/	☐ WITHIN RANGE				1		☐ WITHIN RANGE		1
/		☐ WITHIN RANGE				. 1		☐ WITHIN RANGE		j
	CALIBRATION CHECK			-			LIBRATION CHE	CK .		•
CAL. READING (LOT #):   SH   007 SU (EXP. DATE):   S   23   23 POST-CAL. READING / STANDARD	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME			CAL. READING  READING /SATURATED A	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	
389.01 389.0	1800	WITHIN	7:45	un	1080	64.0/4.0	1800	WITHIN	7:5	SELM
/		☐ WITHIN RANGE				1		☐ WITHIN RANGE		
1		☐ WITHIN RANGE				I.		□ WITHIN RANGE		
1		☐ WITHIN				1		☐ WITHIN RANGE		
TURBID	ITY CALIBRATION CHEC		1	!	L		COMMENTS			1
CALIBRATION	READING (NTU)			1	☐ AU1	TOCAL SOLUTION	☑ STANDARD	SOLUTION (	S)	j
(EXP. DATE): 7114 - 18	(LOT #): A 7 10 4 (EXP. DATE): TU 1/- 1 8	CAL. RANGE	TIME		(LOT #): (EXP. DA	TE):	LIST LOT NUMBERS A UNDER CALI	AND EXPIRATE BRATION CHE		
POST-CAL. READING / STANDARD	POST-CAL READING / STANDARD				CALIB	RATED PARAMETERS	CALIBRATI	ON RANGES <sup>(1</sup>	1)	
19.30/10.0	10.5/10.6	WITHIN RANGE	8.65	am		pН	pH: +/- 0.2 S.	U.		
1	1	☐ WITHIN RANGE				COND	COND: +/- 1% O	F CAL. STAN	IDARD	
1	1	☐ WITHIN RANGE				ORP	ORP: +/- 25 m\	/		
/	1	☐ WITHIN RANGE				D.O.	D.O.: VARIES			
	NOTES					TURB	TURB: +/- 5% O	F CAL. STAN	IDARD	
							_ <sup>(1)</sup> CALIBRATION RAI	NGES ARE SPI	EÇIFIÇ TO	
							THE MODEL OF THE			
							•			•
P	ROBLEMS ENCOUNTERED				,	CORREC	TIVE ACTIONS			
										]
Katy K	eminga 31	3/202	1		-	And	They	3/8	/21	-
SIGNED ( J	· J	DATE			CF	HEOKED BY	U		DATE	



## KLI/BAP

#### **WATER LEVEL DATA**

5-4							,
PROJECT NAME:	CEC Karn	BAP/LI: 2021 GW	V Compliance		DATE:	3/01/20	<del>23</del> 1
PROJECT NUMBER:	418425.000	01.0000			AUTHO	R: Katy Reming	a, Javier Jasso
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	вот	H TO TOM ET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
DE Karn Bottom Ash P	ond						
DEK-MW-15002	145pm		5.84	15	70		
DEK-MW-15004	8:50 ar		27.75	41.	75		
✓DEK-MW-15005	9:11 am		8 270	रेर्ने.	35		
DEK-MW-15006	9: 20am	,	8.00	ai.	50	·	
DE Karn Bottom Ash P	ond and Lir	ned Impoundme	nt 8223	10	1.64		
DEK-MW-18001	Contract	/ `\	<b>BURGULA</b>	MAC	WAY.	<u> </u>	
DEK-MW-15003	1:2301		16.46	27	.34		
Karn Lined Impoundme	ent	44					
OW-10	1:20 pr	Y)	5.96		00		
OW-11	8:30 am		5.96 21.45	35.4	15		
OW-12	1:41pm		16.78	23	40		
Background	j		, 1				
MW-15002	see n	readock L	and fill				
MW-15008	7						
MW-15016					,		
MW-15019 (							
	1						_
	1	:					
<u> </u>			1	I			1

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

Katy Reminga 3/1/2021

SIGNED DATE

CHECH

3/3/21

REVISED 04/2019

1	TO	-
1	IK	-

PROJECT	NAME:	CEC K	(arn LF: 2021 G	W Comp		PREP	ARED		СН	ECKED
PROJECT	NUMBER	R: 41842	5.0000.0000	В	Y: H	(R, JJ,	DATE: 3/1/	/2/ BY:	KR	DATE3/17/20
SAMPLE	ID: KI	I - PC	S	WELL DI	AMET	ER: 🔁 2"		6" 🗷 OTI		V/A
WELL MAT	ERIAL:	PVC	□ ss □ i	RON G	ALVA	NIZED STE	EL	⊠ отг		VA
SAMPLE T	YPE:	<del>⊠ cw</del>	□ ww 🖎	sw 🗆 D	ı	☐ LE	ACHATE	□ от		
PURC	SING	TIME:	DA.	ΓE:		SAN	IPLE	TIME: 10 :	30	DATE: 3/1/21
PURGE METHOD		PUMP BAILER	PERISTALTIC P	<del>UM</del> P			65 s		CTIVITY: _	
DEPTH TO			T/ PVC				y: 37.9			9.2
DEPTH TO	воттом	N/A	T/ PVC			□ NONE	7 1.50		MODERAT	E
WELL VOL	25.14		LITERS [	GALLON	s	TEMPERA	TURE: 1	4.7 °c	OTHER:	
VOLUME F	REMOVED:	N/A	☐ LITERS [	GALLON	S			104	ODOR:	none
COLOR:			gray ODO	DR: Nore			(0.45 um)	200 1100	NO NO	
			BIDITY			FILTRATE			FILTRATE	ODOR:
□ NONE	SLI	СПТ □	MODERATE	☐ VERY	,		LE: MS	/MSD	☐ DUP-	000111
DISPOSAL	METHOD:	☐ GROU	ND DRUM [	OTHER		COMMEN	TS:			
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP			URBIDITY	TEMPERATI	URE WAT	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	+	mg/L)	(NTU)	(°C)	(FEE	
		-	JA							INITIAL
			Surle	æ	to	Jec	Sumpl	e		
	coll	ected	Con	Sufe	rie	wa	ter;	ust E	AST of	
	K	15-5	from	ump_	-					
			TEST IS COMPL 3 % ORP:							
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - NaO	H E	HCL F
NUMBER	SIZE	TYPE	PRESERVATIV	E FILTER	RED	NUMBER	SIZE	TYPE	PRESERV	ATIVE FILTERED
1	250-1	Plash	A	O Y Z	N					DYDN
1	DSAL		A	□ Y 0	N					O Y O N
1	125ml	V	6	D Y N	l N					DYDN
2	6026	YOR	A		+					
CHIDDING	METHOD	(1.		TE SHIPPED	_	3/1/21		AIDDILL	NUMPED:	PI PIN
SHIPPING		Fede			_	3/3/21	7/	-	NUMBER:	1010
COC NUME	BER:	$\underline{\hspace{1cm}}$	SIG	NATURE:	1	very	my	DATE SI	GNED:	3/8/21

PROJECT	NAME:	CEC K	(arn LF: 2021	GW C	omn		PR	EPARE	)		CHEC	CKED
			5.0000.0000						7/1/202	RY: //	0	DATE3/17/20
				1					<u> </u>		R	
			ch		_				6" 🔀			11
- A-73/5	TERIAL:				_		/ANIZED			OTHER		A
SAMPLE T	YPE: .	<del>⊡ CW</del>	□ ww <b>x</b>	SW		DI		LEACHAT	E 🗆	OTHER		
PUR	GING	TIME: —	D/	ATE: -	_	_		SAMPLE		1000		ATE: 3/1/21
PURGE METHOI		PUMP BAILER	PERISTALTIC	PUMP			-	3121	_ SU CO		1TY: <u>90</u>	
DEPTH TO	WATER:	N/A	T/ PVC				TURB	IDITY:	19.1 NT			
DEPTH TO	о воттом	N/A	T/ PVC				□ NO	NE 🗹	SLIGHT	□ мо	DERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	□ G/	ALLO	ONS	TEMP	ERATURE:	15.1	°C OTI	HER: _	
VOLUME	REMOVED	N/A	LITERS	□ G/	ALLO	ONS	_	R: Che		OD	OR:	none
COLOR:	_cl	ear		OR:	nor	e	FILTRA	ATE (0.45 L	ım) 🗆 YE	s 🗆	NO	
		TUR	BIDITY				X	TE COLOR	I		TRATE OD	OR:
□ NONE	X SL	IGHT 🗆	MODERATE		VE	RY			MS/MSD		DUP-	
DISPOSA	LMETHOD	☐ GROU	ND 🗆 DRUM	_ o	THE	R	COM	MENTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY	13	DRP	- 1	D.O.	TURBIDI		ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUM
	(ML/MIN)	(SU)	(umhos/cm)	(	mV)		( mg/L)	(NTU)		(°C)	(FEET)	(GAL OR L)
			N / 1	7	ν.	e	wat	e( !	Sun ph			
	Lat:	43.6	47 4444	°N		L	ONG:	83,8	837520	06°W		
				hor	120	m tal	error	: 8,4	ches			
pH: +/-	0.1 (	PRESERV	TEST IS COMPI	+/- 10 A - NO	ONE	D.C	D.: +/- <b>0.3</b> B - HNO3	C - H2	SO4 D-	or =</td <td>10 E - H0</td> <td>TEMP.: +/-</td>	10 E - H0	TEMP.: +/-
NUMBER	SIZE	TYPE	PRESERVATI	_	-	ERED	-	ER SIZ	E TY	PE PR	RESERVAT	
		phstr	A		-	区	-					
1	125mL		A	-	-	<b>B</b> 1	-					
_1	125mL	J	В		+	<b>1</b>	١					DYD
7	60mL	MOVOA	A	0	Y		-					
HIPPING	METHOD:	Fedex	D/	ATE SH	IPP	ED:	3/3	/21	AIF	RBILL NUM	BER:	
				GNATL		_	1	n				3/8/21

	_							
PROJECT NAME:	CEC	Karn BAP/LI:	2021 GW C	PR	REPARED		CHE	CKED
PROJECT NUMBE	R: 4184		- 1	KR, JJ	DATE:3/1	12421 BY:	3K	DATE: 3/8/21
SAMPLE ID: 140	<del>1 - 1500</del>	DEK-MW	WELL DIA	METER: 🖸	2" 🗌 4" 📋	6" 🗌 OT	HER	4
WELL MATERIAL:	☑ PVC	□ ss □	] IRON □ GA	LVANIZED	STEEL	□ от	HER	
SAMPLE TYPE:	☑ GW	□ ww □	3 sw □ di		LEACHATE	□ от	HER	
PURGING	TIME:3	· 10 pm	DATE: 3/1/2/2	1 8	SAMPLE	TIME: 4	OSPIN	DATE: 3/1/20
METHOD:	PUMP BAILER	PERISTALTIC	C PUMP	PH:	<u> </u>		1 000	umhos/cm
DEPTH TO WATER	me, c	OT/ PVC		TURBI		₫ NTU		
DEPTH TO BOTTOM		<u> </u>	<del>-</del>		S /	IGHT □	MODERATE	□ VERY
WELL VOLUME:	NA	LITERS	☐ GALLONS	TEMPE	RATURE: _1	13 °C	OTHER:	
VOLUME REMOVE	D: 10	LITERS	☐ GALLONS	COLO	41.24		ODOR:	none
COLOR: _()	ould		DOR: 17 611 1		TE (0.45 um)	———— □ YES	M NO	7,0,0
		BIDITY		<u> </u>		1.6NJ.	FILTRATE O	DOR: N.M
□ NONE 🏙 SI		MODERATE	☐ VERY		MPLE: MS		DUP-	DOR:   NA
DISPOSAL METHO	D:☐ GROL	JND DRUM	M ☐ OTHER	СОММ	IENTS:			-
TIME PURGE	PH	CONDUCTIVIT	Y ORP	D.O.	TURBIDITY	TEMPERAT	UBE WATER	R CUMULATIVE
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)		L LEVEL	1
3.350 n 206	1.98	1227	91.3	i & i	207	(°C) / 9	(FEET)	i
3.46 100 1	7 . 7	1223	71.5	1.59	$\frac{AOT}{100}$	7.3	5.96	
2 22	7.11		13.90	<del>}</del>	<u> </u>	+ 7		1
3-42pm	17.11	1733	-	1.50		7 . 7	5.90	
2.5	7.27	1333	<u>-5.0</u>	1.55	3.44	7.3	-5.76	
5.55fM	7.29	1225	-20.1	1.53	5,47	12	5.90	
4 or pn	7.32	1230	-29.7	1.52	4,12	7.1	5.90	154
4:05 pm	7.31	1118	-30.2	1.51	3.96	7,2	5.96	LeL
NOTE: STAB	ILIZATION	TEST IS COME	PLETE WHEN 3 S	UCCESSIV	E READINGS A	ARE WITHIN	THE FOLLOW	NG LIMITS:
	COND.: +/-			.O.: +/- <b>0.3</b>			= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLED	<u> </u>	ATIVE CODES		B - HNO3	C - H2SO4	D - NaO	H E-F	ICL F
NUMBER SIZE	TYPE	PRESERVAT	TIVE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVA	TIVE FILTERED
1 125	P	HNO3 (	(B) 🗆 Y 🗷	N				□ Y □ N
2 M2 40	VOA	A		N				DY DN
1 125	P	A	□ Y 154	N				
				N				DY DN
44		1		N				
SHIPPING METHOD:	Fed	0 \ \	DATE SHIPPED:	212	12021	AIRBILI	NUMBER:	
COC NUMBER:			GIGNATURE:	Katu	Reminas	DATES		3/3/2021
				<del> </del>	/			

## **⇒** TAC

PROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED	]
PROJECT NUMBER: 418425.0001.0000 BY: (KR) JJ DATE: 3/2/2028Y: 5K DATE: 3/8/21	1
SAMPLE ID: OW - 10 WELL DIAMETER: 2" 4" 6" OTHER	Ī
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER	1
SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER	_
PURGING TIME: 12:45 pm DATE: 3/2/2021 SAMPLE TIME: 1: 35 pm DATE: 3/2/2	42
PURGE PUMP PERISTALTIC PUMP  PH: 7.63 SU CONDUCTIVITY: 2.712 umhos/cn  METHOD:  BAILER ORP: mV DO: 77 mg/L	1
DEPTH TO WATER: 6.10 T/ PVC TURBIDITY: 100 NTU 2M	1
DEPTH TO BOTTOM: 15.0 T/ PVC	
WELL VOLUME: NA LITERS CALLONS TEMPERATURE: 16.1 °C OTHER:	
VOLUME REMOVED: 10 DE LITERS DE GALLONS COLOR: CLEAY ODOR: YOUR	٦
COLOR: (190X ODOR: 10 No. FILTRATE (0.45 um) YES NO	1
TURBIDITY FILTRATE COLOR: FILTRATE ODOR:	
□ NONE X SLIGHT □ MODERATE □ VERY QC SAMPLE: □ MS/MSD X DUP- KL	
DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: multiply cond x 1000 (wrong units)	(2)
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME	]
(ML/MIN)         (SU)         (umhos/cm)         (mV)         ( mg/L)         (NTU)         (°C)         (FEET)         (GAL OR L)	_
12:45pm 200 7.11 0.648 54.5 1.31 107 9.3°C 6.10 INITIAL	
12:50 6.59 0.698 36.1 1.11 149 9.8 62.10 IL	
12:55 6.94 0.709 18.0 1.06 122 9.8 6.10 2L	
1:00 6.980.711 -5.6 1.02 76.7 10.0 6.10 3L	
1:65 7.0 8.709 -21.3 1.00 45.6 10.2 6.10 4L	
1:10 7.020.707-31.60.99 34.9 10.10 6.10 5L	_
1:15 7,020.706-41.4 0.98 28.4 10.10 6.16 LeL	
1:20 7.040.710-54.10.97 30.1 10.10 6.10 7 L	
1:25 7.030.710 -549 0.97 228 10.10 6.10 86	
1:30 7.03 0.712 -59.2 0.97 19.4 10.10 6.10 9L	
1:30 7.03 0.712 -59.2 0.97 19.9 10.10 6.10 9L	
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % or = 10 TEMP.: +/-</td <td></td>	
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F	]
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED	
1 250 P A DY N DY DN	
1 125 P A DYXN DY DN	
1 125 P B PYN   PYN	
2 NO VOA A DYZN DYDN	
SHIPPING METHOD: Fedex DATE SHIPPED: 3/3/2021 AIRBILL NUMBER:	Ī
COC NUMBER: SIGNATURE: Katu Reminga DATE SIGNED: 3/83/202	<u> </u>

PROJECT	NAME:	CEC F	(arn BAP/LI: 2	2021 GW C		PR	EPARED			CHEC	KED			
PROJECT	NUMBE	R: 41842	5.0001.0000		BY:	(KR)JJ	DATE:3/3	3/21	BY: 3	K	DATE:	3/3/21		
SAMPLE	ID: K	L1 - S	SC S	WELL	DIAMET	TER: 🔽	2"	6" 🗆	OTHER					
WELL MAT	ERIAL:	☑ PVC	□ SS □	IRON 🔲	GALVA	NIZED S	STEEL		OTHER					
SAMPLE T	YPE:	☑ GW	□ ww □	sw 🗆	Dl		LEACHATE		OTHER			e a commentation de la commentat		
PURC	SING	TIME: 8	Soom D	ATE: 3/3	21	S	AMPLE	• -	0.820			3/21		
PURGE METHOD		PUMP BAILER	PERISTALTIC	PUMP		PH: ORP:	37 70 17	3U CC 1V DO	NDUCTIV			umhos/cr		
DEPTH TO	WATER:	NA	T/ PVC			TURBI	DITY: 34.5	) NT	n Z					
DEPTH TO	воттом	_NA	T/ PVC			□ №	NE SL	IGHT	🕱 мо	DERATE		VERY		
WELL VOL	UME:	NA	LITERS	☐ GALLO	NS	ТЕМРЕ	RATURE: K	.2	°C OTI	HER:				
VOLUME F	REMOVED:	NA	LITERS	☐ GALLO	NS	COLO		(			non	l		
COLOR:		lear	OI	DOR: 100	nez	<del>                                     </del>	TE (0.45 um)			NO	, <del>, , ,</del>			
			BIDITÝ	. <u> </u>			TE COLOR:	NA	<del></del>		ND.	NA_		
□ NONE	□ \$LI		MODERATE	☐ VEI	RY		MPLE: MS			TRATE ODO	ж. <u> </u>	<u> </u>		
	DISPOSAL METHOD GROUND DRUM OTHER COMMENTS:													
TIME PURGE PH CONDUCTIVITY ORB D.O. TURRIDITY TEMPERATURE WATER CUMULATIVE														
''''-	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	1,	mg/L)	(NTU)		(°C)	LEVEL (FEET)	l	EVOLUMI LORL)		
7.00		1.26	1 / 1 4 7	164.			34.5	د: ا	<u>(C)</u>	(FEEI)	;	ITIAL		
8:50at	N	7.17	1416	11129.		1.10	27.2	ð-	<u> </u>	ļ	ļ			
										ļ				
		~~~~~												
		***************************************									<u> </u>			
				<del></del>						<u> </u>				
								ļ						
								<u> </u>						
,				<u> </u>				]						
NO	TE: STABI	LIZATION <sup>-</sup>	TEST IS COMP	LETE WHEN	1 3 SUC	CESSIV	E READINGS A	ARE WIT	THIN THE	FOLLOWIN	G LIMIT	S:		
pH: +/-	0.1	COND.: +/-	3 % ORP	: +/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.:</td> <td>+/-</td>	10	TEMP.:	+/-		
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	В-	ниоз	C - H2SO4	D-	NaOH	E - HC	L F-			
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTE	ERĘD	NUMBI	ER SIZE	TY	PE PA	RESERVATI	VE   FI	LTER <b>E</b> D		
	125	P	A	□ Y	DX N			-				Υ DN		
1	125	D	В		₹ N			1				Y 🔲 N		
	150		A		₽ N	<del> </del>						Y 🗆 N		
7			<u> </u>		Ŋ N	<del> </del>			<b> </b>	——————————————————————————————————————	一片	Y		
	VOA	<u>uo</u>	/ <del> </del>			<u> </u>						<del>- E+-</del>		
			<u> </u>	L   Y	□ N	<u> </u>	<u> </u>	<u> </u>			<u>                                      </u>	Y     N		
SHIPPING I	METHOD:	Fed	<u> </u>	ATE SHIPPE	D:	<u> 3/3</u>	12021	AIR	BILL NUM	BER:				
COC NUME	BER:		s	IGNATURE:	K	attl	Keming	Ø DA	TE SIGNEI	D: 🛴	3/3/	202		

## ₹RC

PROJECT NAME: CEC	Karn BAP/LI: 2	021 GW C	PR	EPARED		CHEC	CKED
PROJECT NUMBER: 4184	25.0001.0000	BY:	KR, JJ	DATE:3/	2/, BY	3K	DATE: 3/8/21
SAMPLE ID: OW - 1	2	WELL DIAME	TER: 🖸	2"	6" D	THER	
WELL MATERIAL:	ss 🗆	IRON GALV	ANIZED S	STEEL	□ 01	THER	
SAMPLE TYPE:	□ ww □	SW 🗆 DI		LEACHATE	□ O1	THER	
PURGING TIME: 4	12 300 D/	TE:3/2/202	<b>2 1</b> S	AMPLE	TIME: 3/	2/20250	ATE - 5 . 00 PM
PURGE ☑ PUMP	PERISTALTIC	PUMP	PH:			JCTIVITY: () + C	umhos/cm
METHOD: ☐ BAILER			ORP:			<u>0-17</u> т	<sub>g/L</sub> 675(5)
DEPTH TO WATER: 10.95	<del></del>		TURBI				
DEPTH TO BOTTOM 23.4	5T/ PVC		□ NO	NE SLI	GHT	MODERATE	☐ VERY
WELL VOLUME: NA	LITERS	GALLONS	TEMPE	RATURE:	<u>. [0</u> °C	OTHER:	
VOLUME REMOVED:	LITERS	GALLONS	COLO	r: <u>Clear</u>		ODOR:	<u>1074</u>
	nge lucido	OR: hone	FILTRA	TE (0.45 um)	☐ YES	ĬX NO	
	RBIDIT		FILTRA	TE COLOR:		FILTRATE OD	OR:
☐ NONE 🛣 SLIGHT 🔀	MODERATE	☐ VERY		MPLE: 🔲 MS		DUP	
DISPOSAL METHOD:☐ GROU	JND DRUM	OTHER	СОММ	IENTS:Multy	oly cond	1 x1000 (	wrong unity)
TIME PURGE PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERA	TURE WATER	CUMULATIVE PURGE VOLUME
(ML/MIN) (SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
4:30 200 6.92	88y 0	28.0 2	18	215	Hili	16.95	INITIAL
4:35 6.90	0.687	- 30 -7 1	.23	79.2	11,4	16.95	14
4540 6,97	0.685	-37.4 1	,   💤	50.7	31.4		2L
4:45 6.98	0.683	-41.3	. 10	34.3	11.	4 14.95	3 -
	10.077		98	14.6	11.5		
	0.675		,97	9.70		5 11,.95	
5:00 7.00			).97	9.83	11.1		
7.00	10,473	<u>                                    </u>	<u>~                                     </u>	1,00	11.6	10.10	
				**************************************		***************************************	
	•			<u> </u>		1	
NOTE: STABILIZATION  pH: +/- 0.1 COND.: +/-			CCESSIV .: +/- 0.3				
						= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
	VATIVE CODES		- HNO3	C - H2SO4			CL F
NUMBER SIZE TYPE	PRESERVATI		NUMB	ER SIZE	TYPE	PRESERVAT	
1 125 P	A						
1 125 P	<u> </u>						O Y O N
1 250 P	A			**************************************			
2 60 VOA	A	DY 🖄 N					
		N C Y					
SHIPPING METHOD: Ted	ex DA	TE SHIPPED:	3/3	1261	AIRBILL	. NUMBER:	
COC NUMBER:	SI	GNATURE:	ecty	Reminge	A DATE S	GIGNED:	13/2021

## TRC

	_									
PROJECT NAM	/IE: CEC	Karn BAP/LI:	2021 GW C	PR	EPARED			CHEC	CKED	
PROJECT NUM	/IBER: 4184	25.0001.0000	BY	: (KR,)J	DATE:3	2/2019	Y: 3	<u>K</u>	DATE:3	18/21
SAMPLE ID:	DW - 1	İ	WELL DIA	METER: 🗾	2" 🗌 4" 🔲	6" 🗌 (	OTHER			
WELL MATERIA	.: 🔽 PVC	ss	] IRON 📋 GA	LVANIZED S	STEEL		OTHER			
SAMPLE TYPE:	☑ GW	□ ww □	]sw □ di		LEACHATE		OTHER			
PURGING	TIME: 2	1' 07 pm	DATE 3/2- /2	21 S	AMPLE	TIME: 12	3-45	pm D	ATE: 3	12/2
PURGE METHOD:	☑ PUMP □ BAILER	PERISTALTIC	PUMP	PH: ORP:		SU CON	DUCTIV	ıтү: <del>О. Т</del>	<del>////</del> 1	umhos/cm
DEPTH TO WAT	ER: 22 . 5	T/ PVC		TURBI			•		o· –	
DEPTH TO BOT				□ NO		IGHT	□ мо	DERATE		√ERY
WELL VOLUME:	NA	LITER\$	☐ GALLONS	TEMPE	RATURE:	0-3·	с от	HER:		
VOLUME REMO	VED: <u>(</u>	LITERS	☐ GALLONS	COLO	R: Clea	<u> </u>	OD	OR:	non	
COLOR: _	c/ear		DOR: none	_ FILTRA	TE (0.45 um)	☐ YES	X	NO		
	TU	RBIDITY		FILTRA	TE COLOR:		_ FIL	TRATE OD	OR:	
□ NONE 🗶	SLIGHT [	MODERATE	☐ VERY	QC \$A	MPLE: MS	/MSD		DUP-		
DISPOSAL MET	HOD:□ GROI	JND 🗆 DRUI	u □ OTHER	сомм	IENTS: Mult	tphy co	and x	woo L	croony	uniti
TIME PUR	re   PH	CONDUCTIVIT	Y ORP	D.O.	TURBIDITY	TEMPER	ATURE	WATER LEVEL		JLATIVE VOLUME
(ML/N		(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C	-	(FEET)	1	OR L)
3:15 20			32.2	2.02	148	10.		22,5		TIAL
3:20	9.14	0.308		1,54	151	10		22.5	<u> </u>	
3:25	9.14	0.31do	33.7	1.30	<i>78.7</i>	10.		225		<u> </u>
3 30	9.14	0.364	<u>   32.8                                   </u>	1.23	<u> 33 °8  </u>	10,	2	33.5	3	<u> </u>
3135	9.14	0.364	32.2	1.18	<u>21.3</u>	10.		33.2	<del>-</del>	4
3:40	9.14	0.361	32.1	1.15	12.9	io.	<u> </u>	22.5	5	<u>, L</u>
3:45	9,13	0.364	31.9	1.15	8,94	10	-3	22.	<b>j</b> 6	<u>L</u>
								-		
NOTE: S	TABILIZATION	TEST IS COMI	PLETE WHEN 3 S	SUCCESSIV	E READINGS A	ARE WITH	IN THE I	FOLLOWIN	IG LIMITS	 i:
pH: +/- <b>0.1</b>	COND.: +/	- <b>3</b> % ORI	P: +/- 10 D	0.O.: +/- <b>0.3</b>	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +</td> <td>-/-</td>	10	TEMP.: +	-/-
BOTTLES FILL	ED PRESER	VATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - N	aOH	E - HO	CL F	
NUMBER SIZ	E TYPE	PRESERVA	TIVE FILTERE	D NUMBI	ER SIZE	TYPE	PR	ESERVAT	IVE FIL	TERED
1 125	P	A	□ Y <b>X</b>	N				, <del>.</del> .		/ 🗆 N
1 120	, P	B		N						/ 🗆 N
1 25		A		N						/ 🗆 N
	nl VOA	A		N						/ 🗆 N
	10, 10,			N						/ 🗆 N
SHIPPING METH	od: F-P.	dex 1	DATE SHIPPED:	3/3/	2021	AIRBI	LL NUM	BER;		
COC NUMBER:			SIGNATURE: 4	7 10	Reminga		SIGNE		3/3/3	7421
				Kary			JOINEL	- <u>0</u>	علاجاد	XUX/L

## ♦ TRC

	_							
PROJECT NAM	E: CEC	Karn BAP/LI: 2	021 GW C	PRE	PARED		CH	HECKED
PROJECT NUM	BER: 41842	25.0001.0000	BY:	(KB) JJ	DATE: 3/	2/2018Y:	2K	DATE: \$ 3/8/2
SAMPLE ID:	GK-MN	1-18001	WELL DIAMET	ΓER: ☑ 2	2"	6" 🗌 OT	HER	
WELL MATERIAL	PVC	□ ss □	IRON GALVA	NIZED ST	ΓEEL	по 🗆	HER	
SAMPLE TYPE:	☑ GW	□ ww □	sw 🗆 di		EACHATE	□ ОТ	HER	
PURGING	TIME: Q	Sown D	ATE3/2/2020	SA	MPLE	TIME: 10	:25cm	DATE: 3/2/26
PURGE METHOD:	☑ PUMP □ BAILER	PERISTALTIC	PUMP '	PH: ]	<u>19.70</u> m	n condi	CTIVITY: <u>A</u>	mg/L629 umhos/cm
DEPTH TO WAT	r: <b>3.5</b> 0	_ T/ PVC		TURBID	ITY: <u>3 / } )</u>	<b>S</b> NTU		E-MARIE STATE OF THE STATE OF T
DEPTH TO BOTT		_ T/_PVC		□ иои	E 🙀 SLI	GНТ □	MODERAT	ΓE □ VERY
WELL VOLUME:	NA	LITERS	GALLONS	TEMPER	RATURE: 🖇	. <u>2.6 °</u> °C	OTHER:	
VOLUME REMOV	/ED: (4)	LITERS	☐ GALLONS	COLOR:	clear		ODOR:	none
COLOR:	Clear	0	OOR: NOILL	FILTRAT	E (0.45 um)	☐ YES	)⊠ NO	
. /	TUF	RBIDITY		FILTRATI	E COLOR:		FILTRATE	ODOR:
□ NONE X	SLIGHT	MODERATE	☐ VERY	QC SAM	IPLE: MS.	/MSD	☐ DUP-	
DISPOSAL METH	IOD:□ GROU	ND 🗆 DRUM	OTHER	COMME	NTS: Mulliy	shy Cond	र १०००	(thing mora)
TIME PURC	··· I DH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERAT	TURE WAT	
(ML/M		(umhos/cm)	(mV) (	(mg/L)	(NTU)	(°C)	(FEE	
9:55am 20	10.79	0.629	125.3 1.	71	11. 1	7.50	C 8.5	6 INITIAL
in won	6.90	0.630	984 1	43	5.30	796	C 8.50	6 11
10:05	10.96	0.629	78.5 /	31	5.82	7.90	2008.5	5 71
10:10	7.04	0.624	107 (01	24	476	8.10	. 6 .	5 3L
10:15	7.03	0629	57.91	20	4 67	8.20	°C 8.5	44
10:20	7.03	0.629	54.2 1	.18	4.78	8.2	000 8	5 56
16 25	7.03	0.629	\$9.70	18	378	3 20	ිC හි.	5 66
NOTE: ST	ABILIZATION	TEST IS COMP	LETE WHEN 3 SUC	CESSIVE	READINGS A	RE WITHIN	THE FOLLO	WING LIMITS:
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORP	+/- <b>10</b> D.O.:	+/- 0.3	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLE	D PRESERV	ATIVE CODES	A - NONE B -	- HNO3	C - H2SO4	D - NaC	)H E	- HCL F
NUMBER SIZI	TYPE	PRESERVAT	VE FILTERED	NUMBE	R SIZE	TYPE	PRESER\	VATIVE FILTERED
1 125		B	□ Y X N					
1 125	P	A	□ Y □ N					□ Y □ N
2 40	·	A	□ Y ⊠. N					U Y D N
1 250		A	□ Y 🔯 N					
			DY DN			***		D Y D N
SHIPPING METH	DD: 101	TCX. D	ATE SHIPPED: 💍	3/3/2	153	AIRBILL	. NUMBER:	
COC NUMBER:			GNATURE: 1	atu	Kanna	∩ DATE S	IGNED:	3/2/2021
		<u> </u>	<u></u>	T	<del>/ \                                   </del>	1		

PROJEC	T NAME:	CEC I	Karn BAP/L	I: 2021 GW		PR	EPARED		CHE	CKED			
PROJEC	TNUMBE	R: 41842	5.0001.000	0	BY:	(KR, J)	DATE:	1 200 BY:	3K	DATE:3/8/21			
SAMPLE	ID: DC	K-MV	1-1500	)3 WELL	_ DIAMET	ΓER: ☑	2"	6" OT	HER				
WELL MAT	ΓERIAL:	☑ PVC	□ ss	☐ IRON ☐	] GALVA	NIZED S	STEEL	□ от	HER	<del></del>			
SAMPLE T	YPE:	☑ GW	□w	□ sw □	] DI		LEACHATE	□ от	HER				
PUR	GING	TIME: (	28am	DATE: ろ) ô	1602	s	AMPLE	TIME: 1/	Seam	DATE: 3/2/201			
PURGE METHOI	٠ <u> </u>	PUMP	PERISTALT			PH: 7	1 - 00		244	340 umhos/cm			
	<u> </u>	BAILER			_	ORP:	3	V DO:	<u>6,11                                   </u>	ng/L			
	O WATER:		T/ PVC			TURBI		•	MODEDATE				
		<u>27.89</u>	T/ PVC		ONG	□ NOI			MODERATE	☐ VERY			
WELL VOL		NA di	LITERS					<u>1.3 °c</u>	OTHER:				
	REMOVED		LITERS			COLO			ODOR:	none_			
COLOR:		<u>ox</u>	<del>.</del>	ODOR:nc	one_	FILTRA	TE (0.45 um)	☐ YES	□ NO				
	N.		BIDITY			-	TE COLOR:		FILTRATE OF	DOR:			
DISPOSAL METHOD GROUND DRUM DOTHER COMMENTS: Multiply Cond 2000 (wrong units)													
DISPOSAI	L METHOD	:□ GROU	ND   DRI	JM 🗌 OTHE	R	СОММ	ENTS: Multy	oly cond	x1000 (u	(Hinn your			
TIME	PURGE RATE	PH	CONDUCTIV	'ITY ORF	,	D.O.	TURBIDITY	TEMPERAT	URE WATER				
	(ML/MIN)	(SU)	(umhos/cn	n) (mV)	,   (	mg/L)	(NTU)	(°C)	LEVEL (FEET)				
11:35	200	7.81	0.325	- 110		23	(3.78	14.3	16.50	1			
11.40		7.89	0.332	34.		03	3.92	14.5	16.50	0 1 L			
11:45		7.89	0. 334			.02	3.34	14.5	i				
11.50		7.86	0.33	8 28	7 1	60	2.61	14.	3 /w-	5 3 1.			
11:50	×	7.82	0.340		5 0	99	3.0	14.3	14.5				
										CON .			
			***************************************		ĺ					(00)			
			-										
								!					
NC.	TF: STARI	ITZATION	TEST IS CO	MPI FTF WHE	N 3 SUC	CESSIVI	E READINGS A	RE WITHIN	THE FOLLOW	ING LIMITS:			
pH: +/-		COND.: +/-		RP: +/- <b>10</b>		+/- 0.3	·		= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-			
BOTTLES	S FILLED	PRESERV	ATIVE CODE	ES A-NONE	В-	HNO3	C - H2SO4	D - NaO	H E-F	ICL F			
NUMBER	SIZE	TYPE	PRESERV	ATIVE FIL	TERED	NUMBE	ER SIZE	TYPE	PRESERVA	TIVE FILTERED			
į	250	B	A	□ Y	N N								
1	125	8	A	□ Y	D N					□ Y □ N			
1	125	Ŕ	В	D Y	ZĮ N								
γ	(00 mi	VOA	A		N N	<b>†</b>				Y D N			
<u>~</u>	OF THE	<u> </u>	1,		N	<u> </u>			<del>                                     </del>	□ Y □ N			
SHIPPING	METHOD:	Fold	x	DATE SHIPE	PED:	3/2/	12020	AIRBILI	NUMBER:	1 1 1			
COC NUMI	<del></del>		<b>7</b>	SIGNATURE	-	2.51	10			3/2/2021			
	·			SIGNATORE	4	wy	Keminga	ואמורטו	٠,١٢٥. ح	DIXIXUXI			

PROJECT NAM	ME: CEC	Karn BAP/LI: 26	021 GW C	PR	EPARED		CHEC	KED
PROJECT NUM	MBER: 4184	25.0001.0000	BY	KR, JJ	DATE 3	() ( BY:	<b>ユ</b> ド	DATE:3/8/21
SAMPLE ID: J	DEK-MU	U 15005	WELL DIA	METER: 🖸	2" . 4"	6" 🔲 OTH	IER	
WELL MATERIA	L: 🖸 PVC	ss 🗀	IRON 🗀 GA	LVANIZED S	STEEL	□ отн	IER	
SAMPLE TYPE:	☑ GW	□ ww □	SW 🗆 DI		LEACHATE	□ ОТН	IER	
PURGING	TIME: (	490 04	ATE: 3/2/21	I	AMPLE			ATE:3/2/2/
PURGE METHOD:	☑ PUMP ☐ BAILER	PERISTALTIC I	PUMP		- 1. 1.	U CONDUC	тіліту: <u>(09</u> <u>20</u> 2 <sub>mg</sub>	
DEPTH TO WAT	rer: 65 LC	T/ PVC		TURBI	1 .	NTU		
DEPTH TO BOT	том: <u></u> ДД-35	_ T/ PVC	· Jar	J NO	NE 🗆 SLI		MODERATE	☐ VÉRY
WELL VOLUME:	NA	LITERS	☐ GALLONS	TEMPE	RATURE:	8.4°c	OTHER:	
VOLUME REMO	VED: 3	LITERS	☐ GALLONS	COLO	R: <u>C\Q</u> 9		ODOR:	1010
COLOR: _	clear	OD	OR: NOV	FILTRA	NTE (0.45 um)	☐ YES	□ NO	
	TUI	RBIDITY		FILTRA	TE COLOR:		FILTRATE.ODC	DR:
ANONE [	SLIGHT 🗆	MODERATE	☐ VERY	QC SA	MPLE: MS	/MSD	DUP- O	
DISPOSAL MET	HOD F GROU	JND 🗌 DRUM	OTHER	соми	IENTS:			
TIME PUR	I PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATU	RE WATER	CUMULATIVE
RA'	IE	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	LEVEL (FEET)	PURGE VOLUME (GAL OR L)
1420 10		1160	-10-7	100	5, 600	7.6	860	INITIAL
7691	7.63	6011	-52.0	263	2, 30	7.8	8.70	
	7.W1	1099	-44.5	2.30	3,50	7.6	187e	
1435	7.54	1099	<b> </b>	1		8.4	470	1.1
		1095	-580	Д. <b>Ө</b> Ө	2.44		47	<del> </del>
1440	7.50			200	1.48	8.5	~~~~ <del>~</del>	<u>_</u>
1445	7.57		-789	200	1.35	8.	שרש	2.1
140	7, 57	1047	-79.0	203	1.15	BY	8re	3
				<u> </u>				
	1							
NOTE: S	TABILIZATION	TEST IS COMPL	ETE WHEN 3 S	SUCCESSIV	E READINGS A	RE WITHIN T	HE FOLLOWIN	G LIMITS:
pH: +/- <b>0.1</b>	COND.: +/	- <b>3</b> % ORP:	+/- <b>10</b> D	0.0.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILL	ED PRESER	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E-HC	L F
NUMBER SIZ	ZE TYPE	PRESERVATI	VE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVATI	VE FILTERED
4 121	- BAN	A		ÎN				
20 101	Pi	À		N				□ Y □ N
2 10 -	21	<u>B</u>		N				DY DN
2 2%		1		N				
	1	1		N		-		DY DN
SHIPPING METH	10D: FS	IEN DA	ATE SHIPPED:	3/3	/2/	AIRBILL N	NUMBER:	78
COC NUMBER:	1.1	<del>.,                                    </del>	GNATURE:	<del></del>		DATE SIG	SNED: 3	TODE
		<u> </u>	•	<del></del>		<u> </u>		<u> </u>

PROJECT NAME:	CEC F	(arn BAP/LI:	2021 GW C	PR	EPARED		CHEC	KED					
PROJECT NUMBE	R: 41842	5.0001.0000	BY:	KR, JJ	DATE	5 ) BY:	JK	DATE:3/8/21					
SAMPLE ID:	EKMU	というの	O WELL DIAN	IETER: 및	2"	6" □ OT⊦	IER						
WELL MATERIAL:	☑ PVC	□ ss □	] IRON 🗌 GAL	VANIZED (	STEEL	□ от⊦	IER						
SAMPLE TYPE:	☑ GW	□ ww : □	]SW □ DI		LEACHATE	□ ОТЬ	IER						
PURGING	TIME: \	il [	DATES STATE		AMPLE	TIME: しろ		ATE313D'					
PURGE  METHOD:		PERISTALTIC	PUMP			U CONDUC		62 umhos/cm					
<u> </u>	20 / 1				<u>-70.3</u> m		<u> 2,10</u> mg	1/L					
DEPTH TO WATER DEPTH TO BOTTOM		T/ PVC		TURBI		<del></del>	MODERATE	□ VERY					
WELL VOLUME:	NA	LITERS	☐ GALLONS	<del> *</del>		<b>√O</b> °C	OTHER:						
VOLUME REMOVE		LITERS	GALLONS	COLO			!	1010					
·	Clear		DOR: 100 K				IODOR: II NO	MOIO					
COLOR:			DOK. TIOIO		ATE (0.45 um)	⊔ 1E9	1						
☐ NONE ☐ SI		BIDITY MODERATE	☐ VERY		TE COLOR:{ MPLE: ☐ MS	/MSD	FILTRATE ODG	)R:					
DISPOSAL METHOD: GROUND DRUM DOTHER COMMENTS:													
TIME PURGE	PH	CONDUCTIVIT	Y ORP	D.O.	TURBIDITY	TEMPERATL	JRE WATER	CUMULATIVE PURGE VOLUME					
(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEÉT)	(GAL OR L)					
1511 14	7.97	ひぞう	-ie7.1	11.00	4.50	6g	891	INITIAL					
151dp	7.6	رزاک	-72.1	269	287	7. て	895	, , ,					
1271	7.54	1145	-600	3-52	3.00	7. "	895	1					
1524	7.55	1148		a.iで	3.15	7. 6	895	1,0					
1531	7.55	1160		210	3.00	7.9	895						
1376	7.55	1162	- 70.3	2.10	291	8.0	895	2,7					
	ļ	· · · · · · · · · · · · · · · · · · ·											
	<u> </u>												
NOTE: STAE	BILIZATION T	TEST IS COMF	PLETE WHEN 3 S	UCCESSIV	'E READINGS A	RE WITHIN T	HE FOLLOWIN	G LIMITS:					
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORF	P: +/- 10 D.	O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-					
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOh	H E-HC	CL F					
NUMBER SIZE	TYPE	PRESERVA <sup>-</sup>	TIVE FILTERE	NUMB	ER SIZE	TYPE	PRESERVATI	VE FILTERED					
2 175	VOA	<u>p</u>		N				Y					
761 1	٦١	A		N				□ Y □ N					
1 125	PI	Š		N									
1 20	, Ov	V		N				□ Y □ N					
And the second s				N	***************************************			D Y D N					
SHIPPING METHOD	Edd	21	DATE SHIPPED:	7 3	1()[	AIRBILL N	NUMBER:	10 h					
COC NUMBER:	_/\	<b>V</b> 5	SIGNATURE:			DATE SIG	GNED: 7	1-11					

# **♦ TAC**

PROJECT	NAME:	CEC F	Karn BAP/LI: 2	2021 GW C		PRE	PARED			CHEC	KED		
PROJECT	NUMBER	R: 41842	5.0001.0000	ВҮ	: <b>K</b>	KR, JJ	DATE: 3 (S	ds (	BA: 2	jk.	DATE: 1/8/21		
SAMPLE	IDD EV	cmw	15009	WELL DIA	METE	R: 🗾 2	2"	6" 🗌	OTHER				
WELL MAT	ERIAL:	☑ PVC	□ ss □	IRON 🗌 GA	LVAN	IZED ST	reel		OTHER				
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗆 DI		L	EACHATE		OTHER				
PURG	GING	TIME: \	500	ATE:3/2/J	(		MPLE	TIME:		<del></del>	ATE: 3/2/DS		
PURGE METHOD	1-	PUMP BAILER	PERISTALTIC	PUMP	_ <b>⊢</b>		<u>7.4/4</u> s -{30-7 m		ONDUCTIVI		umhos/cm		
DEPTH TO	WATER:	27,56	T/ PVC	*	-	TURBID	iτγ: <u></u> (.7ί	NT	U				
DEPTH TO	воттом:	धाः १५	T/ PVC			Ž-NON	E 🗆 SLI	GHT	□ мог	DERATE	☐ VERY		
WELL VOL	UME:	NA	LITERS	☐ GALLONS	Ī	EMPER	RATURE: 🔟	$\Lambda_{\perp}$	_°С ОТН	HER:			
VOLUME F	REMOVED:	<u> </u>	LITERS	☐ GALLONS		COLOR:	<u> كالا</u>	<u> </u>	ODG	or: <u>[√</u>	or		
COLOR:	<u>_B\</u>	zchist	OI	DOR: <u>VI.6 V</u>	<u>_</u>  F	ILTRAT	E (0.45 um)	☐ YE	s "⊈	NO			
		TUR	BIDITY		E	ILTRATE	E COLOR:		FIL	TRATE ODC	OR:		
☐ NONE	☐ SLI		MODERATE	Ø VERY		QC SAM	1PLE: MS	MSD		DUP-			
DISPOSAL METHOD GROUND DRUM OTHER COMMENTS:													
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)		l*	TURBIDITY		PERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME		
150	34	7,78	Ele 1	-71,2	1 .	ig/L)	130.0	€.	(°C) <b>'/</b>	2751	(GAL OR L) INITIAL		
1575	<del>-                                    </del>	7.41	855	-97.0		54	-1		. <b>Y</b>	277c			
		7.41 5,41		<del></del>	+		68 <u>0</u>	11	<u>'                                    </u>				
100			955	-120.0		10	*.	1,	<u>. !</u>	272	9		
1605		7.43	854	-1760	T .	00	6.0	(1-	٦	27h	3		
1640		7.43	०५५)	-1308	1,0	19	ત્ર. <i>७</i> ∪	11	<u>. Z                                    </u>	272	4		
1015		7.43	0837	-170.1		18	190	[]	, ر	37 70	5		
1670		7.43	छद्वप	-136.7	(ý	6	1.75			2770	6		
	1												
NO	TE: STABI	LIZATION 1	TEST IS COMP	LETE WHEN 3	SUCC	ESSIVE	READINGS A	RE WI	THIN THE I	FOLLOWIN	G LIMITS:		
pH: +/-	0.1	COND.: +/-	3 % ORP	: +/- 10 E	).O.: +	·/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-		
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	B - F	HNO3	C - H2SO4	D -	NaOH	E - HC	CL F		
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERE	ĒD I	NUMBER	R SIZE	TY	PE PR	RESERVATI	VE FILTERED		
ユ	125	VOA	<u>A</u>		N						D Y D N		
	176	P(	[Z]		N						□ Y □ N		
	200	Pl	A		N						□ Y □ N		
	761	PI	A		N						DY DN		
					N						D Y D N		
SHIPPING	METHOD:	Fullo	- KS	ATE SHIPPED:	· -	( <u>)</u>	151	AIF	RBILL NUMI	BER:	<del>J M' ' '</del>		
COC NUME		W	<del>****</del>	IGNATURE:	_ <del></del>	-	<del>-                                    </del>		TE SIGNE		2/5/11		
											<del></del>		

PROJEC1	NAME:	CEC H	Karn BAP/LI: 2	021 GW C		PRE	PARED			CHEC	KED
PROJEC1	NUMBE	R: 41842	5.0001.0000		BY:	KR, JJ	DATE: -3	त्र।	BY: 3	14	DATE: 3/8/21
SAMPLE	ID: F	18 H 0	<del>ر</del> ر	WELL (	DIAME	TER: 🗾 :	2"	6" 🗆	OTHER		
WELL MAT	ERIAL:	☑ PVC	□ ss □	IRON 🗆	GALVA	NIZED S	TEEL		OTHER		
SAMPLE T	YPE:	☑ GW	□ ww □	sw 🖂	DI		EACHATE		OTHER		
PUR	SING	TIME:	DA	ATE:			MPLE	TIME:	1630		ATE: 3 12 C
PURGE METHOD		PUMP BAILER	PERISTALTIC	PUMP		PH: <u>{</u>		iv do:	NDUCTIV		umios/cm
DEPTH TO	WATER:		T/ PVC			TURBIC	oity: _/V	NTL	J		
DEPTH TO	ВОТТОМ		. T/ PVA			NON	IE 🗆 SL	IGHT	□ мо	DERATE	☐ VERY
WELL VOL	UME: /	NA /	□ LITER'S	☐ GALLO	NS	ТЕМРЕГ	RATURE:/\_	<u> </u>	°С ОТН	HER:	
VOLUME F	REMOVED:	_ \ _/_	LITERS	☐ GALLO	NS	COLOR	: <u>C\</u> co.'	$\overline{\angle}$	ODO	OR:	10P
COLOR:				OR:		FILTRAT	TE (0.45 um)	☐ YES	<u> </u>	NO	· · · · · · · · · · · · · · · · · · ·
		TUR	BIDITY			FILTRAT	E COLOR:		FIL	TRATE ODG	OR:
□ NONE	SLI	GHT 🗌	MODERATE	☐ VE	RY		/IPLE;   MS	MSD		DUP-	
DISPOSAL	METHOD:	☐ GROUI	ND 🗆 DRUM	OTHER	!	СОММЕ	ENTS:				
TIME	PURGE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPE	RATURE	WATER	CUMULATIVE
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	1,	mg/L)	(NTU)		°C)	(FEET)	PURGE VOLUME (GAL OR L)
	<b>(</b>		(=:::::::::::::::::::::::::::::::::::::	,				<u> </u>		()	INITIAL
											:
		***************************************									
<u> </u>										<u> </u>	
					_					<u></u>	
		·····									
		· · · · · · · · · · · · · · · · · · ·									
										-	
NO	TE: STABI	LIZATION 1	TEST IS COMPL	ETE WHEN	3 SUC	CESSIVE	READINGS	ARE WIT	HIN THE F	OLLOWIN	G LIMITS:
pH: +/-	0.1 (	COND.: +/-	3 % ORP:	+/- 10	D.O.	+/- 0.3	TURB: +/-	10 %	ог =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODES		В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI			NUMBE	R SIZE	TYP	E PR	ESERVATI	VE FILTERED
١	7()	Q (	<u> </u>		N						DY DN
				□ Y	□ N						
		-			□ N						□ Y □ N
					□ N					***************************************	□ Y □ N
					□N						
SHIPPING I	METHOD:	Foo	al DA	TE SHIPPE	D: **	313	Dí	AIRI	BILL NUMI	BER: 🔨	<i>A</i> ' ' '
COC NUME	JER;	Λ /	<u> </u>	GNATURE:			• • <u> </u>		E SIGNED		12/11
		$-\sqrt{2}$	, ,			1 /		1		<u> </u>	

# **CHAIN OF CUSTODY**

Page 26 of 28



## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPL	IPLING SITE: EK Bottom Ash Pond & LI – 2021 Q				PROJECT NUMBER:	9,502,64					ANAL	YSIS RE	QUESTED		Page 1 of 1
DEK	Bottor	n Ash Pond	& LI – 2021	Q1		21-0217									SEND REPORT TO CDBatts
AMPL	ING TEA	AM: Val	41+		DATE SHIPPED:	SI		ATTACHED?	lls						HD Register, TRC
7	RC	- Rat	y tav	ies	3/3/2021		CIRCLE	NO	Total Metals	Anions	S	Alkalinity			PHONE:
CONT	E ROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION /	LOCATION	DEPTH (ft)	# OF CONTAINERS	Tot	Ani	TDS	Alk			REMARKS
		3/2/2021	10:25em	GW	DEK-MW-15003			5	х	x	x	x			
	C	3/2/202			DEK-MW-18001			5	х	x	x	x			
11		3/2/2021			DEK-MW-18001 MS	S		4	x	х		х			
		3/2/202			DEK-MW-18001 MS	SD		4	x	x		x			
					-										
													7		
-	-													1	
	-														
	-														
													+ 1		
														-	
FI INC	MISHE	D BY: (SIGNAT	TURE)	DATE/T	IME I	RECEIVED BY	: (SIGNATUR	E)					COMM	IENTS	
		1 Ken			13/2021	Fed			3.6-20C #018402						
	/	D BY: (SIGNAT		DATE/T	IME:	RECEIVED BY	: (SIGNATUR	E)							
Ŧ	ed	EX		3-	4-2021 1130	Cts	scopith	ansen			OF	RIGINAL	TO LAB	COPY TO	O CUSTOMER

## **CHAIN OF CUSTODY**

Consumers Energy

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPL	ING SITE	Ξ:			PROJECT NUMBER:				ANAL	YSIS RI	QUESTE	D	Page 1 of I		
DEK	Botton	n Ash Pond	-2021 Q1	x		21-021	0								SEND REPORT TO: CDBatts
SAMPI	ING TEA	AM;			DATE SHIPPED:	3	SITE SKETCHEI CIRCLE YES	O ATTACHED? S ONE: NO	Fotal Metals	ns		Alkalinity			HD Register, TRC PHONE:
CON	CE CROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION	ON / LOCATION	DEPTH	# OF CONTAINERS	Tota	Anions	TDS	Alka			REMARKS
21-0	216-01	3/1/2021	4:05 pm	GW	DEK-MW-15002	2		5	x	х	x	x			
	-02	3/5/51	142	GW	DEK-MW-15004	1		5	х	х	х	х			
	-03	312/21	1400	GW	DEK-MW-15005	5		5	x	х	х	x			
	-04	4 11	1534	GW	DEK-MW-15006	5		5	х	х	x	x			
	-05	3661	_	W	DUP-DEK-BAP	407	-	5	x	х	x	x			
,	-06	11 11	1430	W	FB-DEK-BAP			1	x						
				ll i	-						1111				
															· e <sub>t</sub>
RELINQUISHED BY: (SIGNATURE) DATE				DATE/TI	7/21 13KU	D BY: (SIGNATURE)			2.3-5.3%						
RELINQUISHED BY: (SIGNATURE) DATE/TIN			ME:	RECEIVED	A EX BY: (SIGNATUR	E)	#015402								
Feder 3.4-2			21 1130	Osu	DHanse	n			OI	RIGINAL	TO LAB	COPY	TO CUSTOMER		

Page 28 of 28

## **CHAIN OF CUSTODY**



## **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPL	ING SIT	Е			PROJECT NUMBER	04.0040					ANAL	YSIS R	REQUE	STED	_		Page 1 of 1
DEK	Lined	Impoundm	ent – 2021 Q	<b>Q</b> 1		21-0218											SEND REPORT TO CDBatts
SAMPL	ING TEA	AM _ /	caty r Ja		DATE SHIPPED	SITE	SKETCHEI CIRCLE	ATTACHED? ONE	tals								HD Register, TRC
-	TK		Ja	Vier	3/3/2021		YES	NO	Total Metals	Anions	7.0	Alkalinıty					PHONE
	CE TROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION /	LOCATION	DEPTH (ft)	# OF CONTAINERS	Tota	Ani	TDS	Alk					REMARKS
			1:35 pm		OW-10			5	х	х	х	х					
	-02	3/2/2021	3:45 <sub>Pm</sub>	GW	0W=11230	WH		5	х	х	Х	х					
	-03	3/2/2021	5:00 pm	GW	0W-1212(	3-42021		5	х	х	Х	х					
	-04	3/3/2021	8:50am	GW	KLI-SCS			5	х	х	х	х					
	-05	3/1/21	10.30ay	n GW	KLI-PCS			5	х	х	Х	х					
	-06	3/1/21	10:00am	GW	SW-DITCH			5	х	х	Х	x					-
	-07	3/2/2021		GW	DUP-KLI			5	х	х	х	х					
	-08.	3/2/2021	1:35 pm	W	EB-KLI			1	х						_		
	-09	3/2/2021	1:40pm	W	FB-KLI			1	х								
		DBY (SIGNA		DATE/T		RECEIVED BY	•	E)	3.6-5.2°C								
171	Katy Keminga				13/2021	Fedex	C		J.(	u). U	<u>د</u> ر	,					
RELIN	QUISHE	DBY (SIGNA	FURE)	DATE/T	1	RECEIVED BY		E)	#01	GAC	2						
	Fea	ICX		3/4	[2021 1130	Keg	Hanse	2N			O)	RIGINA	L TO I	LAB	COP	у то с	USTOMER



# Appendix C Data Quality Reviews

# Laboratory Data Quality Review Groundwater Monitoring Event March 2021 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the March 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group 21-0217.

During the March 2021 sampling event, a groundwater sample was collected from each of the following wells:

DEK-MW-15003

DEK-MW-18001

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

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

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

## **Data Usability Review Procedure**

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, 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. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

#### **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of 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 metals, anions, and alkalinity. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event March 2021 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the March 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group 21-0218R.

During the March 2021 sampling event, a groundwater sample was collected from each of the following wells:

■ OW-10 ■ OW-11 ■ OW-12

During the March 2021 sampling event, a water/surface water sample was collected from each of the following wells:

KLI-SCSKLI-PCSSW-DITCH

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

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

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

## **Data Usability Review Procedure**

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

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

- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and 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, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

#### **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

#### **QA/QC Sample Summary:**

- Mercury analysis was not initially performed by the laboratory as requested. The laboratory was requested to add mercury results to the laboratory report. Since the samples were analyzed past the method recommended hold time, the results have been flagged accordingly, as summarized in the attached table. Prior analyses at wells near the Karn Lined Impoundment have shown mercury is not present at concentrations above laboratory reporting limits, thus, the qualified non-detect results reported for this round do not adversely impact data usability.
- The metals container provided for sample DUP-KLI was received empty by the laboratory. The laboratory filled the preserved metals container with an unpreserved aliquot from the

anions container for this sample in order to create a preserved sample for metals analysis. The laboratory created this aliquot on 3/4/21 and did not prepare the sample for metals until 3/10/21; thus, there is no adverse impact on data usability since the sample was preserved more than 24 hours prior to preparation.

- One field blank (FB-KLI) and one equipment blank (EB-KLI) sample were collected. Target analytes were not detected in these blanks.
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were DUP-KLI and OW-10; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits with one exception.
  - The RPD for potassium (37.4%) was outside of the acceptance limits in the field duplicate pair. Potential uncertainty exists for potassium in groundwater samples OW-10, OW-11, OW-12, and DUP-KLI, as summarized in the attached table.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Table 1

#### Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn Lined Impoundment – RCRA CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue		
OW-10	3/2/2021	Potassium			
OW-11	3/2/2021		assium Field duplicate variability; potential uncertainty exists.		
OW-12	3/2/2021				
DUP-KLI	3/2/2021				
OW-10	3/2/2021	Mercury			
OW-11	3/2/2021				
OW-12	3/2/2021		Analyzed part the method recommended held time the regults have been florged excerdingly netential		
KLI-SCS	3/3/2021		Analyzed past the method recommended hold time, the results have been flagged accordingly; potential		
KLI-PCS	3/1/2021		uncertainty exists.		
SW-DITCH	3/1/2021				
DUP-KLI	3/2/2021				



# **Appendix D Statistical Analysis**

#### Appendix D

#### Statistical Summary for DE Karn Lined Impoundment First Quarter 2021 Data from April 2019 to May 2021

Karn Lined Impoundment Wells									
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12			
Boron	Trend	0	0	0	<b>^</b> *	0			
Calcium	Trend	↓*	0	<b>^</b> *	↓*	0			
Chloride	Trend	0	0	0	0	0			
Fluoride	Trend	O*	0	O*	<b>^</b> *	O*			
Iron	Trend	↓*	0	0	0	0			
pН	Trend	0	0	0	<b>^*</b>	0			
Sulfate	Trend	0	<b>^</b> *	0	0	0			
Total Dissolved Solids	Trend	↓*	0	0	↓*	0			

#### Notes:

 $O^* = Non-detect$ 

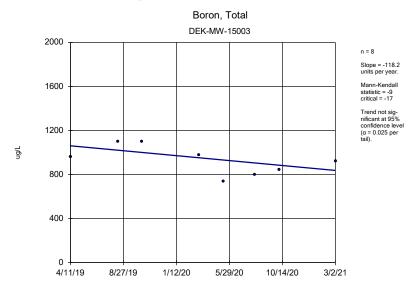
O = No trend

↑ = Upward trend, continuous

\* = Upward trend, new

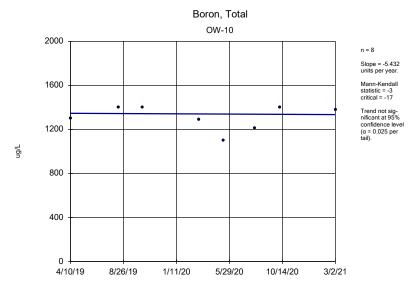
= Upward trend, confirmed

↓\* = Downward trend, new



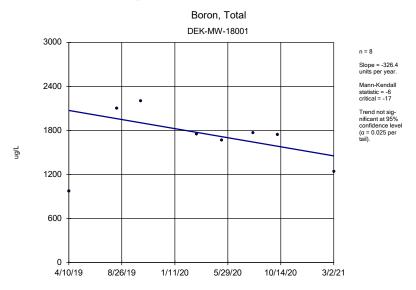
Sen's Slope Estimator Analysis Run 4/12/2021 4:22 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:22 PM

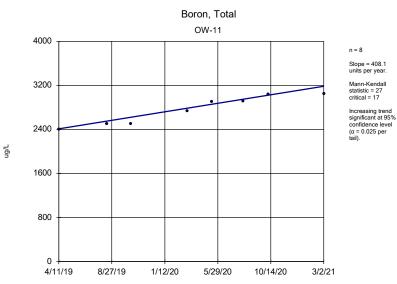
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:22 PM

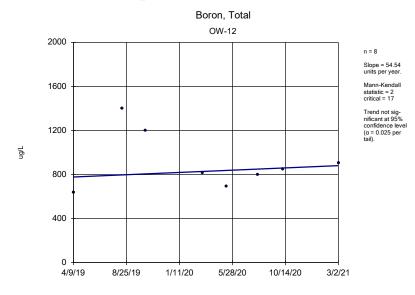
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

#### Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA



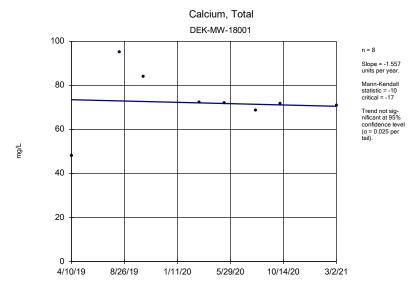
Sen's Slope Estimator Analysis Run 4/12/2021 4:22 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



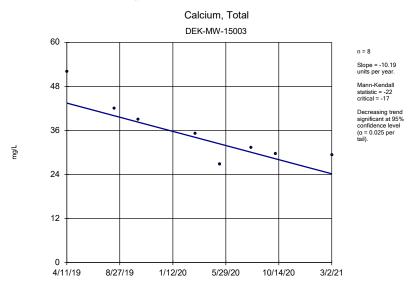
Sen's Slope Estimator Analysis Run 4/12/2021 4:22 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

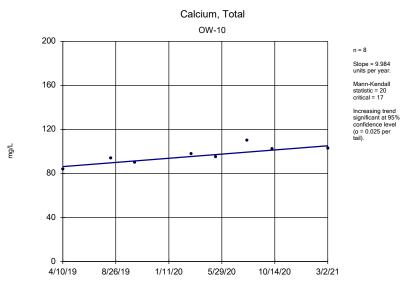
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

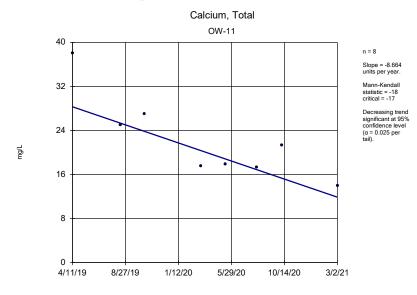
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

#### Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA



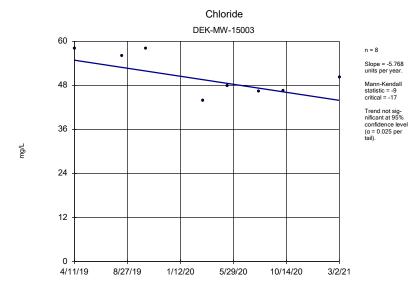
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



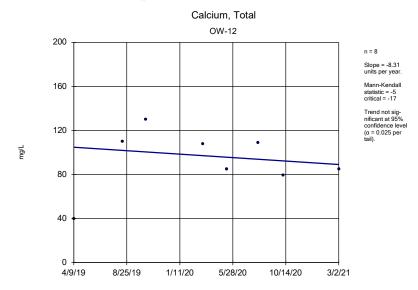
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

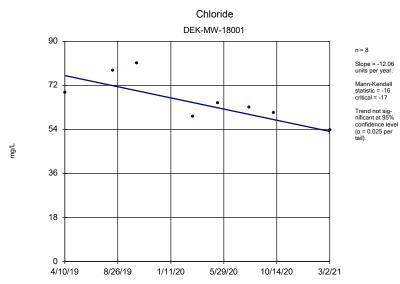
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

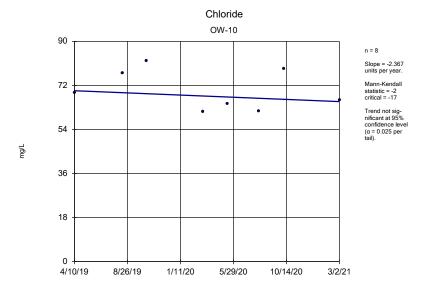
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

#### Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA



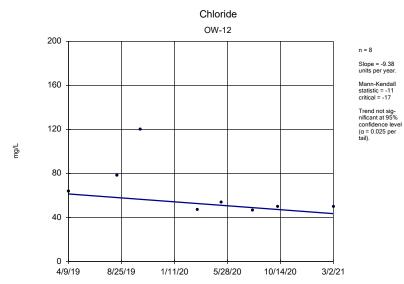
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



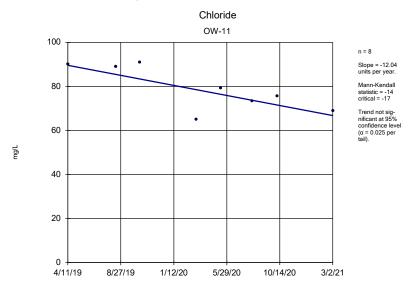
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

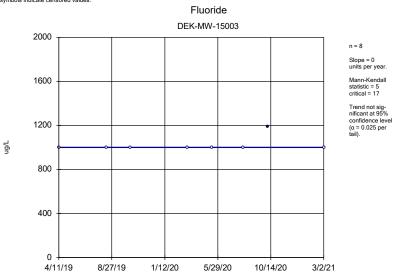
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

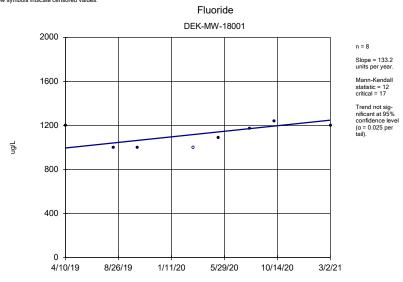
#### Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

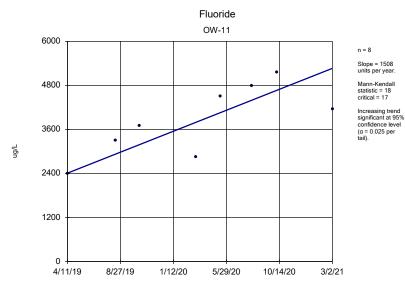
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

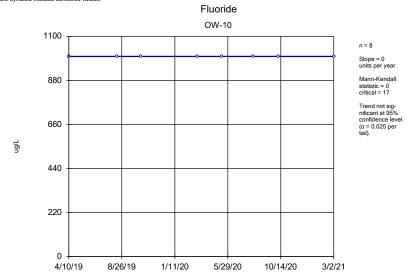
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

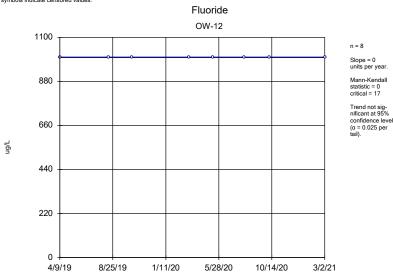
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

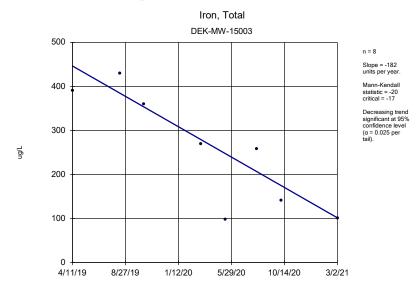
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



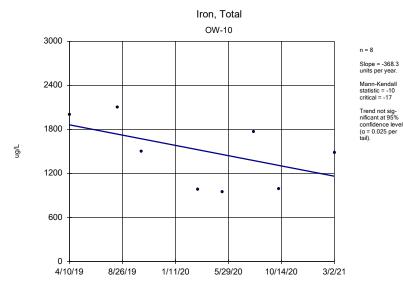
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



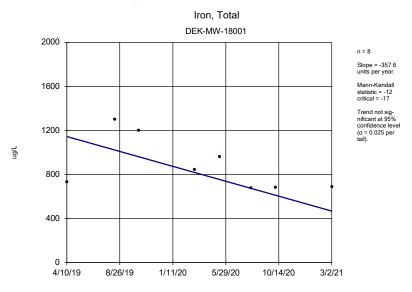
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

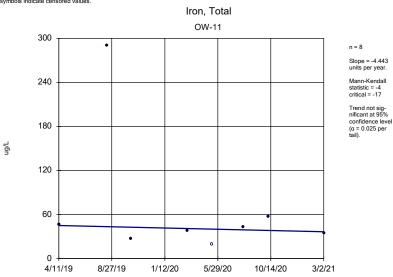
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

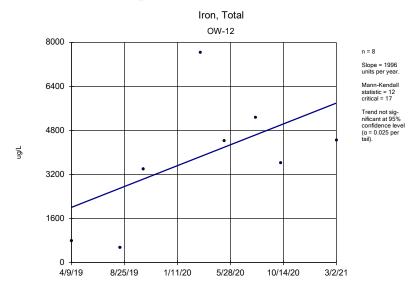
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy

# Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



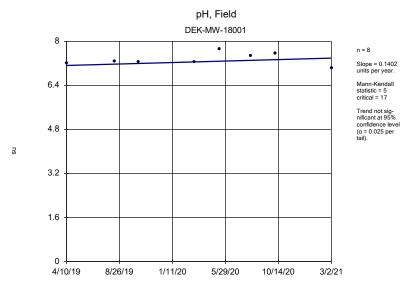
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



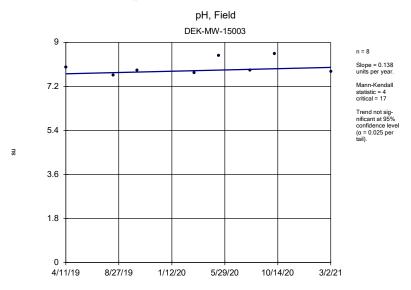
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



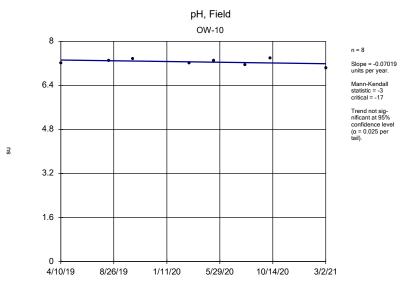
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



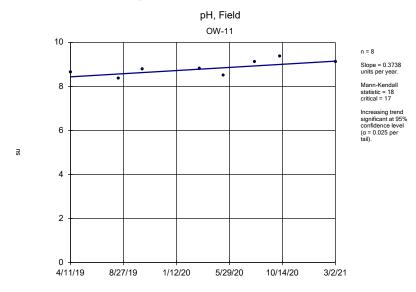
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



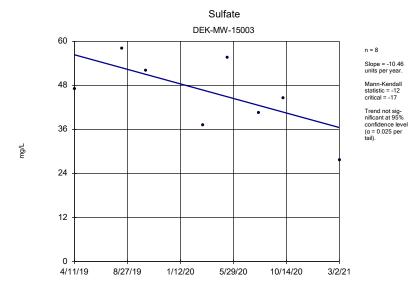
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



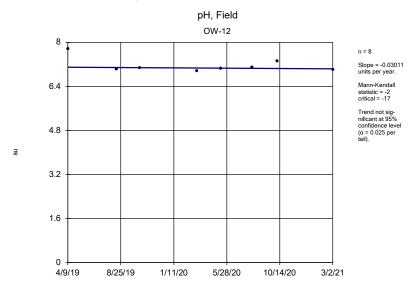
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

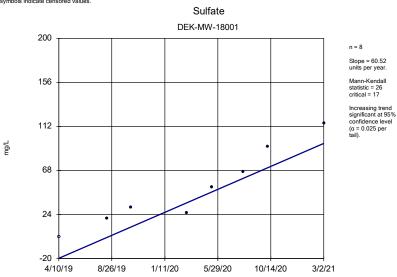
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

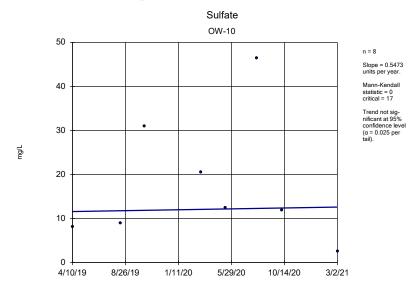
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy





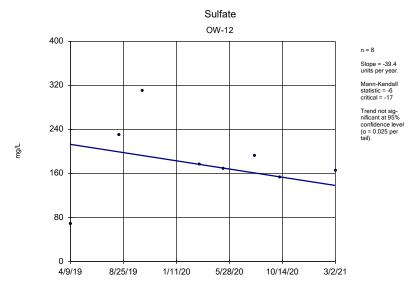
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



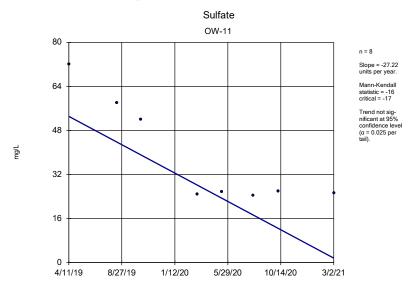
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



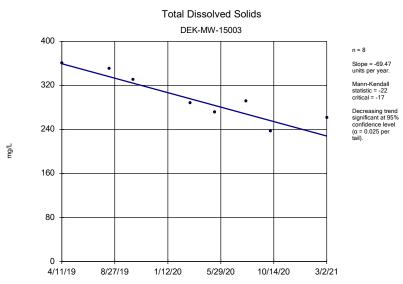
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



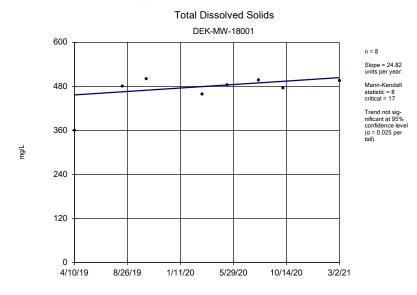
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



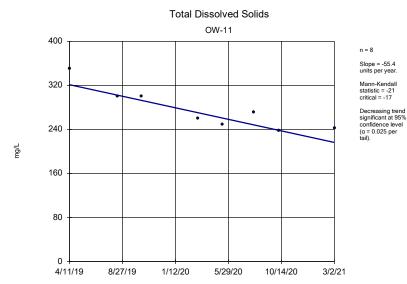
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



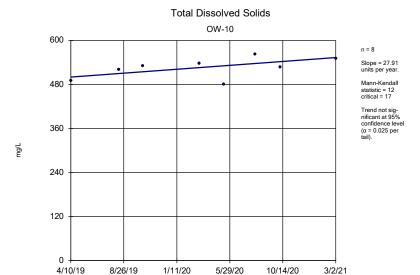
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



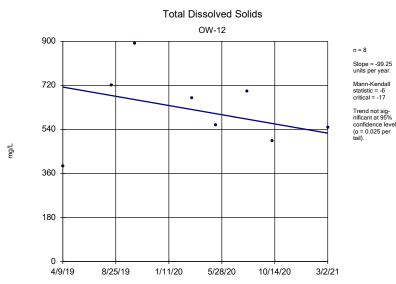
Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



Sen's Slope Estimator Analysis Run 4/12/2021 4:23 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q1.NE - Copy



# Appendix E Secondary Leachate Collection System Monitoring



April 30, 2021

#### TRANSMITTAL VIA EMAIL 04/30/2021

Mr. Phil Roycraft
Michigan Department of Environment, Great Lakes, and Energy
Materials Management Division
Saginaw Bay District Office
401 Ketchum St, Suite B
Bay City, Michigan 48708

WRITTEN ASSESSMENT DETERMINATION AND RESULTS SUMMARY OF REMEDIAL ACTIONS TAKEN AND PLANNED FOR SECONDARY COLLECTION SYSTEM OF DE KARN LINED IMPOUNDMENT, ESSEXVILLE, MICHIGAN; WASTE DATA SYSTEM NUMBER 392503

Dear Mr. Roycraft,

This letter report serves as the first written assessment and summary of remedial actions taken and planned for the Karn Lined Impoundment Secondary Collection System following the submittal of a preliminary written assessment to Michigan Department of Environment, Great Lakes, and Energy (EGLE) on January 22, 2021. An evaluation of the chemical characteristics of the leak detection system required under Rule 437(6) of constituents monitored under the approved Hydrogeological Monitoring Plan (HMP) is summarized in this report but further characterized and discussed in the first quarter 2021 monitoring report submitted under a separate cover under April 30, 2021. A summary of the results of remedial actions taken and planned as requested in the EGLE letter dated February 23, 2021 is provided below as developed from investigation findings.

## SUMMARY OF INVESTIGATIONS PERFORMED

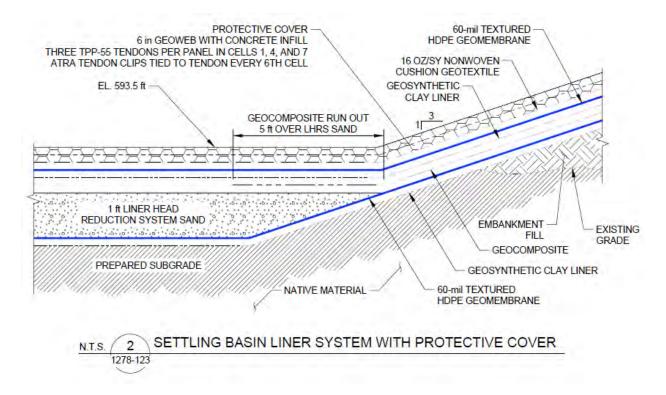
Leak Detection Test – A leak detection survey for the primary liner system by Leak Location Services, Inc. conducted on January 13, 2021 (Attachment A) did not find any leaks in the primary geomembrane. The report results were limited to the eastern segment of the impoundment within 30-feet of the of the concrete-lined area (loading area for bottom ash). The visual limits of the survey would be limited to within 30-feet of the constructed bottom ash berm (Attachment B, Picture 01) demarking the approximate limits of bottom ash settling available for collection prior to the flow path basin enlarging for secondary settling in the primary settling basin.

Visual Observation Point #1 (VOP-1) – Following the leak detection survey, a detailed inspection of the ash loading area by plant staff yielded visual identification of damage to the liner system on January 21, 2021 at the point where the bottom ash sluice water is first discharged into the



primary basin (Attachment B, Picture 02). The size of the damaged area was determined to be approximately four inches in diameter (Attachment B, Picture 03). At the time of discovery, this location seemed to be the most likely source of the increasing weekly volume of liquids removed from the secondary collection system starting on December 10, 2020.

The damage to the geomembrane and concrete in this location was determined to be due to erosion from the discharge of bottom ash into the pond. This area of the bottom ash pond liner system was reinforced during construction by overlying the primary geomembrane consisting of a cellular confinement system (Geocell) with concrete infill to at least 6-inch to protect the primary liner system from the operation of heavy equipment necessary to excavate and stage bottom ash prior to hauling to the Weadock Landfill. Other components of the primary and secondary liner system at this location are depicted in Drawing Detail 2, Drawing 1278, Sheet 123 (Golder, 2020) – figure depicted below.

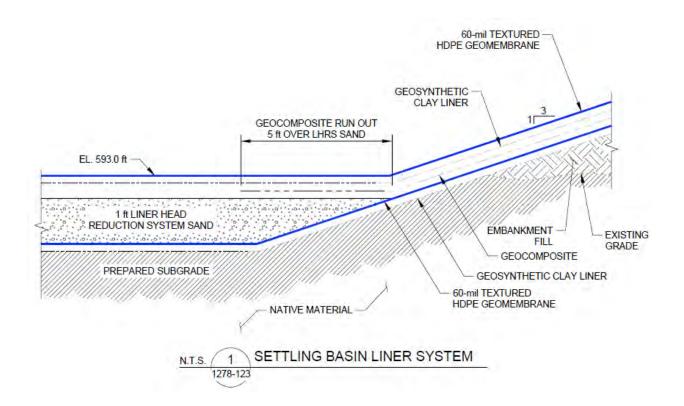


Visual Observation Point #2 (VOP-2) - Consumers Energy completed a secondary investigation of the primary liner on March 6, 2021 after observing that secondary collection system weekly time-averaged flow rates had not demonstrated a decreasing trend after completing the mitigation measure to the identified leak in the liner system on January 21, 2021. This second



effort was coordinated with plant operations that started with temporarily ceasing discharge of the bottom ash sluice water so that the base of the primary liner starting from the concrete improved section (west side) of the Karn Lined Impoundment could be safely accessed (Attachment B, Picture 04). Once the process water discharge could be temporarily stopped, bottom ash was removed and the bottom ash stockpile could be completely cleared from the concrete lined area and a more thorough visual inspection of the area could be conducted by walk-down (Attachment B, Picture 05).

A detailed inspection of the concrete reinforced area and the initial transition to the geomembrane lined portion of the impoundment yielded a second location of the liner system that had been damaged (Attachment B, Picture 06). The second area of noted damage is located at N 782892.575 E 13263221.841 (NAD 83 state plane) and elevation 594.31-ft (NAVD88) (Figure 02). Further evaluation revealed damage to the primary and secondary liner components as a result of an excavator damaging the liner during bottom ash removal, though different from VOP-1 because the damaged area was outside of the area of concrete improvement. Components of the primary and secondary liner system at this location are depicted in Drawing Detail 1, Drawing 1278, Sheet 123 (Golder, 2020) – figure depicted below.





#### SUMMARY OF REMEDIAL ACTION PERFORMED

Remedial Action Performed at Visual Observation Point No.1 (VOP-1)

January 21, 2021 - Consumers Energy initially isolated the apparent leak in the liner system upon discovery by backfilling the entire hole with AquaBlok™ Composite Particle System (Bentonite Aggregate) to reduce leakage into the secondary collection system. The backfilled excavation was covered with a steel plate large enough to cover the point of impact from the discharging tubes to prevent future erosion from scour of the concrete pad and liner system.

March 10, 2021 – Consumers Energy mobilized Fisher Contracting to review repairs that could be made to the liner system. Based on the manner of erosion through the concrete pad and into the primary and secondary liner systems, including geonet systems, performing repairs during this mobilization was not possible without potentially, significantly damaging the liner system even further. Difficulty in performing repairs included:

- Removing Geoweb and concrete primarily to expose enough of the primary and secondary liner system to conduct repairs without further damaging the primary liner.
- Peeling back damaged geomembrane and geonet, by hand, in order to establish viable construction joints in the primary and secondary liner systems to repair geonet and geosynthetic clay liner, as well as weld geomembrane.

Attempting to break into concrete and liner system at Visual Observation Point No.1 (VOP-1) would risk further damage to liner system to complete repair in excess of the current measured leakage into the secondary collection system. The following specific activities were identified in the field as presenting the primary challenges:

- Saw cut into the concrete above liner system would be required to start removing larger portions of the concrete system. Because the concrete is reinforced with Geoweb, this task is at risk of damaging the underlying geomembrane and other components since the materials aren't uniform in strength.
- Once the primary cuts and removal are completed with saws, finish removal work will be necessary to be accomplished by hand with chisels. This work also puts the liner at risk because of the lack of uniformity of strength in material and opportunities to directly or indirectly the underlying geomembrane and other components.
- The extent to which concrete and geomembrane needs to be cut back cannot be assessed with a certainty because the mechanism of breaching was from a scouring, driving head from above and the damage underlying the concrete cannot be directly assessed. Moreover, the degree that a construction joint can be crafted for the geomembranes suitable to seaming to the repair patches, this could potentially require exposing and tearing a substantial area around the location that has been.



Ultimately, the repair team covered the hole with a geotextile in case of future repair and backfilled the area with concrete. The steel plate was placed over this construction area to reduce erosion due to scour (Attachment B, Picture 07).

Liner Repair Conducted at Visual Observation Point No. 2 (VOP-2)

March 6, 2021 – Fisher Contracting installed a physical barrier consisting of concrete Jersey Barriers on either side of the impoundment connected by a cable (Attachment B, Picture 08) that provides a visual barrier and prevents the excavator from operating beyond the extent of the concrete protected surface. The combination of engineering controls to ensure operation of the excavator remains on the concrete pad and operator coaching to ensure significance of cable barrier system are anticipated to minimize damage to liner from errant equipment operations.

March 10, 2021 – The mobilized contractor, Fisher Contracting, proceeded with cleaning off and repairing the primary and secondary liner components at this location. The primary and secondary liner systems were easier to access since the protective concrete surface was not present at this location impeding access to the liner components.

This repair was completed in accordance with Appendix A: CQA Memorandum of the Construction quality assurance documentation and certification report submitted at the time of the operating license application (Attachment B, Picture 09 – Picture 12). This repair was overseen by CQA personnel (Golder Associates, Inc.) collecting documentation and certified by a professional engineer in accordance with Rule R 299.4921 of the Part 115 Rules. The final certified CQA documentation is under review by the certifying engineer and will be provided to EGLE under a separate cover as soon as it is available.

## WRITTEN ASSESSMENT

R 299.4437(g)(i) Assess the Source of Liquids and Amounts of Liquid by Source

The source of the liquids observed in the secondary liner is attributed to the apparent points of damage in two areas of the primary liner system identified on January 21, 2021 and March 6, 2021, respectively (VOP-1 and VOP-2). Entry of water laterally or from beneath the impoundment is considered unlikely since the base of the impoundment system was constructed at elevation 592.0-ft NAVD88 (Golder, 2020) relative to the static water level of the most recent measured closest-neighbor monitoring wells observed at 586.28-ft NAVD88 and 586.09-ft NAVD88 at Monitoring Well DEK-MW-15003 and OW-12, respectively (TRC, 2021). The distance between



the base of the impoundment and water table conservatively estimated based on DEK-MW-15003, that yields a groundwater isolation distance of 5.72-ft. This limits the point of entry of any liquids into the secondary collection system coming directly from the primary basin.

The amounts of liquids associated with the secondary collection system volume removal is maintained in the Karn Lined Impoundment Secondary Collection System Tracker. A graphical depiction of the calculated daily averaged flow rate on a weekly basis, monthly basis, and a three-month average basis (Figure 02). Consumers Energy initially began evaluating weekly observed recovery rates and normalized those rates to a daily average flow rate in order to analyze increasing values overlaying the operational timeline demonstrating that weekly values consistently increased until repairs were completed on March 10, 2021. This date immediately precedes the highest realized collection of daily average flow rate calculated on the day after the repairs were calculated (March 11, 2021) at 470.4 gallons/acre/day. Since the repairs were completed, the weekly daily average flow rate calculation has decreased back towards the Response Flow Rate of 25 gallons/acre/day reaching the lowest observed flow rate of 33.4 gallons/acre/day on April 7, 2021 and measuring 67.9 gallons/acre/day in the most recent event on April 28, 2021. This presentation of data shows how the range of daily average flow rates calculated on a weekly basis were clearly different before repairs were completed relative to after repairs were completed.

It is noteworthy that monthly daily average flow rates starting at the end of December 2021 (commencing with operating license issued on December 10, 2020) through the end of March 2021 depicts a similar trend to the weekly daily average flowrates indicting increased flow rates until the noted repairs were completed. After repairs were completed demonstrate a dramatic decrease in the monthly daily average is present, and the observed end of April value is lower than the December 2020 observed value. Consumers Energy concludes that work completed to repair the liner system at both damage locations has substantially decreased flow to the secondary collection system, though more time is necessary to see if the trend continues so that a three month calculated average of the daily average would be at 25 gallons/acre/day.

R 299.4437(g)(ii) Conduct Constituent Analysis of Liquids and Assess Hazard and Mobility

The Karn Lined Impoundment serves a dual purpose – it stores bottom ash sluiced from the Karn 1&2 electrical generating units and provides treatment through time retention and settling of solids prior to the water discharge through NPDES Outfall 001B. Unlike a solid waste landfill, the Karn Lined Impoundment operates with a consistent hydraulic head of approximately four feet over the primary liner with an intermediary 1-ft thick sand layer that acts as the Leachate Head Reduction System by equalizing the level and flow of water in the system. The additional head

Page 7



over the liner creates a *potential* driving head that is up to four times stronger in the presence of defects or holes in the liner primary and/or secondary liners.

Groundwater is monitored for constituents in a two-stage process – detection monitoring and assessment monitoring – detailed in the approved HMP. The most recent reporting of groundwater for the first quarter 2021 sampling event (TRC, 2021) detailed that the Karn Lined Impoundment remains in detection monitoring (e.g. no evidence of release of a statistically significant increase (SSI) above background levels¹). The lack of confirmed increasing trends of detection monitoring constituent concentrations observed in the groundwater monitoring system, and in particular, Monitoring Well OW-12 that is located approximately 40-ft downgradient of Visual Observation Point VOP-1, indicates that while a physical release of water may have occurred from the unit; a release of hazardous constituents has not been determined based on the time series of water quality data from the secondary collection system or analysis from the groundwater monitoring system.

Water quality data and trends for the secondary collection system (Attachment C) from the start of operation in June 2018 have been analyzed for detection and assessment monitoring constituents for coal ash impoundments approved in the hydrogeological monitoring plan. This analysis demonstrates that each monitored constituent is present at less than the Groundwater Protection Standard (GWPS) established under 40 CFR 257.95(h) or generic groundwater surface water interface (GSI) criteria adopted by the Department pursuant to Section 20120a or reginal background in the case of total dissolved solids with one exception limited to the first quarter 2021 sampling event (TRC, 2021).

Surface water grab samples were collected from the Karn Lined Impoundment primary and secondary collection systems during the first quarter 2021 sampling event for comparison to assess similarities in water quality and water chemistry, but to also assess potential of hazard and mobility of constituents. These results are reported in first quarter 2021 event (TRC, 2021). A few notable observations:

- Arsenic is higher in groundwater than the secondary collection system: Arsenic was observed in the primary and secondary collection systems at 4 ppb and 5 ppb, respectively. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the damaged liner areas, is 121 ppb, which is consistent with concentrations observed in August 2021, before the liner damage occurred, and groundwater does not appear to be influenced from a release from the unit.

<sup>&</sup>lt;sup>1</sup> Consumers Energy will consider a positive statistically significant trend detected over two consecutive sampling rounds as an indicator that concentrations are increasing over time and the groundwater quality may be affected by an outside source, meaning there is a statistically significant increase (SSI) over background levels (Karn Lined Impoundment Hydrogeological Monitoring Plan, TRC, 2020).

"Written Assessment and Summary of Work Karn Lined Impoundment"

Mr. Phil Roycraft April 30, 2021 Page 8



 Vanadium is detected in the primary and secondary collection system and not in groundwater: Vanadium was present in the primary collection system sample at 52 ug/L, which is much higher than the vanadium concentration in the secondary collection system (11 ug/L). Vanadium was not detected in the well nearest the observed liner damage OW-11 (<2 ug/L).</li>

- For indicator constituents, boron, sulfate, and total dissolved solids, the secondary collection system concentrations of 716 ppb, 395 mg/L, and 1,440 mg/L were greater than the respective concentrations observed in the primary collection system of 566 ppb, 77.1 mg/L, and 528 mg/L.
- Indicator parameter, pH, for primary collection system measured in the field at 8.7 standard units was 0.8 standard units greater than the secondary collection system observation
- Secondary Collection System chemistry has not appreciably changed: The time series plots in Attachment A show relatively stable trends in chemistry for samples collected from the primary collection system. Two constituents in the secondary collection system sample were present above relevant criteria this event:
  - o Molybdenum was observed at 159 ug/L in the secondary collection system, as compared to the GSI criterion of 120 ug/L. Molybdenum concentrations observed in the primary collection system was 22 ug/L, which is below the GSI criterion and more similar to prior secondary collection system samples. The first quarter 2021 molybdenum concentration is higher than prior events and will be further evaluated next quarter. in the primary collection system.
  - o Chloride observed at 108 mg/L in both the secondary collection system and the primary collection system sample, as compared to the GSI criterion of 50 ug/L. The first quarter 2021 chloride concentration is higher than prior events and will be further evaluated next quarter.

Comparison of results from the primary and secondary liner systems to the groundwater monitoring system results in addition to the groundwater flow and direction indicate that constituent concentrations observed in the primary basin and secondary liner do not have an apparent impact to the water quality in the Karn Lined Impoundment Groundwater Monitoring System. Furthermore, the primary contaminant of concern within the Karn ash management areas (arsenic) is not detected above generic Part 201 drinking water criteria (10 ppb) in either the primary basin or secondary collection system. It is noteworthy that constituents detected above relevant criteria in either the primary or secondary collection system samples for first quarter 2021 are limited to chloride, molybdenum, and vanadium. Molybdenum concentrations within the monitoring well network are stable or declining. Vanadium is present in all of the surface grab samples (primary basin, secondary collection system, and southwest ditch system) vanadium is not detected in the groundwater monitoring well network, except at OW-11, where

"Written Assessment and Summary of Work Karn Lined Impoundment" Mr. Phil Roycraft

April 30, 2021 Page 9



groundwater quality has been noted to have been influenced by a source other than the Karn Lined Impoundment.

R 299.4437(g)(iii) Assess Seriousness of Any Leaks or Lack of Necessity for Assessment

Locations of identified damage (VOP-1 and VOP-2) from January 21, 2021 and March 3, 2021 (Figure 01) were estimated to have 4-inch diameter and 3-ft by 2-ft areal breaches of the Primary Liner System, respectively.

As daily average flow rates continue to decrease back toward the Response Flow Rate, presence of contaminants observed in the secondary collection system or from the primary basin have been limited to the first quarter 2021 sampling event and only related to chloride, molybdenum and vanadium which do not appear to be impacting the nearest downgradient monitoring well, OW-12.

Given the reduction of measured flow rate in the secondary collection system and the lack of apparent impact to groundwater within the Karn Lined Impoundment Groundwater Monitoring System and immediately adjacent to the lined impoundment, Consumers Energy has demonstrated the lack of seriousness related to liner system damage at VOP-1 and VOP-2.

## **CONCLUSIONS**

- The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner.
- 2. Evaluation of the primary and secondary collection system and groundwater chemistry do not indicate a release of constituents monitored pursuant to the EGLE-approved hydrogeological monitoring plan; therefore, the unit has remained in Detection Monitoring.
- 3. Secondary Collection System water concentrations are consistently less than regulatory standard with the exception of the most recent event for molybdenum and vanadium in the most recent sampling event. These observations are unverified evidence of contamination and are not reflected in the results from the Karn Lined Impoundment Groundwater Monitoring System.
- 4. Repair of breach at Visual Observation Point No. 2 (VOP-2) has significantly reduced the flow rate from the secondary collection system observed on a weekly basis.

"Written Assessment and Summary of Work Karn Lined Impoundment" Mr. Phil Roycraft

April 30, 2021 Page 10



5. Consumers is continuing to monitor the success of the temporary mitigation efforts at VOP-1 while assessing options for a more permanent repair.

## SUMMARY OF REMEDIAL ACTIONS PLANNED

Now that repairs have been completed and weekly-averaged flow rates of recovered water from the secondary collection system are decreasing towards the Response Flow Rate, the following actions are planned for ensuring continued safe operation of the Karn Lined Impoundment in a manner that doesn't harm human health or the environment:

- 1) Pump secondary Collection System on a weekly basis Consumers Energy measures and records volume of water collected for secondary collection system and water elevation in sump and evaluates the calculated weekly daily average flow rate. Weekly recorded values will continue to be evaluated to determine if the recovery volume rates from the secondary collection system necessitate additional action/attempted liner and concrete repair at Visual Observation Point No. 1.
- 2) Now that Consumers Energy has confirmed that the Response Flow Rate has been exceeded based on the average of three consecutive monthly daily average flow rates, Consumers Energy will start submitting notifications of the secondary flowrates on a monthly basis to the Saginaw Bay District Office by the 7th day of the month following each month the Response Flow Rate is exceeded until the monthly average daily flow rate falls below 25 gallons per acre per day. The first notification will be provided by May 7, 2021.
- 3) Consumers Energy will report the evaluation of the chemical characteristics of the leak detection system required under Rule 437(6) in the quarterly groundwater monitoring report submitted for the Karn Lined Impoundment during the active life of the unit pursuant to the EGLE-approved HMP. The first report to be submitted in compliance with Rule 437(6) will be provided by April 30, 2021. Subsequent reports will be provided within 30-days following the end of each calendar quarter through the active life of the Karn Lined Impoundment unless demonstrations detailed in Rule 437 are submitted and accepted by EGLE to discontinue the reporting.
- 4) Consumers Energy will be updating actions, investigations, and further water quality analysis in the semi-annual progress report to the Assessment of Corrective Measures for the Karn Bottom Ash Pond by July 30, 2021.

Page 11



- 5) Consumers Energy will collect at least one more sample from the Primary Collection basin, Secondary Collection System, and, SW Ditch to spatially compare changes in water grab samples relative to groundwater samples. These results will be reported in the second quarter 2021 groundwater monitoring report.
- 6) Consumers Energy is scheduled to cease operations of the Karn 1&2 Electrical Generating Units which are directly supported through the operation of the Karn Lined Impoundment. The coal-fired electrical generating units are scheduled to cease operation in 2023 leading to the initiation of the closure plan (Closure By Removal) of the Karn Lined Impoundment coordinated with the decommissioning of the Karn Units.

This written assessment serves as the first follow-up to the preliminary written assessment Consumers Energy provided on January 22, 2021 and now that an initial round of response actions were completed based on discovery of two locations of damaged geomembrane. Data from first quarter 2021 Karn Lined Impoundment groundwater monitoring event demonstrates that groundwater quality is consistent with previous monitoring events which indicates that if a physical release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality are negligible.

Groundwater conditions will continue to be monitored through the quarterly monitoring program during the active life of the impoundment. Using the secondary collection system flow rates as a leak detection system was successful. The leak was identified, and actions were promptly taken to address the leak. The remedial actions performed and planned actions described in this written assessment are consistent with these findings and balance the need for response actions with safe access and quality repairs that can be implemented in light of the improvements achieved thus far.

Please feel free to contact me with any questions or clarifications.

Sincerely,

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

Principal Engineer

Landfill Operations Compliance

Phone: (517) 788-2982

Email: <a href="mailto:harold.registerjr@cmsenergy.com">harold.registerjr@cmsenergy.com</a>



cc: Mr. Gary Schwerin, EGLE Saginaw Bay District Office

Ms. Lori Babcock, EGLE Saginaw Bay District Office

Mr. Caleb Batts, Consumers Energy

Ms. Darby Litz, TRC

## Figures

Attachment A: Leak Detection Survey

Attachment B: Pictures

Attachment C: Water Quality Data and Trends

## REFERENCES

(Golder, 2020). Construction Quality Assurance Documentation and Certification, D.E. Karn Lined Bottom Ash Impoundment, dated January 7, 2020.

(TRC, 2020). Karn Lined Impoundment Hydrogeological Monitoring Plan, August 2020.

(TRC, 2021). First Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined Impoundment CCR Unit, Essexville, Michigan, April 30, 2021.

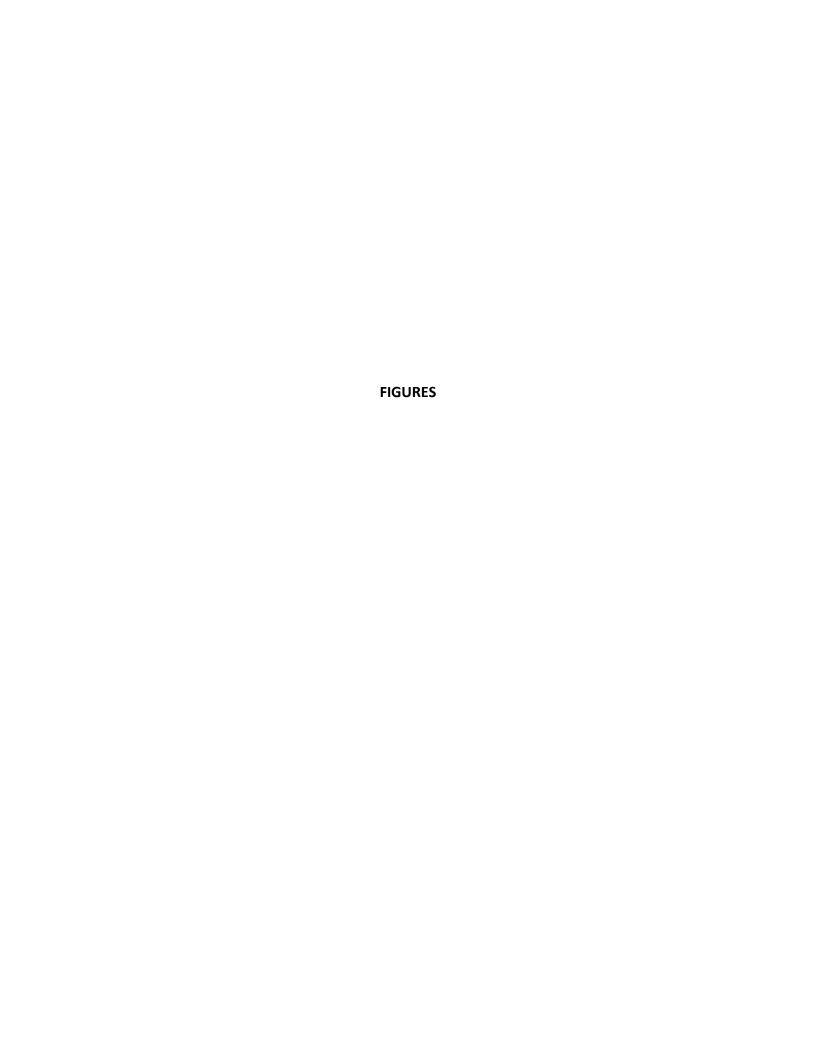




Figure 01

Visual Observation Point No. 1 and Visual Observation Point No. 2

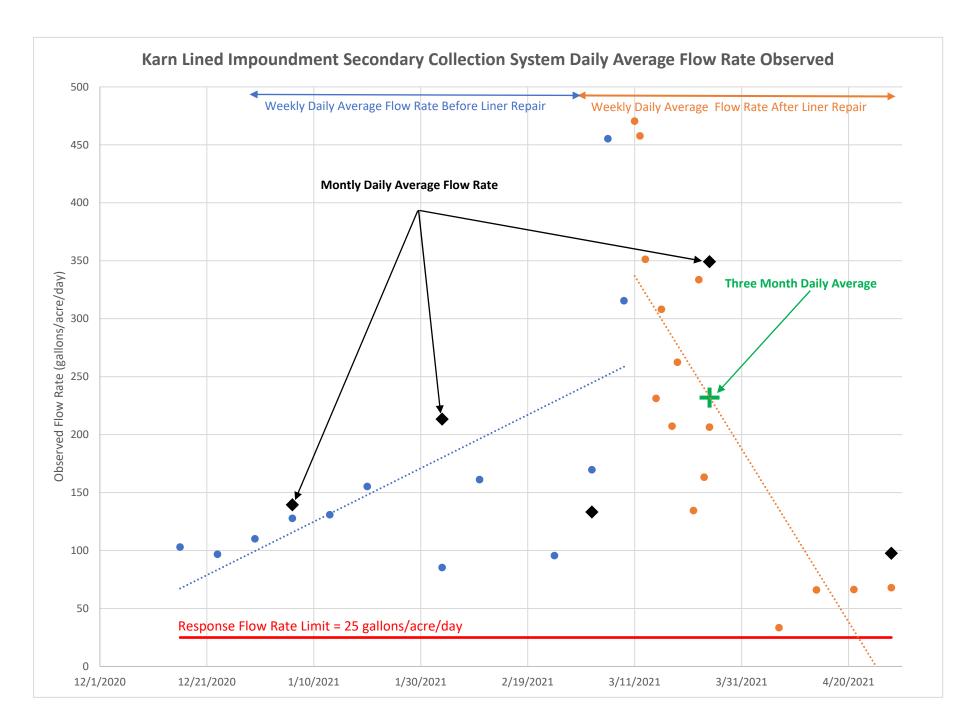


Figure 02

# ATTACHMENT A

**Leak Detection Survey** 

January 15, 2021

Mr. Caleb D. Batts Consumers Energy 2742 N. Weadock Hwy Essexville, MI 48732

Email: caleb.batts@cmsenergy.com

Subject: Proposal for the Geomembrane Leak Location Survey of the Settling Basin

Located at the Consumers Energy De Karn Generating Plant near

Essexville, Michigan LLSI Project 3305

On January 13, 2020, Pissanu Gatesuwan of Leak Location Services, Inc. (LLSI) conducted a geomembrane leak location survey of the Settling Basin located at the Consumers Energy De Karn Generating Plant. The basin has an area of approximately 54,450 square feet and is lined from the bottom up with a prepared subgrade, 60-mil secondary HDPE, geosynthetic clay liner (GCL), 12-inches of sand, and a 60-mil HDPE primary geomembrane. There is 12 to 24-inches of ash covering the primary geomembrane. Approximately one quarter of the pond has concrete covering the primary geomembrane. The concrete makes contact with the earth ground outside the basin. This report documents the results of the survey.

## I. RESULTS

# A. Survey

No leaks were found during the survey of the Settling Basin primary geomembrane. The concrete covered primary geomembrane and the primary geomembrane extending approximately 30 feet east of the concrete could not be surveyed. The electrically grounded concrete produced a false positive audible signal that could not be reduced. This interfering signal could not be reduced once the survey equipment was approximately 30 feet east of the concrete-lined area.

# B. Leak Detection Sensitivity

The leak location equipment was tested to document the leak detection sensitivity. A simulated leak was constructed by placing a 0.055 inch-diameter hole in a plastic container with a thickness approximating the thickness of the geomembrane. An insulated wire with a stripped end will enter the container through a sealed insulating penetration. The other end of the wire was connected to an electrode in contact with the conductive media between the geomembranes. The container was filled with water from the basin and submerged in the basin. Leak location scans were made to determine the maximum distance that the simulated leak can be reliably detected. The simulated leak could be detected from approximately five feet away.

# II. PRINCIPLE OF THE ELECTRICAL SURVEY METHOD

## A. General

The electrical leak location method detects electrical paths through the liner caused by water or moisture in the leaks. A voltage is impressed across the geomembrane being tested. Electrical current flowing through any leaks in the geomembrane produces localized anomalous areas of high current density near the leaks. These areas are located by making electrical potential measurement scans in or on the electrically conductive material covering the geomembrane.

# B. <u>Deep Water Survey</u>

A towed probe survey may also be used to locate leaks in geomembranes that are covered with more than 30 inches of water and for testing side slopes covered with water. The sensor is towed down the side-slope across the short dimension of the basin and then back up the opposite side-slope along the established survey lines while the survey operators stand on opposite banks of the basin. The probe and cable are then moved to the next survey line and the process reversed.

The survey lines spaced approximately 2.5 feet apart are established by placing temporary marks on the liner side-slope near where the survey operators will stand. In this manner, the water does not have to be lowered for the testing and the geomembrane is tested under full hydrostatic load. In addition, long side-slopes can be tested by pulling the sensor up and down the side slope while survey personnel move around the perimeter of the basin.

When a leak is located, the position of the leak is determined by measuring the distance to the sensor when the sensor is at the leak. However, because the probe can only be maneuvered along the survey line, and because of the tolerances in the measurement accuracy, the positioning accuracy for located leaks is anticipated to be about two feet plus one or two percent of the distance to the leak to the edge of the basin. When the water is removed for repair, the leak must be located visually by the leak repair crew using the distance marks provided to guide the repair personnel.

If there are any questions regarding the electrical survey or this report, please contact us at (210) 408-1241. We appreciate the opportunity to have been of service to you.

Respectfully,

John Ortiz

Senior Project Manager



**ATTACHMENT B** 

**Pictures** 



Picture 01 – View of Karn Lined Impoundment Looking North



Picture 02 – View of Karn Lined Impoundment Looking West, Bottom Ash Discharge Point into Primary Basin



 ${\it Picture~03-Visual~Identification~of~Primary~Liner~Damage-Shovel~on~the~Right~for~Scale}$ 



Picture 04 – Safe Access onto Improved Section of Karn Lined Impoundment



Picture 05 – Walkdown and Inspection of Locations of Previous Bottom Ash Storage



Picture 06 – Observed Damage at Visual Observation Point No. 2



Picture 07 – Final Repair Completed at Visual Observation Point No. 1



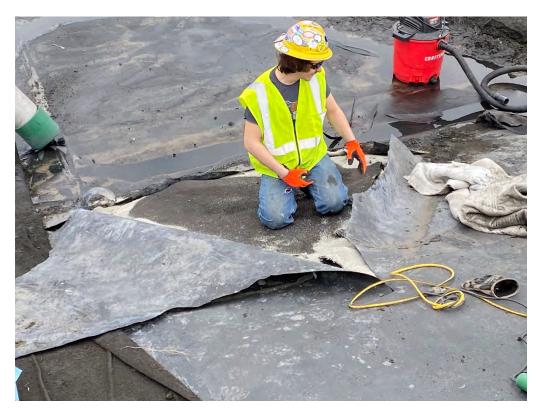
Picture 08 – Installation of Cable Wire and Concrete Jersey Barrier Engineering Control



Picture 09 – Liner Repair at Visual Observation Point No. 2



Picture 10 – Liner Repair at Visual Observation Point No. 2



Picture 11 – Liner Repair at Visual Observation Point No. 2

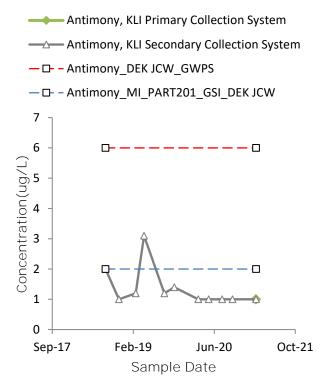


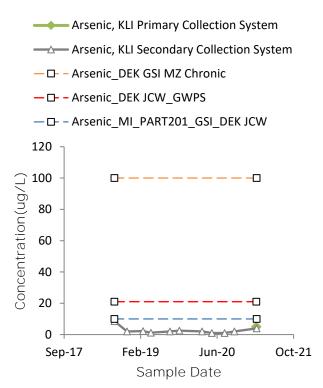
Picture 12 – Liner Repair at Visual Observation Point No. 2

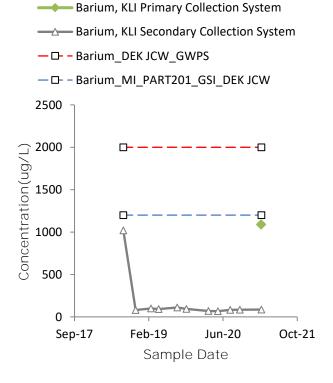
# ATTACHMENT C

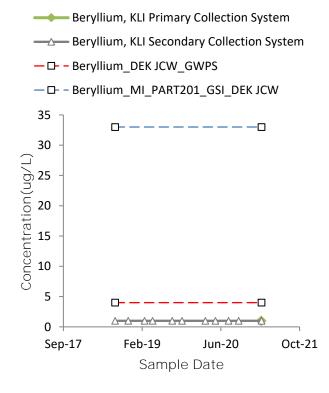
Water Quality Data and Trends

# **Water Quality Time Series**

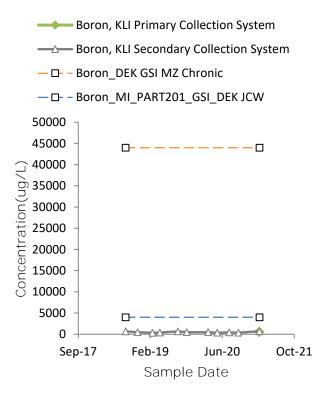


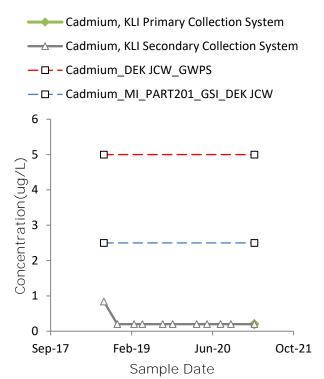


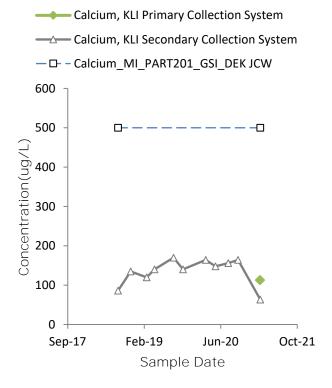


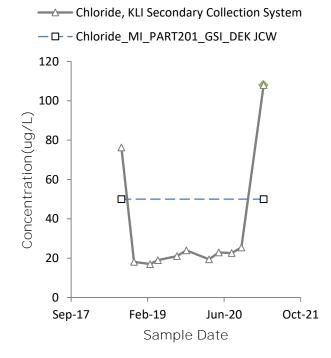


# **Water Quality Time Series**



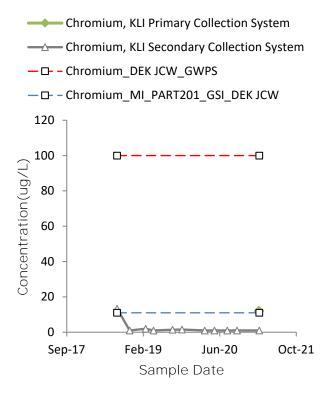


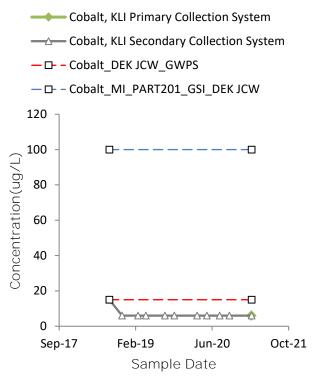


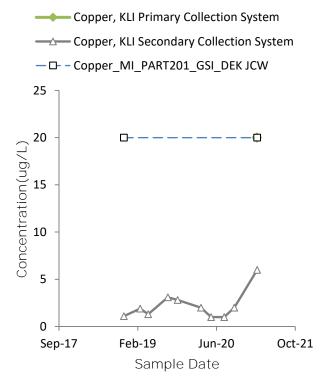


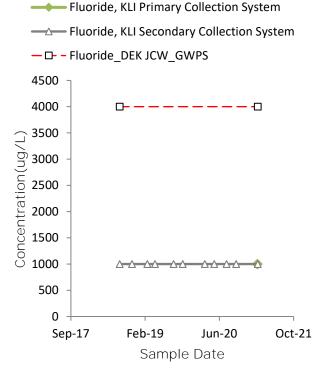
Chloride, KLI Primary Collection System

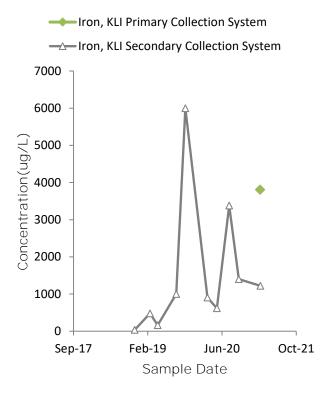
# **Water Quality Time Series**

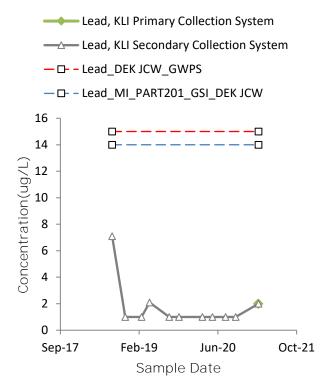


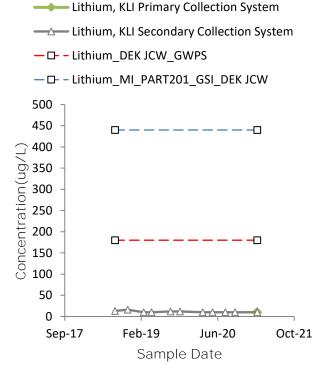


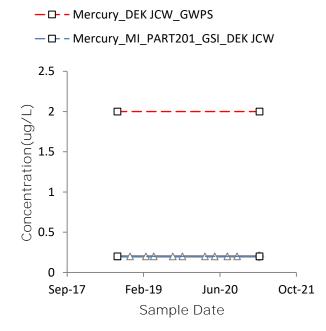












Mercury, KLI Primary Collection System

── Mercury, KLI Secondary Collection System

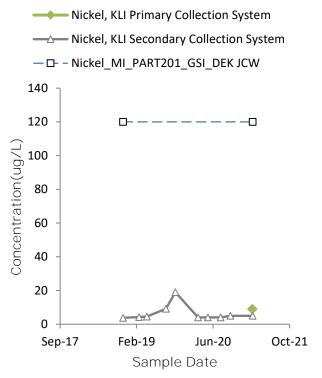
Molybdenum, KLI Primary Collection System

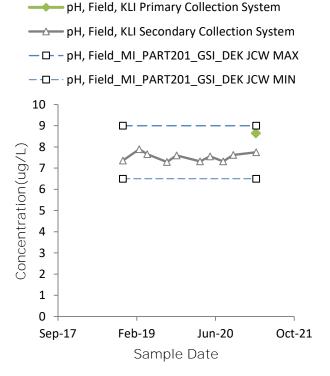
Molybdenum, KLI Secondary Collection System

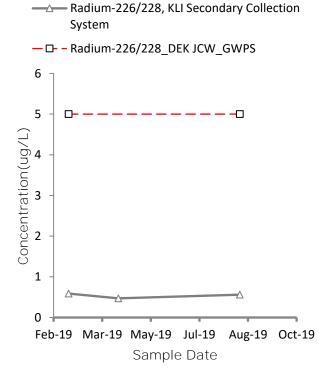
Molybdenum\_DEK JCW\_GWPS

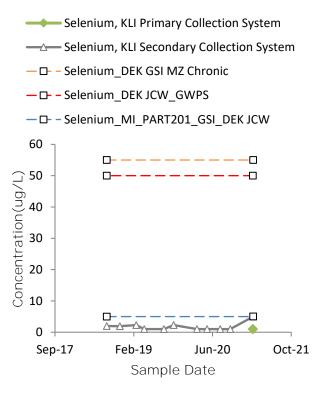
Molybdenum\_MI\_PART201\_GSI\_DEK JCW

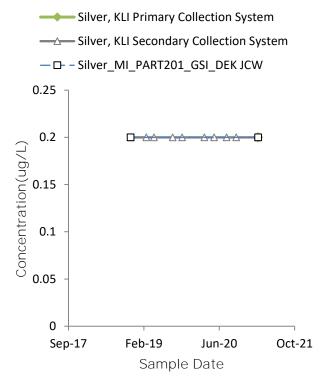
180
160
140
100
100
Sep-17 Feb-19 Jun-20 Oct-21
Sample Date

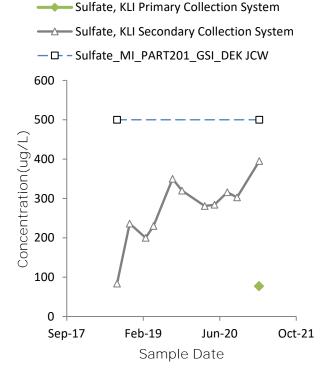


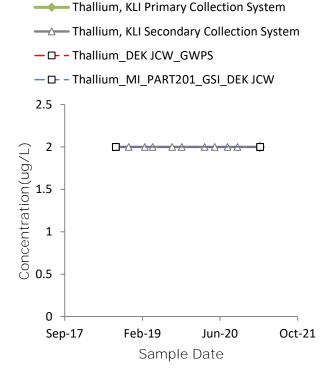




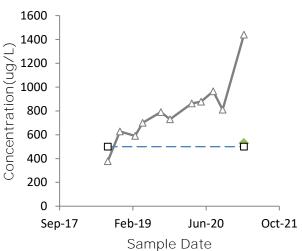


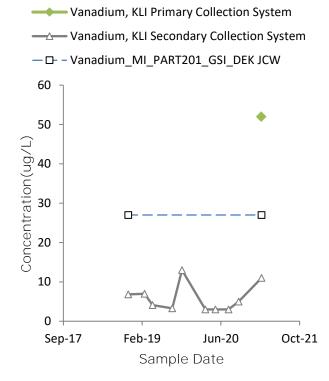


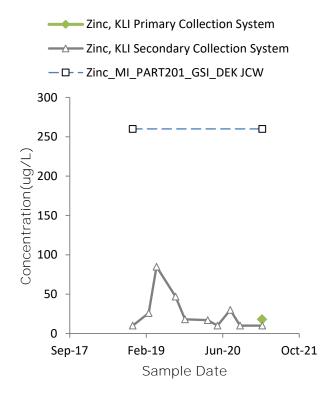




- Total Dissolved Solids, KLI Primary Collection System
- Total Dissolved Solids, KLI Secondary Collection System
- □ Total Dissolved Solids\_MI\_PART201\_GSI\_DEK JCW









# Second Quarter 2021 Hydrogeological Monitoring Report

**DE Karn Lined Impoundment CCR Unit** 

**Essexville**, Michigan

July 2021

Darby Litz

Project Manager/Hydrogeologist

# **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

## **Prepared By:**

TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

Graham Crockford, C.P.G.

Program Manager



# **TABLE OF CONTENTS**

1.0	Introduction								
	1.1 1.2	Statement of Adherence to Approved Hydrogeological Monitoring Plan  Program Summary							
	1.3	Site Overview							
	1.4	Geology/Hydrogeology	2						
2.0	Seco	nd Collection System Monitoring	3						
3.0	Grou	ndwater Monitoring	6						
	3.1	Monitoring Well Network	6						
	3.2	May 2021 Detection Monitoring Event	6						
		3.2.1 Data Quality Review							
		3.2.2 Groundwater Flow Rate and Direction							
4.0	Data	Evaluation	9						
	4.1 Statistical Evaluation of Trends								
	4.2	Detection Monitoring Data Discussion							
	4.3 Alternate Source Demonstration								
5.0	Conc	clusions and Recommendations	.12						
6.0	Pofoi	rences	41						
0.0	Kelei	1611065	. 1 .						
TABI Table Table	1 2	Summary of Groundwater Elevation Data Summary of Field Parameter Results: May 2021							
Table Table		Summary of Groundwater Sampling Results (Analytical): May 2021 Summary of Statistical Exceedances – May 2021							
FIGURES Figure 1 Figure 2 Figure 3		Site Location Map Site Layout Map Shallow Groundwater Contour Map - May, 2021							



# **APPENDICES**

Appendix A Laboratory Analytical Reports

Appendix B Field Notes

Appendix C Data Quality Reviews Appendix D Statistical Analysis

Appendix E Secondary Leachate Collection System Monitoring

Appendix F Alternate Source Demonstration



# 1.0 Introduction

Pursuant to the Federal CCR Rule<sup>1</sup>, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

# 1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Second Quarter 2021 Karn Lined Impoundment Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. This Report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality (MDEQ) – Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Facility Monitoring Submittals, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (NREPA), also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

# 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the Second Quarter 2021 at the Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

<sup>&</sup>lt;sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended.



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

Based on sampling results for the second quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

#### 1.3 Site Overview

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

# 1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts and sands deposited in or on the shores of glacial lakes) at other areas. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

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



# 2.0 Second Collection System Monitoring

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

The Average Daily Flow Rate for the period from December 10, 2020 – January 6, 2021 was calculated as 137.0 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD. Although this calculated flow rate does not constitute the average flow rate for the previous three months per the definition of average daily flow rate under Part 115, Consumers provided a proactive notification and a preliminary written assessment of the flow rate exceedances to the EGLE January 15, 2021 and January 22, 2021, respectively. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner, Consumers Energy continues to monitor improvements in the secondary collection system for improvements in the Daily Average Flow Rate. The Average Daily Flow Rate for the period from April 28, 2021 – June 30, 2021 was calculated as 79.5 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD. The last notification documenting weekly measurements and trends for weekly, monthly, and quarterly daily average flow rates is included in Appendix E.

In response to the exceedance of the SCS action flow rate (AFR), samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) in May 2021 to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

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

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

Arsenic is higher in groundwater than the secondary collection system: Arsenic was detected in both the primary and secondary collection systems at 2 ug/L in May 2021. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the damaged liner areas, is 86 ppb, which is consistent with concentrations observed in



August 2021, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- Vanadium is detected in the primary and secondary collection system and not in groundwater: Vanadium was present in the primary collection system sample at 52 ug/L in March 2021 and 16 ug/L in May 2021, which are higher than the vanadium concentration in the secondary collection system (11 ug/L in March and 6 ug/L in May). Vanadium was not detected in the well nearest the observed liner damage OW-12 (<2 ug/L).
- Secondary Collection System chemistry has not appreciably changed: The time series plots in Attachment A show relatively stable trends in chemistry for samples collected from the primary collection system. Two constituents in the secondary collection system sample were present above relevant criteria this event:
  - Chloride was observed at a concentration of 52.5 mg/L in the secondary collection system, which slightly exceeds the GSI criterion of 50 ug/L. Concentrations of chloride observed in the second quarter 2021 are much lower than the chloride concentration observed in the first quarter 2021, suggesting that the chloride concentration in the secondary collection system appears to be a transient condition. Additionally, chloride was identified as naturally elevated in the Phase II Discharge Evaluation (NRT, September 2005) and was eliminated as a constituent of concern when the mixing zone was first authorized based on the data supporting that conclusion. Chloride values are more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.
  - Total dissolved solids is observed at concentrations above the generic GSI criterion of 500 mg/L; however, the TDS concentration in the primary collection system leachate is significantly lower in concentration suggesting that the elevated TDS is not likely from the primary collection system leachate. Chloride, as described above, is a component of TDS, and TDS is regionally elevated in groundwater. TDS values are also more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.
  - The elevated concentration of molybdenum observed in the secondary collection system in the first quarter 2021 (159 ug/L) was not confirmed; the second quarter concentration was 35 ug/L and is below applicable criteria.

Water quality data collected for Second Quarter 2021 are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored. Using the secondary collection system flow rates as a leak detection system was successful. The leak was identified in the fourth quarter of 2020, actions were promptly taken to address the leak. In January 2021, liner damage was noted in two areas denoted as Visual Observation Point No. 1 (VOP 1) and Visual Observation Point No. 2 (VOP 2). VOP 2 was repaired on March 10, 2021 and VOP 1 was repaired on May 24, 2021 as documented by Golder Associates Inc. Consumers Energy submitted the repair certification reports to the EGLE on May 25, 2021 and June 29, 2021, respectively. The results of the mitigation efforts continue to be monitored.

Consumers Energy continues to monitor the secondary collection system flow rates, record flow rates and head level on the secondary liner in the operating record and evaluate flow rate trends on a weekly basis. Written notifications of flow rates in the secondary collection system will be



provided monthly and evaluations of the chemical characteristics of liquid in the secondary collection system will be reported quarterly. In addition, Consumers Energy continues to provide quarterly updates on remedial actions performed on the leachate collection system through the quarterly groundwater monitoring report required by the HMP.



# 3.0 Groundwater Monitoring

# 3.1 Monitoring Well Network

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

# 3.2 May 2021 Detection Monitoring Event

In accordance with the HMP, TRC conducted the second quarter 2021 monitoring event for the Karn Lined Impoundment on May 3 through 6, 2021. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the May 2021 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents. Radium analysis was performed by Eurofins TestAmerica in St Louis, Missouri.

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



Samples were also analyzed for constituents identified in Section 11519b(2) – Assessment Monitoring Constituents and the additional constituent's magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide additional evaluation of groundwater chemistry. Analytical results from the second quarter 2021 monitoring event are included in the attached laboratory reports (Appendix A).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix B).

Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of one field blank, one equipment blank, one field duplicate (OW-12), and field matrix spike/matrix spike duplicate samples collected at DEK-MW-18001.

# 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

#### 3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the May 2021 groundwater monitoring events are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in May 2021 are generally within the range of 581 to 587 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined



Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in May 2021 demonstrate a reduction in groundwater elevation measurements by several feet when compared to measurement taken in June 2018. 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 and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as illustrated in Figure 3.

The average hydraulic gradient observed on May 3, 2021 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0039 ft/ft. The gradients were calculated using the monitoring well pair DEK MW 15004/DEK-MW-15005, as well as the well water elevation difference and distance between DEK-MW-15003 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same dates as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.20 ft/day or 72 ft/year in May 2021 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

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



# 4.0 Data Evaluation

Based on sampling results for the second quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the second quarter 2021 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria, the generic GSI criteria, and the site-specific mixing-zone GSI criteria. Mixing-zone criteria are provided for the Karn-Weadock complex in the December 23, 2015 mixing zone determination that consists of arsenic, boron, and selenium. As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017.

#### 4.1 Statistical Evaluation of Trends

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

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas<sup>™</sup> Statistical Software (Sanitas<sup>™</sup>). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from August 2019 through May 2021 were analyzed using Mann-Kendall and Sen's Slope at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.



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

- A confirmed increasing trend in sulfate was observed in monitoring well DEK-MW-18001.
- A confirmed increasing trend was observed for calcium in monitoring well OW-10.
- Confirmed increasing trends were observed for boron and pH in monitoring well OW-11.

# 4.2 Detection Monitoring Data Discussion

Although preliminary detection monitoring trends noted in Section 4.1 exist, the groundwater conditions do not conclusively indicate a release from the unit. Groundwater quality is generally consistent with previous monitoring events. The location of one of the two identified liner damage locations is approximately 40-ft upgradient from monitoring well OW-12. Detection monitoring constituent concentrations at OW-12 exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The three wells with noted trends are located much further away from where the release was likely to occur. Additionally, concentrations of several constituents observed at OW-11 are much higher than concentrations observed in the KLI-PCS and KLI-SCS, which support a source other than the Karn Lined Impoundment is affecting chemistry at OW-11. The confirmed increasing trends at OW-10 and DEK-MW-18001 will continue to be evaluated within context of changes in the site operational status. At this time, the increasing trend of calcium concentrations in monitoring well OW-10 and increasing of sulfate in monitoring well DEK-MW-18001 do not indicate a release from the unit, but instead are attributed to another change in conditions, such as groundwater flow regime or redox conditions as shown in Appendix F and discussed further in Section 4.3: Alternate Source Demonstration

#### 4.3 Alternate Source Demonstration

At this time, Consumers Energy is asserting an Alternate Source Demonstration (ASD), for the following:

- Sulfate in monitoring well DEK-MW-18001
- Calcium in monitoring well OW-10; and
- Boron and pH in monitoring well OW-11.

Time-series plots included in Appendix F illustrate that the change in sulfate at DEK-MW-18001 and calcium in monitoring well OW-10 are likely a result of changes in the groundwater flow regime or redox conditions as a result of the Bottom Ash Pond closure activities, rather than a result of a release from the unit. The increasing concentrations began around the time of the dewatering and excavation that occurred in the adjacent Bottom Ash Pond area (April through July 2019), well before a leak in the Karn Lined Impoundment liner system was noted through the increase in the SCS daily average flow rate observed in December 2020.

Additionally, if the release from the liner damage likely occurred near the time of the increased SCS flow rate observed in December 2020, the only well close enough to the release to have been affected is OW-12, located near VOP 1. DEK-MW-18001 is approximately 130 feet away



from VOP 2 and OW-10 is over 500 feet away. Based on the interpreted groundwater contour map and potentiometric surface elevations observed near the KLI, a hydraulic gradient between the location of VOP 2 (approximate groundwater elevation of 586 ft NAVD88) and DEK-MW-18001 can be estimated at 0.0072. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, an estimated seepage velocity was calculated to be 0.36 ft/day or 132 ft/year between VOP 2 and DEK-MW-18001. These calculations indicate that it would take approximately a year for groundwater from near VOP 2 to reach DEK-MW-18001, and if the release occurred in early November, groundwater potentially affected by the release would not have had adequate time to reach DEK-MW-18001 or OW-12.

OW-11 does not appear to be downgradient of either area with noted liner damage, due to the well's position relative to the groundwater elevation high point, as shown in Figure 3. Furthermore, OW-11 has distinct chemistry as compared to the KLI-SCS data as shown in Table 3. Boron, which can be used as a conservative tracer, is nearly six times higher in OW-11 than what has been observed in the KLI-SCS samples, which indicate something other than the Karn Lined Impoundment is influencing chemistry at OW-11. The pH observed at OW-11 is nearly 2 standard units higher than what is observed in the KLI-SCS sample and other nearby wells. The continued used of OW-11 as a compliance well is being evaluated further, and if the well is determined to no longer be an appropriate compliance monitoring point, Consumers Energy will revise the HMP and recertify the well network.



### 5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in three wells, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the May 2021 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in Q4 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored. The third quarter monitoring event is scheduled for July 2021.



# 6.0 References

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



# **Tables**

Table 1
Summary of Groundwater Elevation Data
Karn Lined Impoundment, Essexville, Michigan

	тос		Screen Interval	May 3, 2021			
Well Location	Elevation (ft) Geologic Unit of Screen Interval		Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)		
Background				( /	( )		
MW-15002	587.71	Sand	580.9 to 570.9	6.56	581.15		
MW-15008	585.36	Sand with clay	578.7 to 568.7	4.13	581.23		
MW-15016	586.49	Sand	581.2 to 578.2	4.38	582.11		
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	4.85	581.32		
DEK Bottom Ash Pon		Carra arra Carra Ciay	0.0.0 10 000.0		001.02		
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.75	584.12		
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.75	583.29		
DEK-MW-15005	589.72	Sand	572.3 to 567.3	8.78	580.94		
DEK-MW-15006	589.24	Sand	573.0 to 568.0	8.28	580.96		
DEK Bottom Ash Pon							
DEK-MW-15003	602.74	Sand	578.8 to 574.8	15.40	587.34		
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.41	585.06		
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.75	584.83		
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.35	586.55		
OW-12	603.07	Silty Sand	584.2 to 579.2	17.10	585.97		
DEK Nature and Exter		- ,					
MW-01	597.02	Sand	573.0 to 570.0	16.10	580.92		
MW-03	597.30	Sand	569.8 to 566.8	16.36	580.94		
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	8.30	581.14		
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.22	581.56		
MW-10	596.97	Sand	582.5 to 572.5	16.00	580.97		
MW-12	598.60	Sand	583.9 to 573.9	17.55	581.05		
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	13.45	580.92		
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	14.92	580.88		
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.29	582.70		
MW-23	595.57	Ash/Sand	576.9 to 571.9	13.09	582.48		
<b>DEK Static Water Lev</b>			<u>'</u>		<u>'</u>		
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	16.42	580.92		
MW-04	598.01	NR	569.5 to 564.5	17.09	580.92		
MW-17	597.91	Sand	577.0 to 574.0	13.00	584.91		
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.33	583.89		
MW-19	597.28	NR	572.1 to 567.1	16.10	581.18		
MW-20	632.75	Sand	582.3 to 579.3	51.73	581.02		
MW-21	632.91	Sand	587.1 to 584.1	50.55	582.36		
OW-01	631.33	NR	572.5 to 567.5	50.33	581.00		
OW-02	598.01	Fly Ash	579.4 to 576.4	15.18	582.83		
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	16.88	581.06		
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	9.26	580.95		
OW-05	593.53	Sand	576.9 to 571.9	12.30	581.23		
OW-06	603.95	NR	580.9 to 575.9	21.10	582.85		
OW-07	596.41	Ash	583.3 to 580.3	13.38	583.03		
OW-08	593.93	NR	581.0 to 576.0	10.66	583.27		
OW-09	593.45	NR	585.5 to 580.5	10.12	583.33		
OW-13	588.52	NR	579.5 to 574.5	4.68	583.84		
OW-15	587.75	NR	572.8 to 567.8	4.00	583.75		

#### Notes

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

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

Table 2
Summary of Field Parameter Results: May 2021
Second Quarter 2021 Quarterly Report
Karn Lined Impoundment, Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity				
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)				
Karn Lined Impoundn	Karn Lined Impoundment										
DEK-MW-15003	5/3/2021	1.88	13.0	8.0	340	14.9	4.63				
DEK-MW-18001	5/3/2021	1.72	-64.3	7.3	558	10.6	2.37				
OW-10	5/4/2021	1.68	-61.8	7.1	617	10.5	9.76				
OW-11	5/4/2021	1.81	111.5	9.2	313	11.5	8.70				
OW-12	5/4/2021	1.65	-85.8	7.2	559	12.6	7.53				
KLI-PCS	5/4/2021	6.38	129.1	7.3	570	18.4	11.50				
KLI-SCS	5/6/2021	3.19	53.9	7.5	1,436	12.5	4.89				
SW-DITCH	5/4/2021	5.62	80.8	8.3	566	21.2	6.84				

#### 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): May 2021 Second Quarter 2021 Quarterly Report Karn Lined Impoundment, Essexville, Michigan

							Sample Location:	DEK-MW-15003	DEK-MW-18001	OW-10	OW-12	OW-11	KLI-SCS	KLI-PCS	SW-DITCH
							Sample Date:	5/3/2021	5/3/2021	5/4/2021	5/4/2021	5/4/2021	5/6/2021	5/4/2021	5/4/2021
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	Chronic-Based Mixing Zone GSI Criteria^	Acute-Based Mixing Zone GSI Criteria^			Downgradient				Supplemental	
Appendix III <sup>(1)</sup>															
Boron	ug/L	NC	500	500	NA	44,000	69,000	862	1,180	1,300	747	3,300	580	598	105
Calcium	mg/L	NC	NC	NC	500EE	NC	NC	27.4	65.2	107	75.1	12.9	112	66.9	62.2
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	NC	NC	50.6	51.6	75.1	60.8	67.1	52.5	47.9	52.2
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	3,750	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	NC	NC	32.5	121	< 1	139	25.6	466	69.3	33.7
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	NC	NC	246	486	549	499	239	1,260	328	334
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	NC	NC	8.0	7.3	7.1	7.2	9.2	7.5	7.3	8.3
Appendix IV <sup>(1)</sup>															
Antimony	ug/L	6	6	6	2	NC	NC	< 1	< 1	< 1	1	2	1	< 1	< 1
Arsenic	ug/L	10	10	10	NA	100	680	545	92	4	86	742	2	2	2
Barium	ug/L	2,000	2,000	2,000	1,200	NC	NC	42	135	184	67	37	66	345	128
Beryllium	ug/L	4	4	4	33	NC	NC	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5	5	2.5	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	0.6	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	NC	NC	< 1	< 1	4	< 1	< 1	< 1	3	1
Cobalt	ug/L	NC	40	100	100	NC	NC	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	3,750	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4	4	14	NC	NC	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	NC	NC	20	25	33	30	12	< 10	< 10	< 10
Mercury	ug/L	2	2	2	0.20#	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	NC	NC	25	< 5	< 5	13	297	35	22	< 5
Radium-226/228	pCi/L	5	NC	NC	NC	NC	NC	< 0.548	0.828	1.01	0.530	< 0.498	< 0.587		
Selenium	ug/L	50	50	50	NA	55	120	1	< 1	3	1	3	7	1	< 1
Thallium	ug/L	2	2	2	2	NC	NC	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 11	15 <sup>(2)</sup>														
Iron	ug/L	300**	300 <sup>E</sup>	300 <sup>E</sup>	500,000EE	NC	NC	141	761	2,070	2,520	40	164	255	232
Copper	ug/L	1,000**	1,000E	1,000E	20	NC	NC	< 1	< 1	6	< 1	< 1	3	3	6
Nickel	ug/L	NC	100	100	120	NC	NC	< 2	< 2	5	< 2	2	4	2	2
Silver	ug/L	100**	34	98	0.2	NC	NC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	NC	NC	< 2	< 2	6	< 2	536	6	16	4
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	NC	NC	< 10	< 10	12	< 10	< 10	< 10	< 10	< 10

#### **Notes**

Groundwater compliance is evaluated in accordance with the HMP to determine if a release from the unit has occurred and drinking water and GSI criteria are provided as screening levels only.

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; NA - not applicable; -- - not analyzed.

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.
- \*\* Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- ^ Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using 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}. Mixing Zone 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 MDEQ policy and procedure 09-014 dated June 20, 2012.
- <sup>E</sup> Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

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

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

# Table 4

# Summary of Statistical Exceedances – May 2021 Karn Lined Impoundment Essexville, Michigan

UMMAR	N DEPARTMENT OF ENVIR Y OF STATISTICAL EXCEE Karn Lined Impoundment – V	Data is in unle	(X) ug/L ( ) mg/L ss otherwise	or stated				
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	2 Qtr. 2021 ( <b>bold</b> >201)	1 Qtr. 2021 ( <b>bold</b> >201)		
				_				
		No	Excee	edances	Т	ı		



# **Figures**









# **Appendix A Laboratory Analytical Reports**



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: Ma7 23, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2021 Q2

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 21-0530

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 05/04/2021 and 5/06/2021, for the 2<sup>nd</sup> Quarter monitoring 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 05/07/2021.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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

#### **CASE NARRATIVE**

#### I. Sample Receipt

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

# II. Methodology

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

#### III. Results/Quality Control

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

# **DEFINITIONS / QUALIFIERS**

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

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

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



# **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2021 DEK RCRA Lined Impoundment Wells

**Date Received:** 5/7/2021 **Chemistry Project:** 21-0530

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0530-01	OW-10	Groundwater	05/04/2021 10:45 AM	DEK Lined Impoundment
21-0530-02	OW-11	Groundwater	05/04/2021 08:45 AM	DEK Lined Impoundment
21-0530-03	OW-12	Groundwater	05/04/2021 12:05 PM	DEK Lined Impoundment
21-0530-04	KLI-SCS	Groundwater	05/06/2021 10:24 AM	DEK Lined Impoundment
21-0530-05	KLI-PCS	Groundwater	05/04/2021 11:44 AM	DEK Lined Impoundment
21-0530-06	SW-DITCH	Groundwater	05/04/2021 12:05 PM	DEK Lined Impoundment
21-0530-07	DUP-KLI	Groundwater	05/04/2021 12:00 AM	DEK Lined Impoundment
21-0530-08	EB-KLI	Water	05/04/2021 12:05 PM	DEK Lined Impoundment
21-0530-09	FB-KLI	Water	05/04/2021 12:05 PM	DEK Lined Impoundment



Report Date:

05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: OW-10 Collect Date: 05/04/2021
Lab Sample ID: 21-0530-01 Collect Time: 10:45 AM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0530-01-C01-A01 Analyst: TMR Result Flag **Units** RL Tracking # Parameter(s) **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-01-C01-A02 Analyst: EB RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Antimony ND ug/L 1 05/13/2021 AB21-0514-08 4 1 05/13/2021 AB21-0514-08 Arsenic ug/L Barium 184 05/13/2021 ug/L 5 AB21-0514-08 05/13/2021 Beryllium ND 1 ug/L AB21-0514-08 Boron 1300 20 05/13/2021 AB21-0514-08 ug/L ND Cadmium ug/L 0.2 05/13/2021 AB21-0514-08 Calcium 107000 ug/L 1000 05/14/2021 AB21-0514-08 Chromium 4 ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 6 Copper ug/L 1 05/13/2021 AB21-0514-08 Iron 2070 ug/L 20 05/13/2021 AB21-0514-08 Lead 2 ug/L 1 05/13/2021 AB21-0514-08 Lithium 33 ug/L 10 05/13/2021 AB21-0514-08 17600 1000 05/14/2021 AB21-0514-08 Magnesium ug/L Molybdenum ND ug/L 5 05/13/2021 AB21-0514-08 Nickel 5 ug/L 2 05/13/2021 AB21-0514-08 5240 Potassium ug/L 100 05/14/2021 AB21-0514-08 Selenium 3 ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium 66200 ug/L 1000 05/14/2021 AB21-0514-08 **Thallium** ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium 6 ug/L 2 05/13/2021 AB21-0514-08 Zinc 10 12 ug/L 05/13/2021 AB21-0514-08 Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0530-01-C02-A01 Analyst: DMW RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Chloride 75100 ug/L 05/12/2021 AB21-0512-03 1000 Fluoride ND ug/L 1000 05/12/2021 AB21-0512-03 Sulfate ND ug/L 1000 05/12/2021 AB21-0512-03 Total Dissolved Solids by SM 2540C Aliquot: 21-0530-01-C03-A01 Analyst: DMW Units RL Parameter(s) Result Flag **Analysis Date** Tracking # **Total Dissolved Solids** 549 05/10/2021 AB21-0510-07 mg/L 10



# **Analytical Report**

**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

 Field Sample ID:
 OW-10
 Collect Date:
 05/04/2021

 Lab Sample ID:
 21-0530-01
 Collect Time:
 10:45 AM

Matrix: Groundwater

Alkalinity by SM 2320B	Aliquot:	Analyst: DLS			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	363000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	363000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	ND	ug/L	10000	05/13/2021	AB21-0513-12



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: OW-11 Collect Date: 05/04/2021
Lab Sample ID: 21-0530-02 Collect Time: 08:45 AM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0530-02-C01-A01 Analyst: TMR Result Flag **Units** RL Tracking # Parameter(s) **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-02-C01-A02 Analyst: EB Result RL Parameter(s) Flag Units **Analysis Date** Tracking # 2 Antimony ug/L 1 05/13/2021 AB21-0514-08 Arsenic 742 1 05/13/2021 AB21-0514-08 ug/L Barium 37 05/13/2021 AB21-0514-08 ug/L 5 05/13/2021 Beryllium ND 1 ug/L AB21-0514-08 Boron 3300 20 05/13/2021 AB21-0514-08 ug/L Cadmium 0.6 ug/L 0.2 05/13/2021 AB21-0514-08 Calcium 12900 ug/L 1000 05/14/2021 AB21-0514-08 Chromium ND ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 ND Copper ug/L 1 05/13/2021 AB21-0514-08 Iron 40 ug/L 20 05/13/2021 AB21-0514-08 Lead ND ug/L 1 05/13/2021 AB21-0514-08 Lithium 12 ug/L 10 05/13/2021 AB21-0514-08 1650 1000 05/14/2021 AB21-0514-08 Magnesium ug/L Molybdenum 297 ug/L 5 05/13/2021 AB21-0514-08 Nickel 2 ug/L 2 05/13/2021 AB21-0514-08 5060 Potassium ug/L 100 05/14/2021 AB21-0514-08 Selenium 3 ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium 60500 ug/L 1000 05/14/2021 AB21-0514-08 **Thallium** ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium 536 ug/L 2 05/13/2021 AB21-0514-08 Zinc ND 10 ug/L 05/13/2021 AB21-0514-08 Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0530-02-C02-A01 Analyst: DMW RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Chloride 67100 ug/L 05/12/2021 AB21-0512-03 1000 Fluoride 3750 ug/L 1000 05/12/2021 AB21-0512-03 Sulfate 25600 ug/L 1000 05/12/2021 AB21-0512-03 Total Dissolved Solids by SM 2540C Aliquot: 21-0530-02-C03-A01 Analyst: DMW Units RL Parameter(s) Result Flag **Analysis Date** Tracking # **Total Dissolved Solids** 239 05/10/2021 AB21-0510-07 mg/L 10



**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

 Field Sample ID:
 OW-11
 Collect Date:
 05/04/2021

 Lab Sample ID:
 21-0530-02
 Collect Time:
 08:45 AM

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	72000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	23000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	49000	ug/L	10000	05/13/2021	AB21-0513-12



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: OW-12 Collect Date: 05/04/2021
Lab Sample ID: 21-0530-03 Collect Time: 12:05 PM
Matrix: Groundwater

Mercury by EPA 7470A, Total, A	cury by EPA 7470A, Total, Aqueous			Aliquot:	21-0530-03-C01-A01	Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Mercury	ND	ug/L		0.2 05/12/2021		AB21-0512-13	
Metals by EPA 6020B: CCR Rul	e Appendix III-IV To	tal Metals	Expand	Aliquot:	21-0530-03-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Antimony	1		ug/L	1	05/13/2021	AB21-0514-08	
Arsenic	86		ug/L	1	05/13/2021	AB21-0514-08	
Barium	67		ug/L	5	05/13/2021	AB21-0514-08	
Beryllium	ND		ug/L	1	05/13/2021	AB21-0514-08	
Boron	747		ug/L	20	05/13/2021	AB21-0514-08	
Cadmium	ND		ug/L	0.2	05/13/2021	AB21-0514-08	
Calcium	75100		ug/L	1000	05/14/2021	AB21-0514-08	
Chromium	ND		ug/L	1	05/13/2021	AB21-0514-08	
Cobalt	ND		ug/L	6	05/13/2021	AB21-0514-08	
Copper	ND		ug/L	1	05/13/2021	AB21-0514-08	
Iron	2520		ug/L	20	05/13/2021	AB21-0514-08	
Lead	ND		ug/L	1	05/13/2021	AB21-0514-08	
Lithium	30		ug/L	10	05/13/2021	AB21-0514-08	
Magnesium	21800		ug/L	1000	05/14/2021	AB21-0514-08	
Molybdenum	13		ug/L	5	05/13/2021	AB21-0514-08	
Nickel	ND		ug/L	2	05/13/2021	AB21-0514-08	
Potassium	6030		ug/L	100	05/14/2021	AB21-0514-08	
Selenium	1		ug/L	1	05/13/2021	AB21-0514-08	
Silver	ND		ug/L	0.2	05/13/2021	AB21-0514-08	
Sodium	52300		ug/L	1000	05/14/2021	AB21-0514-08	
Thallium	ND		ug/L	2	05/13/2021	AB21-0514-08	
Vanadium	ND		ug/L	2	05/13/2021	AB21-0514-08	
Zinc	ND		ug/L	10	05/13/2021	AB21-0514-08	
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0530-03-C02-A01	Analyst: DMW	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Chloride	60800		ug/L	1000	05/12/2021	AB21-0512-03	
Fluoride	ND		ug/L	1000	05/12/2021	AB21-0512-03	
Sulfate	139000		ug/L	1000	05/12/2021	AB21-0512-03	
Total Dissolved Solids by SM 2	540C			Aliquot:	21-0530-03-C03-A01	Analyst: DMW	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Total Dissolved Solids	499	3	mg/L	10	05/10/2021	AB21-0510-07	



Report Date: 05/23/21

21-0530

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Lined Impoundment** Sample Site:

Laboratory Project: Field Sample ID: **OW-12** Collect Date: 05/04/2021 Lab Sample ID: 21-0530-03 Collect Time: 12:05 PM

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	161000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	161000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	ND	ug/L	10000	05/13/2021	AB21-0513-12





# Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** 

Field Sample ID: KLI-SCS
Lab Sample ID: 21-0530-04
Matrix: Groundwater

Laboratory Project:

Collect Date:

**21-0530** 05/06/2021

05/23/21

Collect Time: 10:24 AM

Report Date:

Mercury by EPA 7470A, Total, Aqueous				Aliquot:	21-0530-04-C01-A01	.01 Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL Analysis Date		Tracking #	
Mercury	ND		ug/L	0.2	05/12/2021	AB21-0512-13	
Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	Expand	Aliquot:	21-0530-04-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Antimony	1		ug/L	1	05/13/2021	AB21-0514-08	
Arsenic	2		ug/L	1	05/13/2021	AB21-0514-08	
Barium	66		ug/L	5	05/13/2021	AB21-0514-08	
Beryllium	ND		ug/L	1	05/13/2021	AB21-0514-08	
Boron	580		ug/L	20	05/13/2021	AB21-0514-08	
Cadmium	ND		ug/L	0.2	05/13/2021	AB21-0514-08	
Calcium	112000		ug/L	1000	05/14/2021	AB21-0514-08	
Chromium	ND		ug/L	1	05/13/2021	AB21-0514-08	
Cobalt	ND		ug/L	6	05/13/2021	AB21-0514-08	
Copper	3		ug/L	1	05/13/2021	AB21-0514-08	
Iron	164		ug/L	20	05/13/2021	AB21-0514-08	
Lead	ND		ug/L	1	05/13/2021	AB21-0514-08	
Lithium	ND		ug/L	10	05/13/2021	AB21-0514-08	
Magnesium	33000		ug/L	1000	05/14/2021	AB21-0514-08	
Molybdenum	35		ug/L	5	05/13/2021	AB21-0514-08	
Nickel	4		ug/L	2	05/13/2021	AB21-0514-08	
Potassium	4220		ug/L	100	05/14/2021	AB21-0514-08	
Selenium	7		ug/L	1	05/13/2021	AB21-0514-08	
Silver	ND		ug/L	0.2	05/13/2021	AB21-0514-08	
Sodium	267000		ug/L	1000	05/14/2021	AB21-0514-08	
Thallium	ND		ug/L	2	05/13/2021	AB21-0514-08	
Vanadium	6		ug/L	2	05/13/2021	AB21-0514-08	
Zinc	ND		ug/L	10	05/13/2021	AB21-0514-08	
Anions by EPA 300.0 CCR Rule Analy	te List, CI, F,	SO4, Aqu	eous	Aliquot:	21-0530-04-C02-A01	Analyst: DMW	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Chloride	52500		ug/L	1000	05/12/2021	AB21-0512-03	
Fluoride	ND		ug/L	1000	05/12/2021	AB21-0512-03	
Sulfate	466000		ug/L	1000	05/17/2021	AB21-0512-03	
Total Dissolved Solids by SM 2540C				Aliquot:	21-0530-04-C03-A01	Analyst: DMW	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #	
Total Dissolved Solids	1260	3	mg/L	10	05/10/2021	AB21-0510-07	



**Report Date:** 05/23/21

21-0530

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project:

 Field Sample ID:
 KLI-SCS
 Collect Date:
 05/06/2021

 Lab Sample ID:
 21-0530-04
 Collect Time:
 10:24 AM

Alkalinity by SM 2320B			Aliquot:	21-0530-04-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	410000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	410000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	ND	ug/L	10000	05/13/2021	AB21-0513-12



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

 Field Sample ID:
 KLI-PCS
 Collect Date:
 05/04/2021

 Lab Sample ID:
 21-0530-05
 Collect Time:
 11:44 AM

Parameter(s) Resulting Mercury ND		<b>Units</b> ug/L	<b>RL</b> 0.2	Analysis Date	Tracking #
,	-IV Total Metals	ug/L	0.2	05/10/2021	
	-IV Total Metals			05/12/2021	AB21-0512-13
Metals by EPA 6020B: CCR Rule Appendix III		Expand	Aliquot:	21-0530-05-C01-A02	Analyst: EB
Parameter(s) Resu	lt Flag	Units	RL.	Analysis Date	Tracking #
Antimony ND		ug/L	1	05/13/2021	AB21-0514-08
Arsenic 2		ug/L	1	05/13/2021	AB21-0514-08
Barium 345		ug/L	5	05/13/2021	AB21-0514-08
Beryllium ND		ug/L	1	05/13/2021	AB21-0514-08
Boron 598		ug/L	20	05/13/2021	AB21-0514-08
Cadmium ND		ug/L	0.2	05/13/2021	AB21-0514-08
Calcium 6690	0	ug/L	1000	05/14/2021	AB21-0514-08
Chromium 3		ug/L	1	05/13/2021	AB21-0514-08
Cobalt ND		ug/L	6	05/13/2021	AB21-0514-08
Copper 3		ug/L	1	05/13/2021	AB21-0514-08
Iron 255		ug/L	20	05/13/2021	AB21-0514-08
Lead ND		ug/L	1	05/13/2021	AB21-0514-08
Lithium ND		ug/L	10	05/13/2021	AB21-0514-08
Magnesium 1320	0	ug/L	1000	05/14/2021	AB21-0514-08
Molybdenum 22		ug/L	5	05/13/2021	AB21-0514-08
Nickel 2		ug/L	2	05/13/2021	AB21-0514-08
Potassium 2940		ug/L	100	05/14/2021	AB21-0514-08
Selenium 1		ug/L	1	05/13/2021	AB21-0514-08
Silver ND		ug/L	0.2	05/13/2021	AB21-0514-08
Sodium 3070	0	ug/L	1000	05/14/2021	AB21-0514-08
Thallium ND		ug/L	2	05/13/2021	AB21-0514-08
Vanadium 16		ug/L	2	05/13/2021	AB21-0514-08
Zinc ND		ug/L	10	05/13/2021	AB21-0514-08
Anions by EPA 300.0 CCR Rule Analyte List,	CI, F, SO4, Aqı	ieous	Aliquot:	21-0530-05-C02-A01	Analyst: DMW
Parameter(s) Resu	-	Units	RL	Analysis Date	Tracking #
Chloride 4790	0	ug/L	1000	05/12/2021	AB21-0512-03
Fluoride ND		ug/L	1000	05/12/2021	AB21-0512-03
Sulfate 6930	0	ug/L	1000	05/12/2021	AB21-0512-03
Total Dissolved Solids by SM 2540C			Aliquot:	21-0530-05-C03-A01	Analyst: DMW
Parameter(s) Resu	lt Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids 328		mg/L	10	05/10/2021	AB21-0510-07



Report Date: 05/23/21

21-0530

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Lined Impoundment** Sample Site:

Laboratory Project: Field Sample ID: KLI-PCS Collect Date: 05/04/2021 Lab Sample ID: 21-0530-05 Collect Time: 11:44 AM

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	116000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	113000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	ND	ug/L	10000	05/13/2021	AB21-0513-12



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: SW-DITCH Collect Date: 05/04/2021
Lab Sample ID: 21-0530-06 Collect Time: 12:05 PM
Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0530-06-C01-A01 Analyst: TMR Result Flag **Units** RL Tracking # Parameter(s) **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-06-C01-A02 Analyst: EB RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Antimony ND ug/L 1 05/13/2021 AB21-0514-08 2 1 05/13/2021 AB21-0514-08 Arsenic ug/L Barium 128 05/13/2021 ug/L 5 AB21-0514-08 05/13/2021 ND 1 Beryllium ug/L AB21-0514-08 Boron 20 05/13/2021 AB21-0514-08 105 ug/L ND Cadmium ug/L 0.2 05/13/2021 AB21-0514-08 Calcium 62200 ug/L 1000 05/14/2021 AB21-0514-08 Chromium 1 ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 6 Copper ug/L 1 05/13/2021 AB21-0514-08 Iron 232 ug/L 20 05/13/2021 AB21-0514-08 Lead ND ug/L 1 05/13/2021 AB21-0514-08 Lithium ND ug/L 10 05/13/2021 AB21-0514-08 17200 1000 05/14/2021 AB21-0514-08 Magnesium ug/L Molybdenum ND ug/L 5 05/13/2021 AB21-0514-08 Nickel 2 ug/L 2 05/13/2021 AB21-0514-08 2750 Potassium ug/L 100 05/14/2021 AB21-0514-08 Selenium ND ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium 31600 ug/L 1000 05/14/2021 AB21-0514-08 **Thallium** ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium 4 ug/L 2 05/13/2021 AB21-0514-08 Zinc ND 10 ug/L 05/13/2021 AB21-0514-08 Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0530-06-C02-A01 Analyst: DMW RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Chloride 52200 ug/L 05/12/2021 AB21-0512-03 1000 Fluoride ND ug/L 1000 05/12/2021 AB21-0512-03 33700 Sulfate ug/L 1000 05/12/2021 AB21-0512-03 Total Dissolved Solids by SM 2540C Aliquot: 21-0530-06-C03-A01 Analyst: DMW Units RL Parameter(s) Result Flag **Analysis Date** Tracking # **Total Dissolved Solids** 334 05/10/2021 AB21-0510-07 mg/L 10



**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: SW-DITCH Collect Date: 05/04/2021 Lab Sample ID: 21-0530-06 Collect Time: 05/04/2021

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	170000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Bicarbonate	170000	ug/L	10000	05/13/2021	AB21-0513-12
Alkalinity Carbonate	ND	ug/L	10000	05/13/2021	AB21-0513-12





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: 21-0530

**DUP-KLI** Field Sample ID: Lab Sample ID: 21-0530-07 Matrix: Groundwater Collect Date: 05/04/2021 Collect Time: 12:00 AM

Aliquot: 21-0530-07-C01-A01

Report Date:

05/23/21

Analyst: TMR

Mercury by EPA 7470A, Total, Aqueous Result Flag **Units** RL Tracking # Parameter(s) **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-07-C01-A02 Analyst: EB RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Antimony ND ug/L 1 05/13/2021 AB21-0514-08 87 1 05/13/2021 AB21-0514-08 Arsenic ug/L Barium 68 05/13/2021 AB21-0514-08 ug/L 5 05/13/2021 Beryllium ND 1 ug/L AB21-0514-08 Boron 752 20 05/13/2021 AB21-0514-08 ug/L ND Cadmium ug/L 0.2 05/13/2021 AB21-0514-08 Calcium 75500 ug/L 1000 05/14/2021 AB21-0514-08 ND Chromium ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 ND Copper ug/L 1 05/13/2021 AB21-0514-08 Iron 2530 ug/L 20 05/13/2021 AB21-0514-08 Lead ND ug/L 1 05/13/2021 AB21-0514-08 Lithium 29 ug/L 10 05/13/2021 AB21-0514-08 21800 1000 05/14/2021 AB21-0514-08 Magnesium ug/L Molybdenum 13 ug/L 5 05/13/2021 AB21-0514-08 Nickel ND ug/L 2 05/13/2021 AB21-0514-08 6080 Potassium ug/L 100 05/14/2021 AB21-0514-08 Selenium 1 ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium 52700 ug/L 1000 05/14/2021 AB21-0514-08 **Thallium** ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium ND ug/L 2 05/13/2021 AB21-0514-08 Zinc ND 10 ug/L 05/13/2021 AB21-0514-08 Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0530-07-C02-A01 Analyst: DMW RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Chloride 61800 ug/L 05/12/2021 AB21-0512-03 1000 Fluoride ND ug/L 1000 05/12/2021 AB21-0512-03 Sulfate 141000 ug/L 1000 05/12/2021 AB21-0512-03 Total Dissolved Solids by SM 2540C Aliquot: 21-0530-07-C03-A01 Analyst: DMW Units RL Parameter(s) Result Flag **Analysis Date** Tracking # **Total Dissolved Solids** 497 05/10/2021 AB21-0510-07

mg/L

10



**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: DUP-KLI Collect Date: 05/04/2021
Lab Sample ID: 21-0530-07 Collect Time: 12:00 AM
Matrix: Groundwater

Alkalinity by SM 2320B Aliquot: 21-0530-07-C04-A01 Analyst: DLS Parameter(s) Result Flag Units RL**Analysis Date** Tracking # Alkalinity Total 162000 ug/L 10000 05/13/2021 AB21-0513-12 162000 Alkalinity Bicarbonate ug/L 10000 05/13/2021 AB21-0513-12 ug/L **Alkalinity Carbonate** ND 10000 05/13/2021 AB21-0513-12



05/23/21

AB21-0514-08



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Zinc

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0530** 

Field Sample ID: EB-KLI Collect Date: 05/04/2021
Lab Sample ID: 21-0530-08 Collect Time: 12:05 PM
Matrix: Water

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0530-08-C01-A01 Analyst: TMR Parameter(s) Result Flag **Units** RLTracking # **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-08-C01-A02 Analyst: EB Result RL Parameter(s) Flag Units **Analysis Date** Tracking # Antimony ND ug/L 1 05/13/2021 AB21-0514-08 Arsenic ND 1 05/13/2021 AB21-0514-08 ug/L Barium ND 5 05/13/2021 AB21-0514-08 ug/L Beryllium ND ug/L 1 05/13/2021 AB21-0514-08 Boron ND ug/L 20 05/13/2021 AB21-0514-08 Cadmium ND ug/L 0.2 05/13/2021 AB21-0514-08 Calcium ND ug/L 1000 05/14/2021 AB21-0514-08 Chromium ND ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 ND Copper ug/L 1 05/13/2021 AB21-0514-08 Iron ND ug/L 20 05/13/2021 AB21-0514-08 Lead ND ug/L 1 05/13/2021 AB21-0514-08 Lithium ND ug/L 10 05/13/2021 AB21-0514-08 Magnesium ND ug/L 1000 05/14/2021 AB21-0514-08 Molybdenum ND ug/L 5 05/13/2021 AB21-0514-08 Nickel ND ug/L 2 05/13/2021 AB21-0514-08 Potassium ND ug/L 100 05/14/2021 AB21-0514-08 Selenium ND ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium ND ug/L 1000 05/14/2021 AB21-0514-08 Thallium ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium ND ug/L 2 05/13/2021 AB21-0514-08

ND

10

05/13/2021

ug/L



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Zinc

Sample Site: **DEK Lined Impoundment** Laboratory Project: 21-0530

Field Sample ID: FE-KLI Collect Date: 05/04/2021 Lab Sample ID: 21-0530-09 Collect Time: 12:05 PM Matrix: Water

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0530-09-C01-A01 Analyst: TMR Parameter(s) Result Flag **Units** RLTracking # **Analysis Date** Mercury ND ug/L 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0530-09-C01-A02 Analyst: EB Result RL Parameter(s) Flag Units **Analysis Date** Tracking # Antimony ND ug/L 1 05/13/2021 AB21-0514-08 Arsenic ND 1 05/13/2021 AB21-0514-08 ug/L Barium ND 5 05/13/2021 AB21-0514-08 ug/L Beryllium ND ug/L 1 05/13/2021 AB21-0514-08 Boron ND ug/L 20 05/13/2021 AB21-0514-08 Cadmium ND ug/L 0.2 05/13/2021 AB21-0514-08 Calcium ND ug/L 1000 05/14/2021 AB21-0514-08 Chromium ND ug/L 1 05/13/2021 AB21-0514-08 Cobalt ND ug/L 6 05/13/2021 AB21-0514-08 ND Copper ug/L 1 05/13/2021 AB21-0514-08 Iron ND ug/L 20 05/13/2021 AB21-0514-08 Lead ND ug/L 1 05/13/2021 AB21-0514-08 Lithium ND ug/L 10 05/13/2021 AB21-0514-08 Magnesium ND ug/L 1000 05/14/2021 AB21-0514-08 Molybdenum ND ug/L 5 05/13/2021 AB21-0514-08 Nickel ND ug/L 2 05/13/2021 AB21-0514-08 Potassium ND ug/L 100 05/14/2021 AB21-0514-08 Selenium ND ug/L 1 05/13/2021 AB21-0514-08 Silver ND ug/L 0.2 05/13/2021 AB21-0514-08 Sodium ND ug/L 1000 05/14/2021 AB21-0514-08 Thallium ND ug/L 2 05/13/2021 AB21-0514-08 Vanadium ND 2

ND

ug/L

ug/L

10

05/13/2021

05/13/2021

AB21-0514-08

AB21-0514-08





**Report Date:** 05/23/21

Data Qualifiers	Exception Summary
	No exceptions occured.

CONSUMERS ENERGY

## Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM
Project Log-In Number: 21 - 0530
Inspection Date: 5.7.21 Inspection By: CUL+
Sample Origin/Project Name: DEK LI
Shipment Delivered By: Enter the type of shipment carrier.
Pony FedEx UPS USPS Airborne Other/Hand Carry (whom)
Other/Hand Carry (whom)
Tracking Number: Shipping Form Attached: Yes No
Shipping Containers: Enter the type and number of shipping containers received.
Cooler (1) Cardboard Box Custom Case Envelope/Mailer _
Loose/Unpackaged Containers Other
Condition of Shipment: Enter the as-received condition of the shipment container.
Damaged Shipment Observed: None Dented Leaking
Other
Shipment Security: Enter if any of the shipping containers were opened before receipt.
Shipping Containers Received: Opened Sealed
Enclosed Documents: Enter the type of documents enclosed with the shipment
CoC Work Request Air Data Sheet Other
Temperature of Containers: Measure the temperature of several sample containers.
As-Received Temperature Range 2.0-5.0' Samples Received on Ice: Yes V No
M&TE # and Expiration 0 15402
Number and Type of Containers: Enter the total number of sample containers received.
Container Type Water Soil Other Broken Leak
VOA (40mL or 60mk) 14
Quart/Liter (g/p)
9-oz (amber glass jar)
2-oz (amber glass)
125 mL (plastic) \( \bullet \text{U} \)
24 mL vial (glass)
150 560 mL (plastic)

# **CHAIN OF CUSTODY**

Consumers Energy

# **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPLING SITE	PROJECT NUMBER	21.0520				ANAL	YSIS R	EQUEST	ED		Page 1 of 1								
DEK Lined Impoundment – 2021 Q2		21-0530									SEND REPORT TO CDBatts								
AMPLING TEAM	DATE SHIPPED	SITE SKETCHE		sls															HD Register, TRC
DRC		CIRCLI	NO	Total Metals	suc							Alkalınity				PHONE			
	AMPLE MATRIX SAMPLE DESCRIPT	DEPTH	# OF CONTAINERS	Tota	Anions	TDS	Alka				REMARKS								
21-0530-01 5/4/21 10:45	GW OW-10		5	х	х	х	x												
-02 5 4 21 8:45	GW OW-11		5	х	х	х	х												
-03 5/4/21 12:05	GW OW-12		5	x	х	х	х												
-04 5/6/21 10:24	GW KLI-SCS		5	х	х	х	х												
-05 5/4/21 11:44	GW KLI-PCS		5	х	х	х	х												
-06 S/4/21 12:05	GW SW-DITCH		5	х	х	х	х												
-07 5/4/31	GW DUP-KLI		5	х	х	х	x												
-08 5/4/21 12:05	W EB-KLI		1	x															
-09 5/4/21 12:05	W FB-KLI		1	x															
•																			
				-															
							_												
ELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATUR	E)						OMMEN	TS	2.0-5.0%								
Jul hy	5-7-21 /1151	7									015402								
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATUR	XE)	1							6.4.21								
		•				OF	RIGINA	L TO LA	в сс	PY TO	CUSTOMER								



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: May 23, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2021 Q2

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 21-0529

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 05/03/2021, for the 2<sup>nd</sup> Quarter monitoring 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 05/05/2021.

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. <u>Sample Receipt</u>

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

#### II. Methodology

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

#### III. Results/Quality Control

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

#### **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q2-2021 DEK RCRA Bottom Ash Pond & Lined Impoundment

**Date Received:** 5/5/2021 **Chemistry Project:** 21-0529

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0529-01	DEK-MW-15003	Groundwater	05/03/2021 12:33 PM	DEK Bottom Ash Pond & Lined Impoundment
21-0529-02	DEK-MW-18001	Groundwater	05/03/2021 11:28 AM	DEK Bottom Ash Pond & Lined Impoundment
21-0529-03	DEK-MW-18001 MS	Groundwater	05/03/2021 11:28 AM	DEK Bottom Ash Pond & Lined Impoundment
21-0529-04	DEK-MW-18001 MSD	Groundwater	05/03/2021 11:28 AM	DEK Bottom Ash Pond & Lined Impoundment





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0529** 

Field Sample ID: **DEK-MW-15003**Lab Sample ID: 21-0529-01

Matrix: Groundwater

Collect Date: 05/03/2021

Report Date:

05/23/21

Collect Time: 12:33 PM

Mercury by EPA 7470A, Total, Aqueo	Aliquot:	21-0529-01-C01-A01	Analyst: TMR			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.1	05/12/2021	AB21-0512-13
Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand				Aliquot:	21-0529-01-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL.	Analysis Date	Tracking #
Antimony	ND		ug/L	1	05/13/2021	AB21-0514-08
Arsenic	545		ug/L	1	05/13/2021	AB21-0514-08
Barium	42		ug/L	5	05/13/2021	AB21-0514-08
Beryllium	ND		ug/L	1	05/13/2021	AB21-0514-08
Boron	862		ug/L	20	05/13/2021	AB21-0514-08
Cadmium	ND		ug/L	0.2	05/13/2021	AB21-0514-08
Calcium	27400		ug/L	1000	05/14/2021	AB21-0514-08
Chromium	ND		ug/L	1	05/13/2021	AB21-0514-08
Cobalt	ND		ug/L	6	05/13/2021	AB21-0514-08
Copper	ND		ug/L	1	05/13/2021	AB21-0514-08
Iron	141		ug/L	20	05/13/2021	AB21-0514-08
Lead	ND		ug/L	1	05/13/2021	AB21-0514-08
Lithium	20		ug/L	10	05/13/2021	AB21-0514-08
Magnesium	4330		ug/L	1000	05/14/2021	AB21-0514-08
Molybdenum	25		ug/L	5	05/13/2021	AB21-0514-08
Nickel	ND		ug/L	2	05/13/2021	AB21-0514-08
Potassium	4470		ug/L	100	05/14/2021	AB21-0514-08
Selenium	1		ug/L	1	05/13/2021	AB21-0514-08
Silver	ND		ug/L	0.2	05/13/2021	AB21-0514-08
Sodium	46900		ug/L	1000	05/14/2021	AB21-0514-08
Thallium	ND		ug/L	2	05/13/2021	AB21-0514-08
Vanadium	ND		ug/L	2	05/13/2021	AB21-0514-08
Zinc	ND		ug/L	10	05/13/2021	AB21-0514-08
Anions by EPA 300.0 CCR Rule Analy	∕te List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0529-01-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	50600		ug/L	1000	05/06/2021	AB21-0506-07
Fluoride	ND		ug/L	1000	05/06/2021	AB21-0506-07
Sulfate	32500		ug/L	1000	05/06/2021	AB21-0506-07
Total Dissolved Solids by SM 2540C				Aliquot:	21-0529-01-C03-A01	Analyst: CET
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	246	•	mg/L	10	05/07/2021	AB21-0507-02
			····ə· <del>-</del>		00.01,2021	0001 02



**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** 

Laboratory Project: 21-0529

Field Sample ID: **DEK-MW-15003**Lab Sample ID: 21-0529-01

Collect Date: 05/03/2021 Collect Time: 12:33 PM

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	86200	ug/L	10000	05/11/2021	AB21-0511-11
Alkalinity Bicarbonate	86200	ug/L	10000	05/11/2021	AB21-0511-11
Alkalinity Carbonate	ND	ug/L	10000	05/11/2021	AB21-0511-11



05/23/21



# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0529** 

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 05/03/2021

 Lab Sample ID:
 21-0529-02
 Collect Time:
 11:28 AM

Mercury by EPA 7470A, Total, Aqueous	Aliquot:	21-0529-02-C01-A01	Analyst: TMR			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	05/12/2021	AB21-0512-13
Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand					21-0529-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	05/13/2021	AB21-0514-08
Arsenic	92		ug/L	1	05/13/2021	AB21-0514-08
Barium	135		ug/L	5	05/13/2021	AB21-0514-08
Beryllium	ND		ug/L	1	05/13/2021	AB21-0514-08
Boron	1180		ug/L	20	05/13/2021	AB21-0514-08
Cadmium	ND		ug/L	0.2	05/13/2021	AB21-0514-08
Calcium	65200		ug/L	1000	05/14/2021	AB21-0514-08
Chromium	ND		ug/L	1	05/13/2021	AB21-0514-08
Cobalt	ND		ug/L	6	05/13/2021	AB21-0514-08
Copper	ND		ug/L	1	05/13/2021	AB21-0514-08
Iron	761		ug/L	20	05/13/2021	AB21-0514-08
Lead	ND		ug/L	1	05/13/2021	AB21-0514-08
Lithium	25		ug/L	10	05/13/2021	AB21-0514-08
Magnesium	12300		ug/L	1000	05/14/2021	AB21-0514-08
Molybdenum	ND		ug/L	5	05/13/2021	AB21-0514-08
Nickel	ND		ug/L	2	05/13/2021	AB21-0514-08
Potassium	4180		ug/L	100	05/14/2021	AB21-0514-08
Selenium	ND		ug/L	1	05/13/2021	AB21-0514-08
Silver	ND		ug/L	0.2	05/13/2021	AB21-0514-08
Sodium	69700		ug/L	1000	05/14/2021	AB21-0514-08
Thallium	ND		ug/L	2	05/13/2021	AB21-0514-08
Vanadium	ND		ug/L	2	05/13/2021	AB21-0514-08
Zinc	ND		ug/L	10	05/13/2021	AB21-0514-08
Anions by EPA 300.0 CCR Rule Analyt	e List, CI, F,	SO4, Aqu	eous	Aliquot:	21-0529-02-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	51600		ug/L	1000	05/07/2021	AB21-0506-07
Fluoride	ND		ug/L	1000	05/07/2021	AB21-0506-07
Sulfate	121000		ug/L	1000	05/07/2021	AB21-0506-07
Total Dissolved Solids by SM 2540C				Aliquot:	21-0529-02-C03-A01	Analyst: CET
Parameter(s)	Result	Flag	Units	RL.	Analysis Date	Tracking #
Total Dissolved Solids	486	J	mg/L	10	05/07/2021	AB21-0507-02



**Report Date:** 05/23/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0529** 

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 05/03/2021

 Lab Sample ID:
 21-0529-02
 Collect Time:
 11:28 AM

Alkalinity by SM 2320B			Aliquot:	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity Total	191000	ug/L	10000	05/11/2021	AB21-0511-11
Alkalinity Bicarbonate	191000	ug/L	10000	05/11/2021	AB21-0511-11
Alkalinity Carbonate	ND	ug/L	10000	05/11/2021	AB21-0511-11





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: 21-0529

**DEK-MW-18001 MS** Field Sample ID:

Lab Sample ID: 21-0529-03 Matrix: Groundwater

Parameter(s)

Alkalinity Total

Collect Date: 05/03/2021 Collect Time:

Report Date:

05/23/21

11:28 AM

Mercury by EPA 7470A, Total, Aqueous Aliquot: 21-0529-03-C01-A01 Analyst: TMR Result Flag **Units** RL Tracking # Parameter(s) **Analysis Date** Mercury 99.8 % 0.2 05/12/2021 AB21-0512-13 Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Expand Aliquot: 21-0529-03-C01-A02 Analyst: EB RL Parameter(s) Result Flag Units **Analysis Date** Tracking # Antimony 108 % 1 05/13/2021 AB21-0514-08 117 % 1 05/13/2021 Arsenic AB21-0514-08 Barium 109 % 5 05/13/2021 AB21-0514-08 05/13/2021 % 1 Beryllium 113 AB21-0514-08 Boron % 20 05/13/2021 AB21-0514-08 115 104 % Cadmium 0.2 05/13/2021 AB21-0514-08 Calcium 123 % 1000 05/14/2021 AB21-0514-08 Chromium 98 % 1 05/13/2021 AB21-0514-08 Cobalt 104 % 6 05/13/2021 AB21-0514-08 98 % Copper 1 05/13/2021 AB21-0514-08 Iron 88 % 20 05/13/2021 AB21-0514-08 Lead 103 % 1 05/13/2021 AB21-0514-08 Lithium % 110 10 05/13/2021 AB21-0514-08 112 % 1000 05/14/2021 AB21-0514-08 Magnesium Molybdenum 114 % 5 05/13/2021 AB21-0514-08 Nickel 97 % 2 05/13/2021 AB21-0514-08 117 % Potassium 100 05/14/2021 AB21-0514-08 Selenium 118 % 1 05/13/2021 AB21-0514-08 Silver 104 % 0.2 05/13/2021 AB21-0514-08 Sodium 117 % 1000 05/14/2021 AB21-0514-08 **Thallium** 102 % 2 05/13/2021 AB21-0514-08 Vanadium 101 % 2 05/13/2021 AB21-0514-08 Zinc % 10 101 05/13/2021 AB21-0514-08 Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous Aliquot: 21-0529-03-C02-A01 Analyst: DMW Parameter(s) Result Flag Units RL **Analysis Date** Tracking # Chloride 117 % 05/07/2021 1000 AB21-0506-07 Fluoride 90 % 1000 05/07/2021 AB21-0506-07 Sulfate 102 % 1000 05/07/2021 AB21-0506-07 Alkalinity by SM 2320B Aliquot: 21-0529-03-C03-A01 Analyst: DLS

Flag

Units

%

RL

10000

**Analysis Date** 

05/11/2021

Tracking #

AB21-0511-11

Result

97





# **Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0529** 

Field Sample ID: **DEK-MW-18001 MSD** 

Lab Sample ID: 21-0529-04 Matrix: Groundwater Collect Date: 05/03/2021

Collect Time: 11:28 AM

Report Date:

05/23/21

Mercury by EPA 7470A, Total, Aqueous				Aliquot:	Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	100.0		%	0.2	05/12/2021	AB21-0512-13
Metals by EPA 6020B: CCR Rul	le Appendix III-IV To	otal Metals	Expand	Aliquot:	21-0529-04-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	110		%	1	05/13/2021	AB21-0514-08
Arsenic	118		%	1	05/13/2021	AB21-0514-08
Barium	112		%	5	05/13/2021	AB21-0514-08
Beryllium	113		%	1	05/13/2021	AB21-0514-08
Boron	106		%	20	05/13/2021	AB21-0514-08
Cadmium	105		%	0.2	05/13/2021	AB21-0514-08
Calcium	121		%	1000	05/14/2021	AB21-0514-08
Chromium	97		%	1	05/13/2021	AB21-0514-08
Cobalt	104		%	6	05/13/2021	AB21-0514-08
Copper	97		%	1	05/13/2021	AB21-0514-08
Iron	91		%	20	05/13/2021	AB21-0514-08
Lead	102		%	1	05/13/2021	AB21-0514-08
Lithium	108		%	10	05/13/2021	AB21-0514-08
Magnesium	114		%	1000	05/14/2021	AB21-0514-08
Molybdenum	115		%	5	05/13/2021	AB21-0514-08
Nickel	96		%	2	05/13/2021	AB21-0514-08
Potassium	114		%	100	05/14/2021	AB21-0514-08
Selenium	115		%	1	05/13/2021	AB21-0514-08
Silver	104		%	0.2	05/13/2021	AB21-0514-08
Sodium	121		%	1000	05/14/2021	AB21-0514-08
Thallium	102		%	2	05/13/2021	AB21-0514-08
Vanadium	100		%	2	05/13/2021	AB21-0514-08
Zinc	100		%	10	05/13/2021	AB21-0514-08
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	21-0529-04-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	115		%	1000	05/07/2021	AB21-0506-07
Fluoride	94		%	1000	05/07/2021	AB21-0506-07
Sulfate	102		%	1000	05/07/2021	AB21-0506-07
Alkalinity by SM 2320B				Aliquot:	21-0529-04-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity Total	96		%	10000	05/11/2021	AB21-0511-11





**Report Date:** 05/23/21

Data Qualifiers	Exception Summary
	No exceptions occured.

CONSUMERS ENERGY

## Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM	
Project Log-In Number: 21-0529 Inspection Date: 5 5 2  Inspection By: UI+ Sample Origin/Project Name: DEK BAY + L-I	
Shipment Delivered By: Enter the type of shipment carrier.	
Pony FedEx V UPS USPS Airborne Other/Hand Carry (whom)	
Tracking Number: 7847491941 Shipping Form Attached: Yes V	
Shipping Containers: Enter the type and number of shipping containers received.	
Cooler (1) Cardboard Box Custom Case Envelope/Mailer	
Loose/Unpackaged Containers Other	
Condition of Shipment: Enter the as-received condition of the shipment container.	
Damaged Shipment Observed: None Dented Leaking	
Other	
Shipment Security: Enter if any of the shipping containers were opened before receipt.	
Shipping Containers Received: Opened Sealed	
Enclosed Documents: Enter the type of documents enclosed with the shipment.	
CoC Work Request Air Data Sheet Other	_
emperature of Containers: Measure the temperature of several sample containers	
As-Received Temperature Range 1.3. 1.6. Samples Received on Ice: Yes No	
M&TE # and Expiration 015402	
u.4.21 Sumber and Type of Containers: Enter the total number of sample containers received.	
Container Type Water Soil Other Broken Lea	king
VOA (40mL or 60mL)	
Quart/Liter (g/p)	<del></del>
9-oz (amber glass jar)	
2-oz (amber glass)	
125 mL (plastic) <u>\$</u>	
24 mL vial (glass)	
250 500 mL (plastic) 1	
Other	

# **CHAIN OF CUSTODY**

# Consumers Energy

# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SIT	 E	-		PROJECT NUMBER						ANAL	YSIS R	EQUE	STED		Page 1 of 1
DEK Botton	n Ash Pond	& LI – 202	1 Q2		21-0529										SEND REPORT TO CDBatts
SAMPLING TEA		0.0		DATE SHIPPED		SITE SKETCHEL CIRCLE		tals							HD Register, TRC
		PC		5-4-21		YES	NO	Total Metals	Anions		Alkalınıty				PHONE
CE CONTROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION	ON / LOCATIO	DEPTH (ft)	# OF CONTAINERS	Tot	Ani	TDS	Alk				REMARKS
21-0529-01	5-3-21	1233	GW	DEK-MW-15003			5	х	х	х	х				
-02	5-3-21	1128	GW	DEK-MW-18001			5	х	х	х	х				
-03	5-3-21	1128	GW	DEK-MW-18001	MS		4	х	х		х				
-04	5-3-21	1128	GW	DEK-MW-18001	MSD		4	х	х		х				
								_							
											-				
						-									
												_		-	
					,		<u></u>								
					<del></del>										
						<del>-  </del>								-  -	
								<del> </del>	_						
RELINQUISHE	BY (SIGNA	TURE)	DATE/TI	IME .	RECEIVED	BY (SIGNATUR	E)						COM	MENTS	17.
	1 /2		5-1	4-21/1630	F	-dex									8-3-1.6°C 015402
RELINQUISHE	DBY (SIGNA	TUKE	DATE/TI		RECEIVED	BY (SIGNATUR	E)	1							
Fe	d ex		55	5-21 1100						OF	RIGINA	L TO I	LAB	COPY	TO CUSTOMER



# **Environment Testing America**

# **ANALYTICAL REPORT**

Eurofins TestAmerica, Canton 4101 Shuffel Street NW North Canton, OH 44720 Tel: (330)497-9396

Laboratory Job ID: 240-149192-1

Client Project/Site: Karn/Weadock CCR Karn Lined

Impoundment

For:

TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Attn: Darby Litz

Authorized for release by: 6/17/2021 1:20:04 PM

lis Brooks

Kris Brooks, Project Manager II (330)966-9790

Kris.Brooks@Eurofinset.com

LINKS .....

Review your project results through

**Have a Question?** 



Visit us at:

www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

2

3

4

5

7

8

11

12

13

М

# **Table of Contents**

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Method Summary	5
Sample Summary	6
Client Sample Results	7
Tracer Carrier Summary	13
QC Sample Results	14
QC Association Summary	16
Lab Chronicle	17
Certification Summary	19
Chain of Custody	20
Receipt Chacklists	24

5

4

6

0

9

10

12

13

14

## **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-149192-1

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

#### **Qualifiers**

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

#### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.

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

%R Percent Recovery
CFL Contains Free Liquid
CFU Colony Forming Unit
CNF Contains No Free Liquid

DER Duplicate Error Ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL Detection Limit (DoD/DOE)

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision Level Concentration (Radiochemistry)

EDL Estimated Detection Limit (Dioxin)

LOD Limit of Detection (DoD/DOE)

LOQ Limit of Quantitation (DoD/DOE)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

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

NC Not Calculated

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

NEG Negative / Absent
POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
QC Quality Control

RER Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

TNTC Too Numerous To Count

\_

5

6

7

8

10

11

Eurofins TestAmerica, Canton

#### **Case Narrative**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Job ID: 240-149192-1

Laboratory: Eurofins TestAmerica, Canton

**Narrative** 

Job Narrative 240-149192-1

#### Comments

The EPA Method 904.0 Radium-228, EPA Method 903.0 Radium-226, and Ra226\_Ra228 Combined Radium 226 and Radium 228 analyses were performed at the Eurofins TestAmerica St. Louis laboratory.

#### Receipt

The samples were received on 5/12/2021 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 0.8° C.

#### **RAD**

Method 903.0: Radium 226 prep batch 160-510304

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. OW-10 (240-149192-1), OW-11 (240-149192-2), OW-12 (240-149192-3), DUP-KLI (240-149192-4), EB-01 (240-149192-5), KLI-SCS (240-149192-6), (LCS 160-510304/1-A), (LCSD 160-510304/2-A) and (MB 160-510304/22-A)

Method 904.0: Radium-228 Batch 510305

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. OW-10 (240-149192-1), OW-11 (240-149192-2), OW-12 (240-149192-3), DUP-KLI (240-149192-4), EB-01 (240-149192-5), KLI-SCS (240-149192-6), (LCS 160-510305/1-A), (LCSD 160-510305/2-A) and (MB 160-510305/22-A)

Method PrecSep\_0: Ra-228 Batch 160-510305: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: OW-11 (240-149192-2), OW-12 (240-149192-3), DUP-KLI (240-149192-4), EB-01 (240-149192-5) and KLI-SCS (240-149192-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep\_0: Ra-228 Batch 160-510305: The following samples were prepared at a reduced aliquot due to Matrix: OW-10 (240-149192-1). 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: Ra-228 Batch 160- 510305: During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: OW-10 (240-149192-1) and KLI-SCS (240-149192-6). This is an indicator of matrix interference.

Method PrecSep STD: Ra-226 Batch 160-510304: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: OW-11 (240-149192-2), OW-12 (240-149192-3), DUP-KLI (240-149192-4), EB-01 (240-149192-5) and KLI-SCS (240-149192-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Ra-226 Batch 160-510304: The following samples were prepared at a reduced aliquot due to Matrix: OW-10 (240-149192-1). 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: Ra-226 Batch 160-510304: During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: OW-10 (240-149192-1) and KLI-SCS (240-149192-6). This is an indicator of matrix interference.

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

Job ID: 240-149192-1

4

6

Ω

9

10

12

13

114

# **Method Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

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

#### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

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

#### Laboratory References:

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

Job ID: 240-149192-1

# **Sample Summary**

Client: TRC Environmental Corporation.
Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-149192-1	OW-10	Water	05/04/21 10:45	05/12/21 08:00	
240-149192-2	OW-11	Water	05/04/21 08:45	05/12/21 08:00	
240-149192-3	OW-12	Water	05/04/21 12:05	05/12/21 08:00	
240-149192-4	DUP-KLI	Water	05/04/21 00:00	05/12/21 08:00	
240-149192-5	EB-01	Water	05/04/21 12:05	05/12/21 08:00	
240-149192-6	KLI-SCS	Water	05/06/21 10:24	05/12/21 08:00	

Job ID: 240-149192-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: OW-10** Lab Sample ID: 240-149192-1 Date Collected: 05/04/21 10:45

**Matrix: Water** 

Job ID: 240-149192-1

Date	Received:	05/12/21	08:00

Method: 903.0 - Ra	adium-226	(GFPC)								
		` '	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.144	U	0.158	0.158	1.00	0.255	pCi/L	05/18/21 13:46	06/14/21 21:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.4		40 - 110					05/18/21 13:46	06/14/21 21:19	1

Method: 904.0 - I	Radium-228	(GFPC)								
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.867		0.405	0.413	1.00	0.584	pCi/L	05/18/21 14:33	06/11/21 13:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.4		40 - 110					05/18/21 14:33	06/11/21 13:57	1
Y Carrier	87.9		40 - 110					05/18/21 14:33	06/11/21 13:57	1

Method: Ra226_Ra	228 - Con	bined Ra	dium-226 a	nd Radiun	1-228					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium	1.01		0.435	0.442	5.00	0.584	pCi/L		06/15/21 21:24	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: OW-11** Lab Sample ID: 240-149192-2 **Matrix: Water** 

Date Collected: 05/04/21 08:45 Date Received: 05/12/21 08:00

Method: 903.0 - F	Radium-226	(GFPC)								
		` ′	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0732	U	0.108	0.108	1.00	0.183	pCi/L	05/18/21 13:46	06/14/21 21:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.2		40 - 110					05/18/21 13:46	06/14/21 21:19	

Method: 904.0 -	Radium-228	(GFPC)								
		` ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0821	U	0.271	0.271	1.00	0.498	pCi/L	05/18/21 14:33	06/11/21 13:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.2		40 - 110					05/18/21 14:33	06/11/21 13:59	1
Y Carrier	82.6		40 - 110					05/18/21 14:33	06/11/21 13:59	1

Method: Ra226_Ra	228 - Con	nbined Ra	dium-226 a	nd Radium	<b>-228</b>					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.00890	U	0.292	0.292	5.00	0.498	pCi/L		06/15/21 21:24	1

Job ID: 240-149192-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: OW-12** 

Date Collected: 05/04/21 12:05 Date Received: 05/12/21 08:00

Lab Sample ID: 240-149192-3

**Matrix: Water** 

Job ID: 240-149192-1

Method: 903.0 - R	adium-226	(GFPC)								
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.120	U	0.104	0.104	1.00	0.156	pCi/L	05/18/21 13:46	06/14/21 21:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.3		40 - 110					05/18/21 13:46	06/14/21 21:19	1

Method: 904.0 -	Radium-228	(GFPC)								
		,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.410	U	0.294	0.297	1.00	0.461	pCi/L	05/18/21 14:33	06/11/21 13:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.3		40 - 110					05/18/21 14:33	06/11/21 13:59	1
Y Carrier	90.1		40 - 110					05/18/21 14:33	06/11/21 13:59	1

Method: Ra226_Ra	228 - Con	bined Ra	dium-226 a	nd Radium	-228					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.530		0.312	0.315	5.00	0.461	pCi/L		06/15/21 21:24	1

6/17/2021

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: DUP-KLI** 

Date Collected: 05/04/21 00:00 Date Received: 05/12/21 08:00

Lab Sample ID: 240-149192-4

**Matrix: Water** 

Job ID: 240-149192-1

Method: 903.0 - Radium-226 (GFPC)	
	Count
	Uncort

			Unicert.	Oncert.					
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.141	U	0.114	0.115	1.00	0.170 pCi/L	05/18/21 13:46	06/14/21 21:20	1

Total

Carrier %Yield Qualifier Limits Prepared Analyzed Ba Carrier 40 - 110 05/18/21 13:46 06/14/21 21:20 89.5

Method: 904.0 - Radium-228 (GFPC)

226 + 228

MCtiloa: 504.0 - 10	adidiii LLO	(0.10)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.304	U	0.256	0.258	1.00	0.407	pCi/L	05/18/21 14:33	06/11/21 14:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.5		40 - 110					05/18/21 14:33	06/11/21 14:16	1
Y Carrier	88.6		40 - 110					05/18/21 14:33	06/11/21 14:16	1

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

mothod: rtdzzo_rtt	<b>4220 00</b> 111	ibilioa ita	alain <b>LL</b> O a	iia itaaia						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC L	Jnit	Prepared	Analyzed	Dil Fac
Combined Radium	0.445		0.280	0.282	5.00	0.407 p	Ci/L		06/15/21 21:24	1

Dil Fac

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: EB-01** Lab Sample ID: 240-149192-5

Date Collected: 05/04/21 12:05 Date Received: 05/12/21 08:00

**Matrix: Water** 

Job ID: 240-149192-1

Method: 903.0 - I	Radium-226	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0621	U	0.0705	0.0707	1.00	0.177	pCi/L	05/18/21 13:46	06/14/21 21:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.6		40 - 110					05/18/21 13:46	06/14/21 21:20	1

Method: 904.0 -	Radium-228	(GFPC)								
		. ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0578	U	0.251	0.252	1.00	0.443	pCi/L	05/18/21 14:33	06/11/21 14:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.6		40 - 110					05/18/21 14:33	06/11/21 14:16	1
Y Carrier	86.7		40 - 110					05/18/21 14:33	06/11/21 14:16	1

Method: Ra226_Ra	228 - Con	nbined Ra	dium-226 a	nd Radium	1-228					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.00424	U	0.261	0.262	5.00	0.443	pCi/L		06/15/21 21:24	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

**Client Sample ID: KLI-SCS** 

Lab Sample ID: 240-149192-6 Date Collected: 05/06/21 10:24

**Matrix: Water** 

Job ID: 240-149192-1

Date Received: 05/12/21 08:00

Method: 903.0 - F	Radium-226	(GFPC)								
		. ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0907	U	0.109	0.110	1.00	0.180	pCi/L	05/18/21 13:46	06/14/21 21:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.2		40 - 110					05/18/21 13:46	06/14/21 21:20	1
_										

Method: 904.0 -	Radium-228	(GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.425	U	0.365	0.368	1.00	0.587	pCi/L	05/18/21 14:33	06/11/21 14:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.2		40 - 110					05/18/21 14:33	06/11/21 14:16	1
Y Carrier	86.4		40 - 110					05/18/21 14:33	06/11/21 14:16	1

Method: Ra226_Ra2	228 - Con	nbined Rad	dium-226 a	nd Radium	-228					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.516	U	0.381	0.384	5.00	0.587	pCi/L		06/15/21 21:24	1

6/17/2021

## **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
	Ва	
Client Sample ID	(40-110)	
OW-10	84.4	
OW-11	86.2	
OW-12	85.3	
DUP-KLI	89.5	
EB-01	85.6	
KLI-SCS	83.2	
Lab Control Sample	82.0	
Lab Control Sample Dup	87.1	
Method Blank	86.8	
	OW-10 OW-11 OW-12 DUP-KLI EB-01 KLI-SCS Lab Control Sample Lab Control Sample Dup	Client Sample ID         (40-110)           OW-10         84.4           OW-11         86.2           OW-12         85.3           DUP-KLI         89.5           EB-01         85.6           KLI-SCS         83.2           Lab Control Sample         82.0           Lab Control Sample Dup         87.1

Method: 904.0 - Radium-228 (GFPC)

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

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(40-110)	(40-110)	
240-149192-1	OW-10	84.4	87.9	
240-149192-2	OW-11	86.2	82.6	
240-149192-3	OW-12	85.3	90.1	
240-149192-4	DUP-KLI	89.5	88.6	
240-149192-5	EB-01	85.6	86.7	
240-149192-6	KLI-SCS	83.2	86.4	
LCS 160-510305/1-A	Lab Control Sample	82.0	89.3	
LCSD 160-510305/2-A	Lab Control Sample Dup	87.1	90.5	
MB 160-510305/22-A	Method Blank	86.8	84.9	

Ba = Ba Carrier Y = Y Carrier

Eurofins TestAmerica, Canton

Job ID: 240-149192-1

Client: TRC Environmental Corporation. Job ID: 240-149192-1

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-510304/22-A

Lab Sample ID: LCS 160-510304/1-A

**Matrix: Water** 

Analysis Batch: 514296

Client Sample ID: Method Blank

**Prep Type: Total/NA** 

Prep Batch: 510304

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Analyzed Dil Fac Radium-226 0.1200 U 0.103 0.104 1.00 0.156 pCi/L 05/18/21 13:46 06/15/21 07:09

Total

Count

Result Qual

10.88

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 86.8 40 - 110 05/18/21 13:46 06/15/21 07:09

Client Sample ID: Lab Control Sample

75 - 125

Prep Type: Total/NA

Prep Batch: 510304

**Analysis Batch: 514248** LCS LCS **Spike** 

Added

40 - 110

11.3

Total

1.21

1.00

%Rec. Uncert.  $(2\sigma + / -)$ RL %Rec Limits MDC Unit

0.208 pCi/L

LCS LCS Carrier %Yield Qualifier Limits

Lab Sample ID: LCSD 160-510304/2-A

82.0

**Matrix: Water** 

**Matrix: Water** 

Analyte

Radium-226

Ba Carrier

**Analysis Batch: 514248** 

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

96

Prep Type: Total/NA

Prep Batch: 510304

Total LCSD LCSD Spike Uncert.

Analyte Added Result Qual  $(2\sigma + / -)$ 

RL **MDC** Unit %Rec Limits RER Limit 1.25 Radium-226 11.3 1.00 0.163 pCi/L 102 75 - 125 0.26 11.52

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-510305/22-A

**Matrix: Water** 

**Analysis Batch: 513770** 

Client Sample ID: Method Blank

%Rec.

Prep Type: Total/NA

Prep Batch: 510305

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Dil Fac Analyzed Radium-228 Ū 0.255 0.256 1.00 pCi/L 05/18/21 14:33 06/11/21 14:18 0.1192 0.439

> MB MB

Carrier %Yield Qualifier Limits Prepared Dil Fac Analyzed Ba Carrier 86.8 40 - 110 05/18/21 14:33 06/11/21 14:18 40 - 110 Y Carrier 84.9 05/18/21 14:33 06/11/21 14:18

Eurofins TestAmerica, Canton

6/17/2021

**RER** 

# **QC Sample Results**

Client: TRC Environmental Corporation. Job ID: 240-149192-1

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

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

Lab Sample ID: LCS 160-510305/1-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

Analysis Batch: 513948

Prep Type: Total/NA

Prep Batch: 510305

Total LCS LCS %Rec. Spike Uncert. %Rec Analyte Added Result Qual  $(2\sigma + / -)$ RL**MDC** Unit Limits Radium-228 9.64 9.496 1.16 1.00 0.469 pCi/L 75 - 125

LCS LCS %Yield Qualifier Carrier Limits Ba Carrier 82.0 40 - 110 Y Carrier 89.3 40 - 110

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

Lab Sample ID: LCSD 160-510305/2-A Prep Type: Total/NA **Matrix: Water** Analysis Batch: 513948 Prep Batch: 510305 Total

**Spike** LCSD LCSD Uncert. %Rec. **RER** Analyte Added Result Qual  $(2\sigma + / -)$ RL **MDC** Unit %Rec Limits RER Limit Radium-228 1.00 0.397 pCi/L 9.64 9.100 1.10 94 75 - 125 0.18

LCSD LCSD Carrier %Yield Qualifier Limits Ba Carrier 40 - 110 87.1 90.5 40 - 110 Y Carrier

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Job ID: 240-149192-1

#### Rac

#### **Prep Batch: 510304**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149192-1	OW-10	Total/NA	Water	PrecSep STD	
240-149192-2	OW-11	Total/NA	Water	PrecSep STD	
240-149192-3	OW-12	Total/NA	Water	PrecSep STD	
240-149192-4	DUP-KLI	Total/NA	Water	PrecSep STD	
240-149192-5	EB-01	Total/NA	Water	PrecSep STD	
240-149192-6	KLI-SCS	Total/NA	Water	PrecSep STD	
MB 160-510304/22-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-510304/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-510304/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

#### **Prep Batch: 510305**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149192-1	OW-10	Total/NA	Water	PrecSep_0	_
240-149192-2	OW-11	Total/NA	Water	PrecSep_0	
240-149192-3	OW-12	Total/NA	Water	PrecSep_0	
240-149192-4	DUP-KLI	Total/NA	Water	PrecSep_0	
240-149192-5	EB-01	Total/NA	Water	PrecSep_0	
240-149192-6	KLI-SCS	Total/NA	Water	PrecSep_0	
MB 160-510305/22-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-510305/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-510305/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

\_\_\_\_\_

4

**5** 

7

0

10

4.0

13

#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Lab Sample ID: 240-149192-1 **Client Sample ID: OW-10** Date Collected: 05/04/21 10:45 **Matrix: Water** 

Date Received: 05/12/21 08:00

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:19	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513943	06/11/21 13:57	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

**Client Sample ID: OW-11** Lab Sample ID: 240-149192-2 Date Collected: 05/04/21 08:45 **Matrix: Water** 

Date Received: 05/12/21 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:19	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513784	06/11/21 13:59	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

Client Sample ID: OW-12 Lab Sample ID: 240-149192-3

Date Collected: 05/04/21 12:05

Date Received: 05/12/21 08:00

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:19	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513784	06/11/21 13:59	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

**Client Sample ID: DUP-KLI** Lab Sample ID: 240-149192-4 Date Collected: 05/04/21 00:00 **Matrix: Water** 

Date Received: 05/12/21 08:00

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:20	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513770	06/11/21 14:16	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

Eurofins TestAmerica, Canton

Page 17 of 24

Job ID: 240-149192-1

**Matrix: Water** 

#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Lab Sample ID: 240-149192-5

ab odilipic ib. 240-143132-0

**Matrix: Water** 

Job ID: 240-149192-1

Client Sample ID: EB-01
Date Collected: 05/04/21 12:05
Date Received: 05/12/21 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:20	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513770	06/11/21 14:16	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

Client Sample ID: KLI-SCS Lab Sample ID: 240-149192-6

Date Collected: 05/06/21 10:24 Matrix: Water Date Received: 05/12/21 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514232	06/14/21 21:20	SCB	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513770	06/11/21 14:16	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

**Laboratory References:** 

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

2

3

5

<u>о</u>

8

10

11

13

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Job ID: 240-149192-1

#### Laboratory: Eurofins TestAmerica, St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
lowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-22
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

18. CHAIN OF CUSTODY & S	SAMPLE DISCREPANCIES	additional next page	Samples processed by:
	-		
19. SAMPLE CONDITION			
Sample(s)	were received a	ifter the recommended hold	ing time had expired.
Sample(s)			l in a broken container.
	were rec		in diameter. (Notify PM)
Sample(s)			
20. SAMPLE PRESERVATION	V		
		were fu	rther preserved in the laboratory.

WI-NC-099

# **Login Container Summary Report**

240-149192

Temperature readings:

Client Sample ID	Lab ID	Container Type	<u>Con</u> pH	tainer Temp	Preservative Added (mls) Lot #
OW-10	240-149192-A-1	Plastic 1 liter - Nitric Acid	<2		
OW-10	240-149192-B-1	Plastic 1 liter - Nitric Acid	<2		
OW-11	240-149192-A-2	Plastic 1 liter - Nitric Acid	<2		
OW-11	240-149192-B-2	Plastic 1 liter - Nitric Acid	<2		
OW-12	240-149192-A-3	Plastic 1 liter - Nitric Acid	<2		
OW-12	240-149192-B-3	Plastic 1 liter - Nitric Acid	<2		
DUP-KL1	240-149192-A-4	Plastic 1 liter - Nitric Acid	<2		
DUP-KL1	240-149192-B-4	Plastic 1 liter - Nitric Acid	<2		
EB-01	240-149192-A-5	Plastic 1 liter - Nitric Acid	<2		
EB-01	240-149192-B-5	Plastic 1 liter - Nitric Acid	<2		
KLI-SCS	240-149192-A-6	Plastic 1 liter - Nitric Acid	<2		
KLI-SCS	240-149192-B-6	Plastic 1 liter - Nitric Acid	<2		

Ver: 11/01/2020

0845

Date/Time: 5/21

FEDEX

eurofins Environment Testing

# **Chain of Custody Record**

**Eurofins TestAmerica, Canton** 

4101 Shuffel Street NW

North Canton, OH 44720 Phone: 330-497-9396 Fax: 330-497-0772

		I				ı							ı			-
Client Information (Sub Contract Lab)	Sampler:			Brook	Lab PM: Brooks, Kris M	Σ				Carrier	Camer Tracking No(s):	:(s)	0 (4	COC No: 240-136577.1		
Client Contact:	Phone			E-Mail:						State of Origin	Drigin		Ü	Page		Т
ecelving				Kris.	3rooks(	@Euro	Kris.Brooks@Eurofinset.com	£		Michigan	an an			Page 1 of 1		
Company: TestAmerica Laboratories, Inc.					Accredita	itions Re	Accreditations Required (See note)	e note):					7 (	Job #: 240-149192-1		
	<b>Due Date Requested</b>	<u> </u>											Ť	Preservation Codes	des:	Т
13715 Rider Trail North, ,	6/13/2021							Analy	sis Re	<b>Analysis Requested</b>	7			į.		
Gity. Earth City	TAT Requested (days):	8):				$\vdash$								A - nct B - NaOH C - Zn Acetate	M · Hexane N · None O · AsNaO2	
State, Zip. MO, 63045														D - Nitric Acid E - NaHSO4	P - Na2045 Q - Na2SO3	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:				(0		**						108	F - MeOH G - Amchlor H - Ascorbic Acid	R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate	
Email:	:#OM						- 20 C							I - Ice J - DI Water	U - Acetone V - MCAA	
Project Name. Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154					_	B1 8							K - EDTA L - EDA	W - pH 4-5 Z - other (specify)	
Site:	SSOW#:						nime c			_				Other:		
		Sample	Sample Type (C=comp,	Matrix (W=water, S=solid, O=waste/oil,	Id Filtered MSM moh	_deSoe19\0.	_0/PrecSep_						nedmuN ls:			
Sample Identification - Client ID (Lab ID)	Sample Date	Time		BT=Tissue, A=Air)			-00						ю <b>Т</b>	Special I	Special Instructions/Note:	
	(	1	Preservation Code	ion code:									Z			
OW-10 (240-149192-1)	5/4/21	10:45 Eastern		Water		×	×						7	TVA protocol - R: 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
OW-11 (240-149192-2)	5/4/21	08:45 Eastern		Water		×	×						2	TVA protocol - R. 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
OW-12 (240-149192-3)	5/4/21	12:05 Eastern		Water		×	×		_				2	TVA protocol - Ra	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
DUP-KL1 (240-149192-4)	5/4/21	Eastern		Water		×	×						2	TVA protocol - Ra	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
EB-01 (240-149192-5)	5/4/21	12:05 Eastern		Water		×	×						2	TVA protocol - Ra 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
KLI-SCS (240-149192-6)	5/4/21	10:24 Eastern		Water		×	×						2	TVA protocol - Ra 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.	
						_							(8)			
Note: Since laboratory accreditations are subject to change. Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratores. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lests/mainty being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins	places the ownership eing analyzed, the san	of method, an	alyte & accredi shipped back t	tation compliar o the Eurofins	ce upon	out subc	ontract lab	oratories.	This sam	ple shipme be provide	nt is forwar	ded under	chain-of-c	ustody. If the labo	ratory does not currently	

Months Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon ethod of Shipment: Special Instructions/QC Requirements: TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica eceived by: Time: Somewhy by Primary Deliverable Rank: 2 S-12.4 Unconfirmed
Deliverable Requested: I, II, III, IV, Other (specify) Possible Hazard Identification Empty Kit Relinquished by:

13 14

Cooler Temperature(s) °C and Other Remarks

Company

Date/Time:

rquished by: nquished by: Custody Seals Intact: Custody Seal No.:

Client: TRC Environmental Corporation.

Job Number: 240-149192-1

Login Number: 149192

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins TestAmerica, St. Louis

List Creation: 05/13/21 11:08 AM

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 America**

# **ANALYTICAL REPORT**

Eurofins TestAmerica, Canton 4101 Shuffel Street NW North Canton, OH 44720 Tel: (330)497-9396

Laboratory Job ID: 240-149195-1

Client Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

For:

TRC Environmental Corporation. 1540 Eisenhower Place Ann Arbor, Michigan 48108-7080

Attn: Darby Litz

Authorized for release by: 6/17/2021 1:22:47 PM

Kris Brooks, Project Manager II (330)966-9790

Kris.Brooks@Eurofinset.com

·····LINKS ·······

Review your project results through

**Have a Question?** 



Visit us at:

www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

2

3

4

5

6

Q

9

4 4

12

13

# **Table of Contents**

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Method Summary	5
Sample Summary	6
Client Sample Results	7
Tracer Carrier Summary	9
QC Sample Results	10
QC Association Summary	12
Lab Chronicle	13
Certification Summary	14
Chain of Custody	15
Racaint Chacklists	18

4

6

8

3

11

4.0

### **Definitions/Glossary**

Client: TRC Environmental Corporation. Job ID: 240-149195-1

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

#### **Qualifiers**

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

#### **Glossary**

Abbreviation These commonly used abbreviations may or may not be present in this report.

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

%R Percent Recovery
CFL Contains Free Liquid
CFU Colony Forming Unit
CNF Contains No Free Liquid

DER Duplicate Error Ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL Detection Limit (DoD/DOE)

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision Level Concentration (Radiochemistry)

EDL Estimated Detection Limit (Dioxin)

LOD Limit of Detection (DoD/DOE)

LOQ Limit of Quantitation (DoD/DOE)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

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

NC Not Calculated

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

NEG Negative / Absent
POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive
QC Quality Control

RER Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

TNTC Too Numerous To Count

4

5

6

\_

10

11

13

#### **Case Narrative**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-149195-1

Laboratory: Eurofins TestAmerica, Canton

**Narrative** 

Job Narrative 240-149195-1

#### Comments

The EPA Method 904.0 Radium-228, EPA Method 903.0 Radium-226, and Ra226\_Ra228 Combined Radium 226 and Radium 228 analyses were performed at the Eurofins TestAmerica St. Louis laboratory.

#### Receipt

The samples were received on 5/12/2021 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 0.9° C.

#### **RAD**

Method 903.0: Radium 226 prep batch 160-510304: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. DEK-MW-15003 (240-149195-1), DEK-MW-18001 (240-149195-2), (LCS 160-510304/1-A), (LCSD 160-510304/2-A) and (MB 160-510304/22-A)

Method 904.0: Radium-228 Batch 510305: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. DEK-MW-15003 (240-149195-1), DEK-MW-18001 (240-149195-2), (LCS 160-510305/1-A), (LCSD 160-510305/2-A) and (MB 160-510305/22-A)

Method PrecSep\_0: Ra-228 Batch 160-510305: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: DEK-MW-15003 (240-149195-1) and DEK-MW-18001 (240-149195-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep\_0: Ra-228 Batch 160- 510305: During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: DEK-MW-15003 (240-149195-1). This is an indicator of matrix interference.

Method PrecSep STD: Ra-226 Batch 160-510304: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: DEK-MW-15003 (240-149195-1) and DEK-MW-18001 (240-149195-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Ra-226 Batch 160-510304: During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: DEK-MW-15003 (240-149195-1). This is an indicator of matrix interference.

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

2

Job ID: 240-149195-1

5

4

5

6

10

11

12

# **Method Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

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

#### **Protocol References:**

EPA = US Environmental Protection Agency

None = None

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

#### Laboratory References:

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

Job ID: 240-149195-1

1

5

6

8

9

11

4.0

# **Sample Summary**

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-149195-1	DEK-MW-15003	Water	05/03/21 12:33	05/12/21 08:00	
240-149195-2	DEK-MW-18001	Water	05/03/21 11:28	05/12/21 08:00	

Job ID: 240-149195-1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-15003

Date Collected: 05/03/21 12:33 Date Received: 05/12/21 08:00

Lab Sample ID: 240-149195-1

**Matrix: Water** 

Job ID: 240-149195-1

Method: 903.0 - Ra	dium-226	(GFPC)								
		,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0790	U	0.100	0.100	1.00	0.166	pCi/L	05/18/21 13:46	06/15/21 07:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.3		40 - 110					05/18/21 13:46	06/15/21 07:07	1

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0302	U	0.305	0.305	1.00	0.548	pCi/L	05/18/21 14:33	06/11/21 14:17	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.3		40 - 110					05/18/21 14:33	06/11/21 14:17	1
Y Carrier	90.1		40 - 110					05/18/21 14:33	06/11/21 14:17	1

Method: Ra226_Ra2	28 - Con	nbined Rad	dium-226 a	nd Radium	-228					
_			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0488	U	0.321	0.321	5.00	0.548	pCi/L		06/15/21 21:24	1

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-18001

Lab Sample ID: 240-149195-2 Date Collected: 05/03/21 11:28 **Matrix: Water** 

Date Received: 05/12/21 08:00

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.189		0.119	0.120	1.00	0.162	pCi/L	05/18/21 13:46	06/15/21 07:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.1		40 - 110					05/18/21 13:46	06/15/21 07:08	1

Method: 904.0 - I	Radium-228	(GFPC)								
		. ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.639		0.388	0.393	1.00	0.596	pCi/L	05/18/21 14:33	06/11/21 14:17	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.1		40 - 110					05/18/21 14:33	06/11/21 14:17	1
Y Carrier	69.9		40 - 110					05/18/21 14:33	06/11/21 14:17	1

Method: Ra226_Ra	228 - Con	bined Rad	dium-226 a	nd Radium	-228					
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	oncert. (2σ+/-)	oncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.828		0.406	0.411	5.00	0.596	pCi/L	·	06/15/21 21:24	1

Job ID: 240-149195-1

# **Tracer/Carrier Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-149195-1

Method: 903.0 - Radium-226 (GFPC)

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

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(40-110)	
240-149195-1	DEK-MW-15003	79.3	
240-149195-2	DEK-MW-18001	90.1	
LCS 160-510304/1-A	Lab Control Sample	82.0	
LCSD 160-510304/2-A	Lab Control Sample Dup	87.1	
MB 160-510304/22-A	Method Blank	86.8	
Tracer/Carrier Legend			

Method: 904.0 - Radium-228 (GFPC)

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

				Percent Yield (Acceptance Limits)
		Ва	Υ	
Lab Sample ID	Client Sample ID	(40-110)	(40-110)	
240-149195-1	DEK-MW-15003	79.3	90.1	
240-149195-2	DEK-MW-18001	90.1	69.9	
LCS 160-510305/1-A	Lab Control Sample	82.0	89.3	
LCSD 160-510305/2-A	Lab Control Sample Dup	87.1	90.5	
MB 160-510305/22-A	Method Blank	86.8	84.9	

Ba = Ba Carrier Y = Y Carrier

Eurofins TestAmerica, Canton

Client: TRC Environmental Corporation. Job ID: 240-149195-1

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-510304/22-A

Lab Sample ID: LCS 160-510304/1-A

**Matrix: Water** 

Analysis Batch: 514296

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 510304

MB MB Uncert. Uncert. Analyte Result Qualifier  $(2\sigma + / -)$  $(2\sigma + / -)$ RL **MDC** Unit Prepared Analyzed Dil Fac Radium-226 0.1200 U 0.103 0.104 1.00 0.156 pCi/L 05/18/21 13:46 06/15/21 07:09

Total

MB

Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 86.8 40 - 110 05/18/21 13:46 06/15/21 07:09

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Batch: 510304

**Analysis Batch: 514248** Total

Count

LCS LCS %Rec. **Spike** Uncert. Analyte Added Result Qual  $(2\sigma + / -)$ RL **MDC** Unit %Rec Limits Radium-226 11.3 10.88 1.21 1.00 0.208 pCi/L 96 75 - 125

LCS LCS

Carrier %Yield Qualifier Limits Ba Carrier 82.0 40 - 110

Lab Sample ID: LCSD 160-510304/2-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 514248** 

Prep Type: Total/NA

Prep Batch: 510304

Total LCSD LCSD Spike Uncert.

%Rec. **RER** Analyte Added Result Qual  $(2\sigma + / -)$ RL **MDC** Unit %Rec Limits RER Limit 1.25 Radium-226 11.3 1.00 0.163 pCi/L 102 75 - 125 0.26 11.52

LCSD LCSD

Carrier %Yield Qualifier Limits Ba Carrier 40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-510305/22-A

**Matrix: Water** 

**Analysis Batch: 513770** 

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 510305

Dil Fac

6/17/2021

			Count	iolai						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac	
Radium-228	0.1192	U	0.255	0.256	1.00	0.439 pCi/L	05/18/21 14:33	06/11/21 14:18	1	

MB MB Carrier %Yield Qualifier Limits Prepared Ba Carrier 86.8 40 - 110 05/18/21 14:33 06/11/21 14:18 40 - 110 Y Carrier 84.9 05/18/21 14:33 06/11/21 14:18

Eurofins TestAmerica, Canton

Analyzed

# **QC Sample Results**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

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

Lab Sample ID: LCS 160-510305/1-A

**Matrix: Water** 

Analysis Batch: 513948

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Batch: 510305

Job ID: 240-149195-1

Total LCS LCS %Rec. Spike Uncert. %Rec Analyte Added Result Qual  $(2\sigma + / -)$ RL**MDC** Unit Limits Radium-228 9.64 9.496 1.16 1.00 0.469 pCi/L 75 - 125

LCS LCS

%Yield Qualifier Carrier Limits Ba Carrier 82.0 40 - 110 Y Carrier 89.3 40 - 110

Lab Sample ID: LCSD 160-510305/2-A **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Water** 

Analysis Batch: 513948

Prep Type: Total/NA

Prep Batch: 510305

Total

**Spike** LCSD LCSD Uncert. %Rec. **RER** Analyte Added  $(2\sigma + / -)$ RL **MDC** Unit %Rec Limits RER Limit Result Qual Radium-228 1.00 0.397 pCi/L 9.64 9.100 1.10 94 75 - 125 0.18

LCSD LCSD

Carrier %Yield Qualifier Limits Ba Carrier 40 - 110 87.1 90.5 40 - 110 Y Carrier

Eurofins TestAmerica, Canton

6/17/2021

# **QC Association Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

#### Job ID: 240-149195-1

#### Rad

#### **Prep Batch: 510304**

Lab Sample ID 240-149195-1	Client Sample ID  DEK-MW-15003	Prep Type Total/NA	Matrix Water	Method PrecSep STD	Prep Batch
240-149195-2	DEK-MW-18001	Total/NA	Water	PrecSep STD	
MB 160-510304/22-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-510304/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-510304/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

#### **Prep Batch: 510305**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149195-1	DEK-MW-15003	Total/NA	Water	PrecSep_0	- <u> </u>
240-149195-2	DEK-MW-18001	Total/NA	Water	PrecSep_0	
MB 160-510305/22-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-510305/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-510305/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep 0	

\_\_\_\_

4

\_\_\_\_

8

10

11

12

10

#### **Lab Chronicle**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Client Sample ID: DEK-MW-15003 Lab Sample ID: 240-149195-1

Date Collected: 05/03/21 12:33 Matrix: Water

Date Collected: 05/03/21 12:33 Matrix: Wa Date Received: 05/12/21 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514296	06/15/21 07:07	FLC	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513770	06/11/21 14:17	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

Client Sample ID: DEK-MW-18001 Lab Sample ID: 240-149195-2

Date Collected: 05/03/21 11:28 Matrix: Water

Date Received: 05/12/21 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			510304	05/18/21 13:46	HRT	TAL SL
Total/NA	Analysis	903.0		1	514296	06/15/21 07:08	FLC	TAL SL
Total/NA	Prep	PrecSep_0			510305	05/18/21 14:33	MJ	TAL SL
Total/NA	Analysis	904.0		1	513770	06/11/21 14:17	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	514477	06/15/21 21:24	GRW	TAL SL

Laboratory References:

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

Job ID: 240-149195-1

4

5

7

9

11

13

# **Accreditation/Certification Summary**

Client: TRC Environmental Corporation.

Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond

Job ID: 240-149195-1

#### Laboratory: Eurofins TestAmerica, St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
lowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-22
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

2

3

6

8

46

4 4

12

Company

Date/Time: // a/

Method of Shipment

5/12/2

llere

Received by:

Company

1545

- cold stonge

Received by:

Company TRC

5-7-2

Date:

Cooler Temperature(s) °C and Other Remarks:

13 14

5

**Environment Testing** 

6.018.0

Eurofins TestAmerica, Canton

Phone: 330-497-9396 Fax: 330-497-0772

North Canton, OH 44720 4101 Shuffel Street NW

Custody Seals Intact: Custody Seal No.:

Eurofins TestAmerica Canton Sample Receipt Form/Narrative	Login #: 149145
Canton Facility	Cooler unpacked by:
lient Jacob Krenz Site Name	
poler Received on $\frac{5}{12}$ Opened on $\frac{5}{12}$	Trent C
edEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier	Other
Receipt After-hours: Drop-off Date/Time Storage Location	
estAmerica Cooler # Foam Box Client Cooler Box Other	
COOLANT: Wet Ice Blue Ice Dry Ice Water None  Cooler temperature upon receipt  IR GUN# IR-11 (CF +0.1 °C) Observed Cooler Temp. °C Corrected Cooler IR GUN #IR-12 (CF +0.2 °C) Observed Cooler Temp. °C Corrected Cooler Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity  -Were the seals on the outside of the cooler(s) signed & dated?  -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  -Were tamper/custody seals intact and uncompromised?  Shippers' packing slip attached to the cooler(s)?  Did custody papers accompany the sample(s)?  Were the custody papers relinquished & signed in the appropriate place?  Was/were the person(s) who collected the samples clearly identified on the COC?  Did all bottles arrive in good condition (Unbroken)?  Could all bottle labels (ID/Date/Time) be reconciled with the COC?  For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and so the correct bottle(s) used for the test(s) indicated?	Temp. °C Temp. °C Temp. °C Tests that are not checked for pH by Receiving: VOAs No
Are these work share samples and all listed on the COC?	s No
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.	s) No
P. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  Were all preserved sample(s) at the correct pH upon receipt?	No NA pH Strip Lot# <u>HC022887</u>
If yes, Questions 13-17 have been checked at the originating laboratory.  Were all preserved sample(s) at the correct pH upon receipt?  Were VOAs on the COC?  Ye	s) No
Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  Were all preserved sample(s) at the correct pH upon receipt?  Were VOAs on the COC?  Were air bubbles >6 mm in any VOA vials?	No NA pH Strip Lot# <u>HC022887</u> s No
Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  Were all preserved sample(s) at the correct pH upon receipt?  Were VOAs on the COC?  Were air bubbles >6 mm in any VOA vials?  Larger than this.  Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	S No NA pH Strip Lot# HC022887 S No S No NA
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  7. Was a LL Hg or Me Hg trip blank present?  Pontacted PM Date by via Verbal	No NA pH Strip Lot# HC022887 S No S No NA S No S No
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  • Larger than this.  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	No NA pH Strip Lot# HC022887 S No S No NA S No S No
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  7. Was a LL Hg or Me Hg trip blank present?  9. Verbal Voncerning	No NA pH Strip Lot# HC022887 s No s No NA s No s No voice Mail Other
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  7. Was a LL Hg or Me Hg trip blank present?  9. Verbal Voncerning	No NA pH Strip Lot# HC022887 s No s No NA s No s No voice Mail Other
Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  Were all preserved sample(s) at the correct pH upon receipt?  Were VOAs on the COC?  Were air bubbles >6 mm in any VOA vials?  Larger than this.  Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #  Ye  Was a LL Hg or Me Hg trip blank present?  Ye  Ontacted PM  Date  Date  by  via Verbal Verbal  Oncerning	No NA pH Strip Lot# HC022887 s No s No NA s No s No voice Mail Other
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	No NA pH Strip Lot# HC022887 s No s No NA s No s No voice Mail Other  Samples processed by:
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	S No NO NA pH Strip Lot# HC022887 S No S No NA S No S No Voice Mail Other  Samples processed by:
2. Are these work share samples and all listed on the COC?  If yes, Questions 13-17 have been checked at the originating laboratory.  3. Were all preserved sample(s) at the correct pH upon receipt?  4. Were VOAs on the COC?  5. Were air bubbles >6 mm in any VOA vials?  6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	S No NO NA pH Strip Lot# HC022887 S No S No NO NO Noice Mail Other  Samples processed by:  ling time had expired. d in a broken container.

WI-NC-099

were further preserved in the laboratory.

Preservative(s) added/Lot number(s):\_\_\_\_

Sample(s)

Time preserved:

VOA Sample Preservation - Date/Time VOAs Frozen:

Eurofins TestAmerica, Canton 4101 Shuffel Street NW

4101 Shuffel Street NW North Canton, OH 44720	•	Chain of Custody Record	of Cust	ody Re	ecor	~						Environment Testing America
Phone: 330-497-9396 Fax: 330-497-0772	Sampler			I ab PM				S	Camier Tracking No(s)	.(8).	COC No	
Client Information (Sub Contract Lab)				Brook	Brooks, Kris M				7		240-136581.1	
Client Contact: Shipping/Receiving	Phone:			E-Mail: Kris.E	E-Mail: Kris.Brooks@Eurofinset.com	urofins	et.com	Sta	State of Origin: Michigan		Page: Page 1 of 1	
Company TestAmerica Laboratories, Inc.					Accreditatio	ns Requir	Accreditations Required (See note)				Job #: 240-149195-1	
Address: 13715 Rider Trail North,	Due Date Requested: 6/13/2021	ij					¥	Analysis Requested	sted		Preservation Codes	des:
Oiy: Earth City	TAT Requested (days):	398):									A - HCL B - NaOH C - 7n Acetate	M - Hexane N - None O - AsNaO2
State, Zip. MO, 63045	T						_			-	D - Nitric Acid E - NaHSO4	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:										F - MeOH G - Amchlor H - Ascorbic Acid	R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate
Email:	:# OM				(0)							
Project Name: Karn/Weadock CCR Groundwater Monitoring	Project #: 24024154				JO 80						K-EDTA	W - pH 4-5 Z - other (specify)
Site:	SSOW#:				A) as	onst2 (	Dd:				of cor	
Sample Identification - Client ID (Lab ID)	Sample Date	Sample	Sample Type (C=comp, G=grab)	Matrix (Wewater, Sacold, Orwaste/oil, BT-Tissue, A-Ar.)	beretiid bieid M\SM mnoheq eqeSoe14\0.608	0-de25e14\0.406	8226Ra228_GF				TedmuM testoT	Special Instructions/Note:
	X	X	-1 (0)		X							
DEK-MW-15003 (240-149195-1)	5/3/21	12:33 Fastern		Water	×	×	×				2 TVA protocol -	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DEK-MW-18001 (240-149195-2)	5/3/21	11:28 Eastern		Water	×	×	×		_		2 TVA protocol -	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
							-					
				3								
Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lests/maintx being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.	erica places the ownershi trix being analyzed, the so to date, return the signed	p of method, ar amples must be d Chain of Cust	alyte & accredit shipped back to ody attesting to	tation complian to the Eurofins Said complican	ce upon ou estAmerica ce to Eurofi	t subcontra a laborator ins TestAn	act faborato y or other ir nerica.	ies. This sample sl structions will be pr	nipment is forwa ovided. Any ch	irded under ch anges to accre	ain-of-custody. If the lal editation status should be	poratory does not currently brought to Eurofins
Possible Hazard Identification					Samp	le Dispo	sal (Af	e may be asse	ssed if sam	ples are re	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month	1 1 month)
Unconfirmed					]	Return	Return To Client	gsia	Disposal By Lab		Archive For	Months
Deliverable Requested: I, II, IV, Other (specify)	Primary Deliverable Rank:	able Rank: 2			Specie	al Instruc	ctions/QC	Special Instructions/QC Requirements:				
Empty Kit Relinquished by:		Date:			Time:				Method of Shipment:	ipment:		
Relinquished by	Date/Time: <b>5-12-21</b>	11	5	Company	Re	Received by:	FED	EX	Δ	Date/Time:		Company
Relinquished by: FED EX	Date/Time:		0	Company	Re	Received by:	9	7	<u>a</u> *	Date/Time:   5  13 2	5480	Company STL
Relinquished by:	Date/Time:		Q.	Company	A.	Repeived by:		د	Δ	ate/Time:		
Custody Seals Intact: Custody Seal No.:					8	oler Temp	erature(s) °	Cooler Temperature(s) °C and Other Remarks:	ks:			
1					1							000000000000000000000000000000000000000

Client: TRC Environmental Corporation.

Job Number: 240-149195-1

Login Number: 149195

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins TestAmerica, St. Louis

List Creation: 05/13/21 11:16 AM

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.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# **Appendix B Field Notes**

# TRC

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Compliance
PROJECT NUMBER:	418425.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	5/3/21 TO 5/6/21
PURPOSE OF FIELDWORK:	First semiannual 2021 CCR Sampling event
<u> </u>	
WORK PERFORMED BY:	Audrey Cook, Jake Krenz, Javier Jasso
<del>// / / / / / / / / / / / / / / / / / /</del>	-7-21
SIGNED	DATE CHECKED BY DATE



		i	<del>&gt;</del>	(A . h					
PROJECT NAME:	CEC Karn BAP/LI: 2021 G	W Comp DATE:	5/3/21	TIME ARRIVED: \$ ; 00					
PROJECT NUMBER:	418425.0001.00	000 AUTHO	PR: Audrey Cook, Jake Krenz	TIME LEFT: 17:00					
		WEATH	<b>ER</b>						
TEMPERATURE: 60	°F WIND:	5 - <b>  0</b> мрн	VISIBILITY	CLEAR					
	WOF	RK/SAMPLING	PERFORMED						
-SAMPLED,			·						
	nw-15006								
DEK M	W- ISVUE								
DEK-W	W-15005,	DUP-CAPE;	DUP-DEK-BAP						
DEIZIY	MM-1100M								
	VM-12008	<u>z</u>	Krenz Somphen!	MW -15002					
DEK-MW-18001 (MS/MSD) MW-15016									
DEK-MW-15003 MW-15019									
PROBLEMS ENCOUNTERED CORRECTIVE ACTION TAKEN									
	/_	•	1						
	N/A		N/A						
		COMMUNIC	ATION						
NAME	REPRESENTING	COMMON	SUBJECT / COMME	NTS					
C. Batts	LEC	check	11/out						
	INVESTIGA	ATION DERIVE	WASTE SUMMARY						
WASTE MATRIX	QUANTITY		COMMENTS						
71.11.504									
			<del></del>						
Andrea	5/7/2	-1	10.2	5-7-21					
SIGNED		DATE	CHECKED BY	DATE					
		5/112	STILLS BY	DATE					

**REVISED 04/2019** 

DATE



REVISED 04/2019

#### GENERAL NOTES

	/ .								
	KLE/BAP		10						
PROJECT NAME:		DATE:	5-9-21	TIME ARRIVED: 0800					
PROJECT NUMBER:	418425.000 <b>\$</b> .0000	AUTHO	DR: Bikame	TIME LEFT: 1700					
		WEATH	ER						
TEMPERATURE: 55 °F WIND: 5-10 MPH VISIBILITY: Cloudy									
	WORK / SA	MPLING	PERFORMED						
A. Cook Same	led only on -1	ט סי	v-11, ow-12						
Sampled KI	ted only on -1 -2-pcs and box su	1. Ditc	h						
4 1									
		<del> </del>							
PROBL	EMS ENCOUNTERED		CORRECTIV	E ACTION TAKEN					
	• • • • • • • • • • • • • • • • • • •	**		·					
pental me	ter failure		Si brenz to le	using to prick					
			up replacemen	4					
			•						
	CO	MMUNIC	ATION						
NAME	REPRESENTING		SUBJECT / COMM	ENTS					
C. Batts	cec ,	check	in/out						
				· · · · · · · · · · · · · · · · · · ·					
	INVESTIGATION	DERIVE	D WASTE SUMMARY						
WASTE MATRIX	QUANTITY		COMMENTS						
purge water	NM p	wyed	to ground						
And R	5-7-21								

DATE

CHECKED BY



REVISED 04/2019

#### **GENERAL NOTES**

PROJECT NAME:	CEC Karn LF: 2021 GW	Complian	DATE:	5-6-21	TIME ARRIVED: O		
PROJECT NUMBER:	418425.000 <b>4</b> .0			R: Si Krenz			
PROJECT NOMBER.	410425.0004.0	0000	AUTHOR	4. 21 HAY	TIME LEFT: 1230	<u> </u>	
	· · · · · ·		WEATHE	R	e e e		
TEMPERATURE: 60	°F WIND:	0-5		VISIBI	LITY: cheer		
Sumpled 1	and the second s	ORK / SAI	VIPLING I	PERFORMED	· ·		
sampled 1	(L) -) C)						
PROBLEMS ENCOUNTERED CORRECTIVE ACTION TAKEN							
11/0					·		
10/14				NA			
				• /-			
gila de la composición dela composición de la composición dela composición de la composición de la composición de la com		CON	MUNICA	TION			
NAME	REPRESENTING			SUBJECT / CO	MMENTS		
C. Betts	CEC		chea.k	1 fout			
		ļ			· · · · · · · · · · · · · · · · · · ·		
	INVESTI	GATION D	ERIVED	WASTE SUMMARY			
WASTE MATRIX	QUANTITY			COMMEN	ITS		
purge nater	Nm	purged to KLI					
,		<del>                                     </del>					
		<u></u>					
1.2	7/ 8-	-7-21					
SIGNED		DATE		CHECKED BY		DATE	



### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC Karn	BAP/LI: 2021 GW	OAMELED MANE.	A			
PROJECT NO.:	418425.00	01.0000	SAMPLER NAME:	Audrey Cook, Jake Krenz,	Javier Jasso		
WATER LEVEL MEASU	JREMENTS COL	LECTED WITH:		<del></del>	<del></del>		
HER	ON DIPPER-T		TRC A2				
NAME AND MODEL OF IN	STRUMENT		SERIAL NUMBER (IF A	PPLICABLE)			
PRODUCT LEVEL MEA	SUREMENTS C	OLLECTED WIT	Н:	•			
	NA			NA			
NAME AND MODEL OF IN	STRUMENT		SERIAL NUMBER (IF A	PPLICABLE)			
DEPTH TO BOTTOM O	F WELL MEASU	IREMENTS COLI	ECTED WITH:				
HER	ON DIPPER-T			TRC A2			
NAME AND MODEL OF IN	STRUMENT		SERIAL NUMBER (IF A	PPLICABLE)			
PURGING METHOD							
PERIS	STALTIC PUMP			TRC A2			
NAME AND MODEL OF PU	JMP OR TYPE OF	BAILER	SERIAL NUMBER (IF A	PPLICABLE)			
SAMPLING METHOD							
PERIS	STALTIC PUMP			TRC A2			
NAME AND MODEL OF PU	JMP OR TYPE OF	BAILER	SERIAL NUMBER (IF APPLICABLE)				
GEOTECH [	DISPOSABLE FII	_TER	0.45 MICRON				
NAME AND MODEL OF FI	LTERATION DEVI	CE	FILTER TYPE AND SIZE				
DEDICAT	ED POLY TUBIN	lG	☑ LOW-FLOV	V SAMPLING EVENT			
TUBING TYPE	-						
PURGE WATER DISPO	SAL METHOD						
☑ GROUND	☐ DRUM	☐ POTW	☐ POLYTANK ☐ (	OTHER			
DECONTAMINATION A	ND FIELD BLAN	IK WATER SOUF	RCE				
STO	RE BOUGHT	·	LABO	RATORY PROVIDED			
POTABLE WATER SOURCE	CE .		DI WATER SOURCE				
Inl A		5-1-21					
SIGNED	0	DATE	CHECKED BY		DATE		

REVISED 04/2019

DATE

♦ TRC WATER QUALITY METER CALIBRATION LOG YSAMPLER: PROJECT NAME: CEC Karn LF: 2021 GW Compliance MODEL: YSI PRO SS AC, JJ, JK SERIAL #: Ann Arbor PROJECT NO .: 418425.0000.0000 Rema DATE: 21 PH CALIBRATION CHECK SPECIFIC CONDUCTIVITY CALIBRATION CHECK pH 4 / 10 CAL. READING pH 7 TEMPERATURE (LOT #): OGK 445 (LOT #): OG 1941 (LOT#): 66 F 127 CAL. CAL. TIME TIME (EXP. DATE): SV1/22 (EXP. DATE): NOV/22 RANGE (EXP. DATE): JUハ /21 (°CELSIUS) RANGE POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD RANGE 0840 4.00 14.00 7.04 9:00 c845 17.04 1 116 WITHIN WITHIN WITHIN WITHIN Ż Ø 1 400 7.05 17,05 400 0902 1167 11167 14.7 0907 WITHI WITHIN ORP CALIBRATION CHECK D.O. CALIBRATION CHECK CAL. READING **TEMPERATURE** CAL. READING **TEMPERATURE** (LOT #): 19F100017 CAL. CAL. TIME TIME (°CELSIUS) (EXP. DATE):6~4~2024 **RANGE** RANGE (°CELSIUS) POST-CAL. READING / STANDARD OST-CAL. READING /SATURATED AIR WITHIN RANGE WITHIN 2856 10.75 / 10.75 240.6 / 240.6 17.6 0835 15.4 ☐ WITHIN WITHIN 1 WITHIN WITHIN RANGE 1960 15.9 9.60 15.0 243,8 / 243,8 0916 WITHIN ☐ WITHIN **TURBIDITY CALIBRATION CHECK** COMMENTS CALIBRATION READING (NTU) ☑ STANDARD SOLUTION (S) AUTOCAL SOLUTION (LOT#): 18293474 (LOT #): CAL. LIST LOT NUMBERS AND EXPIRATION DATES TIME UNDER CALIBRATION CHECK **RANGE** (EXP. DATE): 4/22 (EXP. DATE): (EXP. DATE): POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD CALIBRATED PARAMETERS CALIBRATION RANGES (1) +/- 0.2 S.U. 0885 10.31 /10.0 П WITHIN 1 +/- 1% OF CAL. STANDARD 1 COND COND: WITHIN П 1 1 ORP ORP: +/- 25 mV WITHIN **VARIES** D.O. D.O.: +/- 5% OF CAL. STANDARD **TURB NOTES** Second readings YSE PRO DSS (1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER rental PROBLEMS ENCOUNTERED CORRECTIVE ACTIONS

CHECKED BY

# → TRC

# WATER QUALITY METER CALIBRATION LOG

						_						
PROJECT NAME:	CEC Karn LF: 2021 GW Co	mpliance		MODEL	: YSC	oro D	\$\$	SAMPL	ER:	(AC) J.	J, JK	(
PROJECT NO.:	418425.0000.0000			SERIAL	#: Ann	Anh	or	DATE:	5-4	1-21		
PH	CALIBRATION CHECK				S	PECIF	IC CONDL	CTIVIT	Y CALIBI	RATION	I CH	HECK
рН 7 (LOT #): <b>ОСКЧЧ 5</b>	pH 4 / 10 (LOT #): Θ <b>GF</b> <sup>12</sup> 7	CAL.	TIME		CAL. READING			TEMPERATURE				
(EXP. DATE): NOV/32 POST-CAL READING/STANDARD	(EXP. DATE): JUN /22 POST-CAL. READING / STANDARD	RANGE	INVIE		(EXP. DAT		SUN/21 G/STANDARD	(°CE	LSIUS)	RANG	E	TIME
7.04 / 7.04	4,00 / 4,00	WITHIN RANGE	0722	1	1167		1167	15	.0	₩I	THIN	07/2
/	1	□ WITHIN RANGE		1	""	1		'		□ wn	THIN NGE	<u> </u>
1	1	☐ WITHIN RANGE		-		1				□ wn	$\rightarrow$	
1	1	☐ WITHIN RANGE				1				□ wn	THIN NGE	
ORP	CALIBRATION CHECK	1 15	<u> </u>	_			D.O. CAL	IBRATI	ON CHE	<u> </u>		
CAL. READING	TEMPERATURE	1	Ι	7	C/	AL. REA		·	RATURE		- 1	
(LOT #): 14 F /00017 (EXP. DATE): 6~4-2024	(°CELSIUS)	CAL. RANGE	TIME			. NEA	DING		LSIUS)	CAL		TIME
POST-CAL, READING / STANDARD		1			POST-CAL.	READING /	SATURATED AIR	I .				
246.0/246.0	13.5	WITHIN RANGE	0727	1			9,60	<del>                                     </del>	<u> </u>	₩I WIT	THIN NGE (	0929
1		☐ WITHIN RANGE				1				□ WIT	THIN NGE	
1		☐ WITHIN RANGE				1				□ WIT	THIN NGE	
1		☐ WITHIN RANGE				1					THIN NGE	
TURBID	ITY CALIBRATION CHEC	CK		_				COMM	ENTS		•	
CALIBRATION	READING (NTU)	l .			☐ AUT	OCAL SO	DLUTION	☑ S	TANDARD	SOLUTIO	ON (S	3)
(LOT#): 182 93474	(LOT #):	CAL.	TIME		(LOT #):			LIST LOT NUMBERS AND EXPIRATION DATE UNDER CALIBRATION CHECK			ON DATE	
(EXP. DATE): 4/22	(EXP. DATE):	RANGE	IIIVIL		(EXP. DAT	E):					ж	
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				CALIBR	ATED PA	RAMETERS		CALIBRATI	ON RANG	ES (1)	
10.17 / 10.0	1	X WITHIN RANGE	6729			ρН		рН:	+/- 0.2 S.	U.		
1 .	1	☐ WITHIN RANGE				COND		COND:	+/- 1% O	F CAL. S	TAN	OARD
/	1	☐ WITHIN RANGE				ORP		ORP:	+/- 25 m\	/		
/	/	☐ WITHIN RANGE				D.O.		D.O.:	VARIES			
	NOTES			7		TURB		TURB:	+/- 5% O	F CAL. S	TANI	DARD
									RATION RAN			
		<u> </u>										
F	DODI ENG ENGGINEEDED						CORRECT	VE ACTIO	NS			
	ROBLEMS ENCOUNTERED											
	ROBLEMS ENCOUNTERED	<u></u>	-									
	ROBLEMS ENCOUNTERED											
	ROBLEMS ENCOUNTERED	<u>ч</u>					W-011				_	



#### WATER QUALITY METER CALIBRATION LOG

y IRC	WATER Q	UALITY	Y ME						
PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	V Complian	ce	MODEL:	YSI P	no Plus	SAMPLER:	AC,(II), J	J
PROJECT NO.:	418425.0001.0000			SERIAL	#: T <del>RC /</del>	12 Rental	DATE: 5-6	-21	
PH (	CALIBRATION CHECK				SPE	CIFIC CONDU	CTIVITY CALIBI	RATION C	HECK
рН 7 (LOT #): ОБ КНЧ5	pH 4 / 10 (LOT #):	CAL.	-		CAL. (LOT #): ტ 6	READING D qu3	TEMPERATURE	CAL.	
(EXP. DATE) NOV/20	(EXP. DATE):	RANGE	TIME		(EXP. DATE):		(°CELSIUS)	RANGE	TIME
POST-CAL, READING / STANDARD	POST-CAL. READING / STANDARD				POST-CAL. RE	ADING / STANDARD		100	
7,04 /7,04	4,00 14,00	WITHIN RANGE	0630		1413	1 1417	25.0	☐ WITHIN RANGE	0627
. 1	1	□ WITHIN RANGE			:	1		□ WITHIN RANGE	
1	/	☐ WITHIN RANGE				1		☐ WITHIN RANGE	
1	1	☐ WITHIN RANGE		]		1		☐ WITHIN RANGE	
ORP	CALIBRATION CHECK			_		D.O. CAL	IBRATION CHE	ĊК	
CAL. READING	TEMPERATURE				CAL.	READING	TEMPERATURE		
(LOT #): (EXP. DATE):	(°CELSIUS)	CAL. RANGE	TIME				(°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD						DING /SATURATED AIR		1	
247.0 / 247.0	13.1	•	0639		10.75	1 10.75	15,4		0642
1		☐ WITHIN RANGE				1		☐ WITHIN RANGE	
1		☐ WITHIN RANGE				1		☐ WITHIN RANGE	
1		☐ WITHIN RANGE				1		☐ WITHIN RANGE	
TURBID	ITY CALIBRATION CHEC	K		•			COMMENTS		
The same of the sa	READING (NTU)			]	AUTOCA	L SOLUTION	☑ STANDARD	SOLUTION (	S)
(LOT#): \329347 <sup>L)</sup> (EXP. DATE): 4/2 <sup>2</sup>	(LOT #): (EXP. DATE):	CAL. RANGE	TIME		(LOT #): (EXP. DATE):		LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			-	CALIBRATE	D PARAMETERS	CALIBRATIO	ON RANGES <sup>(1</sup>	)
10.09 / 10.0	1	WITHIN RANGE	0125		□ pH	<del>-</del> 1	pH: +/- 0.2 S.	U.	
1	1	☐ WITHIN RANGE			□ c	OND	COND: +/- 1% O	CAL. STAN	DARD
1	1	□ WITHIN RANGE				RP	ORP: +/- 25 mV	,	
1	1	☐ WITHIN RANGE			□ D.	.0.	D.O.: VARIES		
	NOTES			-		JRB	TURB: +/- 5% O	CAL. STAN	DARD
	<del></del>					<u>-</u>	(1) CALIBRATION RAN		
			10			·	THE MODEL OF THE V	WATER QUALI	TY METER
	· · · · · · · · · · · · · · · · · · ·								
Р	ROBLEMS ENCOUNTERED					CORRECT	VE ACTIONS		
	· ·						·		
		*							

SIGNED Hy

5-7-21

CHECKED BY

DATE



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Karn	BAP/LI: 2021 GW	/ Compliance	DAT	DATE: \$ < 3 ~ 21				
PROJECT NUMBER:	418425.00	01.0000		AU	AUTHOR: Audrey Cook, Jake Krenz, Jav				
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)		WATER ELEVATION			
DE Karn Bottom Ash F	ond								
DEK-MW-15002	0932	TOC	6.75	15,70					
DEK-MW-15004	1255	TOL	27,75	41.75					
DEK-MW-15005	0925	toc	8,78	22,30					
DEK-MW-15006	0928	706	3.20	21,49					
DE Karn Bottom Ash F	ond and Li	ned Impoundme	nt						
DEK-MW-18001	1 1 1 1								
DEK-MW-15003	1701	TOC	15140	NM					
Karn Lined Impoundm	ent								
OW-10	0945	TOC	6.75	17.90					
OW-11	1305	TOC	21,35	25,44					
OW-12	0936	TOC	17.10	23,42					
Background	* 1 s* 1					<u> </u>			
MVV-15002	0901	TOC	6,56	16.90					
MW-15008	0831	Toc	4,13	17.42					
MW-15016	०४६५	TOC	4.38	8.05					
MW-15019	0845	TOC	4.85	16.86					
<u> </u>		<u> </u>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
				2-1					

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

5-11-21

CHECKED

DATE

SIGNED

# → TRC

PROJECT	NAME:	CEC K	arn <del>LF 2021</del>	GW Comp		PR	EPARED			CHEC	KED
			5. <del>0000</del> .0000	В	Y: A	C, JJ (JI	DATE:5/3	1/21	BY:		DATE:
SAMPLE	ID: NEK	- MW-	13001	WELL DI	AMET	ER: ☑	2"	6" 🗆	OTHER		
WELL MAT			□ ss □	IRON G	ALVA	NIZED S	TEEL		OTHER		
SAMPLE T	YPE:	ਹ GW	□ ww □	sw 🗆 🗈	)I		LEACHATE		OTHER		
PURC	SING	TIME: 10	02 DA	TE: 5/3/	21		AMPLE	TIME:	1128		ATE: 5-3-21
PURGE		PUMP	PERISTALTIC	PUMP					ONDUCTIVI		umhos/cm
METHOD		BAILER						V DO		<u> 7</u> え mg	/L
	WATER:		T/ PVC				DITY: <u>2.37</u>				_
DEPTH TO	воттом	19.65				ION X			OM D	DERATE	☐ VERY
WELL VOL	UME:			GALLON				0.6	_°C OT⊦	IER:	
VOLUME F	REMOVED:			☐ GALLON			R: <u>clear</u>		ODC		none
COLOR:		lear		OR: <u>1014</u>	<u></u>	FILTRA	TE (0.45 um)	☐ YE	s <b>5</b> ≸	NO	
25K	rt <del>o</del> f a		BIDITY				TE COLOR:	4.00		FRATE ODG	DR:
DISPOSAL		-	MODERATE  ID	☐ VER`	Y	COMM	MPLE: X MS ENTS:	MISD		DUP-	<del></del>
	PURGE			1				I	-	WATER	CUMULATIVE
TIME	RATE		CONDUCTIVITY		1	D.O.	TURBIDITY		ERATURE	LEVEL	PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	<u>`</u>	mg/L)	(NTU)		(°C)	3.54	(GAL OR L) INITIAL
1003	<u> 200</u>	7.35	695	173.8		.28	25,2	10			INITIAL
100%	700	7,47	584	137,2		.26	16.3	10.		8.54	l l
1013	200	7,34	566	107.5		.00	14.1	10		8.54	2
1013	200	7.34	563	87.0	1.	91	9.58	10.	4	8.54	3
1023	నాలం	7.32	563	81.2	1.	89	11.5	10.	4	8.54	4
1028	200	7.37	561	61.9	1.	83	8,19	10.	.4	8.54	\$
1033	200	7.30	263	42.4	Į,	80	6.56	10.		8,54	6
1038	200	7.31	562	28.5	į.	78	7.09	10.	, 6	8.54	7
1043	200	728	562	15.6	1:	17	4,13	10	, 7	8.54	8
1048	200	7.28	560	2.4	t.	76	4.28	10	, S	8.54	9
			EST IS COMPI	ETE WHEN						OLLOWIN	IG LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	SFILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D-	NaOH	E - HC	CL F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTEI	RED	NUMB	ER SIZE	TY	PE PR	ESERVATI	IVE FILTERED
6	60mL	VOA	A	□ Y <b>D</b>	<b></b> ¶N						□ Y □ N
3	125mL	Plustic	ß	□ Y 2	Ž N						□ Y □ N
3	125nL	Plastic	A	□ Y 🗷	J N						□ Y □ N
	250mL	Plustic	A		KL N					···	O Y O N
2	14	Plastic	B		<b>X</b> N						DY DN
	SHIPPING METHOD: FEJEK DATE SHIPPED: 5-4-21 AIRBILL NUMBER:										
COC NUMI				GNATURE:		Le	The		TE SIGNE		5-7-21
						4 <u> </u>	<del></del>			_	

### WATER SAMPLE LOG

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn LF: 2021 GW Compli		PREPARED	CHEC	KED
PROJECT NUMBER:	418425.0000.0000	BY:	AC, JJ, JK DATE: 5/3/21	BY:	DATE:

SAMPLEID: DEK-MW-18001

		1017	1000	•					
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
1053	200	7.28	559	-11.2	1.75	2.88	10.6	8.54	10
1058	200	7.27	561	-23.0	1,74	2.61	10.7	8.54	11
1103	200	7.28		-75,0	1.74	2.82	10,6	8.54	<i>1</i> 2
1108	200	7.27	560	-45.0	1.74	2.57	10.7	8,54	13
1113	200	7.26	559	-47.8	1.74	2.59	10.6	8.54	14
1118	TOO	7.29	559	-55.6	1.73	2.43	10.6	8,54	15
1123	200	7.30	55.8	-59.2	1.73	2.51	10.6	8.54	16
1128	200	7.30	558	-64,3	1.72	2.37	10.6	8.54	17
								,	
				***************************************					
			**************************************						
~~~~									
					<del> </del>				
					<b> </b>				
	<b> </b>	<del>                                     </del>							
		<u> </u>							
		<b></b>						<b> </b>	
					-				
	<b></b>				<u> </u>				
	<b></b>		<u> </u>		<del> </del>				
					-				
								<b></b>	
					<u> </u>			<u></u>	

SIGNATURE

Jul My

DATE SIGNED:

5-7-21

# → TRC

PROJECT NAME: CEC Karn BAP/LI: 2021 GW	VC PREPARED	CHECKED
PROJECT NUMBER: 418425.0001.0000	BY: AD JK, JJ DATE: \$ 13/11	BY: 514 DATE: 57-11
SAMPLE ID: DEV-MW-15002 WEL	ELL DIAMETER: 2"  4"  6"	OTHER
	☐ GALVANIZED STEEL ☐	OTHER
SAMPLE TYPE:	□ DI □ LEACHATE □	OTHER
PURGING TIME: 1:14 DATE:53	าง SAMPLE TIME:	13: 08 DATE: 5/3/21
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	PH: 1.3 b su cor ORP: -191, V mV DO:	NDUCTIVITY: 1023 umhos/cm
DEPTH TO WATER: 6.80 T/ PVC	TURBIDITY: 10.32 NTU	,
DEPTH TO BOTTOM: 15.79 T/ PVC	□ NONE Z SLIGHT	☐ MODERATE ☐ VERY
	LLONS TEMPERATURE: 1,9	°C OTHER:
VOLUME REMOVED: 1 SALITERS GAL	LLONS COLOR: CLEAR	ODOR: NONC
COLOR: CULAL ODOR: N	/り//と FILTRATE (0.45 um) 🔀 YES	NO NO
TURBIDITY	FILTRATE COLOR: Chew	FILTRATE ODOR: none
DISPOSAL METHODS GROUND DRUM OTH	VERY QC SAMPLE: ☐ MS/MSD HER COMMENTS: FIUTER (A)	SEO UM DISSULVED MET AL
	TEX SOMMENTO FIGURE (V)	
TIME PURGE PH CONDUCTIVITY OR	RP D.O. TURBIDITY TEMPE	RATURE   WATER   CUMULATIVE   LEVEL   PURGE VOLUME
		°C) (FEET) (GAL OR L)
12:18 200 7.44 1130 -70	7.0	7.02 INITIAL
12:23 200 7.34 1153 - 137	7.8 0.12 23.0 9.9	7.04 16
12:28 200 7.36 1147 -155	5.1 0.07 19.5 9.9	7,04 26
12:37 200 7.37 1112 -157	7.7 0.07 12.9 9.9	7.04 36
12:38 200 1.37 1100 -162	1.8 0.01 12.45 9.9	7.04 4L
12:43 200 737 1092 -166	6.4 0.08 11.68 9.9	7.04 56
12:48 200 7.37 1084 -170	1.5 0.08 10.21 9.9	7.04 66
12: (3) 200 7:37 1060 -177	7.1 0.06 [0.62 9.9	7.04 76
12:58 200 7.37 1050 -170	9.5 0.06 10.90 9.9	7,84 86
13:03 206 7.37 1031 -196	0.4 0.08 10.29 9.9	7.04 82
NOTE: STABILIZATION TEST IS COMPLETE WH	HEN 3 SUCCESSIVE READINGS ARE WIT	HIN THE FOLLOWING LIMITS:
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10	D.O.: +/- <b>0.3</b> TURB: +/- <b>10 %</b>	or = 10 TEMP.: +/-</td
BOTTLES FILLED PRESERVATIVE CODES A - NON	NE B - HNO3 C - H2SO4 D -	NaOH E - HCL F
NUMBER SIZE TYPE PRESERVATIVE FI	FILTERED NUMBER SIZE TYP	PE PRESERVATIVE FILTERED
2 12 6 6	YXN 1 125my P	BY DN
2 60m VOA A -	Y DEON	
1 125 P B	Y K N	
	YON	
1 250 P A D	Y	□ Y □ N
SHIPPING METHOD: Fed-ex DATE SHIP	IPPED: 5-5-21 AIR	BILL NUMBER:
COC NUMBER: SIGNATUR	RE: DAT	TE SIGNED:

♦ TAC

#### WATER SAMPLE LOG

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Co		PREPARED		CHE	CKED
PROJECT NUMBER:	418425.0001.0000	BY:	AC, JK, JJ DATE: \$ /3/2/	BY:	ZK	DATE:5->-21

SAMPLE ID: DEK-MW-15002

TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE
I IIVIL	RATE							LEVEL	PURGE VOLUME
17:118	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU) 10.32	(°C)	(FEET)	(GAL OR L)
13:08	200	7.38	1023	- 181 , 4	0.09	10.36	9.7	7.64	102
13:45									
***************************************									
				······································				***************************************	
	·····								
		·		····					
	***************************************								
								<del></del>	
	***************************************							·····	
									1
						***************************************			
		***************************************							
								de esta de desta de la compansión de la co	
		~~~							
						<del></del>			
				-17-11		******		***************************************	
						*****************			
					~~~				
								***************************************	
				**************************************					
L							J		

SIG	NAT	ı IR	Ę٠
SIG	IAW I	ŲΓ	⊏.

Brown.	C
<del>// • • • • • • • • • • • • • • • • • • </del>	

# → TRC

PROJEC	T NAME:	CEC H	(arn LF: 2021	GW Comp	PR	EPARED		CHE	CKED
PROJEC <sup>-</sup>	T NUMBEI	R: 41842	5.0000.0000	BY:	AC, JJ,	DATE: 5-	3-21 BY:		DATE:
SAMPLE	ID: /	EK-M	w - 1500	3 WELL DIAM	/IETER: 🗵	2" 🗌 4" 🔲	6" 🗌 OT	HER	
WELL MAT	ΓERIAL:	☑ PVC	□ ss □	IRON 🗌 GAI	VANIZED:	STEEL	□ от	HER	
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗆 DI		LEACHATE	□ от	HER	
PUR	GING	TIME: 1	15 D	ATE: 5-3-21	S	AMPLE			ATE: 5-3-21
PURGE METHOI	٠	PUMP BAILER	PERISTALTIC	PUMP	PH:		U CONDU	CTIVITY: <u>34</u>	이나 umhos/cm g/L
DEDTH TO		16.40	T/ DVC		_	DITY: 4,63			g/L
	D BOTTOM		T/ PVC					MODERATE	☐ VERY
WELL VOL			LITERS	☐ GALLONS			4.9 °c	OTHER:	
	REMOVED		☑ LITERS	GALLONS	<del></del>	R: chem		ODOR:	none
COLOR:		. <u></u>		OR: None		ATE (0.45 um)		MDOR	
132311.			BIDITY			TE COLOR:		FILTRATE OD	OR:
NONE	☐ SLI		MODERATE	☐ VERY		AMPLE: MS	/MSD	DUP-	
DISPOSA			ND 🗌 DRUM	OTHER	COM	MENTS:			
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERAT	URE WATER	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
1218	100	8.23	346.0	31.0	2.51	6.08	15,2	17, 36	INITIAL
1343	100	3.07	339,7	19.9	2.11	4.64	14.9	17.61	,5
1728	100	8,03	339.5	16.6	2.02	4.57	14.9	17.70	
1233	100	8.02	340,4	13.0	1.88	4.63	14.9	17,75	1.5
							***************************************		
**************************************	L								
NC.	TE: STARI	ILIZATION :	FEST IS COMP	LETE WHEN 3 S	LICCESSIV	E DEADINGS /	DE WITHIN	THE EOU OWI	MG I IMITS:
pH: +/-		COND.: +/-			.O.: +/- <b>0.3</b>			= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaO	H E-H	CL F
NUMBER	SIZE	TYPE	PRESERVAT	VE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVAT	IVE FILTERED
2	60mL	VOA	A		N				□ Y □ N
1	125mL	plastic	A		N				□ Y □ Z
1	125mL	]	B		N				□ Y □ N
1	250mL	J	A	□ Y 🕦	N				
ર	14	PlushL	A	□ Y <b>X</b> 3	N				
SHIPPING	METHOD:	Fedex	, D.	ATE SHIPPED:	5-4	1-21	AIRBILL	NUMBER:	
COC NUM	BER:		s	GNATURE:	And	They	DATE SI	GNED:	5-7-21

# ◆ TRC

PROJECT NAME: CEC Karn BAP/L	/LI: 2021 GW C PREPARED CHECKED					
PROJECT NUMBER: 418425.0001.000	00 BY: A	C, JK, JJ DATE: 5/3	151 BA: 2	L DATE: 5-7-2)		
SAMPLE ID: DEK-MW- SUBY WELL DIAMETER: 2" 4" 6" OTHER						
WELL MATERIAL: ☑ PVC ☐ SS	☐ IRON ☐ GALVA	NIZED STEEL	☐ OTHER			
SAMPLE TYPE:	□ SW □ DI	LEACHATE	☐ OTHER			
PURGING TIME 13:50	DATE: () 3) 2)		TIME: 14:16	1 1 1 1 1 1 1		
PURGE ☑ PUMP PERISTAL' METHOD: ☐ BAILER	TIC PUMP	PH: 1.54 SI ORP: 174.6 m	v do: <u>6</u> .	TY: <u>632</u> umhos/cm . <b>12</b> mg/L		
DEPTH TO WATER: 27.73 T/ PVC		TURBIDITY: 7.86	2 NTU			
DEPTH TO BOTTOM 12.0 T/ PVC		ĎSNONE □ SLIC		DERATE VERY		
WELL VOLUME: NA LITERS	GALLONS		<u>1.%</u> ℃   от⊦			
VOLUME REMOVED: 4 LITERS	GALLONS	COLOR: CLEAR	ODC	DR: ABNG	_]	
COLOR: CLEAR	ODOR: NONE	FILTRATE (0.45 um)	□ YES 🏋			
TURBIDITY		FILTRATE COLOR:	FIL1	FRATE ODOR:	] .	
NONE SLIGHT MODERAT	E	QC SAMPLE: MS/	MSD 🗆	DUP-		
DISPOSAL METHOD: ☐ GROUND ☐ DR	UM  OTHER	COMMENTS:	<i>*</i>		]	
TIME PURGE PH CONDUCTION		D.O. TURBIDITY	TEMPERATURE	WATER CUMULATIVE LEVEL PURGE VOLUME	Ī	
(ML/MIN) (SU) (umhos/c		mg/L) (NTU)	(°C)	(FEET) (GAL OR L)	-	
13:50 200 7.60 673	-   -	0.64 7.74	14.5	L 1.1)	-	
13:11 200 7.18 629		29 7.70	14.5	28.02 L	_	
14:00 ~00 7.55 631	-172.6 0	25 6.54	14.7	18.07 76	_	
14:05 200 7.52 631	-171.80	31 8.01	14.8	28.05 JL		
14:10 200 7.54 672		1,20 7.20	14.8	28.67 46		
					_	
					-	
					-	
				<u> </u>	-	
NOTE: STABILIZATION TEST IS CO		CESSIVE READINGS A			_	
BOTTLES FILLED PRESERVATIVE COL	DES A - NONE B -	HNO3 C - H2SO4	D - NaOH	E- HCL F		
NUMBER SIZE TYPE PRESERY	ATIVE FILTERED	NUMBER SIZE	TYPE PR	ESERVATIVE FILTERED		
2 11 6 8	□ Y DXÎ N	1-125-6	$\theta$	8 X D N	] N.U	
2 COMIVOA A	□ Y <b>S</b> K N		,	□ Y □ N		
1 IZIMU P A	□ Y 128' N					
1 125 ML 8 B	□ Y Dæ N				-	
1 251ML P A	□ Y X N			D Y D N		
SHIPPING METHOD: Feler		m 6- 01	1	DED:	7	
	DATE SHIPPED:	5-5-21	AIRBILL NUM	DER.	_	

<b>&lt;&gt;</b>	TA	C

PROJECT NAME: CEC K	Karn BAP/LI: 2021 GW C	PR	EPARED		CHECK	(ED
PROJECT NUMBER: 41842	5.0001.0000	BY: AC, JK, J	J DATE: SIN	BA: 2	K	DATE: 5-7-21
SAMPLEID: DEK.MW	- 15005 WELL	DIAMETER: 🖸	2"	] OTHER		
WELL MATERIAL: ☑ PVC	☐ SS ☐ IRON ☐	GALVANIZED S	TEEL.	OTHER		
SAMPLE TYPE:	□ww □sw □	DI 🗆	LEACHATE [	] OTHER		
PURGING TIME:	1.55 DATE: 5/3/	ıl s	AMPLE TIME	11:35		TE: 5/3/4
PURGE ☑ PUMP METHOD: ☐ BAILER	PERISTALTIC PUMP	PH: ORP:	1000	ONDUCTIVITO:	ΓΥ: <u>629</u> Σ <u>1</u> mg/l	
DEPTH TO WATER: 1 14	T/ PVC	TURBI	DITY: 3.68 N	TU		
DEPTH ТО ВОТТОМ 12.36	T/ PVC	DZ NOI	NE SLIGHT	☐ MOD	ERATE	☐ VERY
WELL VOLUME: NA	LITERS GALLO	ONS TEMPE	RATURE: 10,6	_°с отн	ER:	
VOLUME REMOVED: 8 し	LITERS GALLO		R: CLEAR	ODO	R: <u>(/</u> /	s NE
COLOR: LIEAR	ODOR: N (	NE FILTRA	TE (0.45 um) 🔲 YI	s 🗷	NO	
ند ا	BIDITY	FILTRA	TE COLOR:	FILT	RATE ODOI	₹:
NONE SLIGHT	MODERATE	RY QC SA	MPLE: MS/MSD	<u>X</u>	DUP- 12	12-BAP; D
DISPOSAL METHOD GROUN	ND DRUM OTHE	R COMM	ENTS:		Water	D: F6-DEE
TIME PURGE PH RATE (ML/MIN) (SU)	CONDUCTIVITY ORP (umhos/cm) (mV)	D.O. ( mg/L)	TURBIDITY TEM (NTU)	PERATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
10:55 200 7.68		2 0.34	7 41 10	35	8.92	INITIAL
11:00 200 7.59	631 -157	.3 0 17	6.48	รัว	0 93	16
11:05 200 7.60	631 -159	. 70.11	4-99 14	6	8.93	26
11:10 200 7.61	630 -165	.1 0.10	7.5-5- 10	. 6	8.93	36
11:15 200 7.62	628 -174.	9 6,07	4.80 10	. 6	8,93	76
11:20 200 7.63	612 -182	Y 0.08	6.18 10	, 7	8,94	Si
11:25 200 7.62	616 -194.	2 0.06	8.29 10	, 6	8,94	66
11:30 200 762	613 -102	6 0.08	4.01 10.	6	8.94	74
11:35 200 7.61	629 -199.	7 0.07	3.68 16.	6	8.94	76
	TEST IS COMPLETE WHE					
pH: +/- <b>0.1</b> COND.: +/-		D.O.: +/- <b>0.3</b>	TURB: +/- <b>10</b> %	or =</td <td></td> <td>EMP.: +/-</td>		EMP.: +/-
	ATIVE CODES A - NONE		<del>- 1</del>	- NaOH	E - HCL	
NUMBER SIZE TYPE		ERED NUMBI	ER SIZE T	/PE PRI	ESERVATIV	<del></del>
M IL P		Sk N				
4 GUML VOA		N N	_		<i>y</i>	
2 12566		N			······································	
2 125m2 f	A PY	N				
2 210ml f	<u> </u>	PN				
SHIPPING METHOD: Fede	DATE SHIPP	ED: <u>5-5-</u>	- <u>21</u> AI	RBILL NUME	BER:	
COC NUMBER:	SIGNATURE:		D	ATE SIGNED	:	

PROJECT NAME:	CEC	Karn BAP/LI: 2	.021 GW C	PF	REPARED		CHE	CKED
PROJECT NUMBE	R: 41842	5.0001.0000	BY:	AC, JK,	JJ DATE:513	U BY:	2ĸ	DATE: 5
SAMPLE ID: 08	e-Mu	1-15006	WELL DIAM	IETER: 🗵	2"	6"	HER	
WELL MATERIAL:	☑ PVC	□ ss □	IRON 🗌 GAL	VANIZED	STEEL	□ от	HER	
SAMPLE TYPE:	☑ GW	□ ww □	SW □ DI		LEACHATE	🗆 от	HER	
PURGING	TIME: 9:	us D	ATE: 5/3/21	5	SAMPLE	TIME: ) (	: 25	DATE: \$\\\^2\\^2
METHOD:	PUMP	PERISTALTIC	PUMP	PH:	<del></del> ,	<del>}</del>	CTIVITY: 11	
Ш	8.VS	T/ D//0		ORP:			0.07	ng/L
DEPTH TO WATER:		T/ PVC		— □XNC		NTU ☐	MODERATE	□ VI
WELL VOLUME:	NA	☐ LITERS	[] GALLONS			7.7 °c	OTHER:	
VOLUME REMOVED		LITERS	GALLONS		R: CUEA		ODOR:	NONE
COLOR: A/O	<del></del>	- /	DOR: NONE		ATE (0.45 um)		₩ NO	
-		BIDITY			TE COLOR:		FILTRATE O	DOR:
NONE ☐ SI		MODERATE	☐ VERY		AMPLE: MS	S/MSD	DUP-	
DISPOSAL METHO	GROU	ND 🗌 DRUM	OTHER	COM	MENTS:			
TIME PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERAT	URE WATER	1
(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET	
9:50 200	1.33	113	58.6	0.45	6.24	10,7	8.3	
7.3)	7.37	1139	51.3	0.19	231	10.7	8.3°	
10:00	7.44	1138	-81,2	0.1 <u>M</u>	8.56	10.6	8.3	3 20
[0:01]	1,47	1139	-119.6	0.12	7.72	10.7	8.4	
16:10	7,49		-128.7	0.13	6.44	10.6	8, 40	
10:13	1,50	1137	145.6	0.10	8.15	10.8	8.40	
10:20	7.50	1140	_ 152, 0	0.16	8.46	10.6	8.4	
11125 4	1,53	1140	-152.6	0.09	5,30	10.7	8.4	0 70
NOTE: STAE	ILIZATION	TEST IS COMPI	LETE WHEN 3 S	UCCESSIV	'E READINGS A	ARE WITHIN	THE FOLLOW	ING LIMITS:
pH: +/- <b>0.1</b>	COND.: +/-	3 % ORP:	: +/- <b>10</b> D.	O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/</td>	TEMP.: +/
BOTTLES FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaO	Н Е-Н	ICL F
NUMBER SIZE	TYPE	PRESERVATI	VE FILTERE	NUMB	ER SIZE	TYPE	PRESERVA	TIVE FILT
2 16	ρ	В	D Y B	N				□ Y
2 60ml	VOA	A		N				_ Y
1 12501	P	B		N				□ Y
1 1- 0	P	A		N				□ Y
1 /Wat	i e							

# \_**◇** TRC

PROJECT NAME: CEC Karn BAP/	'LI: 2021 GW C	PREPARED		CHECKED
PROJECT NUMBER: 418425.0001.00	000 BY: A	AC, JK, JJ DATE: 5	N BY:	SK DATE: 5-7-21
SAMPLE ID: DW-10	WELL DIAMET	FER: ☑ 2" ☐ 4" ☐	6" ☐ OTHER	
WELL MATERIAL: ☑ PVC ☐ SS	☐ IRON ☐ GALVA	NIZED STEEL	☐ OTHER	
SAMPLE TYPE:	□ SW □ DI	☐ LEACHATE	☐ OTHER	
PURGING TIME: 9:25	DATE: SMN	SAMPLE	TIME: 10;45	- DATE: 5/4/7.)
PURGE PUMP PERISTAL	TIC PUMP	PH: 7.07 s		
BAILER			, — L — — — — — — — — — — — — — — — — — —	. 68_ mg/L
DEPTH TO WATER: 6,70 T/ PVC DEPTH TO BOTTOM: 19,00 T/ PVC			NTU	
WELL VOLUME: NA ☐ LITER.	S		<u></u>	DERATE VERY
VOLUME REMOVED: 6 LITER		COLOR: CLEAC		NER: OR: NONE
COLOR: (LEAC	ODOR: NONE	FILTRATE (0.45 um)		NO
TURBIDITY		FILTRATE COLOR:		TRATE ODOR:
NONE SLIGHT MODERAT	TE	QC SAMPLE: MS		DUP-
DISPOSAL METHOD ☐ GROUND ☐ DE	RUM   OTHER	COMMENTS:		
TIME PURGE PH CONDUCTION	IVITY ORP	D.O. TURBIDITY	TEMPERATURE	WATER CUMULATIVE
(ML/MIN) (SU) (umhos/c	em) (mV) (	mg/L) (NTU)	(°C)	LEVEL PURGE VOLUME (FEET) (GAL OR L)
9:25 200 730 611.		.99 35.7	10.2	6.88 INITIAL
9:36 200 7.12 613	1224 1	.92 43.4	10,2	1.01 IL
9:35 200 7.03 618	38.4 1	84 40.3	105	7.04 26
9:40 200 7.02 621	68, 4' 1,	79 28.0	10.5	1.06 3L
9:95 200 7.00 621	53.3	.76 22.9	10,5	7.10 90
9:56 200 6.98 623	40,7 1	75 20,7	10,6	1.12 SL
9:55 201 6.99 624	123,4 1	73 17.7	10.6	7.13 60
0:00 200 7.01 624	7.8 1	172 15,9	10,7	7.15 76
10:05 200 7.00 620	1 -2.0 1.	7/ 17.8	10,7	7.17 76
10:10 200 7.03 673	-17.4 1:	76 13.8	10.7	7,20 96
NOTE: STABILIZATION TEST IS CO				
pH: +/- <b>0.1</b> COND.: +/- <b>3</b> %	DRP: +/- <b>10</b> D.O.:	+/- <b>0.3</b> TURB: +/-	10 % or =</td <td>10 TEMP.: +/-</td>	10 TEMP.: +/-
BOTTLES FILLED PRESERVATIVE COD	DES A - NONE B -	HNO3 C - H2SO4	D - NaOH	E-HCL F
NUMBER SIZE TYPE PRESERV	/ATIVE FILTERED	NUMBER SIZE	TYPE PR	ESERVATIVE FILTERED
2 11 P B				
2 LUML VOA A	□ Y Æ N			□ Y <b>□</b> N
1 Irsal P B	□ Y DE N			□ Y □ N
1 175ml P 9	U S V			
1 Buni P 4				
SHIPPING METHOD: Felex	DATE SHIPPED:	5-5-21	AIRBILL NUM	BER:
COC NUMBER:	SIGNATURE:		DATE SIGNED	D:

# **WATER SAMPLE LOG**

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Co		PREPARED		CHEC	KED
PROJECT NUMBER:	418425.0001.0000	BY:	AC, JK, JJ DATE: SIN N	BY:	SK	DATE: 5-7-21

SAMPLE ID: 0 W - 10 PURGE WATER CUMULATIVE CONDUCTIVITY TEMPERATURE TIME ORP D.O. TURBIDITY RATE LEVEL PURGE VOLUME ( mg/L) (ML/MIN) (SU) (umhos/cm) (mV) (NTU) (FEET) (GAL OR L) 200 10:15 7.05 622 -23.9 1221 10.7 7.15 1.70 100 200 1.70 11.98 10,6 7.15 10:20 7,64 621 114 7.06 10.6 200 7.18 いいしい 1.69 126 7.07 0:30 200 1.67 10.6 7.19 りし 1,69 10.6 7.07 7.19 146 200 200 10.6 10:40 7,20 7.07 69 KL 10:45 200 10,5 7.26 166

SIGNATURE:	Arm	

DATE SIGNED: 1/4/L/

PROJECT NAME: CEC Karn BAP/LI: 20	21 GW C	PREPARED		CHECKED			
PROJECT NUMBER: 418425.0001.0000	BY: A	C, JK, JJ DATE:5 V	IN BY: 3	SK DATE: 5-7-21			
SAMPLE ID: 0 \( \sigma - \ildot\)	WELL DIAMETI	ER: 🗸 2" 🗌 4" 🔲	6" OTHER				
WELL MATERIAL: ☑ PVC ☐ SS ☐ I	IRON 🗌 GALVAN	NIZED STEEL	☐ OTHER	R			
SAMPLE TYPE: ☑ GW ☐ WW ☐ \$	SW 🗆 DI	☐ LEACHATE	OTHER				
PURGING TIME: 7:50 DAT	TE: SIN 21	SAMPLE	TIME: 8,45	DATE: 5/4/21			
PURGE PUMP PERISTALTIC PUMP  METHOD:  BAILER  PH:   PH:   ORP:   III.   MV DO:   NV DO:   MV DO:   MV DO:   MV DO:   MV MV DO:   MV M							
DEPTH TO WATER: 1.50 T/ PVC TURBIDITY: 1.70 NTU							
DEPTH TO BOTTOM 15.19 T/ PVC		NONE SLIC	_ ЭНТ_ □ МО	ODERATE   VERY			
WELL VOLUME: NA LITERS CALLONS TEMPERATURE: 11. J °C OTHER:							
VOLUME REMOVED: LITERS GALLONS COLOR: ODOR: NONE							
COLOR: LULA C ODC	OR: NONE	FILTRATE (0.45 um)	YES 🔀	LNO			
TURBIDITY		FILTRATE COLOR:	FI	LTRATE ODOR:			
□ NONE 🎢 SLIGHT □ MODERATE	☐ VERY	QC SAMPLE: MS/	MSD	DUP			
DISPOSAL METHOD: GROUND ☐ DRUM	OTHER	COMMENTS:					
TIME PURGE PH CONDUCTIVITY		D.O. TURBIDITY	TEMPERATURE	LEVEL   PURGE VOLUME			
(ML/MIN) (SU) (umhos/cm) 1.50 20th 9.3に 327 1	<u> </u>	mg/L) (NTU) (NTU)	(°C)	(FEET) (GAL OR L)			
	- 3			22.05			
			11.3				
0. 0 1.31 30 3		42 11.46	<del></del>	22.77 76			
8:05 200 9.37 307.2 3:10 200 9.43 309 6			11.5				
2:10 100 4.01 309.6		14 15.2		72.89 7.56			
19 13 1			11.4				
3:20 100 9.21 311.6	- 4	94 12.07	11.4	22.96 4.50			
9:20 100 9.21 711.6		.44 8 79	11. J	22.91 5.62			
9.30 100 9.21 311.6	114.96 4	,49 6.06	11.5	22.93 5.5 0			
8:35 100 9.21 312.2	112.9 1.	90 3.96	11.5	22.94 6.0 6			
NOTE: STABILIZATION TEST IS COMPLET PH: +/- 0.1 COND.: +/- 3 % ORP: -	'	CESSIVE READINGS A					
BOTTLES FILLED PRESERVATIVE CODES	A - NONE B -	HNO3 C - H2SO4	D - NaOH	E - HCL F			
NUMBER SIZE TYPE PRESERVATIV		NUMBER SIZE	· · · · · · · · · · · · · · · · · · ·	PRESERVATIVE FILTERED			
2 10 8	□ Y Ox N						
2 bomb VOA A	□ Y X N						
1 1212 / 6	- Y 50 N						
1 12 Smy P A	V X N						
1 Zivni P A	V SON						
	TE SHIPPED:	5-5-21	AIRBILL NU	MBER:			
			DATE SIGN	ED.			

#### **WATER SAMPLE LOG**

(CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Co		PREPARED		C	CHECKED
PROJECT NUMBER:	418425.0001.0000	BY:	AC, JK, JJ DATE:	BY:	2K	DATE: 5-7-21

	ID: 0 V	-						WATER	CUMULATIVE
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	LEVEL	PURGE VOLUM
0	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	22.V	(GAL OR L)
8:40	100	4.60	312.6	11.9	1, 0	<b>3</b> . 84 8.70	11.5		6.56
1.45	106	9.21	(umhos/cm) 312.6 312.7	III.8	1.81	8,70	11.5	22.95	7.0 L
			•						
		<u> </u>							
					-				
				<b> </b>					
	<del> </del>	<del> </del>							
	<del> </del>								
					<u> </u>		-		
		<u> </u>			ļ				
					<u> </u>				
·····									
		<del>                                     </del>							
· · · · · · · · · · · · · · · · · · ·				<del> </del>				<b></b>	
		<del></del>					<u> </u>	ļ	
	<u> </u>	<del> </del>		<del> </del>	-			-	
	<b></b>			ļ				-	
								<u> </u>	<b></b>
	<b></b>								
	<del> </del>	<del>                                     </del>		1	1	<b> </b>			

SIG	NAT	JRE:

fore	Low
<i>V V</i>	

DATE SIGNED: S/4/21

PROJECT NAME: CEC Karm BAP/LI: 2021 GW C PREPARED CHECKED  PROJECT NUMBER: 418425.0001.0000 BY: AC, JK, JJ DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) DATE: \( \lambda \) BY: SK DATE: \( \lambda \) BALER DOTHER  PURGING TIME: \( \lambda \): \( \lambda \): \( \lambda \) DATE: \( \lambda \) \( \lambda \) DAT					
Well DIAMETER:   2"   4"   6"   OTHER					
WELL MATERIAL:					
SAMPLE TYPE:   GW   WW   SW   DI					
PURGING TIME:   :\( \) DATE: \( \frac{1}{1} \) \( \frac{1}{1} \) \( \) DATE: \( \frac{1}{1} \) \( \frac{1}{1} \) \( \) DATE: \( \frac{1}{1} \) \( \frac{1}{1} \) \( \) DATE: \( \frac{1}{1} \) \( \) DATE: \( \frac{1}{1} \) \( \frac{1} \					
PURGE					
PURGE					
METHOD:					
DEPTH TO WATER:   7.					
DEPTH TO BOTTOM 13.50 T/ PVC					
WELL VOLUME: NA   LITERS   GALLONS   TEMPERATURE: 11.6 °C   OTHER:   VOLUME REMOVED:   MITTERS   GALLONS   COLOR: (JCAK)   ODOR: (VIVE   COLOR: (JCAK)   ODOR: (JCAK)   ODO					
COLOR:					
TURBIDITY					
□ NONE □ SLIGHT ☑ MODERATE □ VERY □ QC SAMPLE: □ MS/MSD ☑ DUP- 1/2 □ DISPOSAL METHOD □ GROUND □ DRUM □ OTHER □ COMMENTS: FIELD BLAFVK H&R &  TIME PURGE RATE (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GALOR L)  11: 75					
DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: FIELD BLANK HERE.  TIME PURGE RATE (SU) (UMHOS/CM) (MV) (MV) (MV) (MV) (MV) (MV) (MV) (M					
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL (GALOR L) (MIMIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GALOR L) (MIMIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GALOR L) (MIMIN) (SU) (17.70 STO) -36.6 (MIMIN) (NTU) (SU) (TO) (TO) (MIMIN) (MIMIN) (SU) (MIMIN) (MI					
TIME   RATE   PH   CONDUCTIVITY   ORP   D.O.   TORBIDITY   TEMPERATURE   LEVEL   PURGE VOLUME (GAL OR L)					
(ML/MIN)   (SU)   (umhos/cm)   (mV)   (mg/L)   (NTU)   (°C)   (FEET)   FORGE VOLLOME (FEET)   (GAL OR L)   (11.75)   10.0   7.20   5.74   1   2.06   39.1   12.7   7.70   INITIAL   (11.35)   200   7.12   5.70   -36.6   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01)   (20.01					
11:75 700 7.20 574 1.1 2.06 39.1 12.7 17.20 INITIAL 11:30 200 7.10 570 -36.6 1.20 27.3 12.7 17.20 1L 11:35 200 7.12 570 -50.0 1.66 13.5 12.6 17.22 2L 11:40 200 7.15 570 -58.7 1.66 12.0 12.6 17.23 3L 11:41 200 7.16 565 -68.0 1.64 10.39 12.5 17.23 46 11:50 200 7.18 564 -75.2 1.62 10.97 12.6 17.24 5L 11:55 200 7.19 562 -81.1 1.67 8.64 12.6 17.24 5L 11:55 200 7.19 563 -85.0 164 6.65 12.5 17.25 8L 12:05 200 7.19 559 -85.8 1.65 7.53 12.6 17.25 8L					
11:30 200 7.10 570 -36.6 1.20 27.3 12.7 17.20 12  11:35 200 7.12 570 -50.0 1.66 13.5 12.6 17.22 20  11:40 200 7.15 570 -58.7 1.66 12.0 12.6 17.23 30  11:41 200 7.16 565 -68.9 1.64 10.39 12.5 17.23 40  11:50 200 7.18 564 -75.2 1.62 10.97 12.6 17.24 50  11:55 200 7.19 562 -81.1 1.67 8.64 12.6 17.24 60  12:00 200 7.19 563 -85.0 164 6.65 12.5 17.25 80  NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
11:35 200 7.12 570 -50.0 1.66 13.5 12.6 17.22 20 11:40 200 7.15 570 -58.7 1.66 12.0 12.6 17.23 31 11:41 200 7.16 565 -68.9 1.64 10.39 12.5 17.23 46 11:50 200 7.18 564 -75.2 1.62 10.97 12.6 17.24 51 11:55 200 7.19 562 -81.1 1.67 8.64 12.6 17.24 61 12:00 200 7.19 563 -85.0 1.64 6.65 12.5 17.25 80 12:05 200 7.19 559 -85.8 1.65 7.53 12.6 17.25 80  NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
11:40 200 7.15 570 -58.7 1.66 12.0 12.6 17.23 36  11:41 200 7.16 565 -68.9 1.64 10.39 12.5 17.23 46  11:50 200 7.19 564 -75.2 1.62 10.97 12.6 17.24 56  11:55 200 7.19 563 -85.0 1.64 6.65 12.5 17.25 76  12:00 200 7.19 563 -85.0 1.64 6.65 12.5 17.25 76  12:05 200 7.19 559 -85.8 1.65 7.53 12.6 17.25 80  NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
11:45 200 7.16 565 -68.9 1.64 10.39 12.5 17.23 46 11:50 200 7.19 564 -75.2 1.62 10.97 12.6 17.24 56 17:55 70 11 7.19 562 -81.1 1.67 8.64 12.6 17.24 66 17:60 200 7.19 563 -85.0 1.64 6.65 12.5 17.25 76 17.25 80 12:05 200 7.19 559 -85.8 1.65 7.53 12.6 17.25 80 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
1:50 200 7.18 564 - 75.7 1.67 10.97 17.6 17.24 56 17:00 200 7.19 562 - 81.1 1.67 8.64 12.6 17.25 66 17:00 200 7.19 563 - 85.0 164 6.65 17.5 17.25 76 17:05 200 7.19 559 - 85.8 1.65 7.53 17.6 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86 17.75 86					
11:55 70 0 7.19 \$62 -81.1 1.67 8.64 12.6 17.1 60 12:00 700 7.19 \$63 -85.0 164 6.65 12.5 17.1 76 12:05 700 7.19 \$59 -85.8 1.65 7.53 12.6 17.7 80 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
17:00 200 7.19 563 -85.0 164 6.65 12.5 17.15 7L 12:05 200 7.19 559 -85.8 1.65 7.53 12.6 17.25 80  NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:					
NEW 104 COND 1/29 OPP 1/40 DO 1/03 THEP 1/40 OF 5/2 40 TEMP 1/					
pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10% or = 10 TEMP.: +/-</td					
BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F					
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED					
Y IL P B DY BN DY DN					
4 GUML VOA A DYZN					
2 Irsac P B DY XN DY DN					
2 125ml P A DY DN					
2 21 Vm L P A DY N DY N					
SHIPPING METHOD: Fedex DATE SHIPPED: 5-5-21 AIRBILL NUMBER:					
COC NUMBER: DATE SIGNED:					

# ↑ TRC

PROJECT	NAME:	CEC K	(arn LF: 2021	I GW Comp		PRE	PARED			CHEC	KED
PROJECT	NUMBER	R: 41842	5.0000.0000		BY:	AC, JJ, JK	DATE:		BY:		DATE:
SAMPLE	ID:	KLI -	PCS	WELL	DIAME	TER:-	2" 🗌 4" 🖸	] 6" <b>K</b> Î	OTHER	N/	fA
WELL MAT	ERIAL: .	☑ PVC	□ ss □	IRON 🗆	GALV	'ANIZED S	ΓEEL	Æ	OTHER	N/	4
SAMPLE T	YPE:	<del>- 6₩</del>	□ ww Œ	<b>Հ</b> sw □	DI	L	EACHATE.		OTHER		
PUR	GING	TIME:	. [	DATE:			MPLE	TIME:	1144		TE: 5/4/21
PURGE METHOD	· _	PUMP B <b>A</b> ILER	PERISTALTIO	PUMP		PH: _ ORP: _		SU CO		TY: <u><b>57</b></u> 38 mg	umhos/cm
DEPTH TO		/	T/ PVC			TURBIC		5 NTU			
DEPTH TO	A		T/ PVC			□ NON				DERATE	☐ VERY
WELL VOL	<del>/ \                                   </del>	NA /	□ LITERS	✓ ☐ GALLO	ONS	TEMPER	RATURE:	8,4	°С ОТН	IER:	· · · · · · · · · · · · · · · · · · ·
VOLUME	REMOVED:		☐ LITERS	☐ GALLO	ONS	COLOR	: Cleer		ODC	DR:	none
COLOR:	$\overline{}$		/ 0	por:		FILTRAT	TE (0.45 um)	☐ YES	ど	NO	
'		TUR	BIDITY	•		FILTRAT	E COLOR:		FILT	TRATE ODC	DR:
☐ NONE	☐ SLI		MODERATE	□ VE		QC SAM	/IPLE: 🔲 M	S/MSD		DUP-	
DISPOSAL	_METHOD:	GROU	ND 🗌 DRU	M   OTHE	R	COMME	ENTS:				
TIME	PURGE RATE	PH	CONDUCTIVIT			D.O.	TURBIDITY	I	ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME (GAL OR L)
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		( mg/L)	(NTU)		°C)	(FEET)	(GAL OR L)
				<del>                                     </del>					··········		
		9.0	C	, der		colleg	ted	inst			
		JM .	face of	doctor.							
		East		scs		Suprop		-			
		······	·····								
			***	_							
NC	TE: STABI	LIZATION 1	TEST IS COM	PLETE WHE	N 3 SL	CCESSIVE	READINGS	ARE WIT	HIN THE I	FOLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % OR	P: +/- <b>10</b>	D.C	D.: +/- <b>0.3</b>	TURB: +	/- 10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODE	A - NONE	Е	3 - HNO3	C - H2SC	4 D-	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILT	ERED	NUMBE	R SIZE	TYF	PE PR	RESERVATI	VE FILTERED
2	60nL	VOA	A	ΠY	1 12	1					DY DN
1	nome	Plestic	ß	□ Y	X I	1					□ Y □ N
1	125ml		A	□ Y	<b>X</b> 1	1		1			
1	250mL		A	□ Y	KQ 1	1					DY DN
	•	<del>-</del>				1				····	□ Y □ N
SHIPPING	METHOD:	Fedex		DATE SHIPP	ED:	5-6-	21	AIR	BILL NUM	BER:	
COC NUM	BER:			SIGNATURE		I	Jen	DA	TE SIGNE	<del></del> D;	5-7-21
					- (1		<u> </u>	- 1			· · · · · · · · · · · · · · · · · · ·

# <u> → TRC</u>

PROJECT NAME: CEC Karn LF: 2021 GW Com							PRE	PARED		CHECKED		
PROJECT NUMBER: 418425.0000.0000							BY: AC, JJ, (IV) DATE: 5-4-21			BY: DATE:		
	ID: SW						***************************************	2"   4"			N,	/A
WELL MAT	TERIAL:	PVC	SS [	] IRON	☐ GAI	LVA	NIZED ST	TEEL		OTHER	N/I	#
SAMPLE T	YPE:	⊕ CW	□ ww )	(SW	□ DI			EACHATE		OTHER		
PUR	GING	TIME:	<del></del>	DATE:						1205		TE: 5-4-21
PURGE METHOI	<b>.</b>	PUMP BAILER	PERISTALTI	C PUMP	_				U CON		TY: <u>56</u> 762 mg/	<b>6</b> umhos/d
	OWATER:		T/ PVC				TURBID	ity: <u>63°</u> E □ SLI	_	□ мог	DERATE	☐ VERY
WELL VOL	<del></del>	NA	☐ XITERS	☐ GAL	LONS		TEMPER	RATURE: 2			IER:	
	REMOVED:		LITERS	☐ GAL				Clear		ODO		None
COLOR:				DDOR:			FILTRAT	E (0.45 um)	☐ YES	Ø	NO	
	· · · · · · · · · · · · · · · · · · ·	TUR	BIDITY					E COLOR:			TRATE ODO	R.
□ NONE	☐ SLI		MODERATE	·	VERY			/IPLE: ☐ MS	/MSD		DUP-	· · · · · · · · · · · · · · · · · · ·
DISPOSA	L METHOD	☐ GROUI	ND DRU	м 🗆 отн	IER		СОММЕ	NTS:				
	PURGE	511	CONDUCTO (			一		TURRIDITY			WATER	CUMULATIVE
TIME	RATE	PH	CONDUCTIVI	1		l	D.O.	TURBIDITY		RATURE	LEVEL	PURGE VOLUM
	(ML/MIN)	(SU)	(umhos/cm)	) (m <sup>1</sup>	V)	-	mg/L)	(NTU)	(°	C)	(FEET)	(GAL OR L) INITIAL
						-		<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>				INITIAL
	l	ATI				<u> </u>		NG!				
			4452°					74828	0.			
	43	, 647	4452	Ч		8	3.83	14828	W			
	M. 100 (100 (100 (100 (100 (100 (100 (100		***************************************		***************************************	T						
					···	<del> </del>		<del></del>				***************************************
				_		-				***************************************		
					······································	-				······································		
	where the state of				***************************************	-						
	<u> </u>											
								READINGS				
pH: +/-	0.1	COND.: +/-	3% OR	P: +/- <b>10</b>		0.0.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>ГЕМР.: +/-</td>	10	ГЕМР.: +/-
BOTTLE	SFILLED	PRESERV	ATIVE CODE	S A - NO	NE	В-	HNO3	C - H2SO4	D - N	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVA		LTERE	D	NUMBE	R SIZE	TYPI	E PR	ESERVATI	/E FILTERE
7	Conl	VOA	A			N						
1	125mL	Plastic	<i>A</i>		Y 🔼	N			<u> </u>			
	125mL		ß		Y 🗷	N						
(	250mL	,/	A		Y X	N						
	*				Y 🗆	N						
SHIPPING	METHOD:	Fede	×	DATE SHIF	PPED:		5-6-8	2(	AIRF	ILL NUM	BER:	
COC NUM				SIGNATUR	~	7		Olim		E SIGNE		5-7-21
000 110101					·—·	Ħ		1	PAT	_ 0,011		
						V						

# <mark>, ♦ T</mark>RC

PROJECT	GW Comp	PRE	PARED			PREPARED CHECKED					
PROJECT	NUMBER	R: 41842	5.0000.0000		BY:	AC, JJ, 🌘	DATE:5-	6-21	BY:		DATE:
SAMPLE	ID: Ko	n In	fluent	WELL	DIAME	TER: 🔂 2	4" 🗌	6" 🖄	OTHER	N,	/A
WELL MAT	ERIAL:	7 PVC	□ ss □	IRON 🗆	GALV	ANIZED ST	EEL	×	OTHER	N	P/A
SAMPLE T	YPE:	<mark>⊡ GW</mark>	□ ww □	sw 🗆	DI		EACHATE	X	OTHER	in fla	rent
PURC	SING	TIME:	D/	ATE:		SA	MPLE	TIME:	1000	` .	ATE: 5-6-21
PURGE METHOD		PUMP	PERISTALTIC Sample				<u>7,73   s</u> 171, 2  m		NDUCTIVI	<sub>TY:</sub> <u></u> ዓወ . <u>19</u> mg	/L umhos/cm
DEPTH TO	WATER:	NA	T/ PVC	1		TURBIDI	TY: <u>65</u> ,	<u>ک</u> ntu	J		
DEPTH TO	воттом	NA	T/ PVC			☐ NONE	□ SL	IGHT	Ø MOI	DERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	☐ GALLC	NS	TEMPER	ATURE:	19	°С ОТ⊦	IER:	
VOLUME F	REMOVED:	_ NA	LITERS	☐ GALLO	NS	COLOR:	clear whin	on bac	berith ODO	DR:	none
COLOR:	Chear	w/iron	bacteria OD	OR: <u>100</u> 1	re	FILTRATE	E (0.45 um)	☐ YES		NO	
		TUR	BIDITY			FILTRATE	COLOR:		FIL	TRATE ODC	OR:
□ NONE	☐ SLI	GHT 🗹 🖔	MODERATE	☐ VE	RY		PLE: MS	/MSD	,	DUP-	
DISPOSAL	METHOD:	☑ GROUI	ND 🗆 DRUM	☐ OTHER	₹	COMME	NTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY				TURBIDITY	1	ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		( mg/L)	(NTU)	1 (	(°C)	(FEET)	(GAL OR L) INITIAL
								<u> </u>		<u> </u>	INTIAL
						$\triangle$				<b></b>	
				<u> </u>	/1						
				/\/	/	7					
				<b> </b>							
			***************************************				·····				
				<u> </u>						<u> </u>	
NO	TE: STABI	LIZATION 1	TEST IS COMPI	ETE WHE	1 3 SU	CCESSIVE	READINGS	ARE WIT	HIN THE	OLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- 10	D.O	: +/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	В	- HNO3	C - H2SO4	D -	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILT	ERED	NUMBER	SIZE	TYF	PE PR	ESERVATI	VE FILTERED
2	60ML	NOA	A		X N					. 10	
	125mL	Plastic	Ā		X) N			<b></b>		***************************************	N
	125mb	Plustic	B		N S	1		<b> </b>			
	inome	1 "7"10	<u> </u>		□ N	<del> </del>		<b></b>		***************************************	
								1			<u> </u>
SHIPPING	METHOD:	<u>Fedre</u>	<b>X</b> □ D/	ATE SHIPPI	ED:	5-6-8	21	AIR	BILL NUM	BER:	
COC NUME	BER:		SI	GNATURE:	4	me;	ly	DAT	TE SIGNEI	D:	5-7-21
			•	-	-//		0				

<b>·</b>	TRO	<b>–</b> ,	Cern BAP/	W.A	\TE	RS	SAMP	LE	LOG	•							
PROJECT	NAME:		<del>(arn-LF÷</del> 202				PR					-	CHE	CKE	D		
PROJECT	NUMBE	R: 41842	5.0000.0000	)		BY:	AC, JJ,	<b></b>	DATE: \$-	6-21	BY:			DA	TE:		
SAMPLE	ID: K	LI SO	<u>LS</u>	ľ	WELL	. DIAM	ETER: 🛃	2" [	□ 4" □	6" [	] ОТН	IER					
WELL MAT		<del>⊠ PVC</del>	~~~~	] IRO	N $\square$	GAL	VANIZED:	STEE	L		ОТН	IER					
SAMPLE T	YPE:	☑ GW	□ ww [	⊒ sw	′ □	DI		LEAC	CHATE		] OTH	IER	***************************************	***************************************			
PURC	SING	TIME:		DATE:			5	SAMF	PLE	TIME	: (0	124			: 5-6-	-21	
PURGE		PUMP ,	PERISTALTI Dedisposted	C BUM	<del>L</del> S		PH:	<u></u>	46 s	u c	ONDUC	CTIVIT	ry: <u>1</u> 4	36	un	nhos	/cm
METHOD	):	BAILER/\		$\triangle$	1	-	ORP:	<u>53</u>	<u>5,9</u> m	ıV DO	D:	3,1	9 ,	mg/L			
DEPTH TO	WATER	NA	. т/ <b>/</b> vc /				_		: 4,80								
DEPTH TO	воттом	N/t	T/PVS	$\rightarrow$			Ø NO		SLI			MOD	ERATE		☐ VE	RY	
WELL VOL		\	LITERS	ㅡ;	GALL		_		URE: <u>\</u>		_℃_	отн		_			
VOLUME F	REMOVED:	$\bigvee$	LITERS	$-\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$	GALL	ONS	COLO					ODO		100	m_		_
COLOR:				ODOR:			FILTRA	ATE (C	0.45 um)	YE	ES		NO		T		
- NONE	[ ] OL		BIDITY MODERATE	. г	¬	-0.4	FILTRA						RATE O	DOR:		_	
NONE			ND DRU	•	☐ VE				E: MS			<u> </u>	DUP-				
DISPOSAL		LI GROO	ND DRO	, UNI	OTHE	.к	COMN	/IENTS	S:								
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVI		ORP (mV)		D.O. ( mg/L)		RBIDITY (NTU)	TEMI	PERATU	IRE	WATEI LEVEL (FEET	_ Pt	CUMUL JRGE V (GAL C	OLU	ME
															INITI		
													-		¥		
							1	١									
	# to the desired to t			W	7								***************************************			<del> </del>	
	***************************************	***************************************		111	$T^{-}$	/	<u> </u>										
				H V	/		1-	-						$\dashv$			
				_		/+	·	·			**********		***********	$\dashv$			
						<del>/  </del>					. <del></del>			-			
				_			18-18-19-18-18-18-18-18-18-18-18-18-18-18-18-18-						***************************************	-			
													<del></del>	_			
NO pH: +/- (		COND.: +/-	TEST IS COM 3 % OF	IPLETE RP: +/-			JCCESSIV D.: +/- 0.3		ADINGS A TURB: +/-			'HE F =</td <td></td> <td></td> <td>IMITS: ИР.: +/-</td> <td></td> <td></td>			IMITS: ИР.: +/-		
BOTTLES	FILLED	PRESERV	ATIVE CODE	<u>S</u> A-	NONE	. E	3 - HNO3	С	- H2SO4	D.	- NaOF	1	E-I	HCL	F		_
NUMBER	SIZE	TYPE	PRESERVA	ATIVE	FILT	ERED	NUMB	ER	SIZE	TY	PE	PRE	SERVA	TIVE	FILT	ERE	D
2	60mL	VOA	A	[	] Y	N N	١								□ Y		N
1	125mL	Plastic	A	[	] Y	<b>\(\omega\)</b>	N								□ Y		N
1	RSML	Plastic	В		<b>□</b>   Y	Ø I	N								□ Y		N
					<b>□</b> Y		N .								□ Y	巨	N
					] Y		v								□ Y		N
SHIPPING	METHOD:	Feel	ex	DATE S	SHIPP	ED:	5-6	2	1	AII	RBILL N	JUMB	BER:				
									<u>.                                      </u>	1,							

# → TRC

PROJECT NAME: CEC Karn LF: 2021 GW Comp PREPARED CHECKED											
PROJEC	T NUMBE	R: 41842	25.0000.0000		BY: A	vc' n''()	DATE: 5-	3-21	BY:		DATE:
SAMPLE	ID: M	W-150	02	WELL	DIAMET	ER: 🗾	2" 🗌 4" 🔲	6" 🗌	OTHER		
WELL MAT	ΓERIAL:	☑ PVC	□ ss □	IRON 🗆	GALVA	NIZED S	TEEL		OTHER		
SAMPLE T	YPE:	☑ GW	□ ww □	lsw □	DI		LEACHATE		OTHER		
PUR	GING	TIME:	328 🗅	DATE: <b>5-3</b>	-21	S	AMPLE	TIME:	1400		ATE: 5-3-21
PURGE METHOI	٦.	PUMP BAILER	PERISTALTIC	PUMP		PH: .		U COI	NDUCTIVI	TY: <u>6 8</u> 67 mg	236 umhos/cm
DEPTH TO	O WATER:	6.50	_T/ PVC			TURBI	OITY: <b>4.44</b>	NTU			
DEPTH TO	о воттом	16.90	T/ PVC			IX NON	NE 🗆 SLI	GHT	□ мог	DERATE	☐ VERY
WELL VOL	UME:	NA	LITERS	☐ GALLO	NS	TEMPE	RATURE: 1	0.4	с отн	IER: _	
VOLUME REMOVED: 6   ■ LITERS □ GALLONS COLOR: elect ODOR: noive									noive		
COLOR: Clear ODOR: None FILTRATE (0.45 um) YES NO									M==		
			BIDITY			FILTRAT	E COLOR:	·	FIL	TRATE ODG	DR:
IX NONE	☐ SLI	IGHT 🗌	MODERATE	☐ VEI	RY	QC SAI	MPLE: MS	/MSD	₩	DUP- Be	ekground
DISPOSA	L METHOD	<b>⊠</b> GROU	ND DRUM	1 OTHER	₹	сомм	ENTS:				
TIME	PURGE RATE	PH	CONDUCTIVIT			D.O.	TURBIDITY		RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
1330	(ML/MIN)	(SU) 6,11	(umhos/cm) 9540	(mV)		mg/L)	5.04	1	C)	(FEET)	(GAL OR L) INITIAL
***************************************			<del> </del>	21.7		.43	<del></del>	·	-6	6.67	1
1335	200	6.20	9731	9.0		94	3.86	10.		6.72	
1340	200	6.27	9007	-25.8		80	2.71	10,	<del></del>	6.74	2
1345	200	6,46	6605	-44.6		72	4.41	10.		6,76	3
1350	200	6.50	6138	-48.8		71	4.06	10.	3	6.77	4
1355	200	6.51	6126	- 51.3	1.	69	4.43	10.		6.77	5
1400	200	6.51	6276	-53.1	1.	67	4.44	10,4	<u> </u>	6.77	6
***************************************							***				
			TEST IS COMP						HIN THE F	OLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP	P: +/- 10 	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - I	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTE	ERED	NUMBE	R SIZE	TYP	E PR	ESERVATI	VE FILTERED
4	60ml	VOA	A	□ Y	⊠ N						
2	DSmL	Plastic	A	□Y	XÍ N						□ Y □ N
2	125mL		В	□ Y	XX N						D Y D N
a	250ml		Ā	ΠY	X) N					***************************************	
4	11	V	В		<b>X</b> N						
SHIPPING		Fedex	-	ATE SHIPPE		5-4-1	21	AIRE	BILL NUMI	BER: +	
COC NUMI	BER:		s	IGNATURE:	7	R	(K.)	DAT	E SIGNED		5-7-21
					#	<u>~_`</u>					, , , , , ,

<b>&lt;&gt;</b>	TR	C
		_

PROJECT NAME: CEC Karn BAP/LI: 2021 GW C		PREPARED			CHECKED						
PROJECT NUMBER: 418425.0001.0000 BY:	: A0	C, JK, JJ	DATE: S)3	1/21	BY:	SK	DATE: 5-7-21				
SAMPLE ID: PETE MW. 15008 WELL DIAMETER: 1 2" 4" 6" OTHER											
WELL MATERIAL:	LVAN	IIZED STEE	EL		OTHE	R					
SAMPLE TYPE:		☐ LEA	CHATE		OTHE	R					
PURGING TIME STATE DATE: STATE		SAM		TIME:	15:	<u>.                                    </u>	DATE: S/1/21				
PURGE PUMP PERISTALTIC PUMP	-	PH: 6 · ·					umhos/cm				
LI BAILER		ORP:		P 56		). <u>27                                    </u>	ng/L (				
DEPTH TO WATER: 1/ PVC	—.	TURBIDITY	-		_		_				
DEPTH TO BOTTOM: 17.50 T/ PVC	<del></del>	NONE	SLIC		N	MODERATE	☐ VERY				
WELL VOLUME: NA LITERS GALLONS	_	TEMPERAT		b	°C C	OTHER: _	- A //S - / A				
VOLUME REMOVED: 9℃ □ LITERS □ GALLONS		COLOR:	NONG		C	DDOR:	NONE				
COLOR: GRUWN ODOR: NUNE	_	FILTRATE (	0.45 um) [	☐ YE	s T	₿ NO					
TURBIDITY	Ŀ	FILTRATE C	OLOR:			FILTRATE OF	OOR:				
□ NONE SLIGHT □ MODERATE □ VERY		QC SAMPL	.e: 🗌 ms/	MSD		DUP-					
DISPOSAL METHOD:☐ GROUND ☐ DRUM ☐ OTHER		COMMENTS:									
TIME PURGE PH CONDUCTIVITY ORP	С	).O. TL	JRBIDITY	TEMP	ERATUR	E WATER	PURGE VOLUME				
(ML/MIN) (SU) (umhos/cm) (mV)	(n	ng/L)	(NTU)		(°C)	(FEET)					
15:11 200 6.81 1065 - 159.9	Ψ,	8010	1,42	9.0	<u>)                                    </u>	19.18					
15.16 200 6.77 1059 -184.8	0		.07	9.0		4.20	) 16				
15:21 200 6.78 1074 - 246.5	0.	20 5	.69	9,0	)	19.20	11				
15:26 200 6.81 1014 -217.1	0.	13 7	.74	9.	0	4.22					
15:31 1000 -180.3	U.	11 4		<u>9,</u>	0	4.22	1V				
15:36 200 6.83 981 -292.5	0.	16 3	,41	9	0	4.22	15 L				
15:41 203 6.83 979 -279-1	0.	19 3.	54	9.1	<u>)                                    </u>	4,200	66				
15:46 200 6.84 972 -228.8		25 4.	54	9.0		4.27					
15:51 200 6.84 956 -223.8		24 S.	99		<u>0</u>	4.22					
15:56 200 6.94 967 -25:3	O,	24 5	18	9.	D	4.22	-196				
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 S	succ	ESSIVE RE	EADINGS A	RE WIT	THIN TH	IE FOLLOWI	NG LIMITS:				
pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D	0.0.: +	-/- <b>0.3</b>	TURB: +/-	10 %	or <	:/= 10	TEMP.: +/-				
BOTTLES FILLED PRESERVATIVE CODES A - NONE	B - I	HNO3 (	C - H2SO4	D -	NaOH	E - H	ICL F				
NUMBER SIZE TYPE PRESERVATIVE FILTERE	ĒD Ţ	NUMBER	SIZE	TYF	PE	PRESERVA	TIVE FILTERED				
2 10 P B DYX	N										
2 GOMI VOA A DYB	N						DY DN				
1 125 M4 B B DY SPN											
1 125 MU P A DY	d <sub>N</sub> ↑			······································	-	***************************************					
	N										
SHIPPING METHOD: FELEX DATE SHIPPED:		5-5-2	(	AIR	BILL N	JMBER:	,				
COC NUMBER: SIGNATURE:	·			DAT	TE SIGN	JED:					

# **◇** TRC

	PROJECT	NAME:	CEC K	(arn LF: 2021	GW Comp	PR	EPARED		CHECKED							
	PROJECT	NUMBER	R: 41842	5.0000.0000	BY:	AC, JJ,	R DATE: 5-	3-21 BY:	BY: DATE:							
	SAMPLE	ID: M	w-15	016	WELL DIA	METER: 🗹	2" 🗌 4" 🔲	6" □ OTH	IER							
	WELL MAT	ERIAL:	☑ PVC	□ ss □	IRON ☐ GA	LVANIZED S	STEEL	П ОТН	IER							
	SAMPLE T	YPE:	☑ GW	□ ww □	SW □ DI		LEACHATE	□ отн	IER							
	PURC	SING	TIME: 14	141 D	ATE: 5-3-2	·	SAMPLE TIME 1609 1509 DATE: 5-3-21									
	PURGE METHOD	٠.	PUMP BAILER	PERISTALTIC	PUMP		PH: 7.24 SU CONDUCTIVITY: 991 umhos/cm									
ı	DEPTH TO	WATER:	4.18	T/ PVC		TURBI	TURBIDITY: 3.14 NTU									
- 1	DEPTH TO	BOTTOM:	7.92	T/ PVC		т іхі иоі	NE 🗌 SLI	GHT □	MODERATE	☐ VERY						
- 1	WELL VOL	UME:	NA .	LITERS	☐ GALLONS	TEMPE	RATURE:	<u>v.⊋</u> .c	OTHER:							
	VOLUME F	REMOVED:	5	LITERS	☐ GALLONS	COLO	R: <u>clear</u>		ODOR:	none						
	COLOR:		Clear	O[	OOR: 10re	_ FILTRA	TE (0.45 um)	☐ YES	<b>⊠</b> NO							
			TUR	BIDITY		FILTRA	TE COLOR:		FILTRATE ODG	DR:						
	NONE	☐ SLI	GНТ □	MODERATE	☐ VERY	QC SA	MPLE: 🗌 MS	/MSD	DUP-							
	DISPOSAL	METHOD:	<b>⊠</b> GROUI	ND 🗌 DRUM	☐ OTHER	COMM	IENTS:									
	TIME	PURGE RATE	PH	CONDUCTIVITY		D.O.	TURBIDITY	TEMPERATU	LEVEL	CUMULATIVE PURGE VOLUME						
	21.2.44	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L) INITIAL						
	1444	<u> </u>	7,69	1009	3.0	3.52	8.62	10,9	4,45	INITIAL						
	1449	200	7.31	941	-3.4	1.92	8.01	10,4	4.50							
	1454		7,26	950	-4,9	1.84	7.32	10.3	4.51	2						
459	1 <del>55</del> 4	200	7.25	967	-6.9	1.80	3.96	10.1	4.52	3						
504	1604	200	7.23	985	-8.6	1.77	<u> </u>	10,1	4,52	" 4						
1509	1609	200	7,24	991	-10,4	1,74	3.14	10.2	4,52	5						
	NO	TE: STABI	LIZATION 1	TEST IS COMP	LETE WHEN 3 S	SUCCESSIV	E READINGS A	ARE WITHIN T	HE FOLLOWIN	G LIMITS:						
	pH: +/-	0.1	COND.: +/-	3 % ORP	: <b>+/- 10</b> D	0.O.: +/- <b>0.3</b>	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-						
	BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOl	H E-HC	CL F						
	NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERE	D NUMB	ER SIZE	TYPE	PRESERVATI	VE FILTERED						
	2	60mL	VOA	A	□ Y <b>7</b>	N				□ Y □ N						
	ı	125mL	Plastic	Α	□ Y <b>IX</b> (	N				D Y D N						
	ı	125mL		B	□ Y <b>X</b>	N				□ Y □ N						
	1 20	MAS MUS	Dal	A	□ Y <b>X</b> 0	N				□ Y □ N						
	2	16		ß	□ Y 🔯	N				O Y O N						
	SHIPPING	METHOD:	Feder		ATE SHIPPED:	5-4-	21	AIRBILL I	NUMBER:							
	COC NUMI	BER:		s	IGNATURE:	And	Then	DATE SIG	GNED:	5-7-21						
						<del></del>	X	<u> </u>								

# 

		CECR	arn LF: 2021 (	GW Comp		PRE	CHE	ECKED									
PROJECT	Г NUMBE	R: 41842	5.0000.0000	ВУ	: A	.c, 11/1 <u>k</u>	DATE:5-	3-21	BY:			DAT	E:				
SAMPLE	ID: M	w-180	019	WELL DIA	MET	ER: 🗾 :	2"	6" [	ОТН	ER							
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER																	
SAMPLE TYPE:																	
PUR	GING	TIME: 15	1							DATE: 5-7-21							
PURGE METHOD	٠.	PUMP BAILER	PERISTALTIC I	PUMP			<u>6,80</u> s -69.2 m				гү: <u>13°</u> 79 п			umh	os/	cm	
DEPTH TO WATER: 4.89 T/ PVC TURBIDITY: 3,40 NTU																	
DEPTH TO	о воттом	16.88	T/ PVC		✓ NONE □ SLIGHT □ MODERATE □ VERY												
WELL VOL	.UME:	NA	LITERS	☐ GALLONS													
VOLUME	REMOVED:		LITERS	☐ GALLONS		COLOR	: clear			ODC	R: _	no	n	Ü			
COLOR:			OD			FILTRAT	ΓΕ (0.45 um)	□ Y	ES	风	NO .						
		TUR	BIDITY			FILTRAT	E COLOR:			FILT	RATE O	OOR:					
X NONE	☐ SLI	GHT 🗌	MODERATE	☐ VERY		QC SAMPLE: MS/MSD DUP-											
DISPOSA	L METHOD	☐ GROUI	ND 🗌 DRUM	☐ OTHER		COMME	ENTS: FB-B	ack	.900m	W	Collec	ted					
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	1.5		D.O. mg/L)	TURBIDITY		IPERATU		WATER LEVEL	R C	CUMULATIVE PURGE VOLUME (GAL OR L)			ME	
1543		7.00		(mV) -17.8	_	.98	3,42		(°C) 9.5		(FEET)	_	`			ᅥ	
1548	200	6.91		-54.0			2.66		8.8		5.00			1			
				<del> </del>		97											
1553		6.86	1404	-63.4		86	2.10		8.7		5.00			<u>k</u> _			
1558			1400	-67.3		.82	2.42		3.6		5.00						
1603	700	6.80	1398	-69,2	1.	79	3.40	8.6		. 6   5.			4				
			~														
		·															
***************************************					$\top$		.,										
NC pH: +/-		LIZATION 1 COND.: +/-	TEST IS COMPL			CESSIVE +/- 0.3	E READINGS A				OLLOWI	NG LII					
BOTTI F	S FILLED	PRESERV	ATIVE CODES	A - NONE	R -	HNO3	C - H2SO4		- NaOH		F - F	ICL	F -				
NUMBER		TYPE	PRESERVATI	1		NUMBE			YPE		ESERVA			LTE		<u>-</u>	
2	60mL	VOA	A		N	1	125mL	Plan	stic		Æ		<u> </u>	Υ	'K	N	
<u> </u>	125mL		Ā		N	1	25 ML	1,00	Plastic		b					N	
<u>'</u>	15-1	1	B		N	2	14	<del></del>			B				<b>₹</b>		
1 257	Some Some	<del></del>		□ Y 🔊	N		1-1		<u> </u>		······································			Y	=	N	
ð	16	<b> </b>	<u>A</u> B		N		100	ld	Bank	<u>.                                    </u>			=	· [		N	
	METHOD:	Fedex	<u> </u>	ATE SHIPPED:		-4-21			IRBILL N		BFR.	<u> </u>			_		
		1 tores			/ - <u>`</u>	.0 -	01		ATE SIG			5-	7-	21			
COC NUM			1 210	GNATURE:	سدر	~~	· Illian	שו	ヘーこうじ	INCL	<i>i</i> .	3	/	<b>α</b> 1			

# **CHAIN OF CUSTODY**

Page 31 of 33



# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE	PROJECT NUMBER					ANAL	YSIS R	EQUEST	ED		Page 1 of 1		
DEK & JCW Background- 2021 Q2 RCRA	21-0	1525									SEND REPORT TO CDBatts		
SAMPLING TEAM	DATE SHIPPED	SITE SKETCHED		als							HD Register, TRC		
TRC	5-4-21	CIRCLE YES	NO	Total Metals	Anions	S	Alkalınity				PHONE		
CE SAMPLE SAMPLE CONTROL# DATE TIME MATRIX		ION (ft)	# OF CONTAINERS	Tot	Ani	TDS	All All				REMARKS		
21-0525-01 5-3-21 1400 GW	MW-15002		3	x	х	х	х						
-02 S-3-21 1556 GW	MW-15008		3	х	х	х	х						
-03 5-3-21 1509 GW	MW-15016		3	x	х	х	х						
-04 5-3-21 1603 GW	MW-15019		3	х	х	x	х						
-05 <b>5-3-21</b> — GW	DUP-Background		3	х	х	х	х						
√ -06 5-3-21 1603 W	FB-Background		1	x	х								
									+				
RELINQUISHED BY (SIGNATURE) DATE/		ED BY (SIGNATUR	E)		l			C	OMME	NTS	0.3-1400		
In Ky 5	4-21 //630	Fedex		0.3-1.6°C 015402									
RELINQUISHED BY (SIGNATURE) DATE/	TIME RECEIVE	ED BY (SIGNATUR	E)										
Fed Ex 5.	5.21 1100 Ot	desta	nsen	ORIGINAL TO LAB COPY TO CUSTOMER									

#### Page 32 of 33

# **CHAIN OF CUSTODY**

# Consumers Energy

# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPLING SIT	E	-		PROJECT NUMBER						ANAL	Page 1 of 1				
DEK Bottor	n Ash Pond	& LI – 202	1 Q2		21-0	529									SEND REPORT TO CDBatts
AMPLING TEA		ıc		DATE SHIPPED  5-4-2	SITE SKETCHED ATTACHED?  CIRCLE ONE		Metals	80		nıty				HD Register, TRC PHONE	
CE CONTROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION	NI/I OCATI	YES DEPTH ON (ft)	NO # OF CONTAINERS	Total Metals	Anions	TDS	Alkalınıty				REMARKS
	5-3-21	1233	GW	DEK-MW-15003	N/ LOCATI	OIV (II)	5	х	х	х	х			_	
-02	5-3-21	1128	GW	DEK-MW-18001			5	х	х	х	х				
-03	5-3-21	1128	GW	DEK-MW-18001	MS		4	х	х		х				
<b>↓</b> -04	5-3-21	1128	GW	DEK-MW-18001	MSD		4	x	x		х				
										i					
LINQUISHEI	NOVISHED BY (SIGNATURE)  DATE/TIME  RECEIVED BY (SIGNATURE)  5-4-21 / 1636  Fevrex		Œ)						COM	MENTS	8-3-1.6°C				
bful		>_		4-21/1630			<del></del>	_							016402
- 1	BY (SIGNA	-	DATE/T			ED BY (SIGNATUR	•								
<u>te</u>	d ex		54	5-21 1100	CH:	sevDXHa	inser)			OI	RIGINA	T TO I	LAB_	COPY	Y TO CUSTOMER

# **CHAIN OF CUSTODY**



# **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLI	NG SIT	E	·		PROJECT NUMBER	01.050			-		ANAL	YSIS F	EQUE	STED			Page 1 of 1
DEK	Lined	Impoundm	ent – 2021 Q	22		21-053	0										SEND REPORT TO CDBatts
SAMPLI					DATE SHIPPED		SITE SKETCHED CIRCLE	ATTACHED?	als			۸.					HD Register, TRC
	V	RC					YES	NO	Total Metals	su		Alkalınity					PHONE
CONTI	E ROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LO	OCATION	DEPTH	# OF CONTAINERS	Tota	Anions	TDS	Alka					REMARKS
		5/4/21		GW	OW-10			5	х	х	х	x					
	-02	SYZ	8:45	GW	OW-11			5	х	х	х	х					`
	-03	5/4/21	12:05	GW	OW-12			5	х	х	х	х					
	-04	5/6/21	10:24	GW	KLI-SCS			5	х	х	x	х					
	-05	5/4/21	11:44	GW	KLI-PCS			5	х	х	х	х					
	-06	5/4/21	12:05	GW	SW-DITCH			5	х	х	х	х					
	-07	5/4/81		GW	DUP-KLI			5	х	х	x	x					
			12:05	w	EB-KLI			1	х								
		5/4/21			FB-KLI			1	х								
,											-						
RELINC	NOUISHED BY (SIGNATURE)  DATE/TIME  RECEIVED BY (SIGNATURE)		E)			I	<u> </u>	<u> </u>	COM	MENT	S	2.0-5.0%					
#	l	h	_	5-7	7-21 /1151	4											015402
RELINC	UISHE	DBY (SIGNA	TURE)	DATE/T	ME RE	CEIVED	BY (SIGNATUR	E)	1								6.4.21
							7				OI	RIGINA	AL TO	LAB	COF	Y TO	CUSTOMER
														_			



# Appendix C Data Quality Reviews

# Laboratory Data Quality Review Groundwater Monitoring Event May 2021 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the May 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 21-0529.

During the May 2021 sampling event, a groundwater sample was collected from each of the following wells:

DEK-MW-15003

DEK-MW-18001

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

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

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

### **Data Usability Review Procedure**

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

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

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates, 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. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of 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, and alkalinity. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event May 2021 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the May 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery group 21-0530.

During the May 2021 sampling event, a groundwater sample was collected from each of the following wells:

OW-10

OW-11

■ OW-12

During the May 2021 sampling event, the following water/surface water samples were collected:

KLI-SCS

KLI-PCS

SW-DITCH

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

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

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

# **Data Usability Review Procedure**

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

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

- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

# **QA/QC Sample Summary**

- One field blank (FB-KLI) and one equipment blank (EB-KLI) sample were collected. Total metals were not detected in these blanks.
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were DUP-KLI and OW-12; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Laboratory Data Quality Review Groundwater Monitoring Event May 2021 DE Karn Bottom Ash Pond/Lined Impoundment

Groundwater samples were collected by TRC for the May 2021 sampling event. Samples were analyzed for radium; the radium analyses were subcontracted by Eurofins-TestAmerica in Canton, Ohio to Eurofins-TestAmerica in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-149195-1.

During the May 2021 sampling event, a groundwater sample was collected from each of the following wells:

DEK-MW-15003

DEK-MW-18001

Each sample was analyzed for the following constituents:

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

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

# **Data Usability Review Procedure**

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

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

- Percent recoveries for carriers for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

# **Review Summary**

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

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

# **QA/QC Sample Summary**

- A method blank was analyzed with each analytical batch for radium; target analytes were not detected in the method blank samples.
- An equipment blank was not collected in this data set.
- A field blank was not collected in this data set.
- The LCS and LCSD recoveries and relative percent differences (RPDs) were within QC limits.
- MS and MSD analyses were not performed on a sample from this data set.
- A field duplicate pair was not collected in this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Carrier recoveries, where applicable, were within 40-110%.

# Laboratory Data Quality Review Groundwater Monitoring Event May 2021 CEC DE Karn Lined Impoundment

Groundwater samples were collected by TRC for the May 2021 sampling event. Samples were analyzed for radium; the radium analyses were subcontracted by Eurofins-TestAmerica in Canton, Ohio to Eurofins-TestAmerica in St. Louis, Missouri. The laboratory analytical results were reported in laboratory sample delivery group (SDG) 240-149192-1.

During the May 2021 sampling event, a groundwater sample was collected from each of the following wells:

■ OW-10 ■ OW-11 ■ OW-12

■ KLI-SCS ■

Each sample was analyzed for the following constituents:

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

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

# **Data Usability Review Procedure**

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

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

- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Percent recoveries for carriers for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

# **Review Summary**

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

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

# **QA/QC Sample Summary**

- A method blank was analyzed with each analytical batch for radium. Target analytes were not detected in the method blanks.
- One equipment blank (EB-01) was collected. Target analytes were not detected in the equipment blank sample.
- A field blank was not collected in this data set.
- The LCS/LCSD recoveries and relative percent differences (RPDs) of the radium analyses were within QC limits.
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were DUP-KLI and OW-12; RPDs between the parent and duplicate sample were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Carrier recoveries, where applicable, were within 40-110%.



# **Appendix D Statistical Analysis**

### Appendix D

# Statistical Summary for DE Karn Lined Impoundment Second Quarter 2021 Data from August 2019 to May 2021

Karn Lined Impoundment Wells							
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	
Boron	Trend	0	↓*	0	<b>↑</b>	0	
Calcium	Trend	$\downarrow$	↓*	<b>↑</b>	<b>↓</b>	↓*	
Chloride	Trend	0	↓*	0	0	0	
Fluoride	Trend	O*	0	O*	0	O*	
Iron	Trend	<b>↓</b>	0	0	0	0	
рН	Trend	0	0	0	<b>↑</b>	0	
Sulfate	Trend	0	<b>↑</b>	0	0	<b>↓</b> *	
Total Dissolved Solids	Trend	<b>↓</b>	0	0	<b>↓</b>	↓*	

#### Notes:

O\* = Non-detect

O = No trend

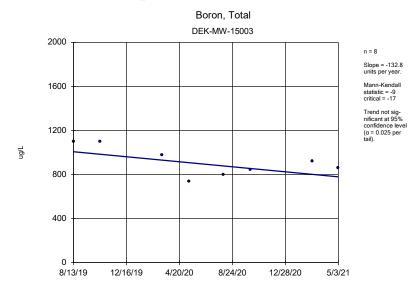
= Upward trend, continuous

↑\* = Upward trend, new

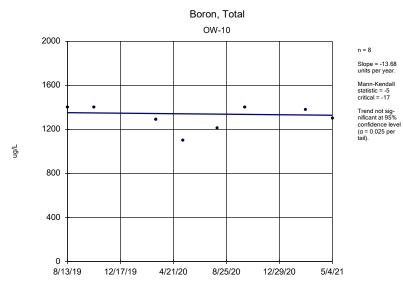
= Upward trend, confirmed

↓ = Downward trend, continuous

↓\* = Downward trend, new

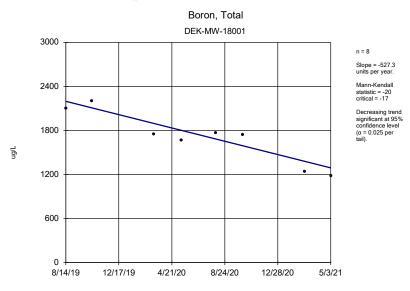


Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



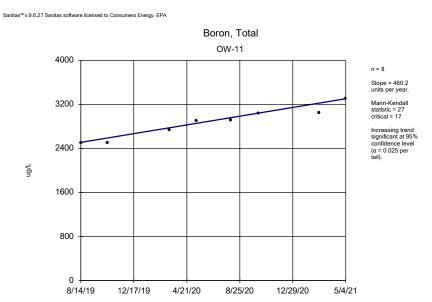
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



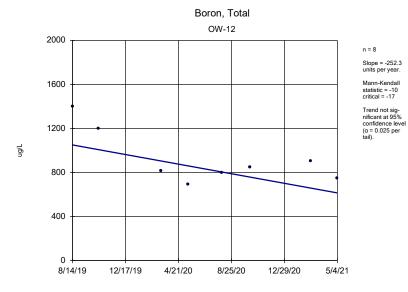
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

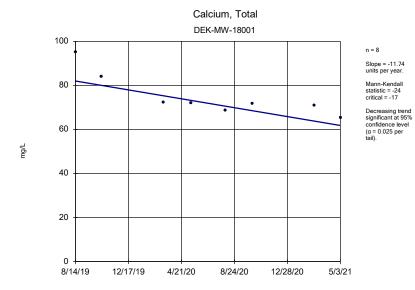


Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

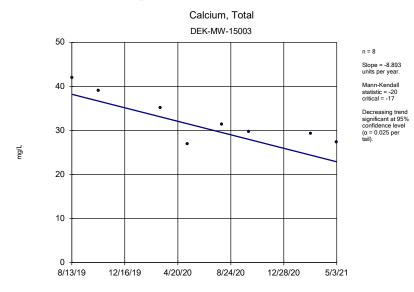


Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



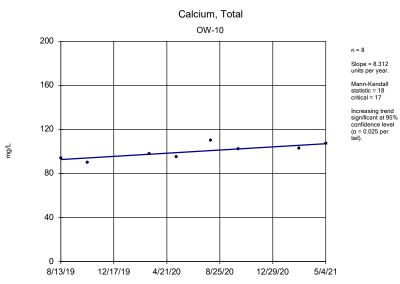
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



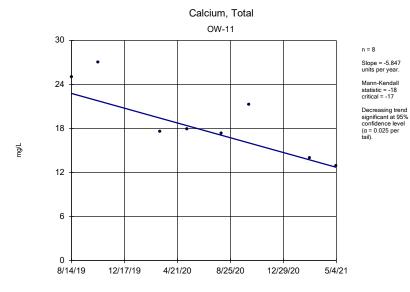
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM



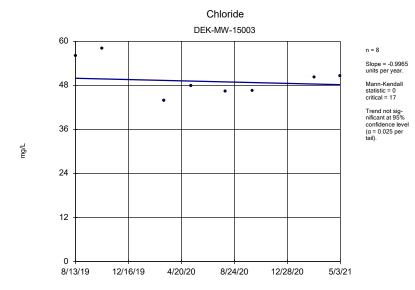
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



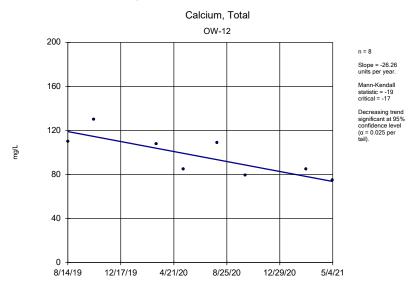
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



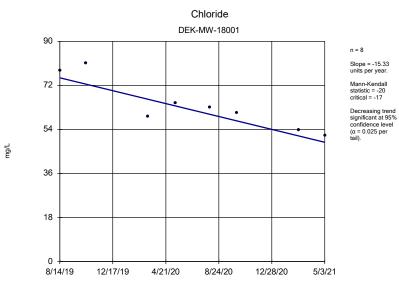
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



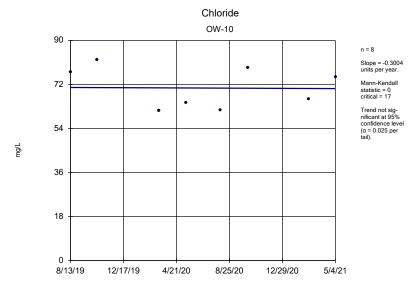
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



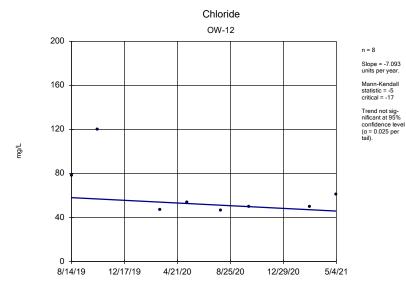
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



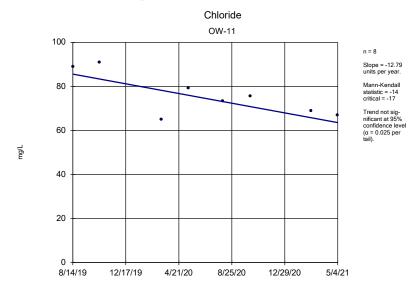
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



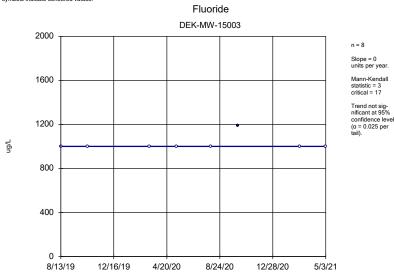
Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

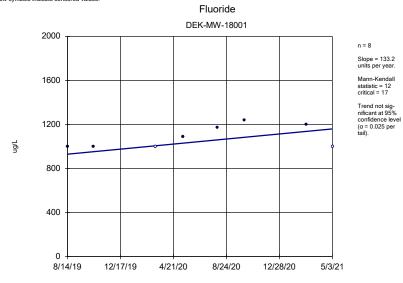
# Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 6/14/2021 9:46 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

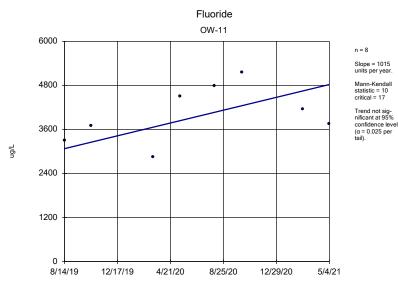
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

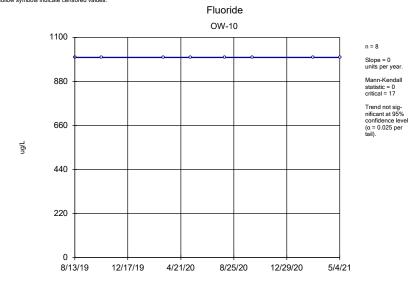
 $\mathsf{Sanitas^{\text{\tiny{TM}}}}\,\mathsf{v.9.6.27}\,\mathsf{Sanitas}\,\mathsf{software}\,\mathsf{licensed}$  to Consumers Energy.  $\mathsf{EPA}$ 



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

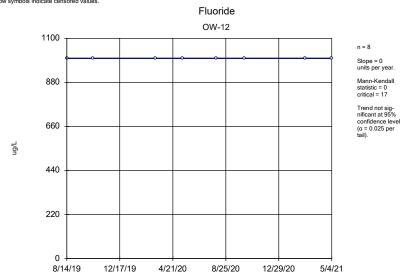
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

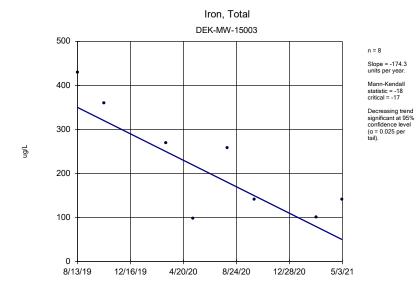
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

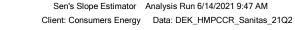
Sanitas™ v.9.6.27 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.

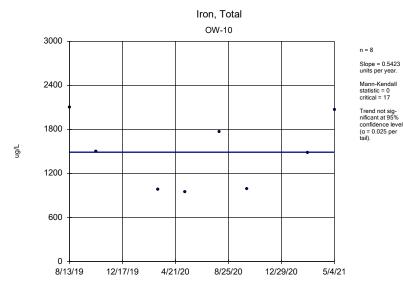


Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

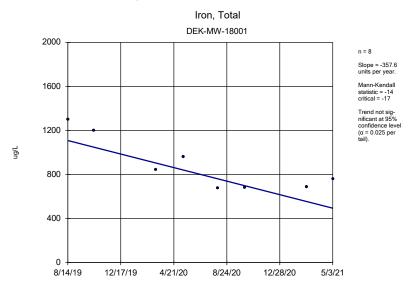






Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

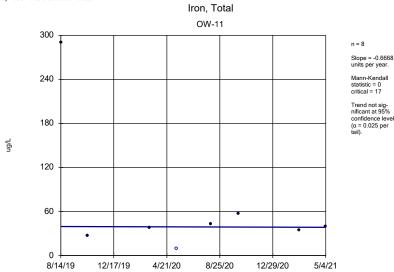
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

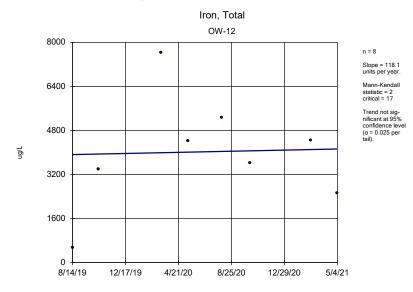
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2





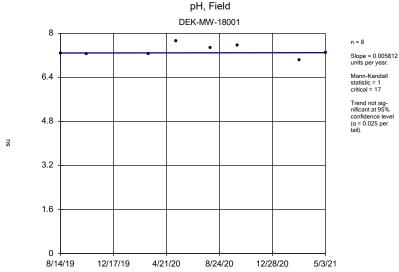
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



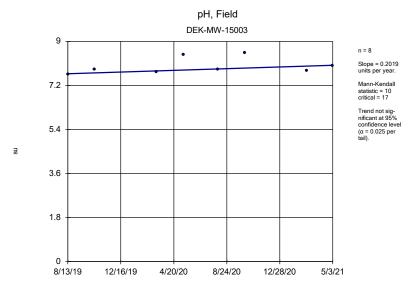
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



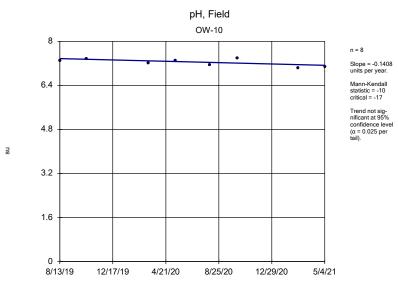
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



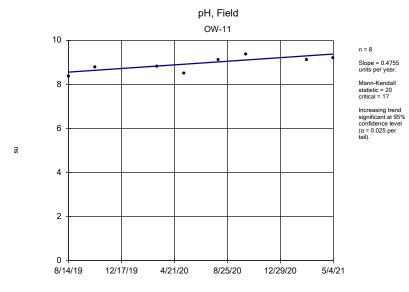
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



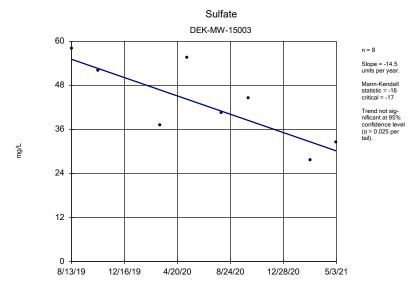
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



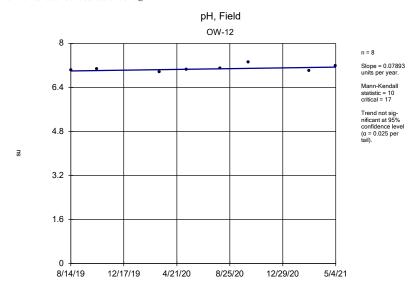
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



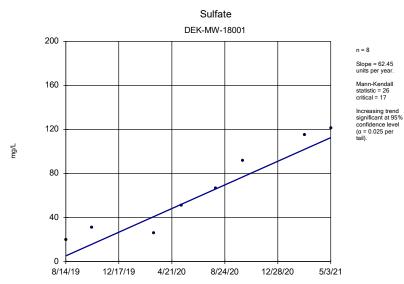
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

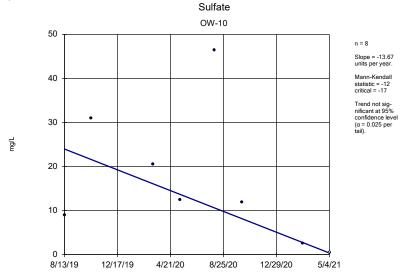
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



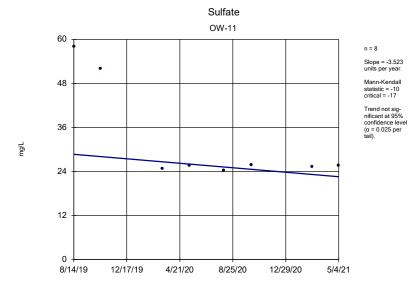
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



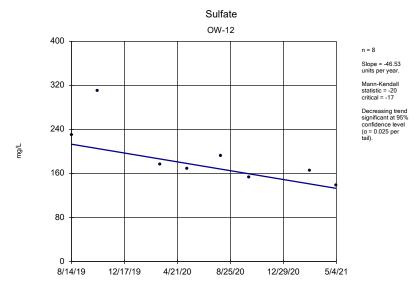


Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



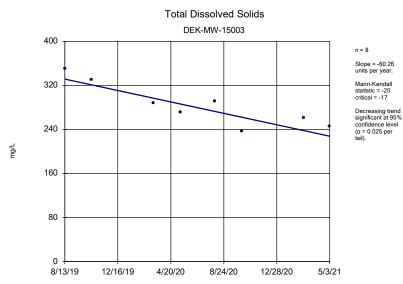
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



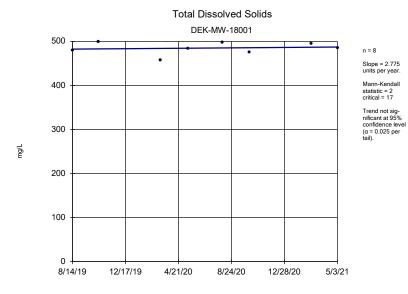
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

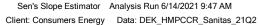
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

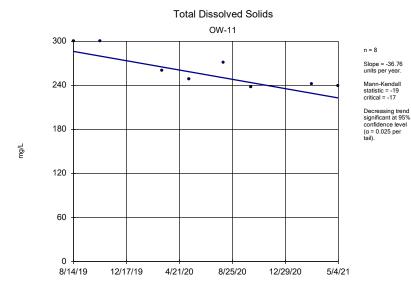


Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

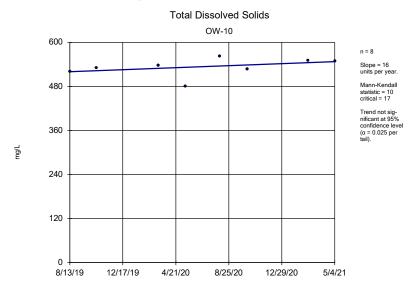






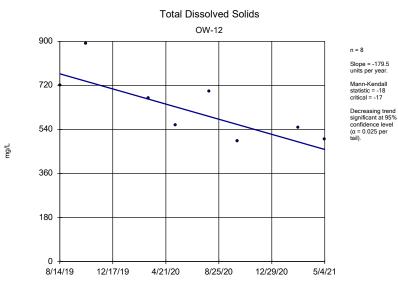
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2



Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

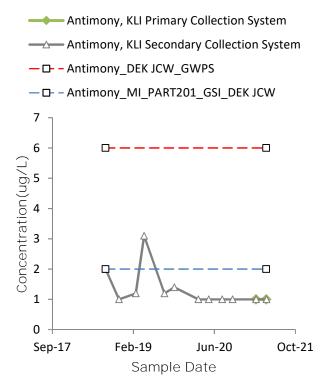


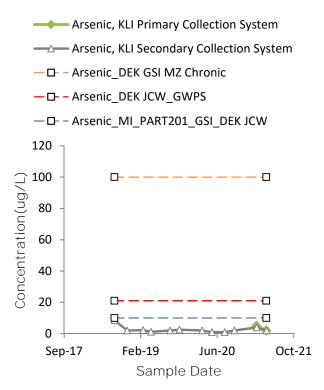
Sen's Slope Estimator Analysis Run 6/14/2021 9:47 AM

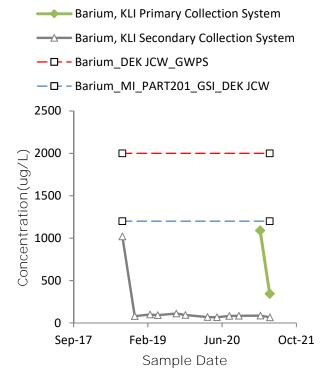
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q2

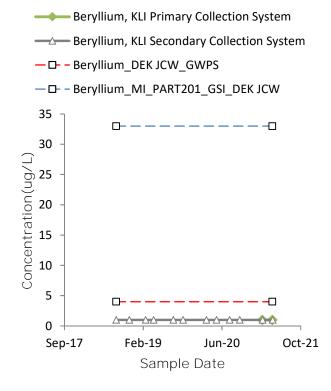


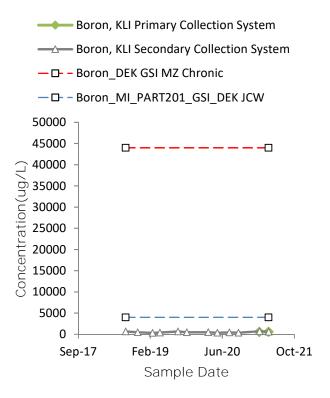
# Appendix E Secondary Leachate Collection System Monitoring

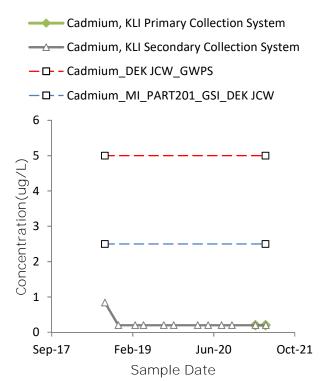


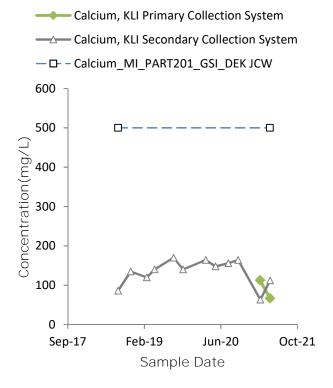


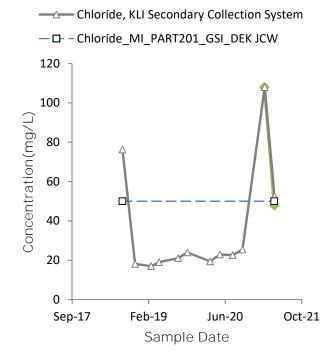




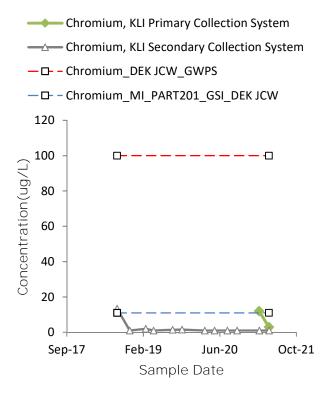


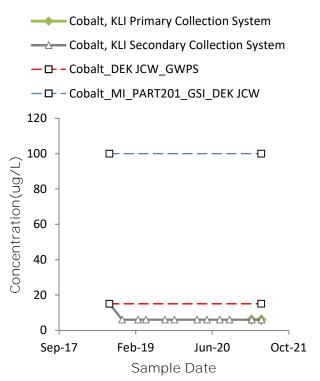


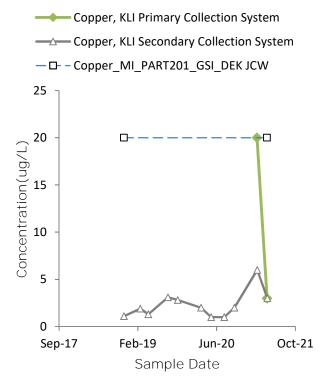


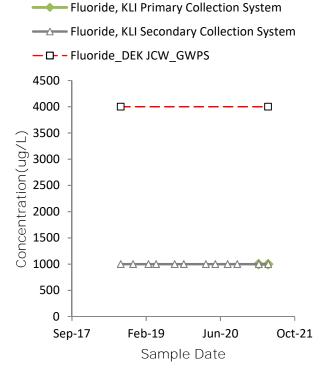


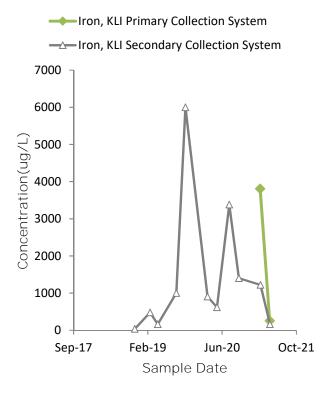
Chloride, KLI Primary Collection System

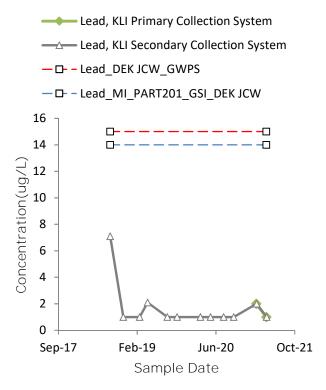


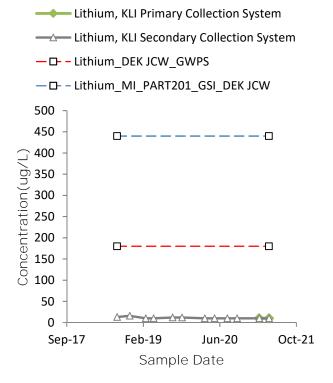


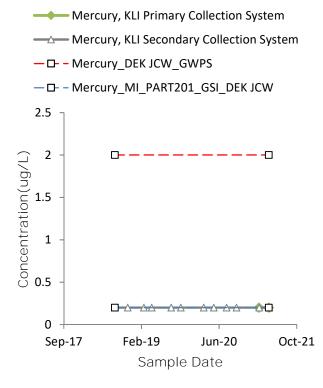


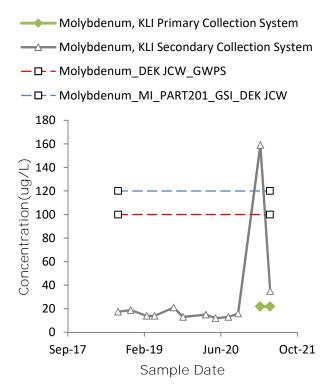


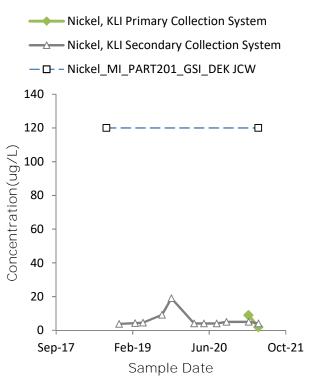


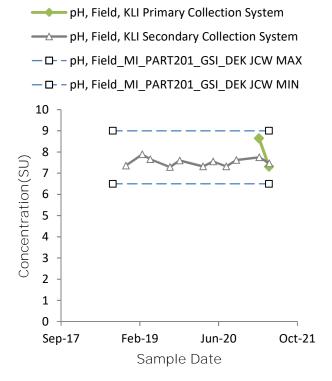


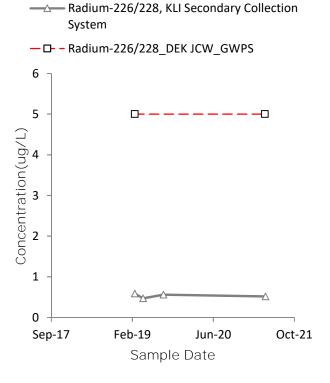


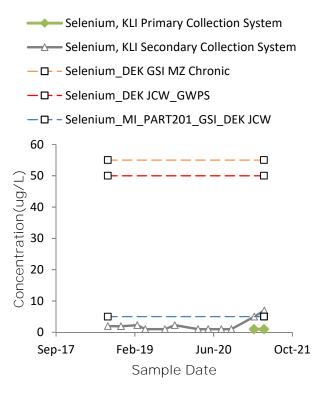


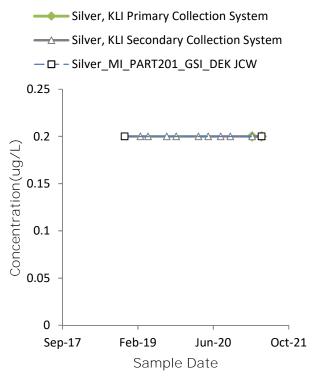


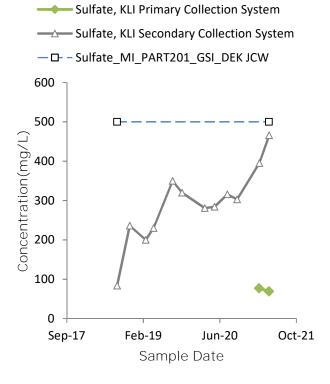


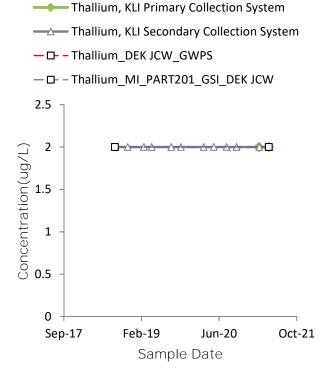




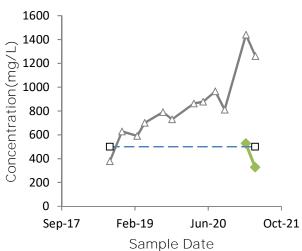


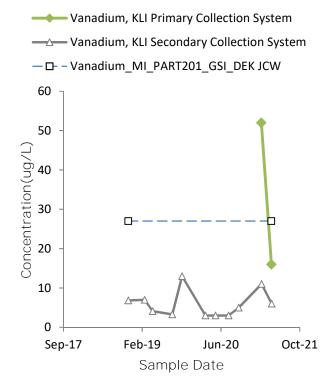


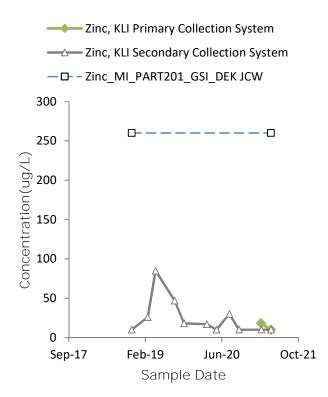




- Total Dissolved Solids, KLI Primary Collection System
- Total Dissolved Solids, KLI Secondary Collection System
- □ Total Dissolved Solids\_MI\_PART201\_GSI\_DEK JCW









# **Appendix F Alternate Source Demonstration**



#### A CMS Energy Company

Date: July 30, 2021

To: Operating Record

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

RE: Alternate Source Demonstration Professional Engineer Certification, §257.94(e)2

DE Karn Lined Impoundment CCR Unit

Professional Engineer Certification Statement [40 CFR 257.94(e)2]

I hereby certify that the alternative source demonstration presented within this Second Quarter 2021 Hydrogeological Monitoring Report for the DE Karn Lined Impoundment CCR unit has been prepared to meet the requirements of Title 40 CFR §257.94(e) 2 of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.94(e) 2.

Signature

July 30, 2021

**Date of Certification** 

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

Name

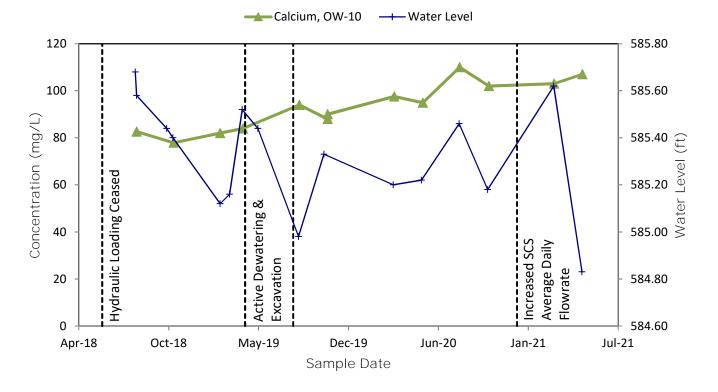
6201056266

Professional Engineer Certification Number

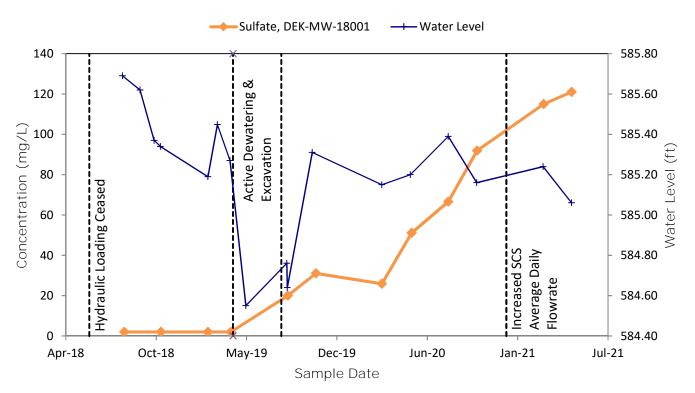
#### References

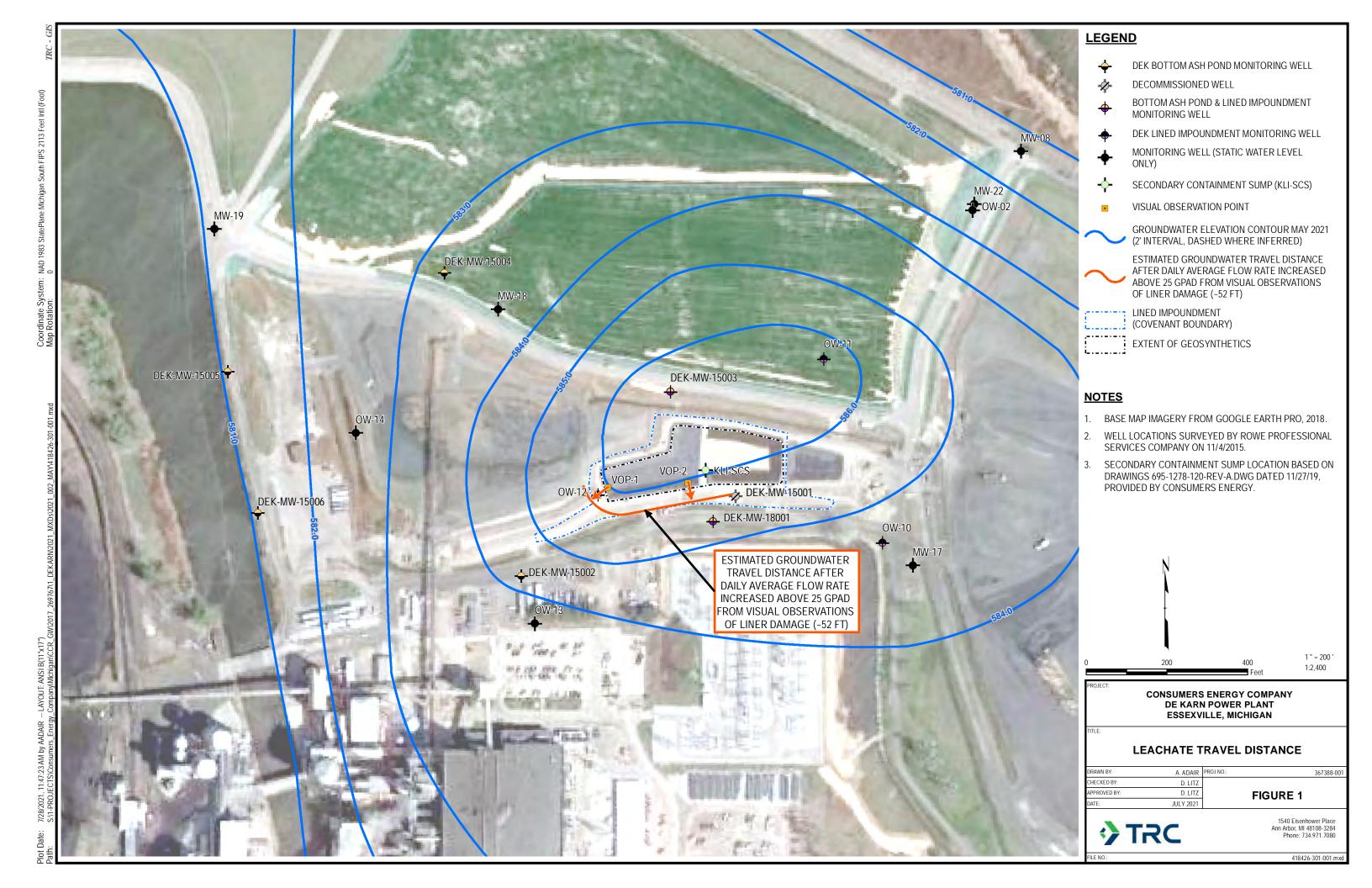
TRC (July 2021). <u>Second Quarter 2021 Hydrogeological Monitoring Report, DE Karn Lined</u> Impoundment CCR Unit, Essexville, Michigan

# Calcium at OW-10



# Sulfate at DEK-MW-18001







October 28, 2021 VIA email: <u>BabcockL4@michigan.gov</u>

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

SUBJECT: DE KARN LINED IMPOUNDMENT LICENSE REQUIREMENTS – GROUNDWATER QUALITY

MONITORING RESULTS FOR THIRD QUARTER 2021

Dear Ms. Babcock,

Attached you will find the above-referenced compliance monitoring report for the DE Karn Lined Impoundment (Report) to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. The monitoring event was conducted and the report was prepared by TRC under the direction of Consumers Energy Environmental Services. The report includes the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality - Office of Waste Management and Radiological Protection communication prescribing the format for solid waste disposal facility monitoring submittals.

This report was prepared in conformance with the *Karn Lined Impoundment Hydrogeological Monitoring Plan*, dated November 2020 ("HMP") that was approved by the MDEQ on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020. Should you have any questions regarding this submittal, please contact the undersigned at (517) 788-2982.

Sincerely,

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

Principal Engineer

Landfill Operations Compliance

Phone: (517) 788-2982

Email: harold.registerjr@cmsenergy.com

cc: Mr. Phil Roycraft, EGLE Saginaw Bay District Office (via email ROYCRAFTP@michigan.gov)

Mr. Gary Schwerin, EGLE Saginaw Bay District Office (via email <a href="mailto:SchwerinG@michigan.gov">SchwerinG@michigan.gov</a>)

Mr. Caleb Batts, Consumers Energy (via email <a href="mailto:Caleb.Batts@cmsenergy.com">Caleb.Batts@cmsenergy.com</a>)

Encl: Karn Lined Impoundment - 3Q2021 Groundwater Monitoring Report

Karn Lined Impoundment - 3Q2021 Laboratory Analysis Data Spreadsheet



# Third Quarter 2021 Hydrogeological Monitoring Report

**DE Karn Lined Impoundment CCR Unit** 

**Essexville**, Michigan

October 2021

Darby Litz /

Project Manager/Hydrogeologist

# **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

## **Prepared By:**

TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

Graham Crockford, C.P.G.

Program Manager



# **TABLE OF CONTENTS**

1.0	Intro	Introduction					
	1.1	Statement of Adherence to Approved Hydrogeological Monitoring Plan					
	1.2	Program Summary					
	1.3	Site Overview	2				
	1.4	Geology/Hydrogeology	.2				
2.0	2.0 Second Collection System Monitoring						
2.0	2.0 Geoong Conection System Montornig						
3.0	Groundwater Monitoring						
	3.1	Monitoring Well Network	ţ				
	3.2	May 2021 Detection Monitoring Event	ļ				
		3.2.1 Data Quality Review	. (				
		3.2.2 Groundwater Flow Rate and Direction	. (				
4.0	Data	Evaluation	•				
	4.1	Statistical Evaluation of Trends					
	4.2 4.3	Detection Monitoring Data Discussion					
	4.3	Alternate Source Demonstration	٠.;				
5.0	Conc	lusions and Recommendations	1 (				
6.0	Refer	rences	11				
0.0	Itterer						
TABI	LES						
Table	1	Summary of Groundwater Elevation Data					
Table		Summary of Field Parameter Results: July 2021					
Table Table	_	Summary of Groundwater Sampling Results (Analytical): July 2021 Summary of Statistical Exceedances – July 2021					
Table	7	Summary of Statistical Exceedances Sury 2021					
FIGU	RES						
Figure		Site Location Map					
Figure 2 Figure 3		Site Layout Map Shallow Groundwater Contour Map - July, 2021					
rigure	<del>-</del> 3	Shallow Groundwater Contour Map - July, 2021					



## **APPENDICES**

Appendix A Laboratory Analytical Reports

Appendix B Field Notes

Appendix C Data Quality Reviews Appendix D Statistical Analysis

Appendix E Secondary Leachate Collection System Monitoring



## 1.0 Introduction

Pursuant to the Federal CCR Rule<sup>1</sup>, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

# 1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Third Quarter 2021 Karn Lined Impoundment Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. This Report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality (MDEQ) — Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Facility Monitoring Submittals, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (NREPA), also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

# 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the Third Quarter 2021 at the Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

X:\WPAAM\PJT2\418425\0001\2021Q3\R418425.1 3Q21.DOCX

<sup>&</sup>lt;sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended.



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

Based on sampling results for the third quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

### 1.3 Site Overview

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

# 1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts and sands deposited in or on the shores of glacial lakes) at other areas. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

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



# 2.0 Second Collection System Monitoring

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

The Average Daily Flow Rate for the period from December 10, 2020 – January 6, 2021 was calculated as 137.0 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD. Although this calculated flow rate does not constitute the average flow rate for the previous three months per the definition of average daily flow rate under Part 115, Consumers provided a proactive notification and a preliminary written assessment of the flow rate exceedances to the EGLE January 15, 2021 and January 22, 2021, respectively. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner, Consumers Energy continues to monitor improvements in the secondary collection system for improvements in the Daily Average Flow Rate. The Average Daily Flow Rate for September 2021 was calculated as 72.6 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD, as documented in the Consumers Energy Notification of Secondary Flow Rates, DE Karn Lined Impoundment (Type III Coal Ash Impoundment) WDS #392503 (Consumers Energy, October 7, 2021).

In response to the exceedance of the SCS Response Action Flow Rate), samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) in July 2021 to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

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

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

Arsenic is higher in groundwater than the secondary collection system: Arsenic was detected in both the primary and secondary collection systems at 5 ug/L and 2 ug/L, respectively, in July 2021. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the damaged liner areas, is 86 ug/L, which is consistent



with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.

- Vanadium is detected in the primary and secondary collection system and not in groundwater: Vanadium was present in the primary collection system sample at 52 ug/L in March 2021, 16 ug/L in May 2021, and 25 ug/L in July 2021, which are higher than the vanadium concentration in the secondary collection system (11 ug/L in March and July and 6 ug/L in May). Vanadium was not detected in the well nearest the observed liner damage OW-12 (<2 ug/L).
- Secondary Collection System chemistry has not appreciably changed: The time series plots in Attachment A show relatively stable trends in chemistry for samples collected from the primary collection system, with the exception of TDS and sulfate. These also are the only two constituents in the secondary collection system sample were present above relevant criteria (i.e. GSI criteria) this event. In both cases the concentration in the primary collection system leachate is significantly lower in concentration suggesting that the elevated TDS and sulfate is not likely from the primary collection system leachate. The TDS and sulfate concentrations in the secondary collection system are also more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.

Water quality data collected for Third Quarter 2021 are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored. Using the secondary collection system flow rates as a leak detection system was successful. The leak was identified in the fourth quarter of 2020, actions were promptly taken to address the leak. In January 2021, liner damage was noted in two areas denoted as Visual Observation Point No. 1 (VOP 1) and Visual Observation Point No. 2 (VOP 2). VOP 2 was repaired on March 10, 2021 and VOP 1 was repaired on May 24, 2021 as documented by Golder Associates Inc. Consumers Energy submitted the repair certification reports to the EGLE on May 25, 2021 and June 29, 2021, respectively. The results of the mitigation efforts continue to be monitored.

Consumers Energy continues to monitor the secondary collection system flow rates, record flow rates and head level on the secondary liner in the operating record and evaluate flow rate trends on a weekly basis. Written notifications of flow rates in the secondary collection system will be provided monthly and evaluations of the chemical characteristics of liquid in the secondary collection system will be reported quarterly. In addition, Consumers Energy continues to provide quarterly updates on remedial actions performed on the leachate collection system through the quarterly groundwater monitoring report required by the HMP.



# 3.0 Groundwater Monitoring

# 3.1 Monitoring Well Network

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

# 3.2 May 2021 Detection Monitoring Event

In accordance with the HMP, TRC conducted the third quarter 2021 monitoring event for the Karn Lined Impoundment on July 26 through 27, 2021. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the July 2021 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

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



Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide additional evaluation of groundwater chemistry. Analytical results from the third quarter 2021 monitoring event are included in the attached laboratory reports (Appendix A).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix B).

Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of one field blank, one equipment blank, one field duplicate (OW-12), and field matrix spike/matrix spike duplicate samples collected at DEK-MW-18001.

# 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

### 3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the July 2021 groundwater monitoring events are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in July 2021 are generally within the range of 581 to 587 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

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



process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in July 2021 demonstrate a reduction in groundwater elevation measurements by several feet when compared to measurement taken in June 2018. 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 and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as illustrated in Figure 3.

The average hydraulic gradient observed on May 3, 2021 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0040 ft/ft. The gradients were calculated using the monitoring well pair DEK MW 15004/DEK-MW-15005, as well as the well water elevation difference and distance between DEK-MW-15003 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same dates as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.20 ft/day or 73 ft/year in July 2021 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

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



### 4.0 Data Evaluation

Based on sampling results for the third quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the third quarter 2021 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria, the generic GSI criteria, and the site-specific mixing-zone GSI criteria. Mixing-zone criteria are provided for the Karn-Weadock complex in the December 23, 2015 mixing zone determination that consists of arsenic, boron, and selenium. As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017.

### 4.1 Statistical Evaluation of Trends

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

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas<sup>™</sup> Statistical Software (Sanitas<sup>™</sup>). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from October 2019 through July 2021 were analyzed using Mann-Kendall and Sen's Slope at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.



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

- A continuous increasing trend in sulfate was observed in monitoring well DEK-MW-18001.
- A continuous increasing trend was observed for calcium in monitoring well OW-10.
- Continuous increasing trends were observed for boron and pH in monitoring well OW-11.

## 4.2 Detection Monitoring Data Discussion

Although preliminary detection monitoring trends noted in Section 4.1 exist, the groundwater conditions do not conclusively indicate a release from the unit. Groundwater quality is generally consistent with previous monitoring events. The location of one of the two identified liner damage locations is approximately 40-ft upgradient from monitoring well OW-12. Detection monitoring constituent concentrations at OW-12 exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. The three wells with noted trends are located much further away from where the release was likely to occur. Additionally, concentrations of several constituents observed at OW-11 are much higher than concentrations observed in the KLI-PCS and KLI-SCS, which support a source other than the Karn Lined Impoundment is affecting chemistry at OW-11. The increasing trends at OW-10 and DEK-MW-18001 will continue to be evaluated within context of changes in the site operational status. At this time, the increasing trend of calcium concentrations in monitoring well OW-10 and increasing trend of sulfate in monitoring well DEK-MW-18001 do not indicate a release from the unit, but instead are attributed to another change in conditions, such as groundwater flow regime or redox conditions as shown in Appendix F and discussed further in Section 4.3: Alternate Source Demonstration

### 4.3 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed in the Second Quarter 2021 Hydrogeological Monitoring Report (TRC, July 2021):

- Sulfate in monitoring well DEK-MW-18001
- Calcium in monitoring well OW-10; and
- Boron and pH in monitoring well OW-11.

\_



## 5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in three wells, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the July 2021 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in Q4 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored. The fourth quarter monitoring event is scheduled for October 2021.



### 6.0 References

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



# **Tables**

Table 1

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

	тос		Screen Interval	July 26, 2021		
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)	
Background	<u>I</u>	1	<u> </u>	(11 = 1 = 0)	(1-7)	
MW-15002	587.71	Sand	580.9 to 570.9	6.39	581.32	
MW-15008	585.36	Sand with clay	578.7 to 568.7	4.08	581.28	
MW-15016	586.49	Sand	581.2 to 578.2	4.00	582.49	
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	4.91	581.26	
DEK Bottom Ash Pone		Caria ana Caria Ciay	070.0 10 000.0		0020	
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.08	584.79	
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.83	583.21	
DEK-MW-15005	589.72	Sand	572.3 to 567.3	8.48	581.24	
DEK-MW-15006	589.24	Sand	573.0 to 568.0	8.00	581.24	
DEK Bottom Ash Pone			0.0.0 10 000.0	0.00	00	
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.30	586.44	
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.23	585.24	
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.30	585.28	
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.44	586.46	
OW-12	603.07	Silty Sand	584.2 to 579.2	16.96	586.11	
DEK Nature and Exter		City Cara	001.2 10 070.2		000	
MW-01	597.02	Sand	573.0 to 570.0	16.02	581.00	
MW-03	597.30	Sand	569.8 to 566.8	16.32	580.98	
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	8.33	581.11	
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.24	581.54	
MW-10	596.97	Sand	582.5 to 572.5	15.86	581.11	
MW-12	598.60	Sand	583.9 to 573.9	17.52	581.08	
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	13.30	581.07	
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	14.75	581.05	
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.34	582.65	
MW-23	595.57	Ash/Sand	576.9 to 571.9	13.30	582.27	
DEK Static Water Leve		7.01,00.10	0.000 10 0.10		002.2.	
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	16.34	581.00	
MW-04	598.01	NR	569.5 to 564.5	17.02	580.99	
MW-17	597.91	Sand	577.0 to 574.0	12.65	585.26	
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.48	583.74	
MW-19	597.28	NR	572.1 to 567.1	15.78	581.50	
MW-20	632.75	Sand	582.3 to 579.3	51.66	581.09	
MW-21	632.91	Sand	587.1 to 584.1	50.69	582.22	
OW-01	631.33	NR	572.5 to 567.5	50.18	581.15	
OW-02	598.01	Fly Ash	579.4 to 576.4	15.21	582.80	
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	16.50	581.44	
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	9.23	580.98	
OW-05	593.53	Sand	576.9 to 571.9	12.10	581.43	
OW-06	603.95	NR NR	580.9 to 575.9	21.25	582.70	
OW-07	596.41	Ash	583.3 to 580.3	14.18	582.23	
OW-08	593.93	NR	581.0 to 576.0	10.60	583.33	
OW-09	593.45	NR NR	585.5 to 580.5	10.28	583.17	
OW-13	588.52	NR NR	579.5 to 574.5	3.68	584.84	
OW-15	587.75	NR	572.8 to 567.8	2.55	585.20	

#### Notes:

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

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

NR: Not Recorded

Table 2

### Summary of Field Parameters: July 2021 Third Quarter 2021 Quarterly Report Karn Lined Impoundment - Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature	Turbidity (NTU)
Karn Lined Impoundn	nent	(IIIg/L)	(1117)	(30)	(diffilos/ciff)	( 0)	(1110)
DEK-MW-15003	7/27/2021	1.97	-96.3	8.4	459	19.5	2.0
DEK-MW-18001	7/27/2021	1.95	-109.5	7.5	821	14.8	1.6
KLI-PCS	7/27/2021	9.41	-29.3	9.0	565	25.7	17.5
KLI-SCS	7/27/2021	3.40	-5.2	7.5	1,708	20.8	3.8
OW-10	7/27/2021	1.96	30.7	7.0	787	14.7	9.6
OW-11	7/27/2021	2.14	31.2	9.4	327	14.7	8.3
OW-12	7/27/2021	1.70	-81.1	7.1	564	16.5	1.8
SW-DITCH	7/27/2021	8.26	-56.7	10.4	2,915	29.8	40.1

#### 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): July 2021 Thrid Quarter 2021

# Karn Lined Impoundment – Essexville, Michigan

					Sample Location:	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	KLI-SCS	KLI-PCS	SW-Ditch
					Sample Date:	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021
				MI Non-	Jampie Zater	172172021					172172021		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Constituent	Unit	EPA MCL	MI Residential*	Residential*	MI GSI^			downgradient				Supplemental	
Appendix III <sup>(1)</sup>													1
Boron	ug/L	NC	500	500	4,000	825	1,230	872	3,190	721	521	668	138
Calcium	mg/L	NC	NC	NC	500EE	23.6	67.9	127	9.32	62.4	116	55.7	51.6
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	53.1	52.5	86.2	63.9	57.6	44.0	60.5	124
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,610	< 1,000	< 1,000	< 1,000	3,010
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	42.5	112	122	25.8	118	506	50.3	645
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	246	467	626	205	443	1,240	331	1,690
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	8.4	7.5	7.0	9.4	7.1	7.5	9.0	10.4
Appendix IV <sup>(1)</sup>													1
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	3	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	354	78	4	497	86	2	5	7
Barium	ug/L	2,000	2,000	2,000	1,200	40	127	169	33	56	87	408	82
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	1	< 1	< 1	1	2	3
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	2,610	< 1,000	< 1,000	< 1,000	3,010
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lithium	ug/L	NC	170	350	440	15	19	23	< 10	20	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	26	< 5	9	253	16	14	23	10
Selenium	ug/L	50	50	50	5.0	1	< 1	14	5	1	8	2	3
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 1	15 <sup>(2)</sup>												1
Iron	ug/L	300**	300 <sup>E</sup>	300€	500,000 <sup>EE</sup>	157	1,290	1,230	128	3,470	2,350	731	696
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	< 1	< 1	3	2	< 1	3	4	6
Nickel	ug/L	NC	100	100	120	< 2	2	5	3	2	6	3	4
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	11	1,120	< 2	8	25	5
Zinc	ug/L	5,000**	2,400	5,000 <sup>E</sup>	260	< 10	< 10	< 10	< 10	< 10	11	< 10	< 10

#### Notes:

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

SU - standard units; pH is a field parameter.

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

NC - no criteria

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2021
- \*\* 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 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection
- monitoring constituents (iron) and assessment monitoring constituents (copper, nickel, silver, vanadium, and zinc) are reported.

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

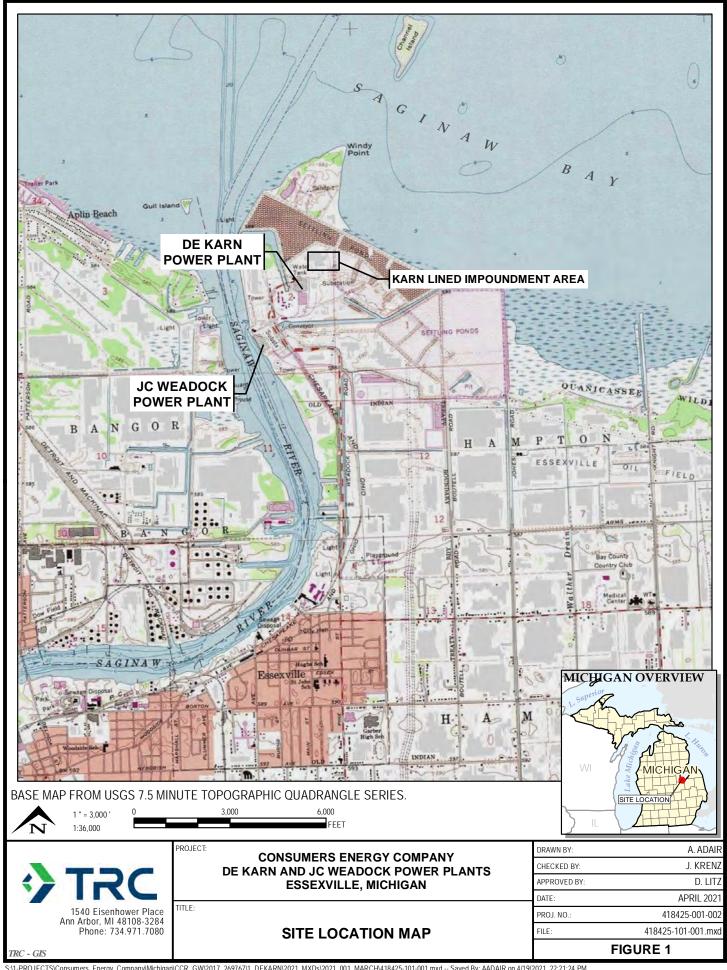
# Table 4

Summary of Statistical Exceedances – July 2021 Karn Lined Impoundment Essexville, Michigan

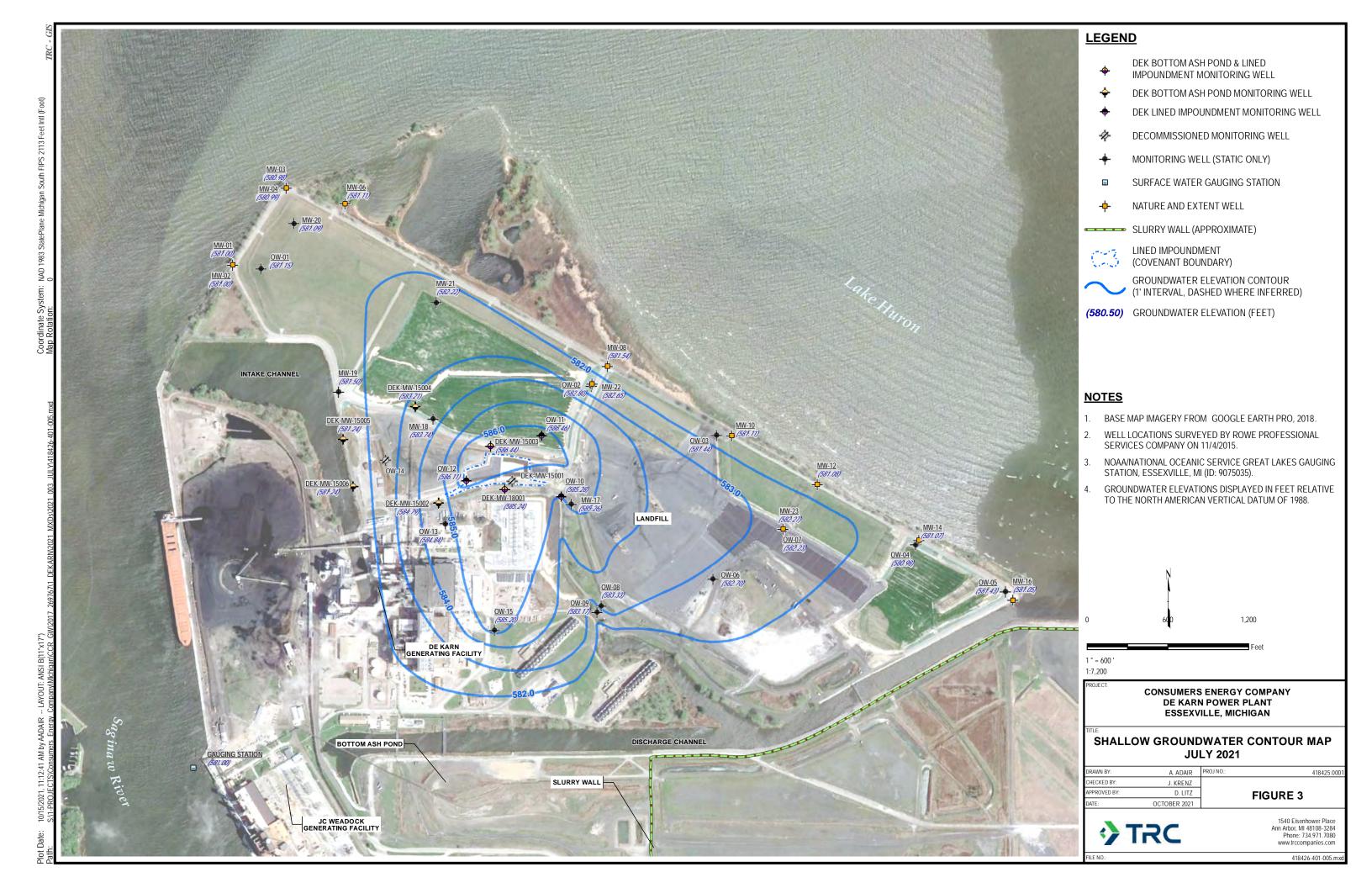
IMMAR	RY OF STATISTICAL EXCEE		IND ENERG	. 1		Data is in unle	(X) ug/L ()mg/L ss otherwise s	or stated
Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	3 Qtr. 2021 ( <b>bold</b> >201)	2 Qtr. 2021 ( <b>bold</b> >201)	1 Qtr. 2021 ( <b>bold</b> >201)	
		No	Exce	edances				



# **Figures**









# **Appendix A Laboratory Analytical Reports**



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: August 15, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2021 Q3

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 21-0879

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 07/27/2021, for the 3<sup>rd</sup> Quarter monitoring requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/29/2021.

Samples for Total and Dissolved Organic Carbon have been subcontracted to Brighton Analytical, LLC. and the results are listed under the analyst initials "BAL".

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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

#### **CASE NARRATIVE**

### I. Sample Receipt

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

### II. Methodology

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

### III. Results/Quality Control

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

## **DEFINITIONS / QUALIFIERS**

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

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

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



# **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2021 DEK RCRA Bottom Ash Pond & Lined Impoundment

**Date Received:** 7/29/2022 **Chemistry Project:** 21-0879

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0879-01	DEK-MW-15003	Groundwater	07/27/2021 01:41 PM	DEK Bottom Ash Pond & Lined Impoundment
21-0879-02	DEK-MW-18001	Groundwater	07/27/2021 02:30 PM	DEK Bottom Ash Pond & Lined Impoundment
21-0879-03	DEK-MW-18001 MS	Water	07/27/2021 02:30 PM	DEK Bottom Ash Pond & Lined Impoundment
21-0879-04	DEK-MW-18001 MSD	Water	07/27/2021 02:30 PM	DEK Bottom Ash Pond & Lined Impoundment



Report Date:

08/15/21

21-0879



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project:

 Field Sample ID:
 DEK-MW-15003
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0879-01
 Collect Time:
 01:41 PM

D	B W		11. 9		Amalana's Bod	<b>-</b>
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rul	e Appendix III-IV To	tal Metals	s Ехр	Aliquot #: 21-0	879-01-C01-A02	Analyst: EE
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	354		ug/L	1.0	08/06/2021	AB21-0806-01
Barium	40		ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Boron	825		ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND		ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	23600		ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND		ug/L	6.0	08/06/2021	AB21-0806-01
Copper	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Iron	157		ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	15		ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	3860		ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	26		ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	5140		ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	1		ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND		ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	45700		ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 21-0	)879-01-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	53100		ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND		ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	42500		ug/L	1000.0	08/10/2021	AB21-0810-23
Alkalinity by SM 2320B				Aliguot #: 21-0	)879-01-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	71200	-	ug/L	10000.0	08/04/2021	AB21-0804-03



# **Analytical Report**

**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project: **21-0879** 

 Field Sample ID:
 DEK-MW-15003
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0879-01
 Collect Time:
 01:41 PM

Alkalinity by SM 2320B				Aliquot #: 21-0	879-01-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Bicarbonate	71200		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Dissolved Solids by SM 2540C				Aliquot #: 21-0	879-01-C05-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	246		mg/L	10.0	07/30/2021	AB21-0730-03
Total Organic Carbon by SM 5310B, A	queous			Aliquot #: 21-0	879-01-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4100		ug/L	1000.0	08/09/2021	AB21-0808-06
Dissolved Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	879-01-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	6200		ug/L	1000.0	08/09/2021	AB21-0808-07



Report Date:

08/15/21



**Laboratory Services** 

A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment Laboratory Project: 21-0879

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0879-02
 Collect Time:
 02:30 PM

Mercury by EPA 7470A, Total, A	•		1124	-	0879-02-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rul	e Appendix III-IV To	tal Metals	s Ехр	Aliquot #: 21-0	879-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	78		ug/L	1.0	08/06/2021	AB21-0806-01
Barium	127		ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Boron	1230		ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND		ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	67900		ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND		ug/L	6.0	08/06/2021	AB21-0806-01
Copper	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Iron	1290		ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	19		ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	12700		ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	ND		ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	2		ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	4420		ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND		ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	74100		ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule	Analyte List. Cl. F.	SO4. Agu	ieous	Aliquot #: 21-0	9879-02-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	52500	-	ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND		ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	112000		ug/L	1000.0	08/10/2021	AB21-0810-23
Alkalinity by SM 2320B				Alignot #: 24.0	1970_02_C02_A04	Analyst DLS
Parameter(s)	Result	Flag	Units	RL	0879-02-C03-A01 Analysis Date	Analyst: DLS Tracking
. ,		riay			-	_
Alkalinity Total	192000		ug/L	10000.0	08/04/2021	AB21-0804-03



# **Analytical Report**

**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment Laboratory Project: 21-0879

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0879-02
 Collect Time:
 02:30 PM

Alkalinity by SM 2320B				Aliquot #: 21-0	879-02-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Bicarbonate	192000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Dissolved Solids by SM 2540C				Aliquot #: 21-0	879-02-C05-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	467		mg/L	10.0	07/30/2021	AB21-0730-03
Total Organic Carbon by SM 5310B, Ad	queous			Aliquot #: 21-0	879-02-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4600		ug/L	1000.0	08/09/2021	AB21-0808-06
Dissolved Organic Carbon by SM 5310	B, Aqueous			Aliquot #: 21-0	879-02-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	8600		ug/L	1000.0	08/09/2021	AB21-0808-07





Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment

Field Sample ID: **DEK-MW-18001 MS** 

Lab Sample ID: 21-0879-03

Matrix: Water

Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	21-0879
--------------	-----------------------------------------	---------------------	---------

Collect Date: 07/27/2021 Collect Time: 02:30 PM

Report Date:

08/15/21

Mercury by EPA 7470A, Total, Aqueous			Aliquot #: 2	Analyst: CLH	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	92.7	%	0.2	08/02/2021	AB21-0802-08

Metals by EPA 6020B: CCR	Rule Appendix III-IV To	Aliquot #: 21-0	Analyst: EB		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	108	%	1.0	08/06/2021	AB21-0806-01
Arsenic	97	%	1.0	08/06/2021	AB21-0806-01
Barium	105	%	5.0	08/06/2021	AB21-0806-01
Beryllium	98	%	1.0	08/06/2021	AB21-0806-01
Boron	118	%	20.0	08/06/2021	AB21-0806-01
Cadmium	99.3	%	0.2	08/13/2021	AB21-0806-01
Calcium	114	%	1000.0	08/06/2021	AB21-0806-01
Chromium	92	%	1.0	08/06/2021	AB21-0806-01
Cobalt	91	%	6.0	08/06/2021	AB21-0806-01
Copper	95	%	1.0	08/06/2021	AB21-0806-01
Iron	96	%	20.0	08/06/2021	AB21-0806-01
Lead	98	%	1.0	08/06/2021	AB21-0806-01
Lithium	82	%	10.0	08/06/2021	AB21-0806-01
Magnesium	113	%	1000.0	08/06/2021	AB21-0806-01
Molybdenum	111	%	5.0	08/06/2021	AB21-0806-01
Nickel	95	%	2.0	08/06/2021	AB21-0806-01
Potassium	106	%	100.0	08/06/2021	AB21-0806-01
Selenium	99	%	1.0	08/06/2021	AB21-0806-01
Silver	93.5	%	0.2	08/06/2021	AB21-0806-01
Sodium	114	%	1000.0	08/06/2021	AB21-0806-01
Thallium	98	%	2.0	08/06/2021	AB21-0806-01
Vanadium	97	%	2.0	08/06/2021	AB21-0806-01
Zinc	99	%	10.0	08/06/2021	AB21-0806-01

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous A				879-03-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	107	%	1000.0	08/10/2021	AB21-0810-23
Fluoride	91	%	1000.0	08/10/2021	AB21-0810-23
Sulfate	105	%	1000.0	08/10/2021	AB21-0810-23

Alkalinity by SM 2320B	Α	Aliquot #: 21-0879-03-C03-A01						
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking			
Alkalinity Total	95	%	10000.0	08/04/2021	AB21-0804-03			



Report Date:

08/15/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment Laboratory Project: 21-0879

 Field Sample ID:
 DEK-MW-18001 MSD
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0879-04
 Collect Time:
 02:30 PM

Matrix: Water

Mercury by EPA 7470A, Total, Aqued		Aliquot #: 21-0	Analyst: CLH			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking	
Mercury	103	%	0.2	08/02/2021	AB21-0802-08	
Metals by EPA 6020B: CCR Rule App	pendix III-IV To	tal Metals Exp	Aliguot #: 21-0	0879-04-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking	
Antimony	108	%	1.0	08/06/2021	AB21-0806-01	
Arsenic	96	%	1.0	08/06/2021	AB21-0806-01	
Barium	102	%	5.0	08/06/2021	AB21-0806-01	
Beryllium	100	%	1.0	08/06/2021	AB21-0806-01	
Boron	118	%	20.0	08/06/2021	AB21-0806-01	
Cadmium	103	%	0.2	08/13/2021	AB21-0806-01	
Calcium	115	%	1000.0	08/06/2021	AB21-0806-01	
Chromium	89	%	1.0	08/06/2021	AB21-0806-01	
Cobalt	88	%	6.0	08/06/2021	AB21-0806-01	
Copper	94	%	1.0	08/06/2021	AB21-0806-01	
Iron	84	%	20.0	08/06/2021	AB21-0806-01	
Lead	99	%	1.0	08/06/2021	AB21-0806-01	
Lithium	85	%	10.0	08/06/2021	AB21-0806-01	
Magnesium	113	%	1000.0	08/06/2021	AB21-0806-01	
Molybdenum	111	%	5.0	08/06/2021	AB21-0806-01	
Nickel	91	%	2.0	08/06/2021	AB21-0806-01	
Potassium	109	%	100.0	08/06/2021	AB21-0806-01	
Selenium	99	%	1.0	08/06/2021	AB21-0806-01	
Silver	93.4	%	0.2	08/06/2021	AB21-0806-01	
Sodium	119	%	1000.0	08/06/2021	AB21-0806-01	
Thallium	101	%	2.0	08/06/2021	AB21-0806-01	
Vanadium	92	%	2.0	08/06/2021	AB21-0806-01	
Zinc	96	%	10.0	08/06/2021	AB21-0806-01	
Anions by EPA 300.0 CCR Rule Anal	lyte List, CI, F,	SO4, Aqueous	Aliquot #: 21-0	)879-04-C02-A01	Analyst: DMW	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking	
Chloride	111	%	1000.0	08/10/2021	AB21-0810-23	
Fluoride	94	%	1000.0	08/10/2021	AB21-0810-23	
Sulfate	107	%	1000.0	08/10/2021	AB21-0810-23	
Alkalinity by SM 2320B			Aliquot #: 21-0	9879-04-C03-A01	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking	
Alkalinity Total	96	%	10000.0	08/04/2021	AB21-0804-03	



A CENTURY OF EXCELLENCE

**Report Date:** 08/15/21

Data Qualifiers	Exception Summary
	No exceptions occured.

CONSUMERS ENERGY

# Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

# TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number:	1-0879				
Inspection Date: 7/29/20	121		Inspection By:	Meganke	e d
Sample Origin/Project Name:	100	BoHan	Ash Po	nd & LI	
Shipment Delivered By: Enter	the type of shi	pment carrier			
Pony Fe Other/Hand Carry (who	om)				Airborne
Tracking Number: 81	5720417	831	Shipping Form	Attached: Yes_	No
Shipping Containers: Enter the	type and num	ber of shippi	ng containers receiv	ved.	
Cooler Ca Loose/Unpackaged Con				Env	elope/Mailer
Condition of Shipment: Enter	the as-received	condition of	the shipment conta	iner.	
Damaged Shipment Obs	served: None	1			Leaking
		7-7-7-	11.6	o accorden	
Shipment Security: Enter if any Shipping Containers Re				/	
Enclosed Documents: Enter the	type of docum	nents enclose	d with the shipmen	12	
CoC _ Work				Other_	
Temperature of Containers: M	easure the tem	perature of se	everal sample conta	iners.	
As-Received Temperatu	ire Range 1.0	-20c	Samples Receive	d on Ice: Yes	No
M&TE # and Expiration					
Number and Type of Container	rs: Enter the to	otal number o	of sample containers	s received.	
Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or (0mL))	8				
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
Part of the state	8				
Mc 24 mL vial (glass)				فسجرا الد	
750500 mL (plastic)	1				
Other					

# **CHAIN OF CUSTODY**

# Consumers Energy

# CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPLING SIT	E:		77.7	PROJECT NUMBER:				ANALYSIS REQUESTED						Page 1 of 1				
DEK Botto	m Ash Pond	& LI – 202	21 Q3	21	21-0879													SEND REPORT TO: CDBatts
AMPLING TE.	AM:			DATE SHIPPED:	SIT		ATTACHED?	als					HD Register, TRC					
						CIRCLE	NO NO	Fotal Metals	Anions	Alkalinity		61	Ċ	PHONE:				
CE CONTROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCA	TION	DEPTH (ft)	# OF CONTAINERS	Tota	Ani	Alk	TDS	TOC	DOC	REMARKS				
21-0879-01	Planla	1341	GW	DEK-MW-15003			7	x	х	х	x	х	x					
-02		1430	GW	DEK-MW-18001			7	х	х	x	x	х	х					
-03		1430	GW	DEK-MW-18001 MS			4	x	x	x								
-04		1430	GW	DEK-MW-18001 MSD			4	x	x	x								
					_													
LINQUISHE	D BY: (SIGNA	TURE)	7/2		VED BY	(SIGNATUR	E)						COMMEN	1.0 <del>2</del>				
ELINGUISHE	D BY; (SIGNA	TURE)	DATE/T									015402						
Fed			7-7	9-21 1000	ON-	euxtla	(NO)			0.5	NOD!	r mo	AD CO					
1 CVC	7/4			( so ( two		879 Page 13				OF	GGINA	L TO	LAB CO	PY TO CUSTOMER				



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: August 15, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2021 Q3

CC: BTRunkel, P22-120 Darby Litz, Project Manager

HDRegister, P22-521 TRC Companies, Inc.
BLSwanberg, P22-119 1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 21-0880

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 07/27/2021, for the 3<sup>rd</sup> Quarter monitoring requirement, as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 07/29/2021.

Samples for Total and Dissolved Organic Carbon have been subcontracted to Brighton Analytical, LLC. and the results are listed under the analyst initials "BAL".

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. <u>Sample Receipt</u>

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

# II. Methodology

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

### III. Results/Quality Control

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

## **DEFINITIONS / QUALIFIERS**

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

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

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



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

Customer Name: Karn/Weadock Complex

Work Order ID: Q3-2021 DEK RCRA Lined Impoundment Wells

Date Received: 7/29/2021 Chemistry Project: 21-0880

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-0880-01	OW-10	Groundwater	07/27/2021 12:49 PM	DEK Lined Impoundment
21-0880-02	OW-11	Groundwater	07/27/2021 01:55 PM	DEK Lined Impoundment
21-0880-03	OW-12	Groundwater	07/27/2021 03:25 PM	DEK Lined Impoundment
21-0880-04	KLI-SCS	Groundwater	07/27/2021 11:57 AM	DEK Lined Impoundment
21-0880-05	KLI-PCS	Groundwater	07/27/2021 11:41 AM	DEK Lined Impoundment
21-0880-06	SW-DITCH	Groundwater	07/27/2021 11:15 AM	DEK Lined Impoundment
21-0880-07	DUP-KLI	Groundwater	07/27/2021 12:00 AM	DEK Lined Impoundment
21-0880-08	EB-KLI	Water	07/27/2021 03:43 PM	DEK Lined Impoundment
21-0880-09	FB-KLI	Water	07/27/2021 03:25 PM	DEK Lined Impoundment



08/15/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-10
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-01
 Collect Time:
 12:49 PM

Mercury by EPA 7470A, Total, A	queous		Aliquot #: 21-0	0880-01-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals Exp	Aliguot #: 21-0	)880-01-C01-A02	Analyst: EB
Parameter(s)	Result	Flag Units	-	Analysis Date	Tracking
Antimony	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	4	ug/L	1.0	08/06/2021	AB21-0806-01
Barium	169	ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Boron	872	ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND	ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	127000	ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	1	ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND	ug/L	6.0	08/06/2021	AB21-0806-01
Copper	3	ug/L	1.0	08/06/2021	AB21-0806-01
Iron	1230	ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	23	ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	14800	ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	9	ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	5	ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	11100	ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	14	ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND	ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	59100	ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND	ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	11	ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND	ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 21-0	)880-01-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag Units		Analysis Date	Tracking
Chloride	86200	ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND	ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	122000	ug/L	1000.0	08/10/2021	AB21-0810-23
Total Dissolved Solids by SM 25	40C		Aliguot #: 21-0	)880-01-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag Units		Analysis Date	Tracking
Total Dissolved Solids	626	mg/L	10.0	07/30/2021	AB21-0730-03
		0000 Daga 5 of 22			



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-10
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-01
 Collect Time:
 12:49 PM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-01-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	276000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	276000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	880-01-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4200		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SM	/I 5310B, Aqueous			Aliquot #: 21-0	880-01-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	4900		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-11
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-02
 Collect Time:
 01:55 PM

Mercury by EPA 7470A, Total, Aqueo	us			Allquot #: 21-0	880-02-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule App	endix III-IV To	tal Metals	з Ехр	Aliquot #: 21-0	880-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	3		ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	497		ug/L	1.0	08/06/2021	AB21-0806-01
Barium	33		ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Boron	3190		ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND		ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	9320		ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND		ug/L	6.0	08/06/2021	AB21-0806-01
Copper	2		ug/L	1.0	08/06/2021	AB21-0806-01
Iron	128		ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	1230		ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	253		ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	3		ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	5540		ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	5		ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND		ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	60500		ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	1120		ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule Analy	/te List, CI, F,	SO4, Aqı	ieous	Aliquot #: 21-0	880-02-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	63900		ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	2610		ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	25800		ug/L	1000.0	08/10/2021	AB21-0810-23
Total Dissolved Solids by SM 2540C				Aliquot #: 21-0	880-02-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	205		mg/L	10.0	07/30/2021	AB21-0730-03



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-11
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-02
 Collect Time:
 01:55 PM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-02-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	77300		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	22700		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	54600		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	880-02-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	4800		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SM	/I 5310B, Aqueous			Aliquot #: 21-0	880-02-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	6400		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-12
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-03
 Collect Time:
 03:25 PM

Mercury by EPA 7470A, Total, Aqueo	us			Allquot #: 21-0	880-03-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule App	endix III-IV To	tal Metals	з Ехр	Aliquot #: 21-0	880-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	86		ug/L	1.0	08/06/2021	AB21-0806-01
Barium	56		ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Boron	721		ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND		ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	62400		ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND		ug/L	6.0	08/06/2021	AB21-0806-01
Copper	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Iron	3470		ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	20		ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	18400		ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	16		ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	2		ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	5760		ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	1		ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND		ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	43200		ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule Analy	yte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 21-0	880-03-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	57600		ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND		ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	118000		ug/L	1000.0	08/10/2021	AB21-0810-23
Total Dissolved Solids by SM 2540C				Aliquot #: 21-0	880-03-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	443		mg/L	10.0	07/30/2021	AB21-0730-03



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

 Field Sample ID:
 OW-12
 Collect Date:
 07/27/2021

 Lab Sample ID:
 21-0880-03
 Collect Time:
 03:25 PM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-03-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	155000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	155000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	880-03-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	2200		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SM	I 5310B, Aqueous			Aliquot #: 21-0	880-03-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	2200		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: KLI-SCS Collect Date: 07/27/2021 Lab Sample ID: 21-0880-04 Collect Time: 11:57 AM

Mercury by EPA 7470A, Total,	Aqueous		Aliquot #: 21-0	Aliquot #: 21-0880-04-C01-A01		
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking	
Mercury	ND	ug/L	0.2	08/02/2021	AB21-0802-08	
Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	tal Metals Exp	Aliguot #: 21-0	0880-04-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag Unit	•	Analysis Date	Tracking	
Antimony	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Arsenic	2	ug/L	1.0	08/06/2021	AB21-0806-01	
Barium	87	ug/L	5.0	08/06/2021	AB21-0806-01	
Beryllium	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Boron	521	ug/L	20.0	08/06/2021	AB21-0806-01	
Cadmium	ND	ug/L	0.2	08/13/2021	AB21-0806-01	
Calcium	116000	ug/L	1000.0	08/06/2021	AB21-0806-01	
Chromium	1	ug/L	1.0	08/06/2021	AB21-0806-01	
Cobalt	ND	ug/L	6.0	08/06/2021	AB21-0806-01	
Copper	3	ug/L	1.0	08/06/2021	AB21-0806-01	
Iron	2350	ug/L	20.0	08/06/2021	AB21-0806-01	
Lead	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Lithium	ND	ug/L	10.0	08/06/2021	AB21-0806-01	
Magnesium	36700	ug/L	1000.0	08/06/2021	AB21-0806-01	
Molybdenum	14	ug/L	5.0	08/06/2021	AB21-0806-01	
Nickel	6	ug/L	2.0	08/06/2021	AB21-0806-01	
Potassium	4460	ug/L	100.0	08/06/2021	AB21-0806-01	
Selenium	8	ug/L	1.0	08/06/2021	AB21-0806-01	
Silver	ND	ug/L	0.2	08/06/2021	AB21-0806-01	
Sodium	293000	ug/L	1000.0	08/06/2021	AB21-0806-01	
Thallium	ND	ug/L	2.0	08/06/2021	AB21-0806-01	
Vanadium	8	ug/L	2.0	08/06/2021	AB21-0806-01	
Zinc	11	ug/L	10.0	08/06/2021	AB21-0806-01	
Anions by EPA 300.0 CCR Rule	e Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 21-0	0880-04-C02-A01	Analyst: DMW	
Parameter(s)	Result	Flag Unit	-	Analysis Date	Tracking	
Chloride	44000	ug/L	1000.0	08/10/2021	AB21-0810-23	
Fluoride	ND	ug/L	1000.0	08/10/2021	AB21-0810-23	
Sulfate	506000	ug/L	1000.0	08/11/2021	AB21-0810-23	
Total Dissolved Solids by SM 2	2540C		Aliguot #: 21-0	0880-04-C03-A01	Analyst: CLH	
Parameter(s)	Result	Flag Unit	•	Analysis Date	Tracking	
Total Dissolved Solids	1240	mg/L	10.0	07/30/2021	AB21-0730-03	
	04.4	1000 Dago 11 of 22				



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: KLI-SCS Collect Date: 07/27/2021 Lab Sample ID: 21-0880-04 Collect Time: 11:57 AM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-04-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	474000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	474000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 5310	DB, Aqueous			Aliquot #: 21-0	880-04-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	12000		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SM	5310B, Aqueous			Aliquot #: 21-0	880-04-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	12000		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: KLI-PCS Collect Date: 07/27/2021 Lab Sample ID: 21-0880-05 Collect Time: 11:41 AM

Donomotor(a)	Descrit	F1-	11-14	D.	Analysis Det	T12
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	s Ехр	Aliquot #: 21-0	)880-05-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	5		ug/L	1.0	08/06/2021	AB21-0806-01
Barium	408		ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Boron	668		ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND		ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	55700		ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	2		ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND		ug/L	6.0	08/06/2021	AB21-0806-01
Copper	4		ug/L	1.0	08/06/2021	AB21-0806-01
Iron	731		ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND		ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	14100		ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	23		ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	3		ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	3680		ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	2		ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND		ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	42100		ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND		ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	25		ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND		ug/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule Analy	te List. Cl. F.	SO4. Agu	ieous	Aliguot #: 21-0	9880-05-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	60500	J	ug/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND		ug/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	50300		ug/L	1000.0	08/10/2021	AB21-0810-23
Total Dissolved Solids by SM 2540C				Alignot #: 24 C	)880-05-C03-A01	Analysti CLL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Analyst: CLH Tracking
` '		ilag			-	_
Total Dissolved Solids	331		mg/L	10.0	07/30/2021	AB21-0730-03



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: KLI-PCS Collect Date: 07/27/2021
Lab Sample ID: 21-0880-05 Collect Time: 11:41 AM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-05-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	133000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	124000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	I0B, Aqueous			Aliquot #: 21-0	880-05-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	2800		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SI	M 5310B, Aqueous			Aliquot #: 21-0	880-05-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	3500		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: SW-DITCH
Lab Sample ID: 21-0880-06

Collect Date: 07/27/2021
Collect Time: 11:15 AM

Mercury by EPA 7470A, Total, A	queous		Aliquot #: 21-0	Aliquot #: 21-0880-06-C01-A01		
Parameter(s)	Result	Flag Unit	s RL	Analysis Date	Tracking	
Mercury	ND	ug/L	0.2	08/02/2021	AB21-0802-08	
Metals by EPA 6020B: CCR Rule	e Appendix III-IV To	tal Metals Exp	Aliquot #: 21-0	)880-06-C01-A02	Analyst: EB	
Parameter(s)	Result	Flag Unit	-	Analysis Date	Tracking	
Antimony	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Arsenic	7	ug/L	1.0	08/06/2021	AB21-0806-01	
Barium	82	ug/L	5.0	08/06/2021	AB21-0806-01	
Beryllium	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Boron	138	ug/L	20.0	08/06/2021	AB21-0806-01	
Cadmium	ND	ug/L	0.2	08/13/2021	AB21-0806-01	
Calcium	51600	ug/L	1000.0	08/06/2021	AB21-0806-01	
Chromium	3	ug/L	1.0	08/06/2021	AB21-0806-01	
Cobalt	ND	ug/L	6.0	08/06/2021	AB21-0806-01	
Copper	6	ug/L	1.0	08/06/2021	AB21-0806-01	
Iron	696	ug/L	20.0	08/06/2021	AB21-0806-01	
Lead	ND	ug/L	1.0	08/06/2021	AB21-0806-01	
Lithium	ND	ug/L	10.0	08/06/2021	AB21-0806-01	
Magnesium	17300	ug/L	1000.0	08/06/2021	AB21-0806-01	
Molybdenum	10	ug/L	5.0	08/06/2021	AB21-0806-01	
Nickel	4	ug/L	2.0	08/06/2021	AB21-0806-01	
Potassium	4870	ug/L	100.0	08/06/2021	AB21-0806-01	
Selenium	3	ug/L	1.0	08/06/2021	AB21-0806-01	
Silver	ND	ug/L	0.2	08/06/2021	AB21-0806-01	
Sodium	609000	ug/L	1000.0	08/06/2021	AB21-0806-01	
Thallium	ND	ug/L	2.0	08/06/2021	AB21-0806-01	
Vanadium	5	ug/L	2.0	08/06/2021	AB21-0806-01	
Zinc	ND	ug/L	10.0	08/06/2021	AB21-0806-01	
Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	SO4, Aqueous	Aliquot #: 21-0	)880-06-C02-A01	Analyst: DMW	
Parameter(s)	Result	Flag Unit		Analysis Date	Tracking	
Chloride	124000	ug/L	1000.0	08/11/2021	AB21-0810-23	
Fluoride	3010	ug/L	1000.0	08/10/2021	AB21-0810-23	
Sulfate	645000	ug/L	1000.0	08/11/2021	AB21-0810-23	
Total Dissolved Solids by SM 25	540C		Aliquot #· 21-0	0880-06-C03-A01	Analyst: CLH	
Parameter(s)	Result	Flag Unit		Analysis Date	Tracking	
Total Dissolved Solids	1690	mg/L	10.0	07/30/2021	AB21-0730-03	
3 = <b>3</b>		g, _		51. 2 <b>0. 202</b> .	0. 00 00	



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: SW-DITCH
Lab Sample ID: 21-0880-06

Collect Date: 07/27/2021
Collect Time: 11:15 AM

Alkalinity by SM 2320B				Aliquot #: 21-0	880-06-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	564000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	66700		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	497000		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	880-06-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	12000		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SI	M 5310B, Aqueous			Aliquot #: 21-0	880-06-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	9600		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: DUP-KLI Collect Date: 07/27/2021
Lab Sample ID: 21-0880-07 Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous				Aliquot #: 21-0	Analyst: CLH	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	u	g/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule	e Appendix III-IV To	tal Metals E	хр	Aliguot #: 21-0	880-07-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	7	u	g/L	1.0	08/06/2021	AB21-0806-01
Arsenic	86	u	g/L	1.0	08/06/2021	AB21-0806-01
Barium	58	u	g/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND	u	g/L	1.0	08/06/2021	AB21-0806-01
Boron	731	u	g/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND	u	g/L	0.2	08/13/2021	AB21-0806-01
Calcium	60300	u	g/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND	U,	g/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND	U,	g/L	6.0	08/06/2021	AB21-0806-01
Copper	ND	U,	g/L	1.0	08/06/2021	AB21-0806-01
Iron	3550	u	g/L	20.0	08/06/2021	AB21-0806-01
Lead	ND	u	g/L	1.0	08/06/2021	AB21-0806-01
Lithium	20	U,	g/L	10.0	08/06/2021	AB21-0806-01
Magnesium	19000	U,	g/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	16	U,	g/L	5.0	08/06/2021	AB21-0806-01
Nickel	2	U,	g/L	2.0	08/06/2021	AB21-0806-01
Potassium	4370	u	g/L	100.0	08/06/2021	AB21-0806-01
Selenium	1	U,	g/L	1.0	08/06/2021	AB21-0806-01
Silver	ND	u	g/L	0.2	08/06/2021	AB21-0806-01
Sodium	45600	u	g/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND	u	g/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND	u	g/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND	u	g/L	10.0	08/06/2021	AB21-0806-01
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqued	ous	Aliquot #: 21-0	880-07-C02-A01	Analyst: DMW
Parameter(s)	Result		Units	. RL	Analysis Date	Tracking
Chloride	57200	U	g/L	1000.0	08/10/2021	AB21-0810-23
Fluoride	ND		g/L	1000.0	08/10/2021	AB21-0810-23
Sulfate	117000		g/L	1000.0	08/10/2021	AB21-0810-23
Total Dissolved Solids by SM 25	540C			Aliquot #: 21-0	880-07-C03-A01	Analyst: CLF
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	441	m	ng/L	10.0	07/30/2021	AB21-0730-03
	24	000 Dogo 17 c	1.00			



**Report Date:** 08/15/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: DUP-KLI Collect Date: 07/27/2021
Lab Sample ID: 21-0880-07 Collect Time: 12:00 AM

Alkalinity by SM 2320B				Aliquot #: 21-0	Analyst: DLS	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Alkalinity Total	158000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Bicarbonate	158000		ug/L	10000.0	08/04/2021	AB21-0804-03
Alkalinity Carbonate	ND		ug/L	10000.0	08/04/2021	AB21-0804-03
Total Organic Carbon by SM 531	0B, Aqueous			Aliquot #: 21-0	880-07-C06-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Organic Carbon	2000		ug/L	1000.0	08/06/2021	AB21-0808-06
Dissolved Organic Carbon by SI	M 5310B, Aqueous			Aliquot #: 21-0	880-07-C07-A01	Analyst: BAL
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Dissolved Organic Carbon	3500		ug/L	1000.0	08/06/2021	AB21-0808-07



08/15/21



A CENTURY OF EXCELLENCE

Sample Site:DEK Lined ImpoundmentLaboratory Project:21-0880Field Sample ID:EB-KLICollect Date:07/27/2021Lab Sample ID:21-0880-08Collect Time:03:43 PM

Matrix: Water

Mercury by EPA 7470A, Total, Aq	Aliquot #: 21-	0880-08-C01-A01	Analyst: CLH		
Parameter(s)	Result	Flag Un	its RL	Analysis Date	Tracking
Mercury	ND	ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals Exp	Aliquot #: 21-	0880-08-C01-A02	Analyst: EB
Parameter(s)	Result	Flag Un	its RL	<b>Analysis Date</b>	Tracking
Antimony	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Barium	ND	ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Boron	ND	ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND	ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	ND	ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND	ug/L	6.0	08/06/2021	AB21-0806-01
Copper	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Iron	ND	ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	ND	ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	ND	ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	ND	ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	ND	ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	ND	ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	ND	ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND	ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	ND	ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND	ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND	ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND	ug/L	10.0	08/06/2021	AB21-0806-01



08/15/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-0880** 

Field Sample ID: FB-KLI Collect Date: 07/27/2021
Lab Sample ID: 21-0880-09 Collect Time: 03:25 PM

Matrix: Water

Mercury by EPA 7470A, Total, Aq	Aliquot #: 21-0	880-09-C01-A01	Analyst: CLH			
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND	ι	ug/L	0.2	08/02/2021	AB21-0802-08
Metals by EPA 6020B: CCR Rule	Appendix III-IV To	tal Metals	Ехр	Aliquot #: 21-0	9880-09-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Antimony	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Arsenic	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Barium	ND	ι	ug/L	5.0	08/06/2021	AB21-0806-01
Beryllium	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Boron	ND	ι	ug/L	20.0	08/06/2021	AB21-0806-01
Cadmium	ND	ι	ug/L	0.2	08/13/2021	AB21-0806-01
Calcium	ND	ι	ug/L	1000.0	08/06/2021	AB21-0806-01
Chromium	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Cobalt	ND	ι	ug/L	6.0	08/06/2021	AB21-0806-01
Copper	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Iron	ND	ι	ug/L	20.0	08/06/2021	AB21-0806-01
Lead	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Lithium	ND	ι	ug/L	10.0	08/06/2021	AB21-0806-01
Magnesium	ND	ι	ug/L	1000.0	08/06/2021	AB21-0806-01
Molybdenum	ND	ι	ug/L	5.0	08/06/2021	AB21-0806-01
Nickel	ND	ι	ug/L	2.0	08/06/2021	AB21-0806-01
Potassium	ND	ι	ug/L	100.0	08/06/2021	AB21-0806-01
Selenium	ND	ι	ug/L	1.0	08/06/2021	AB21-0806-01
Silver	ND	ι	ug/L	0.2	08/06/2021	AB21-0806-01
Sodium	ND	ι	ug/L	1000.0	08/06/2021	AB21-0806-01
Thallium	ND	ι	ug/L	2.0	08/06/2021	AB21-0806-01
Vanadium	ND	ι	ug/L	2.0	08/06/2021	AB21-0806-01
Zinc	ND	ι	ug/L	10.0	08/06/2021	AB21-0806-01



A CENTURY OF EXCELLENCE

#### **Analytical Report**

**Report Date:** 08/15/21

Data Qualifiers	Exception Summary
	No exceptions occured.

CONSUMERS ENERGY

#### Chemistry Department

General Standard Operating Procedure

PROC CHEM-1.2.01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

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

Project Log-In Number: 11-0880	<del></del>
Inspection Date: 729.21	Inspection By:
Sample Origin/Project Name: NEK UNA	d impoundment
Shipment Delivered By: Enter the type of shipmer	nt carrier.
Pony FedEx	UPS Airborne
Other/Hand Carry (whom)	
Tracking Number: 815720417907	Shipping Form Attached: Yes No
Shipping Containers: Enter the type and number of	f shipping containers received.
Cooler Cardboard Box	Custom Case Envelope/Mailer
Loose/Unpackaged Containers	
Condition of Shipment: Enter the as-received cond	lition of the shipment container.
Damaged Shipment Observed: None	Dented Leaking
Other	
Shipment Security: Enter if any of the shipping co	ntainers were opened before receipt.
Shipping Containers Received: Opened	Sealed V
Enclosed Documents: Enter the type of documents	enclosed with the shipment.
CoC Work Request	2 2 3 3 4 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Temperature of Containers: Measure the temperat	ure of several sample containers.
As-Received Temperature Range 1-1-1-3	Samples Received on Ice: Yes V No
M&TE # and Expiration 0 (6407	
Number and Type of Containers: Enter the total r	
Container Type Water Soil	Other Broken Leaking
VOA (40mL or 60mL) 40 = 14	
Quart/Liter (g/p)	
9-oz (amber glass jar)	
2-oz (amber glass)	
125 mL (plastic)	
24 mL vial (glass)	
250 500 mL (plastic)	
Other	

### **CHAIN OF CUSTODY**

Consumers Energy

#### **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPLING SIT	E:			PROJECT NUMBER:			ANALYSIS REQUESTED							Page 1 of 1					
DEK Lined	Impoundm	ent – 2021 (	Q3		21-0880										SEND REPORT TO CDBatts				
AMPLING TEA	AM:			DATE SHIPPED:	SIT		DATTACHED?	S				10				HD Register, TRC			
	TRC			7/28/21		CIRCLE	ONE:	Total Metals	JS				E	linity	Alkalinity	inity			
CE CONTROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LC	OCATION	DEPTH (ft)	# OF CONTAINERS	Total	Anions	TDS	Alkal	TOC	DOC		REMARKS				
21-0880-01	7/27/21	1249	GW	OW-10			7	x	x	х	х	х	x						
-02		1355	GW	OW-11			7	х	х	х	х	х	х						
-03		1525	GW	OW-12	OW-12		7	х	х	х	х	х	х						
-04		1157	GW	KLI-SCS			7	х	х	х	х	х	х						
-05		1141	GW	KLI-PCS			7	х	х	x	х	х	х						
-06		1115	GW	SW-DITCH			7	x	х	х	х	x	х						
-07		~	GW	DUP-KLI			7	x	X	x	x	x	x						
-08		1543	W	EB-KLI			1)	x											
▼ -09	V	1525	W	FB-KLI			1	x											
									1 3										
RELINQUISHE	BY: (SIGNAT	TURE)	7/2	8/21 /1450 REG	CEIVED BY	(SIGNATUR	E)						COMME	ENTS (	4-13°C				
RELINQUISHE	BY: (SIGNA	ΓURE)	DATE/T	IME: REG	CEIVED BY	(SIGNATUR	E)												
Fed	2X		7-1	9-21 rocc	CHS	REDITIO	insan			OF	RIGINA	AL TO	LAB (	OPY TO	CUSTOMER				
				1000	000	380 Page 23		_		01				31 1 10	- CONTONION				



# **Appendix B Field Notes**

# TRC

·	
PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Compliance
PROJECT NUMBER:	418425.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, Mi 48732
DATES OF FIELDWORK:	7/26/21 to 7/28/21
PURPOSE OF FIELDWORK:	3Q21 Supplemental Sampling Event
WORK PERFORMED BY:	David Disney, Jake Krenz, Javier Jasso

My 7/30/2 SIENED DATE

Day Dene 8-2-2 CHECKED BY DATE

PAGE	OF	
	$\sim$	 



#### **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021 G	W Comp DATE	7,	126/21		TIME ARRIV	ED: 0730
PROJECT NUMBER:	418425.0001.00	00 AUTH	IOR:	David Disne	y, Jake Krenz,	TIME LEFT:	1500
		WEAT	HER				
EMPERATURE: 9	3 °F WIND:	0-5 MP	H.		VISIBILITY:	chear	
	WOF	RK / SAMPLIN	G PEF	RFORMED			
sitewide	water leve	15 me	a sur	ed			· · · · · · · · · · · · · · · · · · ·
PROBI	LEMS ENCOUNTERED		+	CO	RRECTIVE	ACTION TAKE	<u> </u>
	14	•			<b>/</b> /	A	
ľ	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				/V	<del>                                     </del>	
		COMMUNI	CATIC	N			
NAME	REPRESENTING	al 1.	-	<del></del>	CT / COMME	NTS	
C. Butts	CEC	<u>Check</u> Site		raining	·Cor	D. Dire	
		<u> </u>	74	race reg	<del>1</del> 04	91 1811W	1
***	INVESTIGA	TION DERIVE	D WA	STE SUM	MARY		
WASTE MATRIX	QUANTITY			C	OMMENTS		
NA	NA		Λ	NA			
IVIV	/ / / / /		/\	/ _/\]	<u> </u>		
					:	<u> </u>	
1.00	1/ / 7/	30/21		70			<i>C</i> . 4
IGNED	<u></u>	DATE	,	CHECKED E		neg	<u>8-7-</u>

PAGE	OF	



#### **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW					ED: 0700
PROJECT NUMBER:	418425.0001.0000	AUTHO	R: David Disney, Ja	ake Krenz,	TIME LEFT:	1630 1
		WEATHE	R			
TEMPERATURE: 7	3 °F WIND: 3	-10 MPH	V	ISIBILITY:	Chear	
	WORK	/ SAMPLING	PERFORMED			
collected	samples from	n Ø	w-10, ow-	-11, 0	ow-12,	
Sw- Bitch,	samples from KLI-PLS, K 18001.	LI-SCS	DEK-MU	1-1500	23, and	
DEK-MW-	18001.					
PROB	LEMS ENCOUNTERED		CORR	ECTIVE A	CTION TAKE	N
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
	1 A A A			1	A	
	10 11			10 1	7	,
		COMMUNICA	TION			
NAME	REPRESENTING	<i>t</i> 1	SUBJECT /	COMMEN	TS	<del></del>
C. Boits	CEC	check	in/out			
· · · · · · · · · · · · · · · · · · ·						
	INVESTIGAT	ON DERIVED	WASTE SUMMAF	27		
WASTE MATRIX	QUANTITY			MENTS		
puras worker	13nm	proge	u b gre	oun d		
		· · · · · · · · · · · · · · · · · · ·				
			. 1			
11.81	Kny 7/30	121	D Y	A	, , , , , , , , , , , , , , , , , , ,	8-2-
SIGNIED	' /I	DATE	CHECKED BY	بعرب	mg,	DATE
ISED 04/2019						

PAGE	OF	



#### **GENERAL NOTES**

PROJECT NAME:	CEC Karn BAP/LI: 2021 C	W Comp	DATE: 7	128/2	.1	TIME ARRIVED: 0600
PROJECT NUMBER:	418425.0001.00	000	AUTHOR:	David Disne	y, Jake Krenz,	TIME LEFT: 1500
		ı	WEATHER			
TEMPERATURE: 72	°F WIND:	25	MPH		VISIBILITY:	cloudy
				RFORMED		
Collected	Samples	from	mor	it oring	wells;	DEK-MW-1500 IW-15006
BEK-WM-	15004, DEK-	MW-	15005	and'	DEK- M	IW-15006
<u> </u>						
_						
PROBI	LEMS ENCOUNTERED	)		C	ORRECTIVE A	ACTION TAKEN
	_					
	MA				1	A
	1000				// /	
		COL	MMUNICAT	ION		
NAME	REPRESENTING			,	CT / COMMEN	ITS
C. Batts	CEC		cheek	in Jour	,	
		-	407	<del>-</del>		
	INVESTIG	ATION F	)ERIVED V	ASTE SUM	MARY	
WASTE MATRIX	QUANTITY		(		COMMENTS	
purge water	Bum	A	rged	to go	und	***
lad	Very -	1/30/	2	2	JA	iony 8-2
SGNED	<i>'</i>	DATE	. '	CHECKED		DA
USED 04/2019						

PAGE	0	F



#### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC Karn B	AP/LI: 2021 GW	SAMPLER NAME: David Disney, Jake Krenz, Javier Jasso					
PROJECT NO.:	418425.000	1.0000	SAMPLER NAME: David Disney, Jake Krenz, Javier Jasso					
WATER LEVEL MEASU	REMENTS COLL	ECTED WITH:						
HERC	ON DIPPER-T		TRC A2					
NAME AND MODEL OF INS	STRUMENT		SERIAL NUMBER (IF APPLICABLE)					
PRODUCT LEVEL MEAS	SUREMENTS CO	DLLECTED WIT	Н:					
	NA		NA					
NAME AND MODEL OF INS	STRUMENT		SERIAL NUMBER (IF APPLICABLE)					
DEPTH TO BOTTOM OF	WELL MEASU	REMENTS COLI	LECTED WITH:					
HERO	ON DIPPER-T		TRC A2					
NAME AND MODEL OF INS	STRUMENT		SERIAL NUMBER (IF APPLICABLE)					
PURGING METHOD								
PERIS	TALTIC PUMP		TRC A2					
NAME AND MODEL OF PU	MP OR TYPE OF E	BAILER	SERIAL NUMBER (IF APPLICABLE)					
SAMPLING METHOD								
PERIS	TALTIC PUMP		TRC A2					
NAME AND MODEL OF PU	MP OR TYPE OF I	BAILER	SERIAL NUMBER (IF APPLICABLE)					
GEOTECH D	ISPOSABLE FIL	TER	0.45 MICRON					
NAME AND MODEL OF FIL	TERATION DEVIC	E.	FILTER TYPE AND SIZE					
DEDICATION TUBING TYPE	ED POLY TUBIN	G	☑ LOW-FLOW SAMPLING EVENT					
PURGE WATER DISPOS	SAL METHOD							
☑ GROUND	☐ DRUM	□ POTW	□ POLYTANK □ OTHER					
DECONTAMINATION A	ND FIELD BLAN	K WATER SOUI	RCE					
STO	RE BOUGHT		LABORATORY PROVIDED					
POTABLE WATER SOURCE	E My	7/70/2 DATE	Di WATER SOURCE  Desig 8-2-7  CHECKED BY  DATE					

REVISED 04/2019



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Karn	BAP/LI: 2021 GW	/ Compliance		DATE:	7/26/8	Ч		
PROJECT NUMBER:	418425.00	01.0000			AUTHOR: David Disney, Jake Krenz, Ja				
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	WATER BOT		DEPTH TO PRODUCT (FEET)	WATER ELEVATION		
DE Karn Bottom Ash F	Pond								
DEK-MW-15002	0914	TOC	6.08	15	.75				
DEK-MW-15004	0948		27.83	41,	80				
DEK-MW-15005	0924		8.48	22.	23				
DEK-MW-15006	0927	V	8.00	21.	50				
DE Karn Bottom Ash F	Pond and Lir	ned Impoundme	nt		,				
DEK-MW-18001	0932	TOC	8.23	19	.65				
DEK-MW-15003	0941	TOC	16.30	27	·87				
Karn Lined Impoundm	ent								
OW-10	1318	Toc	6.30	17.	95				
OW-11	0937		81.44	25,	47		-		
OW-12	9918	V	16.96	73	45				
Background									
MW-15002									
MW-15008									
MW-15016									
MW-15019			18. A.						
						· · · · · · · · · · · · · · · · · · ·			
		-							

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

Al My 7/30/2
GNED DATE

CHECKED

DATE

PAGE	OF	

## 

PROJEC <sup>-</sup>	PROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED										
PROJECT NUMBER: 418425.0001.0000 BY: DD, CK) JJ DATE: 7/27/21 BY: 00 DATE: 2-2-2/											
SAMPLE ID: SW- Ditch WELL DIAMETER: - 4"   6" 1 OTHER NA											
WELL MATERIAL: ✓ PVC SS IRON GALVANIZED STEEL											
SAMPLE TYPE: TO GW.   WW SW   DI   LEACHATE   OTHER											
PURGING TIME: DATE: SAMPLE TIME: ///5 DATE: 7/27/2)											
PURGE METHOD	PURGE PUMP PERISTALTIC PUMP PH: 10-36 SU CONDUCTIVITY: 2915 umhos/cm										
		AILER	/			<u>-56,7</u> m		8,26 mg	1/L		
DEPTH TO	- 11 - 1	<u> </u>	/T/ FIVC		-	DITY: <u>40.</u>			n.,		
	BOTTON		J-P√C	EL GALLONG	ON ON	RATURE:		MODERATE	☐ VERY		
WELL VOL	<del>- 11   1-21 -</del>	<del>/-</del>		GALLONS	<del></del>			OTHER: _			
	REMOVED:			☐ GALLONS		· gray			ione		
COLOR:	<u> </u>		· OD	OR:		TE (0.45 um)	<del></del>	□ NO			
			BIDITY			TE COLOR:			DR: 10ne		
NONE			MODERATE		+	MPLE: MS	MSD	DUP-			
DISPOSAL	_ METHOD:	:∐ GROUI	ND DRUM	☐ OTHER	СОММ	ENIS:					
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATU	RE LEVEL	CUMULATIVE PURGE VOLUME		
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	. (°C)	(FEET)	(GAL OR L)		
1115	NA	1036	2915	~56.7	8,26	40.1	29.8	NA	INITIAL		
				As many papers put	) in the second						
**************************************	THE RESERVE THE PROPERTY OF THE PERSON NAMED IN THE PERSON NAMED I	a serie rese er sec rese v aspertires a recent aer	CONTROL OF STREET, STR		]						
Haariba (Add Milliot) (Mary bus developed dev							Marineto la Marineta de Calenda d				
··											
	74 1887 - R. H. H. H. H. H. H. C. P					**************************************	***************************************				
***************************************						ndd of the finder name of or all devices in the desired and the finished relative to	all the similar life in the last with the second to a second to		5.00 HT (11.00 MINUTED PROPERTY OF THE PROPERT		
									<u> </u>		
					-						
					and the statement	·					
NC	TE: STABI	LIZATION .	TEST IS COMPL	ETE WHEN 3 SU	CCESSIVI	E READINGS A	RE WITHIN T	HE FOLLOWIN	IG LIMITS:		
pH: +/-	0.1	COND.: +/-	3 % ORP:	<b>+/- 10</b> D.O	.: +/- 0.3	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-		
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE B	- HNO3	C - H2SO4	D - NaOH	E-HO	CL F		
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERED	NUMBE	R SIZE	TYPE	PRESERVAT	IVE FILTERED		
2	ComL	Vo4	A		] ]	250mL	Plastic	A	□ Y <b>⊠</b> (N		
1	40mL	VOA	Ε	□ Y 🔼 N							
1	40mL	VOA	Ε	KQ Y 🗆 N					□ Y □ N		
l	125mL	Plastic	Ā	□ Y 👿 N			akirin (di 1844 an riber (daruk balilaken 6.94.) belaken 144 esti beredi	nder Finde den 1967 (1964-1964) de 1968 (1964-1965) vende	□ Y □ N		
1	125mL	plastic	·	□ Y Ø5- N	<u> </u>				□ Y □ N		
SHIPPING		Fedex		ATE SHIPPED:	7/28	121	AIRBILL N	IUMBER: 4			
COC NUM	BER:			GNATURE:	le	Thy	DATE SIG	BNED:	7/30/21		
				- 11		- //					

PAGE	OF	
PAGE	Or	

### \_**◇**TRC

PROJEC1	NAME:	CEC K	(arn BAP/LI: 20	)21 GW C		PREP	ARED		CHEC	KED
PROJECT	NUMBER	R: 41842	5.0001.0000	ВҮ	. DD	), <b>(R)</b> JJ	DATE:7/2	17/21 BY: 1	DŊ	DATE: 8-2-21
SAMPLE	ID:	KLI -	PLS	WELL DIA	METE	R: • 2"	☐ 4" ☐	6" <b>⊠</b> OT⊦	IER //	A
WELL MATERIAL: ☐—PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL 🗖 OTHER NA										
SAMPLE TYPE: @-@W DW DS SW DI LEACHATE DOTHER										
PUR	PURGING TIME: DATE: SAMPLE TIME: 1141 DATE: 7/27/21									
PURGE METHOD	١.	PUMP BAILER	PERISTALTIC F	PUMP		PH: <u> </u>		U CONDUC	9,41 mg	
	WATER:		T/ RVC		-	TURBIDIT	Y: <u>(7.</u> 5 □ SLI	NTU	MODERATE	□ VERY
	воттом	<del>\                                    </del>	<del></del>	☐ GALLONS			TURE:		T	
WELL VOL	- 11	1		☐ GALLONS	-+			. <u>5,7</u> °C	OTHER: _	854
	REMOVED:	+	<i>f</i> 1		-	COLOR:	gray		ODOR: _	none
COLOR:				OR:			(0.45 um)	<del></del>	□ NO	
			BIDITY				COLOR:	theor_	FILTRATE ODG	DR: 10,12
NONE	SLI		MODERATE	☐ VERY				NISD	□ DOP	·
DISPOSAL		☐ GROUI	ND DRUM	☐ OTHER		COMMEN	18:			
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)		.O. T	URBIDITY (NTU)	TEMPERATU	JRE WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1141	NA	8.98	565	-29.3	9,0		17.5	25.7	NA	INITIAL
, , ,	1011	V- ( 0		~11/	7.3	-		<u> </u>		
***************************************	** 1884. 9************************************		· · · · · · · · · · · · · · · · · · ·		-					1
	************************	nos. etam protessamonocostromospor il tiass			-					
		construction of the Constr			-					
						nr entre		1		
		e e annugunge annye gerga anjan anjan renge a annye re e					MATCHER CONTRACTOR CON			
	akarantika.arratuurin 1946, valt Vännell 2000 kuutustu.	an in the second second and the second secon		// <del> </del>			in-de-Lentella de 2-112/2-11-2-112/2-1			
		}*************************************	00-0786-086-08-08-08-08-08-08-08-08-08-08-08-08-08-	***************************************	+			**************************************		
*****			d Analista I Martin amerika a markele maraka markela mendela (1884 Analis 1884).		-					
					1					
NC	TE: STABI	LIZATION	TEST IS COMPL	ETE WHEN 3	SUCC	ESSIVE F	READINGS	ARE WITHIN 1	THE FOLLOWIN	IG LIMITS:
pH: +/-	0.1	COND.: +/-	3% ORP:	+/- 10	0.0.: +	-/- 0.3	TURB: +/-	10 % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - F	ноз	C - H2SO4	D - NaOl	H E- HC	CL F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE	ĒD I	NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERED
3	60mL	VOM	Α		N	. 1	250mL	Plastic	A	□ Y 👿 N
1	40mL	VDA	E	□ Y <b>23</b> .	N					N D Y D
1	40mL	VOA	Ĺ	[ <b>3</b> 4- Y □	N					U Y U N
١	125mb	PlastiL	A	□ Y <b>⊠</b>	N					□ Y □ N
1	125mL		ß	□ Y 🗔	N					□ Y □ N
SHIPPING	METHOD:	Fedre	X DA	TE SHIPPED:	*	7-28-	-21	AIRBILL	NUMBER: .	
COC NUM	BER:		s	GNATURE:		ul	///_	DATE SIG	GNED:	7-30-21
L <u> </u>			1		7		- 0	y i		

		_
PAGE	Oi	

# 

PROJECT	PROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED								KED		
PROJECT NUMBER: 418425.0001.0000 BY						D, 🕼 JJ	DATE: 7/2	7/21	T (C :YE	) 	DATE: 8-2-21
SAMPLE	SAMPLE ID: KLI-SCS WELL DIAMETER: 2 1 4"   6" X OTHER NA										
WELL MATERIAL: ☐ PVO ☐ SS ☐ IRON ☐ GALVANIZED STEEL Ø OTHER NA									-		
SAMPLE TYPE: - WW   SW   DI   LEACHATE DE OTHER Screndary collec										clary collection	
PURGING TIME: DATE: SAMPLE TIME: 1157 DATE: 7/27/2											
PURGE METHOD	745										***************************************
DEPTH TO	WATER:		T/ PVC			TURBIDI	لا: عرج	<u> NTU</u>			
DEPTH TO	BOTTOM:	$\Lambda$	T/ PVC	/		<b>⊠</b> NONE	: SLI	GHT	□ мог	DERATE	☐ VERY
WELL VOL	UME;	NA I	LITERS	☐ GALLO	NS	TEMPER	ATURE: 2	0.8	C OTH	IER:	
VOLUME F	REMOVED		LIŢ <u>É</u> RS   I	☐ GALLO	NS	COLOR:	clear		ODO	DR:	none
COLOR:			OD	OR:		FILTRATE	E (0.45 um)	ĽΣ YES		NO .	
	•	TURI	BIDITY			FILTRATE	COLOR:	leur	FIL7	RATE ODC	R: Noire
□ NONE	☐ SLI	GH <b>T</b> □	MODERATE	☐ VE	RY	QC SAM	PLE: MS	/MSD		DUP-	
DISPOSAL	METHOD:	☐ GROUN	ID 🗌 DRUM	☐ OTHER	₹	COMME	NTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP			TURBIDITY		RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)_		mg/L)	(NTU)		°C)	(FEET)	(GAL OR L)
1157	NA	7,45	४०८।	-5.2	3	.40	3,82	- 火	D.B	NA	INITIAL
######################################				waka niidridrois kabadriordd mildri o'i Childre			-			***************************************	
	n.ammundukt/A Chind IIII Addidi.										1
						1					
man man market surface that the describe as delicated to									alatinit at Matterstonic With	A-14.018 (1P) 1879((AP) 1979(1979(1979)	
			al de leb de alla estica estada en estada estado estado estado estado estado estado estado estado estado estad				PLIANTS & CONTRACTS & PROPERTY CONTRACTS & CONTRACTS & CANADA				
			CHICAGO (CO. 474 - 475 HI 1932 - 445 HI 175 A. 474 A.	1435-14THEORISE - PERSONNEL -			Account to the state of the sta				
				##- The Block to a to							
					Ì						
NO	TE: STABI	LIZATION 1	EST IS COMPL	ETE WHEN	1 3 SUC	CESSIVE	READINGS /	ARE WIT	HIN THE F	OLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D-	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	/E FILT	ERED	NUMBER	SIZE	TYP	E PR	ESERVATI	VE FILTERED
2	60mL	NOA	A		N K	1	250mL	plast	16	A	□ Y X N
l l	YouL		E		<b>⊠</b> N						
<b>,</b>	40mL	J	£	<b> X</b>   Y	□N						□ Y □ N
1	125mL	Plushi	A	□ Y	X N						□ Y □ N
1	125mL	J	ß	□ Y	<b>≱</b> N						□ Y □ N
SHIPPING	METHOD:	Feder	, DA	TE SHIPPE	ED:	7/28	1/21	AIRI	BILL NUM	BER:	
COC NUM				SNATURE:			1		E SIGNE	MH 22 Mars Don Assessment William	7-30-21
			1		#			1			

PAGE	OF	

### **⊘**TRC

PROJEC	Г NАМЕ:	CEC F	(arn BAP/LI: 2	021 GW C		PRE	EPARED			CHEC	KED
PROJEC <sup>-</sup>	T NUMBEI	R: 41842	5.0001.0000		BY: C	DD, (K) J.	DATE:7/2	7/21 B	<u>(100</u>		DATE: 8-2-21
SAMPLE	ID:	OW	-10	WELL (	DIAMET	ER: 🗵	2" 🔲 4" 🔲	6" 🗌 (	OTHER		
WELL MAT	TERIAL:	☑ PVC	□ SS □	IRON 🗌	GALVA	NIZED S	TEEL .		OTHER		
SAMPLE T	SAMPLE TYPE:										
PUR	GING	TIME: 13	LII D	ATE: 7/27	/21		AMPLE	'	<b>교</b> ዛ역		TE: 7/27/21
PURGE METHOD	٠.	PUMP BAILER	PERISTALTIC	PUMP				SU CONI		тү: <u>78</u> * 96_ mg	control of the second s
DEPTH TO WATER: 6.40 T/ PVC TURBIDITY: 9.57 NTU											
DEPTH TO	о воттом	17.95	T/ PVC			X NON		-	_ MOI	DERATE	☐ VERY
WELL VOL		NA	LITERS	GALLO	NS	TEMPE		<u>1,7                                    </u>	OTH	IER:	
VOLUME	REMOVED	<u>: 3,5</u>	□ LITERS	☐ GALLO	NS	COLOR	: <u>clear</u>		ODC	DR:	none
COLOR:		i bear	0	OR: nor	ve_	FILTRA	ΓE (0.45 um)	YES		NO	maa rii maalaan jirga garaa ahaa ka k
		TUR	BIDITY			FILTRAT	E COLOR:	clear	_   FILT	TRATE ODO	or: none
MONE ☑	SLI	GHT 🗌	MODERATE	☐ VEF	₹Y	QC SAI	MPLE: MS	/MSD		DUP-	
DISPOSAL	METHOD	:DX-GROU	ND 🗌 DRUM	OTHER	!	СОММ	ENTS:				
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPER	ATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	(°C	;)	(FEET)	(GAL OR L)
1414	100	7.55	915	-9.1	4.	56	9.00	16.	4	6,70	INITIAL
1219	100	7.07	860	15.8	2	.25	12.3	14.		7,04	.5
1224	100	6.97	854	23.4	2	14	14.2	15,	3	7.04	1.0
1224	100	6.96	838	26.3	ล	1.12	15.3	15.	1	7.06	1.5
1234	100	6,48	804	29.3	3	1.04	15.6	14.9	5	7.16	2.0
1239	100	6.47	802	30.0	) (	1.02	9.81	14.	7	7.20	2.5
1244	100	6.48	7.90	30.4	1	.५८	9.62	14,	7	7.20	3. O
1249	100	6.49	787	30.7	j	.96	9.57	14.	7	7.20	3.5
			-								
NC	TE: STABI	LIZATION T	TEST IS COMPI	ETE WHEN	3 SUÇ	ÇESSIVE	READINGS	ARE WITH	IN THE F	OLLOWIN	G LIMITS:
pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
BOTTLES	SFILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D - Na	aOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	RED	NUMBE	R SIZE	TYPE	PR	ESERVATI	VE FILTERED
2	60mL	VOA	A	□ Y	Z N	1	250mL	Plastic		A	□ Y 🗷 N
١	Yoml	VOA	£	□ Y	N K			1			□ Y □ N
Ì	Yomh	VOA	E	XΥ	□ N				-		□ Y □ N
	125mL	A) (	<del>, , , , , , , , , , , , , , , , , , , </del>	□ Y	X) N		arterit tendi errede aziskekaka erri arta arterita eta kanarren			antamana aattus maska estembarie:	□ Y □ N
\	125mL			_ Y	ХN			1		***************************************	□У□И
SHIPPING	METHOD:	Feder	T D/	ATE SHIPPE	D:	17-2	8-21	AIRBI	LL NUME	BER:	
COC NUMI	BER:	_	SI	GNATURE:	$-\overline{7}$	we	<i>P</i>	DATE	SIGNED	):	7-30-21
<del></del>		<u> </u>			7		- 0				

### <u> → TAC</u>

PROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED											
PROJEC1	NUMBER	R: 41842	5,0001.0000	1	BY: [	DD, <b>(R</b> ) JJ	DATE: <b>7/</b> 3	27/21 BY	:0D		DATE:8-2-21
SAMPLE	ID: (	JW-11		WELL (	DIAMET	ER: ☑ 2'	'	6" 🗀 C	THER		
WELL MAT	ERIAL:	☑ PVC	☐ SS [	] IRON 🗀	GALVA	NIZED STI	EEL		THER		the fit will not be for the second se
SAMPLE T	YPE:	⊡ GW	□ ww □	∃ sw □	DI		ACHATE		THER		
PUR	SING	TIME: J	319	DATE: 7/2	7/21		MPLE		355		ATE:7/27/2)
PURGE METHOD		PUMP BAILER	PERISTALTI	C PUMP				U CONE		ITY: <u>32</u> ./Ч то	7.0 umhos/cm
DEPTH TO WATER: 21.45 T/ PVC TURBIDITY: 8.30 NTU											
DEPTH TO	воттом	25,47	T/ PVC			NONE		GHT [	] MO	DERATE	☐ VERY
WELL VOL			LITERS	☐ GALLO		TEMPER	ATURE: 1º		ОТІ	HER:	
VOLUME			LITERS	☐ GALLO	NS	COLOR:	chear		ODO	DR:	rore
COLOR:		lear		DDOR: NOA	<u>e</u> _	FILTRATE	E (0.45 um)	***************************************		NO	
			BIDITY	_		FILTRATE	1	Chear			OR: <u>Nonc</u>
NONE	X SLI		MODERATE				PLE: MS	/MSD		DUP-	
DISPOSAL	METHOD:	M' GROUI	ND L DRU	M   OTHER		COMME	NTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVI		1	D.O. mg/L)	TURBIDITY (NTU)	TEMPERA		WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1325	100	10.46	328.1	45.7		53	33.2	14.		22.43	INITIAL
1330	100	9,68	324,9				19.5	14,-		22.54	.5
1335	100	4,52	337.8	2511			23.5	15,2	****************	22.70	1,0
1340	100	9.50	330,4	26.5	·	untersion and the state of the state of	14.5	/5. c		22.76	1.5
1345	100	4.46	328.5	28.	7 2		9.76	14.9	<del></del>	22.81	2.0
1350	100	9.45	326.4	30.0	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	9.73	14.6	(1)20000341-0334-030	22.40	2.5
1355	100	9.42	327,0	31,2		M4	8.30	14.7		22.90	7.0
		THE CONTRACTOR OF THE CONTRACT	чинтинутериничны, четанцых иголь частиранцы урус тургур	A State of the sta							
	**************************************		**************************************					POT 1850 146 P CONTROL 1970 - 1970 P. 19	0.46-000 TrA-7000-614-View		
NO pH: +/-		LIZATION T		PLETE <b>WHE</b> N P: +/- 10		CESSIVE   +/- 0.3	READINGS /		N THE I		G LIMITS: TEMP.: +/-
BOTTLES	FILLED	PRESERV	ATIVE CODE	S A-NONE	В-	HNO3	C - H2SO4	D - Na	ЮН	E - HO	L F
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILTE	RED	NUMBER	SIZE	TYPE	PR	ESERVAT	VE FILTERED
2	60mL	VOA	A	□ Y	X N	1	250mL	Plast,	c	A	□ Y <b>X</b> N
1	1 YOUL VOA E DY AN DY N										
1 YOUL VOA E XY ON OYON											
1 125 mL Plastic A DY N DY N											
Ì	125mL	Plustre	B	□ Y	<b>X</b> N						□ Y □ N
SHIPPING		Freshe	χ	DATE SHIPPE	D:	7-27	7-21	AIRBIL	L NUM	BER:	
COC NUME	BER:			SIGNATURE:	A	ne	Thy	DATE	SIGNE	D:	7-30-21
					77						

PAGE	OF

# **⇔** TRC

PROJECT	PROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED										
PROJECT	NUMBER	R: 41842	5.0001.0000		BY: [	DD,(K)J.	J DATE: <b>7</b> -6	7-21 B	y: DD		DATE:8-2-21
SAMPLE	ID:	0w-	12	WELL D	IAMET	ER: 🗾	2" 🗌 4" 🔲	6" 🗆	OTHER		
WELL MAT	ERIAL:	☑ PVC	□ ss □	IRON 🗆	GALVA	NIZED S	TEEL		OTHER		
SAMPLE T	SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER										
PUR	GING	TIME: 1	142 DA	TE:7-27	-21	S	AMPLE	<del></del>	1525		TE: 7-27-2)
PURGE METHOD	PURGE PUMP PERISTALTIC PUMP  METHOD: BAILER  PH: 7.11 SU CONDUCTIVITY: 564 umhos/cm  ORP: -31.1 mV DO: 1.70 mg/L										
DEPTH TO WATER: 16.94 T/ PVC TURBIDITY: 1.83 NTU											
DEPTH TO	BOTTOM:	24,45	T/ PVC			NOI X				DERATE	☐ VERY
WELL VOL	.UME:		<u> </u>	☐ GALLO	NS	TEMPE	RATURE:	<u>6.5 °</u>	с отн	IER:	
VOLUME	REMOVED:		<u> </u>	☐ GALLO	NS	COLOF	: clear		ODC		none
COLOR:	Clight	arano	<u>e</u> od	OR: <u>101</u>	<u>e_</u>	FILTRA	TE (0.45 um)			NO	wayaayaa ayaa aa aa aa aa aa aa aa aa aa
			BIDITY					zhezw		RATE ODC	
□ NONE			MODERATE	☐ VER		QC SA	MPLE: 🔲 MS		<u>*</u>	DUP- K	<u>LT</u>
DISPOSAL	L METHOD;	GROUI	ND   DRUM	OTHER		сомм	ENTS: F	reld	Blan	2 60	llested
TIME	PURGE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPER	RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	(	mg/L)	(NTU)	(°(	C)	(FEET)	(GAL OR L)
1425	200	8.મ	613	53.6		1.26	62.2	17	.7	17.00	INITIAL
1430	200	7.14	582	14.8	ì	.89	24.9	16	. 6	17.00	1
1435	200	7.05	579	7.0		,83	20.2	16	<i>.</i> ``)	17,00	2
1440	200	1,02	583	-8.2		.30	4.72	16.		[7.00	3
1445	200	7,03	<b>583</b>	-19.8	~~~~	.77	2.93	/6:		17.00	4
1450	200	7.05	575	-38.	3	1.74	2,47	16.	Marine Schoolsen	17.00	5
1455	200	7.06	573	-46.0		,73	2.71	16.	andrikalara rawataria mata	17.00	6
1500	<b>૧૦૦</b>	7.08	571	-62.2		.73	2.57	16.		17.00	
	200	7,09	565	~ 5°4.3		.72	2.41	16		17,00	
1505	300		563	-66.5			2.30	16.		17.00	-
				1							<u> </u>
			TEST IS COMPL 3 % ORP:				TURB: +/-				TEMP.: +/-
BOTTLES	SFILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D- N	laOH	E- HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTE	RED	NUMBI	ER SIZE	TYPE	E PR	ESERVATI	VE FILTERED
4	bonk	VOA	A	□ Y i	X N	2	250mL	Plast	اد ا	A	□ Y <b>X</b> N
2	40mL	VOA	E		K N						□ Y □ N
2	4026	VOA	E	(X) Y	□ N						□ Y □ N
2	125mL	Plastic	A		<b>∡</b> ], N			***************************************		are are an analysis and high below the wide	□ Y □ N
3	125mL	Plastic	ß	□ Y	Z N						□ Y □ N
SHIPPING	METHOD:	Fede	<b>D</b> /	ATE SHIPPE	.D:	7-26	3-21	AIRB	ILL NUM	BER;	
COC NUM	BER:		SI	GNATURE:	7	ul	Thy	- DATE	E SIGNEI	): "	7-30-21
			i		#		<del></del>	i		=	

PAGE	C	)F

<b>{</b> }	TRO	-

#### WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Co		PREPARED		CHECKED
PROJECT NUMBER:	418425.0001.0000	BY:	DD, (R) JJ DATE: 7-27-21	BY: <i>[)()</i>	DATE: 3 2-21

OW-12 SAMPLE ID: WATER CUMULATIVE PURGE CONDUCTIVITY TEMPERATURE TIME ORP D.O. TURBIDITY **PURGEVOLUME** RATE LEVEL (NTU) (GAL OR L) (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (°C) (FEET) 1515 1.97 16.5 566 10 200 7.10 -72,0 1.70 17.00 564 1520 16.5 200 7.1) -77.4 1.70 1,76 17.00 1) 12 \$64 1525 200 7.11 -81.1 1.70 1,82 17.00 16.5

SIGNATURE:

Jul Ky

DATE SIGNED: 7-30-21

PAGE	OF	

# 

PROJECT NUMBER: 418425.0001.0000  BY: DD. JK. JJ DATE		NAME.	050.6	C DAD/II. 0/	204 024 0						CHEC	/CD
SAMPLE ID:   E	PROJECT	NAME:	CEC	(arn BAP/LI: 20	J21 GW C		PR	EPARED				
WELL MATERIAL:   SI-PVC   SS	PROJEC1	NUMBER	R: 41842	5.0001.0000	BY	′: [	DD, JK, J	J DATE:		BY: <i>Ŋ ŷ</i>		
SAMPLE TYPE:	SAMPLE	ID:	EB-1	LI	WELL DIA	MET	ER; « <del></del>	2" 4" 🗆				
PURGING	WELL MAT	ERIAL:	<del>☑- P∀</del> €	□ ss □	IRON 🗌 GA	ALVA	NIZED S	STEEL		OTHER	M	A
PURGE	SAMPLE T	SAMPLE TYPE:  WW SW N DI LEACHATE OTHER										
DEPTH TO WATER	PUR	PURGING TIME: DATE: SAMPLE TIME: 1543 DATE: 7-27-21										
DEPTH TO WATER			PUMP	PERISTALTIC	RUMP		PH:	S	n co	NDUCTIV	ITY:	umhos/cm
DEPTH TO BOTTOM	METHOL	"	BAILER		<u> </u>		ORP:		V DO:	- / -	/ mg	<u>/L</u>
	DEPTH TO	WATER:	<b>-/}-</b>	+ +			1	*******	<b>71</b>	1 /	/	
VOLUME REMOVED.	DEPTH TO	BOTTOM:			<del> </del>		□ NO	NE SLI	GHT-			⊔ VERY
ODOR:			<del>-1-\-</del>	<del></del>	₹		_		#	<del>// // // /</del>		
NONE	VOLUME	REMOVED:		f	_	}	1		<u> </u>	'		
NONE	COLOR:		<u> </u>	OD	OR:		FILTRA	TE (0.45 um)	☐ YES			
DISPOSAL METHOD		_			_			<u>:—-</u>				R:
TIME   PURGE   PH   CONDUCTIVITY   ORP   D.O.   TURBIDITY   TEMPERATURE   WATER   LEVEL   PURGE VOLUME (GAL OR L)							L		/MSD		DUP-	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  ph: +/- 0.1	DISPOSAL	METHOD:	☐ GROUI	ND [] DRUM	OTHER		СОММ	IENTS:				
MILMIN   (SU   (umhos/cm)   (mV)   (mg/L)   (NTU   (*C)   (FEET)   (GALOR L)   INITIAL	TIME		PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMP	ERATURE	1	
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1			(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)	(	(°C)		
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED         NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F - HCL		1									1	INITIAL
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED         NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F - HCL								**************************************				
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED         NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F - HCL		**************************************	***************************************	***************************************						utundaksi 2015ak 4. milli kush katabati kish		
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED         NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F - HCL				name kan dan biberes kund kenera ad bi Hill Hill biber biblik av de kener	whatever del devel destructive del deve et tradais, haber et el serve est et este	-		Michael British Laws Sand Life School Strands School Schoo				ukordel rushkan ahar o akrimum di di attarbarah 2000ki 1855 suu 460ki 1885 suuhorilliiki 1804
pH: +/- 0.1         COND.: +/- 3 %         ORP: +/- 10         D.O.: +/- 0.3         TURB: +/- 10 %         or           TEMP.: +/-           BOTTLES FILLED         PRESERVATIVE CODES A - NONE         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED         NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         C - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F           1         125mL         Plasher         B - HNO3         N - H2SO4         D - NaOH         E - HCL         F - HCL						+		#0************************************	<u> </u>	and the second s		
pH: +/- 0.1       COND.: +/- 3 %       ORP: +/- 10       D.O.: +/- 0.3       TURB: +/- 10 %       or        <= 10					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-				~40.474.0° 70.970 NAMA-PO-488.1.404.1.40		
pH: +/- 0.1       COND.: +/- 3 %       ORP: +/- 10       D.O.: +/- 0.3       TURB: +/- 10 %       or        <= 10			**************************************							and the set between the second	<u> </u>	
pH: +/- 0.1       COND.: +/- 3 %       ORP: +/- 10       D.O.: +/- 0.3       TURB: +/- 10 %       or        <= 10			era mana kerakan kerakan mana di Marika (Marika) da kerakan da mana	adantilier terbanik oli ker kristaan tersisak daribik etikilitik oli sebandi	k-made star dende dates i den Bratilli de de la composition de						<u> </u>	
pH: +/- 0.1       COND.: +/- 3 %       ORP: +/- 10       D.O.: +/- 0.3       TURB: +/- 10 %       or        <= 10	ANGESTA PERSONAL PROPERTY AND ANGESTA ANGESTA AND ANGE											
pH: +/- 0.1       COND.: +/- 3 %       ORP: +/- 10       D.O.: +/- 0.3       TURB: +/- 10 %       or        <= 10												
PH: +/- 0.1   COND.: +/- 3%   ORP: +/- 10   D.O.: +/- 0.3   TURB: +/- 10%   or = 10   TEMP.: +/-    </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>helicohen</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						helicohen						
BOTTLES FILLED   PRESERVATIVE CODES   A - NONE   B - HNO3   C - H2SO4   D - NaOH   E - HCL   F    NUMBER   SIZE   TYPE   PRESERVATIVE   FILTERED   NUMBER   SIZE   TYPE   PRESERVATIVE   FILTERED    1	NC	TE: STABI	LIZATION '	TEST IS COMPL	ETE WHEN 3	SUC	CESSIV	E READINGS	ARE WIT	HIN THE	FOLLOWIN	G LIMITS:
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED  1 125mL Plastic B	pH: +/-	0.1	COND.: +/-	3 % ORP:	+/- 10	D.O.:	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-
NUMBER SIZE TYPE PRESERVATIVE FILTERED NUMBER SIZE TYPE PRESERVATIVE FILTERED  1 125mL Plastic B	BOTTLE!	S FILL ED	PRESERV	ATIVE CODES	A - NONE	В.	HNO3	C - H2SO4	. D-	NaOH	F - HC	
							1		T	- 1		
SHIPPING METHOD: Fedcx DATE SHIPPED: 7-28-2( AIRBILL NUMBER:	ï	125ml	Pladr	R		N						□ Y □ N
		1 - 2 80 1	1 20170									F4-E4-
SHIPPING METHOD: Fedcx DATE SHIPPED: 7-28-2 ( AIRBILL NUMBER:					<del></del>				<u> </u>			
SHIPPING METHOD: Fedck DATE SHIPPED: 7-28-2 ( AIRBILL NUMBER:												
SHIPPING METHOD: Fedcx DATE SHIPPED: 7-28-2 ( AIRBILL NUMBER:		and the second s	***************************************				1		ļ			
					μγμ	ļN	- Control					LI IY LI IN
COC NUMBER: SIGNATURE: Aully DATE SIGNED: 7-30-21	SHIPPING	METHOD:	Fedex	t DA	TE SHIPPED:	_	7-5	18-21	AIR	BILL NUM	BER:	
	COC NUM	BER:		SI	GNATURE:	/	Jul	Ken	DA <sup>-</sup>	TE SIGNE	D:	7-30-21
(/	1			11		Ŧ	===	0	11			

· <b>&gt;</b>	TRO	<b>_</b> c£c	Korn BA	WATER	SAM	PLE LOG	•			
PROJECT			ARN LF 2021	CM COM	F	REPARED			CHEC	KED
PROJECT	NUMBE	R: 41842	5.0000.0000	BY	: JJAS	SO DATE:7	Pelvi	3Y: 3	K	DATE 8/2/21
SAMPLE	SAMPLE ID SOU WELL DIAMETER: 2" 4" 6" OTHER									
WELL MAT	ERIAL:	☑ PVC	ss 🗌	IRON GA	LVANIZEI	STEEL		OTHER		
SAMPLE T	YPE:	☑ GW	□ ww □	SW 🗌 DI		LEACHATE		OTHER		
PUR	GING	TIME: \	3 ( 0/	ATE: 712612	-1	SAMPLE	TIME:	205		TE:7/26/31
PURGE	Ţ	PUMP	PERISTALTIC	PUMP	PH:		SU COM	NDUCTIV		81 umhos/cm
METHOD	METHOD: BAILER ORP: - 139.1 mV DO: 4 mg/L 1.9.1									
DEPTH TO		846	T/ PVC				<u>⊮≃∕</u> NTU	_ '		_
DEPTH TO	воттом	: <u> </u>	T/ PVC				IGHT	□ мо	DERATE	☐ VERY
WELL VOL	UME:	N/A	LITERS	GALLONS	TEM			с отн	HER:	. 62.4
VOLUME			✓ LITER\$	☐ GALLONS		.OR: <u>( [ [ [</u>		OD	OR:	<u> 1010                                 </u>
COLOR:	<u> </u>	eu		OOR: <u>11014</u>	FILT	RATE (0.45 um)	YES		NO	
			BIDITY		<u> </u>	RATE COLOR:	Jua	FIL	TRATE ODC	DR: 10m
MONE		IGHT	MODERATE	U VERY		<u> </u>	S/MSD		DUP-	
DISPOSAL	_ METHOD	: 🗸 GROUI	ND   DRUM	OTHER	COI	MMENTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY	ORP (mV)	D.O.	TURBIDITY (NTU)		RATURE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1/35	i Go	795	(umhos/cm)	~63.0	(mg/L)	1150	19.		8.47	INITIAL
1140	19	7.Cc	88 1	-121-3	233		141		€.60	
1145		754	887	-124.0	300		14.		841	, , , , , , , , , , , , , , , , , , , ,
1150		7.40	871	~132.0	1.99	290	14	<u> </u>	8.63	10
1155		7.59	880	- 130.0	1.94		14.0		864	)
izu		7.58	4084	- 124.9	1.95		13.0		865	2 12
1205		7.58	889	-1295	1.90		140	<del></del>	8.66	2
			X	1						
waanuummeenne an me			**************************************							
No.	OTE: STAE	ILIZATION	TEST IS COMP	LETE WHEN 3 :	SUCCESS	IVE READINGS	ARE WITH	IIN THE F	OLLOWING	LIMITS:
pH: +/-		COND.: +/-				0 % TURB: +/-		or ≃</td <td></td> <td>TEMP.: +/- 0.5°C</td>		TEMP.: +/- 0.5°C
BOTTLES	\$ FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO	3 C - H2SO <sub>4</sub>	1 D-N	NaOH	E - HC	L F
NUMBER	SIZE	TYPE	PRESERVATI	VE FILTERE	D NUN	BER SIZE	TYPI	E PR	RESERVATI	VE FILTERED
2	125 mL	VOA	А		N	40	voc		E	P Y □ N
ł l	125 mL	PLASTIC	А	<del> </del>   <del> </del>	N	250	19		A	□ Y D N
Ì	125 mL	PLASTIC	В		N					□Y □N
	1 L	PLASTIC	В		N					□Y □N
Ì	40	W	E	□ Y 🖟	N					□Y □N
SHIPPING	METHOD:	lab D	OF OFF D	ATE SHIPPED:	7/2	9 129	AIRE	BILL NUM	BER: N/A	<u></u>
COC NUME	BER:	N/A	, sı	GNATURE:	-		DAT	E SIGNEI	D: -	han

PROJECT NAME: GEC KARN LF-2021 GW-GOM							EPARED	CHEC	KED			
PROJECT	Г NUMBE	R: 41842	5. <del>0000.0000</del>		BY:	JJASS0	DATE: A	elv BY:	3K	DATE 8/2/21		
SAMPLE	ID: DE	EK-M	U-1500(	WELL	DIAME	TER: 🗸	2"	6"  OTH	IER			
WELL MAT	ERIAL:	✓ PVC	ss 🗆	IRON _	GALVA	ANIZED S	STEEL	□ отн	IER			
SAMPLE T	YPE:	☑ GW	□ ww □	sw 🗌	DI		LEACHATE	OTH	IER			
PUR	GING	TIME: \3	LZU DA	TE:7/36	わり	S	AMPLE	TIME: ()	45 0	ATE:7/28/21		
PURGE METHOD	): [	PUMP BAILER	PERISTALTIC F	PUMP			15.17	U CONDUC	TIVITY: <u>136</u>			
DEPTH TO	WATER	8.ce	T/ PVC			TURBI		NTU	1118	jr L		
	BOTTOM	_	T/ PVC			₩o		GHT.	MODERATE	☐ VERY		
WELL VOL		N/A	LITERS	GALLO	NS	<del>                                     </del>	RATURE: 15		OTHER:			
VOLUME	REMOVED	2.5	 LITERS	 GALLO	NS	COLO	· Chile	×	ODOR: _1	001U		
COLOR:		cleur	OD	OR: <u>∩0</u>	ne	FILTRA	TE (0.45 um)	YES	□ NO			
-		TUR	BIDITY			FILTRATE COLOR: CON FILTRATE ODOR: NON						
NONE	ĴĴ SL	IGHT 🗌	MODERATE	☐ VEI	RY	QC SAMPLE: MS/MSD DUP-						
DISPOSAL	LMETHOD	: 🔽 GROUI	ND DRUM	OTHER	₹	СОММ	ENTS:					
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)		D.O. ( mg/L)	TURBIDITY (NTU)	TEMPERATU	JRE WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)		
1330	IOP	781	(aninosicin)	~iei.	-	1()	7.0	19.0	901	INITIAL		
1232	10	7.63	1373	-97.		રાહ	7.30	10.1	8.10	15		
1230		7.59	1277	-114.		96	(e.70	15.7	8.10	1		
12-35		7,600	1273	-122	$X + \iota$	90	7.00	(5)	8W	j.c		
1240		7.40	1266	-124.		છવ	7.00	15.5	€. IC	1		
1245		7.60	1243	-174	5	89	6.95	ا کی آ	510	2.1		
										-3		
				***************************************								
		1										
L	OTE: STAF	ILIZATION	TEST IS COMPL	ETE WHEN	1 3 SU	CESSIV	E READINGS 4	RE WITHIN T	HE FOLLOWIN	G LIMITS:		
pH: +/-		COND.: +/-		+/- 10 %			% TURB: +/-		= 5</td <td>TEMP.: +/- 0.5°C</td>	TEMP.: +/- 0.5°C		
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	В	- HNO3	C - H2SO4	D - NaOl	H E-HO	CL F		
NUMBER	SIZE	TYPE	PRESERVATI	VE FILT	ERED	NUMB	ER SIZE	TYPE	PRESERVAT			
3	125 mL	VOA	A	Y	IJ N	ĺ	์ มีบ	<i>iy</i> oc	E	Q Y □ N		
l	125 mL	PLASTIC	Α	Ū₹	☑ N	1	250	Pl	A			
1	125 mL	PLASTIC	В	ΠIY	N		1					

SHIPPING METHOD:	lab Drop OFF	DATE SHIPPED:	7/29/	<b>)</b> /	AIRBILL NUMBER: N/A
COC NUMBER:	N/A	SIGNATURE:			DATE SIGNED: 7/19/1/

PLASTIC

VOC

E

1 L

40

TRC CEC Karn BAP/LE SAMPLE LOG

PROJECT NAME:	<del>SEC K</del>	ARN LF 202	1-GW-COM	PR	PREPARED CHECKED						
PROJECT NUMBER	R: 41842	5. <del>0000.000</del> 6	BY:	JJASS0	DATE 7/2	en By:	7K	DATE:8/2/21			
SAMPLE ID: DEKMU 15004   WELL DIAMETER: 2"   4"   6"   OTHER											
WELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER											
SAMPLE TYPE:	SAMPLE TYPE:  GW WW SW DI LEACHATE OTHER										
PURGING	TIME:(`ろ	18 [	PATE: 7/28/2	j s.	AMPLE	TIME: [3]	38 04	TE 7/28/2(			
PURGE 🗸	PUMP	PERISTALTIC	PUMP	PH: 7		U CONDUC	TIVITY: <b>2580</b>	umhos/cm			
METHOD:	BAILER	·-	<del></del>	ORP:	<u>ι)υ.Σ</u> π	V DO:	<u>λο<sup>0</sup> </u> mg	/L			
DEPTH TO WATER:	<u> 3763</u>	T/ PVC		TURBII		NTU _					
DEPTH TO BOTTOM	1180	T/ PVC		104-1		·	MODERATE	☐ VERY			
WELL VOLUME:	N/A	LITER\$	GALLONS	TEMPE	RATURE: 1	هي ده	OTHER:				
VOLUME REMOVED:	<u> </u>	✓ LITERS	GALLONS	COLOF	: <u>Chu</u>	ecil	ODOR: <u>(</u>	10 K			
COLOR:	long	4 0	DOR: <b>70 K</b>	FILTRA	TE (0.45 um)	J-YES	☐ NO				
		BIDITY		FILTRA	TE COLOR: C	(2W	FILTRATE ODC	R: 104			
NONE SL	IGHT 👍	MODERATE	☐ VERY	QC SA	MPLE: 🗌 MS	/MSD	DUP-	<u>.</u>			
DISPOSAL METHOD	: 🗸 GROUN	ND DRUM	1 OTHER	сомм	ENTS:						
TIME PURGE	PH :	CONDUCTIVIT	Y ORP	D.O.	TURBIDITY	TEMPERATU	RE WATER	CUMULATIVE			
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	(FEET)	PURGE VOLUME (GAL OR L)			
1318 104	7.59	446		835	450	20.9	2780	INITIAL			
1373	7.26	884	-1000	2.39	4.60	16.9	2800	. <			
1320	7.33	<i>ପ</i> ର୍ଜ୍ଞ 3	-120.0	2.10	J.C	168	28.00	ı			
1333	7.33	<i>9</i> 8(	-120.3	308	30	(6.7	2800	1.5			
1330	7.33	880	2120.2	309	195	160	28.00	5			
	700		12120.00	301	1~ 1 3	1400	20.00	5=			
						<del> </del>		<del>- 3.</del>			
<del>                                     </del>		······································									
		***************************************									
			***************************************								
NOTE: STAB	ILIZATION	TEST IS COME	PLETE WHEN 3 SU	JCCESSIVE	E READINGS A	RE WITHIN TH	HE FOLLOWING	LIMITS:			
pH: +/- 0.1	COND.: +/-	10 % ORF	P: +/- 10 % D.0	O.: +/- <b>10</b> %	6 TURB: +/-	<b>10</b> % or	= 5</td <td>TEMP.: +/- 0.5°C</td>	TEMP.: +/- 0.5°C			
BOTTLES FILLED	PRESERVA	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E - HC	L F			
NUMBER SIZE	TYPE	PRESERVAT	IVE FILTERED	NUMBE	ER SIZE	TYPE	PRESERVATI	VE FILTERED			
2 125 mL	VOA	Α	□Y ✓I	v   (	40	VOC	E	₽Y □N			
125 mL	PLASTIC	Α		v	ጋጭ	PΙ	A	□Y ØW			
( 125 mL	PLASTIC	В		N T				□Y □N			
1 L	PLASTIC	В		N				□Y □N			
1 He	w	E		N				□ Y □ N			
SHIPPING METHOD:	· · · · · · · · · · · · · · · · · · ·	C	1 1 1 1		9 1	AIRBILL N	IUMBER: NI//	· · · · ·			
SHIPPING METHOD: DATE SHIPPED: AIRBILL NUMBER: N/A  COC NUMBER: N/A SIGNATURE: DATE SIGNED: DATE SIGNED:											

PAGE	OF	

WATER SAMPLE LOG CEC Kurn BAP/LI PROJECT NAME: GEC KARN LF 2021-GW COM **PREPARED** CHECKED DATE 7179171 DATE: 8/2/2 PROJECT NUMBER: 418425.0000-0000 BY: JJASS0 **π**/~ WELL DIAMETER: ☑ 2" ☐ 4" ☐ 6" ☐ OTHER SAMPLE ID: \FK-15003 √ PVC ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER WELL MATERIAL: □ ss SAMPLE TYPE: □ GW □ww □ sw ☐ LEACHATE ☐ OTHER 241 DATE: 7 /27 /2 **PURGING** TIME: \ DATE: SAMPLE TIME: <u>837</u> 459 ✓ PUMP SU CONDUCTIVITY: PERISTALTIC PUMP PH: umhos/cm PURGE METHOD: ORP: <u>'Su. 3</u> BAILER mV IDO: DEPTH TO WATER: しいろう 146 NTU T/ PVC TURBIDITY: DEPTH TO BOTTOM: 27 6 T/ PVC **d**-NONE SLIGHT MODERATE VERY 19.1 WELL VOLUME: LITERS GALLONS TEMPERATURE: N/A °C OTHER: VOLUME REMOVED: ✓ LITERS ☐ GALLONS COLOR: ODOR: gone COLOR: ODOR: NOK YES. □ NO FILTRATE (0.45 um) nona Check FILTRATE ODOR: TURBIDITY FILTRATE COLOR: QC SAMPLE: MS/MSD SLIGHT ☐ MODERATE LNONE VERY DUP-DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS: PURGE WATER CUMULATIVE TIME CONDUCTIVITY ORP D.O. TURBIDITY **TEMPERATURE** RATE LEVEL PURGE VOLUME (ML/MIN) (SU) (mV) (mg/L) (NTU) (°C) (FEET) (GAL OR L) (umhos/cm) 1316 536 INITIAL -49.5 100 श्री スネイ 24.0 (2.76 5.50 461 7.44 (32( ~83.0 296 **8.37** 1726 840 456 -87.0 3.0 19,4 しろろしゃ みしじ 457 -958 1331 あるフ 1.45 9.60 2.00 1803 Lί 837 (334 1.97 19.5 1812 459 1-94 -900 (ZÚ( 1.97 **6.37** 1.98 igni 455 **2**.T -96.3 1821 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: pH: +/- 0.1 COND.: +/- 10 % ORP: +/- 10 % D.O.: +/- 10 % TURB: +/- 10 % TEMP.: +/- 0.5°C or </= 5 **BOTTLES FILLED** PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL NUMBER SIZE **PRESERVATIVE FILTERED** NUMBER SIZE TYPE **PRESERVATIVE TYPE FILTERED** 40 E 125 mL VOA N EP **₩** N Α 1100 **PLASTIC** ØY ☑ N Цü Œ N 125 mL Α 1000 125 mL **PLASTIC** В 4 Υ N N 1 L **PLASTIC** В Y ✓ N N A **350** AB DNP OFF SHIPPING METHOD: DATE SHIPPED: AIRBILL NUMBER: N/A

SIGNATURE:

N/A

DATE SIGNED:

COC NUMBER:

\* TRC CEC KARN BAP/L **WATER SAMPLE LOG** PROJECT NAME: CEC KARN LF 2021 GW COM **PREPARED** CHECKED PROJECT NUMBER: 418425,<del>0000,000</del>0 BY: JJASS0 DATE: ) ( BY: TH DATE: 8-2-2 WELL DIAMETER: ✓ 2" 🔲 4" 🔲 6" 🔲 OTHER SAMPLE ID: DEK MW18001 WELL MATERIAL: V PVC □ss ☐ IRON ☐ GALVANIZED STEEL OTHER SAMPLE TYPE: □ sw ☑ GW □ ww ☐ LEACHATE ☐ OTHER **PURGING** TIME: 1400 DATE: 7/27/21 SAMPLE 1430 DATE: 7/27 /31 TIME: PH: フ、らじ ✓ PUMP PERISTALTIC PUMP SU CONDUCTIVITY: PURGE umhos/cm METHOD: ORP:-109. mv DO: 1.91 BAILER <u> છ.૪૩</u> TURBIDITY: 1.59 NTU DEPTH TO WATER: T/ PVC DEPTH TO BOTTOM: 19 La V T/ PVC NONE SLIGHT MODERATE TEMPERATURE: (4%) WELL VOLUME: LITERS ☐ GALLONS N/A OTHER: nor VOLUME REMOVED: ✓ LITERS ☐ GALLONS COLOR: () Lea ODOR: clow □ NO COLOR: ODOR: NO W FILTRATE (0.45 um) YES FILTRATE ODOR: NO W TURBIDITY SLIGHT | MODERATE NONE QC SAMPLE: MS/MSD ☐ VERY DUP-DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS: **PURGE** WATER CUMULATIVE TIME CONDUCTIVITY ORP TURBIDITY TEMPERATURE RATE **LEVEL PURGE VOLUME** (ML/MIN) (SU) (mV) (NTU) (umhos/cm) ( mg/L) (°C) (FEET) (GAL OR L) 100 フフろ છાધવ 22.9 INITIAL 400 ٦ (١٩٠٠) 170 871 7 46 843 6.5O 401 2.26 7.43 -112.0 5.40 14. 1 ١ ブダン 63 L 410 -1076 204 3. W Y ነዛ. እ 850 199 411 800つ -107.6 14. 2.00 850 634 420 7.50 -108.5 196 14.0 いほつ **め**. (レ 1.96 1421 6 <del>3</del> 3 -104.0 57 7.50 14.8 ひに 1.95 80 1430 ६३१ - 1845 1.59 148 7.50 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: pH: +/- **0.1** COND.: +/- 10 % ORP: +/- 10 % D.O.: +/- 10 % TURB: +/- 10 % or </= 5 TEMP.: +/- 0.5°C **BOTTLES FILLED** PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F-NUMBER SIZE PRESERVATIVE NUMBER **TYPE FILTERED** SIZE **TYPE PRESERVATIVE FILTERED** √AN 125 mL VOA Α ☑ N 40 () VOC PLASTIC ✓ N 125 mL ZY *11*90 **T**Y Α 40 125 mL PLASTIC ✓ N R Υ 1 L PLASTIC В ΠY **∠** N 250 l III N つし

SHIPPING METHOD:

COC NUMBER:

LE DOP OFF

N/A

DATE SHIPPED:

SIGNATURE:

AIRBILL NUMBER:

DATE SIGNED:

N/A

PAGE	OF	

## → TAC

## **WATER SAMPLE LOG**

PROJECT NAME: CEC Karn LF: 2021 GW Comp							PREPARED CHECKED			KED		
PROJEC	T NUMBE	R: 41842	25.0000.000	0	ВУ	<b>(</b>	<b>)</b> ), JJ, J	IK DATE: 7-1	18-21	BY:	JIL	DATE:8/2/2
SAMPLE ID: DEIC MW 15002 WELL DIAMETER: 2" 4" 6" OTHER												
WELL MATERIAL: ☑ PVC ☐ SS ☐ IRON ☐ GALVANIZED STEEL ☐ OTHER												
SAMPLE TYPE:												
PUR	GING	TIME: /	355	DATE	7-28	-21		AMPLE	TIME:	1430	) D.	ATE: 7-28-2
PURGE METHO	D	PUMP BAILER	PERISTALT	IC PUN	/IP		PH: ORP:	<del></del>	nV DO	NDUCTIN		6 umhos/ca
DEPTH T	O WATER:	6.22	T/ PVC				TURB				************************	To
	O BOTTOM		T/ PVC				□ NO		.IGHT	□ мо	DERATE	☐ VERY
WELL VO		NA	LITERS		GALLONS		TEMPE	RATURE: /	3,7	°С ОТ	HER:	
VOLUME	REMOVED	: ד	LITERS		GALLONS		COLO	R: <u>//c/</u> //	<u>,                                     </u>	OD	OR: _	None
COLOR:	_ <i>N</i> e	M		ODOR	_N <sub>e</sub> ∧ℓ		FILTRA	TE (0.45 um)	YE:	s 🗆	NO	
			BIDITY				FILTRA	TE COLOR: _/	/0/l		TRATE OD	
NONE			MODERATE		☐ VERY		QC SA	MPLE: MS	S/MSD	Z	DUP- D	CIC-BAD
DISPOSA	L METHOD	☑ GROUI	ND 🗆 DRU	IM 🗆	OTHER		СОМИ	IENTS: F		llect.	col He	ere
TIME	PURGE RATE	PH	CONDUCTIV	- 1	ORP		D.O.	TURBIDITY		ERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUMI
1355	(ML/MIN)	757	(umhos/cm		(mV) <i>5</i> . 5		mg/L)	(NTU)	1	(°C)	(FEET)	(GAL OR L)
1355	200	7.40		1	), <del>5</del> 	<u> </u>	17	12.56	14.	<i>!</i> !	6.22	INITIAL
1400	ļ	7,40	1082		1/2	<del></del>		12.15	14.	_	6.45	***************************************
1405	<b> /-</b>	7.71	1080		16.4	-	OP	8.84	14.0	) 	6.45	<u></u>
1410		7.90	1071	_	5 6,6	$\perp C$	<u>ط0.(</u>	6.84	13.	9	6.45	3
1415	<u> </u>	7.40	1062	_ -3	8.8	0	.07	7.53	13.	9	6.45	4
1420		7,41	1054		46.9	9,0	15	7,84	/3.	8,	6,45	5
1425		7.41	1042	-	50.3	G	1.08	8.70	13	,8	6,45	6
1430	!	7.42	1026		<u>52.9</u>	0	./0	8.04	13.	7	7.45	7
						-						
								E READINGS				
pH: +/-		DRESERVA	ATIVE CODE	RP: +/-			+/- 0.3	TURB: +/-		Or =</td <td></td> <td>TEMP.: +/-</td>		TEMP.: +/-
NUMBER		TYPE	PRESERVA		FILTERE	-	HNO3	C - H2SO4 ER SIZE	TYF	NaOH	E - HO	
- Ap - 1	AOML	VOA	•			+	_		<u> </u>		KOO A	
Z T	YUML		<u>A</u>   6			N	2	2 Scml	Pla	>1)C /	<u>4° 71</u>	
7		VoA				N			<u> </u>		**************************************	
- 1 イ	40ml		E			N	v.d.++ 1545048+/4.455.4C4.+1		-		THE RESERVE OF THE PERSON OF T	
2	125ML	Plastic	( <u>)</u>			N					manifes management as a second or a second	
						N		10:	<u></u>			Y
SHIPPING	METHOD:	lab Dro	p off	DATE	SHIPPED:		7/29		AIR	BILL NUM	IBER:	ENGLISH STORY CONTROL CONTROL STORY STORY STORY CONTROL
COC NUMI	BER:			SIGNA	TURE:	大	أسيحد	Diene	DAT	TE SIGNE	D:	7-29-21



## Appendix C Data Quality Reviews

## Laboratory Data Quality Review Groundwater Monitoring Event July 2021 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the July 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 21-0879.

During the July 2021 sampling event, a groundwater sample was collected from each of the following wells:

DEK-MW-15003

DEK-MW-18001

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

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

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

## **Data Usability Review Procedure**

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

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, 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. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of 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, and alkalinity. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.

## Laboratory Data Quality Review Groundwater Monitoring Event July 2021 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the July 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 21-0880.

During the July 2021 sampling event, a groundwater sample was collected from each of the following wells:

■ OW-10

OW-11

■ OW-12

During the July 2021 sampling event, the following water/surface water samples were collected:

■ KLI-SCS

KLI-PCS

SW-DITCH

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

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

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

## **Data Usability Review Procedure**

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

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

- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

It should be noted that results for method blanks and 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, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

## **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

## **QA/QC Sample Summary**

- One field blank (FB-KLI) and one equipment blank (EB-KLI) sample were collected. Total metals were not detected in these blanks.
- The field duplicate pair samples were DUP-KLI and OW-12; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits with the exception of antimony which was detected at 7 ug/L in DUP-KLI and was nondetect in sample OW-12. The RPD for antimony was not calculable in this sample but the absolute difference of the results was > the reporting limit. Potential uncertainty exists for positive and nondetect results for antimony in all groundwater samples, as summarized in Attachment 1.
- Laboratory duplicate analyses were not performed on a sample from this data set.

## Attachment 1

Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn Lined Impoundment – RCRA CCR Monitoring Program Erie, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
OW-10	7/27/2021		
OW-11	7/27/2021	Antimony	Field duplicate variability potential uncertainty eviets
OW-12	7/27/2021	Antimony	Field duplicate variability; potential uncertainty exists.
DUP-KLI	7/27/2021		



## **Appendix D Statistical Analysis**

## Appendix D

## Statistical Summary for DE Karn Lined Impoundment Third Quarter 2021

## Data from October 2019 to July 2021

Karn Lined Impoundment Wells									
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12			
Boron	Trend	0	$\downarrow$	0	↑ <sup>ASD</sup>	0			
Calcium	Trend	<b>↓</b>	$\downarrow$	↑ <sup>ASD</sup>	$\downarrow$	$\downarrow$			
Chloride	Trend	0	$\downarrow$	0	0	0			
Fluoride	Trend	O*	0	O*	0	O*			
Iron	Trend	0	0	0	0	0			
рН	Trend	0	0	0	<b>↑</b>	0			
Sulfate	Trend	0	↑ <sup>ASD</sup>	0	0	$\downarrow$			
Total Dissolved Solids	Trend	0	0	0	$\downarrow$	$\downarrow$			

## Notes:

O\* = Non-detect O = No trend

= Upward trend, continuous

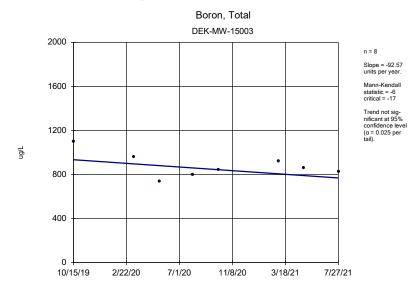
↑\* = Upward trend, new

= Upward trend, confirmed

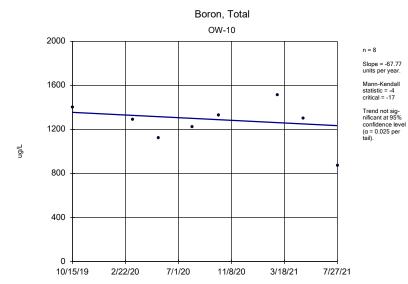
= Downward trend, continuous

↓\* = Downward trend, new

↑ ASD = Alternate Source Demonstration (Second Quarter 2021 Hydrogeological Monitoring Report for the Karn Lined Impoundment CCR Unit, TRC, July 2021.)

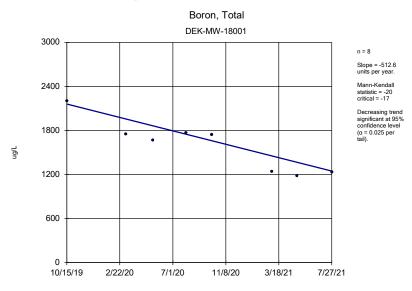


Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

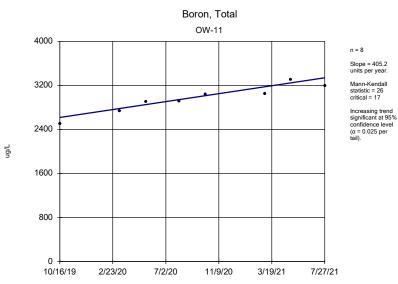
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

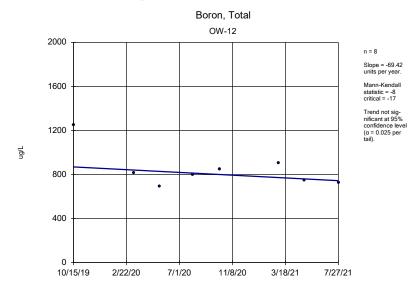
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG



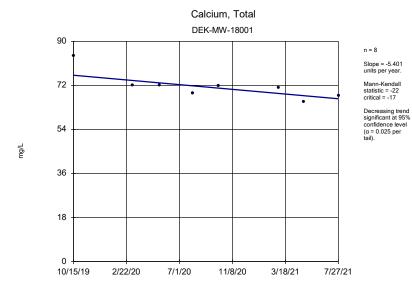
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



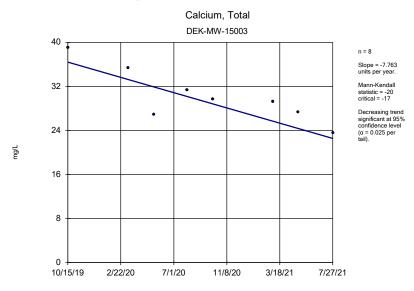
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

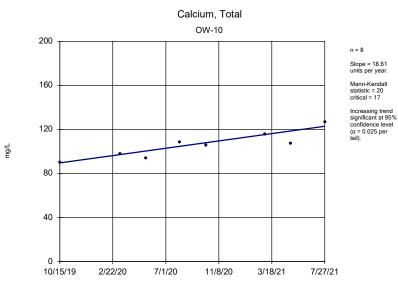
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

## Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG



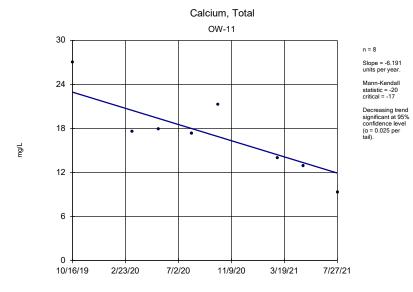
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

10/15/19

2/22/20

7/1/20



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

# Chloride DEK-MW-15003 1 = 8 Slope = 2.829 units per year. Mann-Kendall statistic = 10 critical = 17 Trend not significant at 95% confidence level (a = 0.025 per tail).

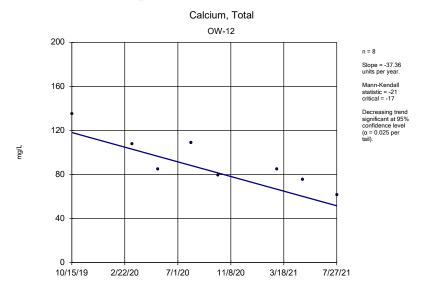
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

11/8/20

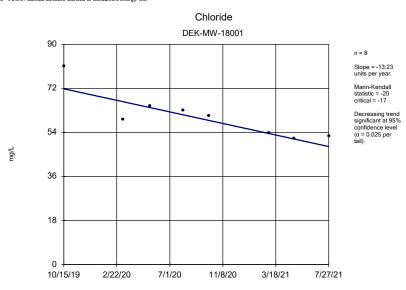
3/18/21

7/27/21



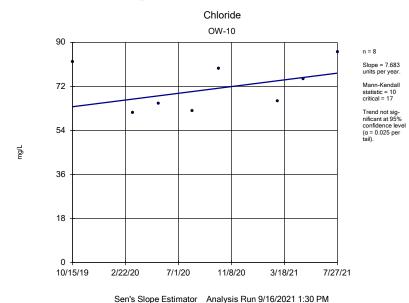
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3





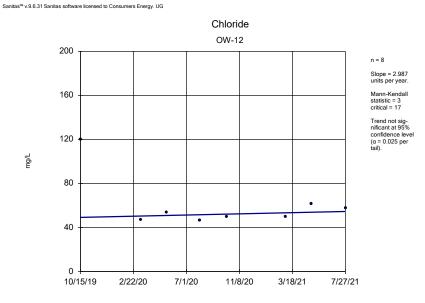
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



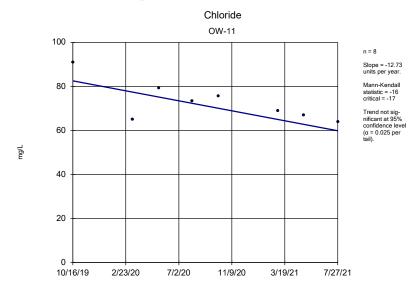
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3





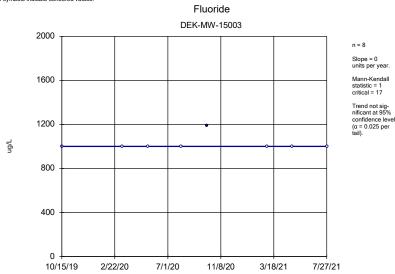
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

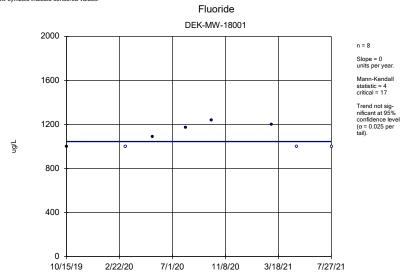




Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

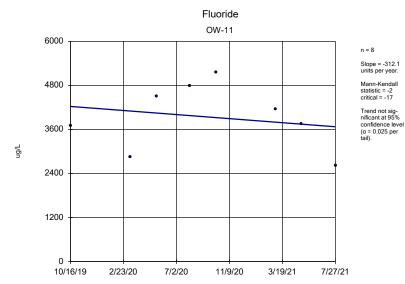
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

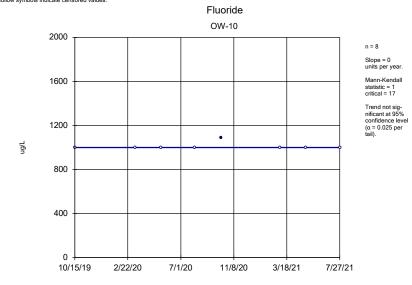
Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

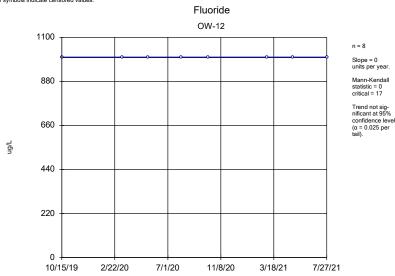
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



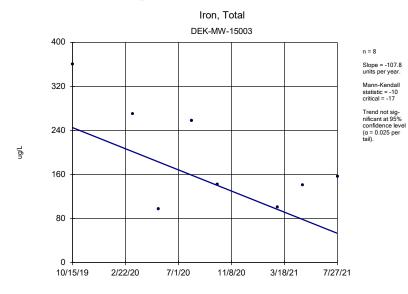
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

Sanitas<sup>tw</sup> v.9.6.31 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



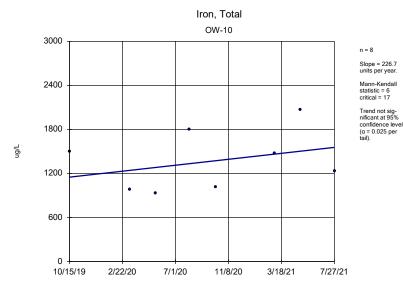
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



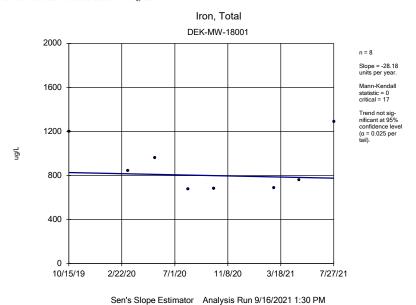
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



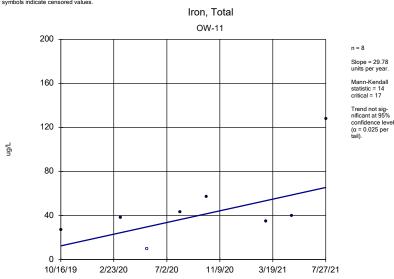
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



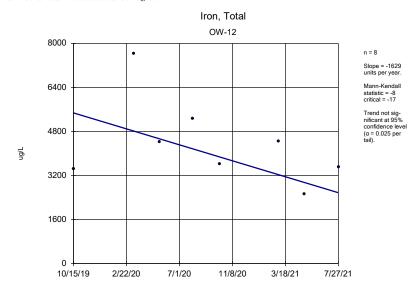
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

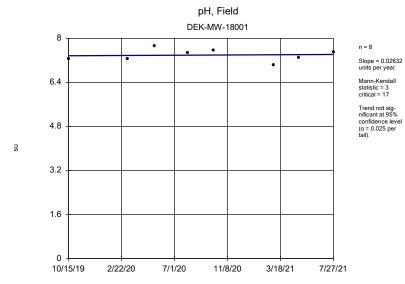
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

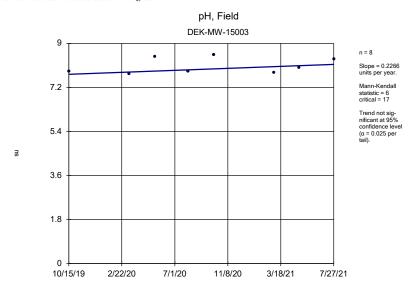
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

## Sanitas $^{\text{\tiny{TM}}}$ v.9.6.31 Sanitas software licensed to Consumers Energy. UG



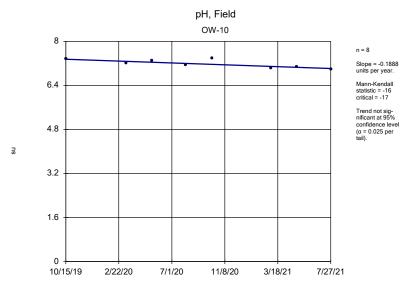
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

## Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG

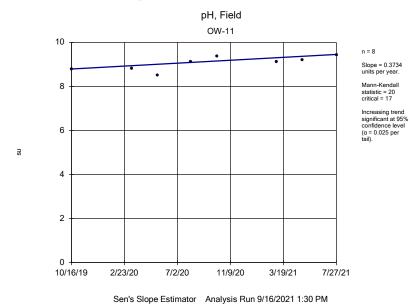


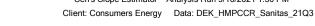
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

10/15/19

2/22/20





## DEK-MW-15003 n = 8 Slope = -9.198 units per year. Mann-Kendall statistic = 9 critical = -17 Trend not significant at 95% confidence level (a = 0.025 per tail).

7/1/20

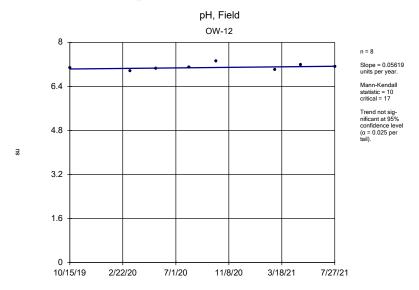
Sulfate

Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

11/8/20

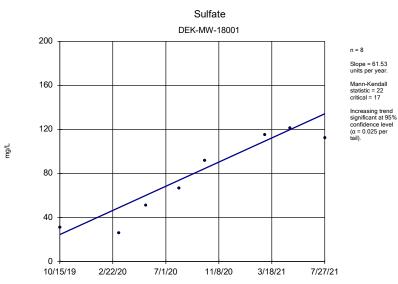
3/18/21

7/27/21



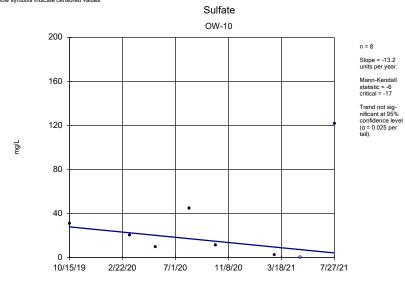
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

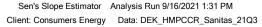




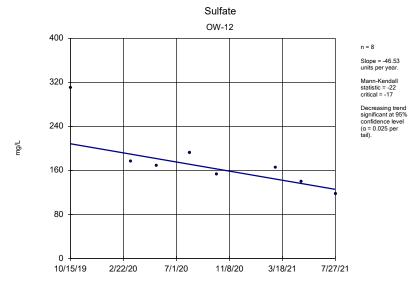
Sen's Slope Estimator Analysis Run 9/16/2021 1:30 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



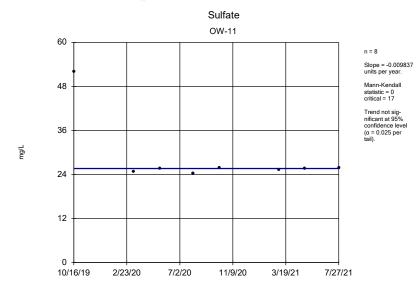


## Sanitas $^{\text{\tiny{TM}}}$ v.9.6.31 Sanitas software licensed to Consumers Energy. UG



Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

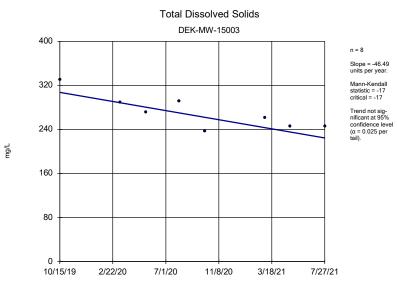
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

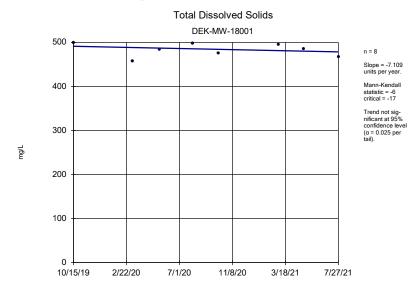
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

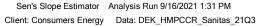
## Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG

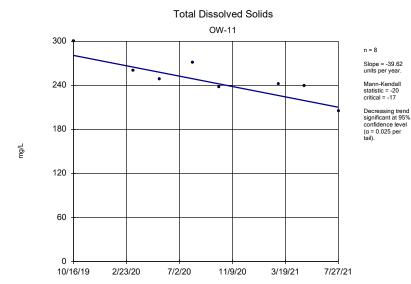


Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

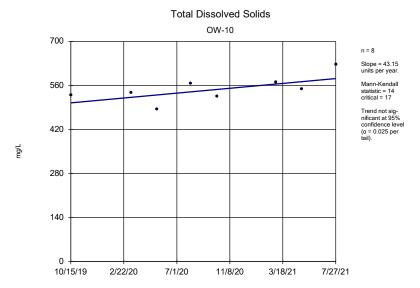






Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

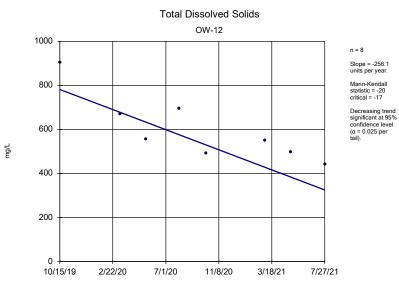
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3



Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

## Sanitas™ v.9.6.31 Sanitas software licensed to Consumers Energy. UG

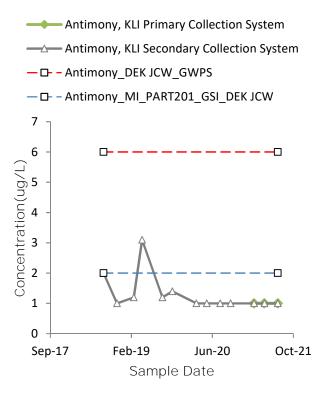


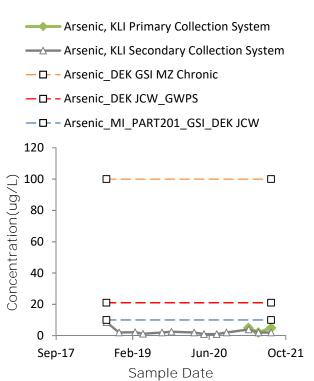
Sen's Slope Estimator Analysis Run 9/16/2021 1:31 PM

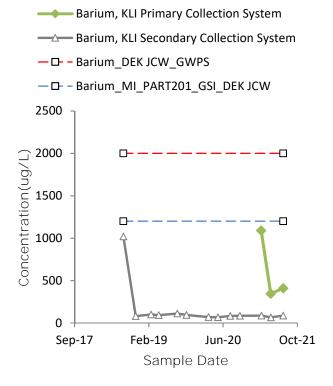
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q3

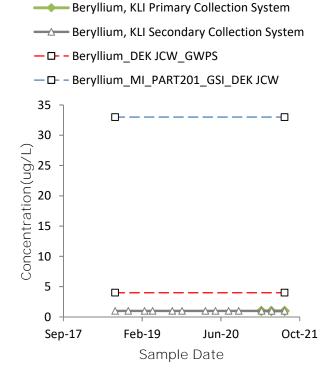


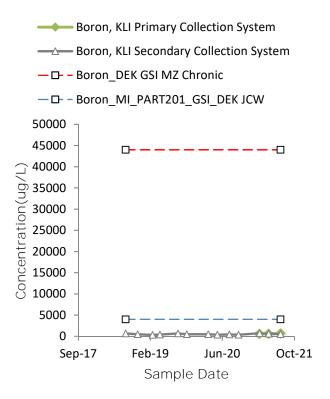
## Appendix E Secondary Leachate Collection System Monitoring

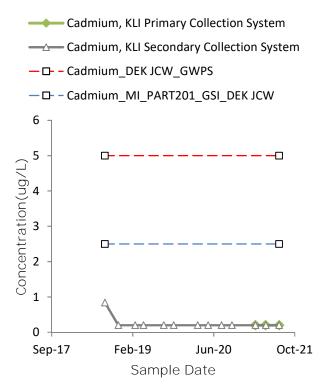


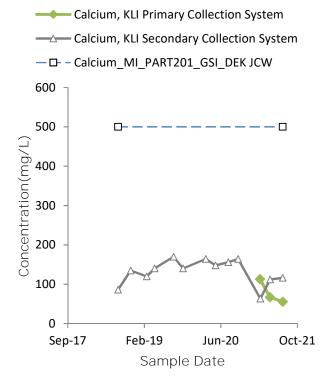


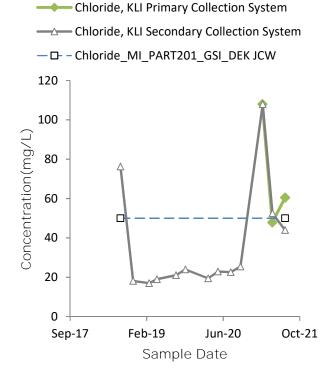


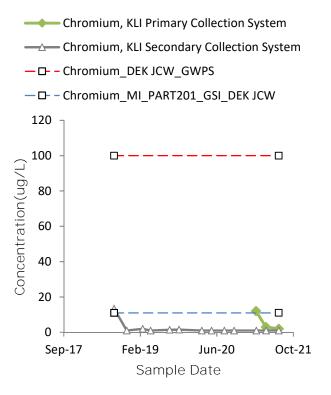


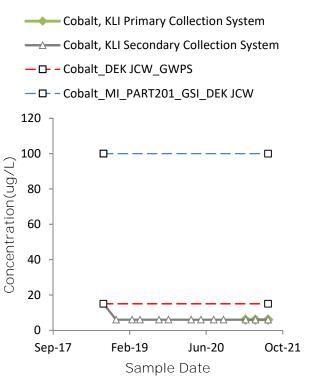


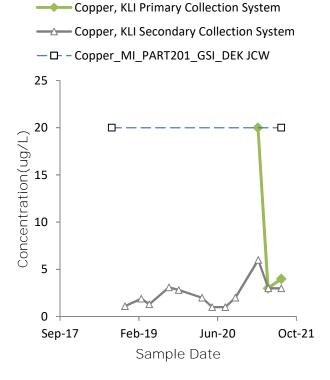


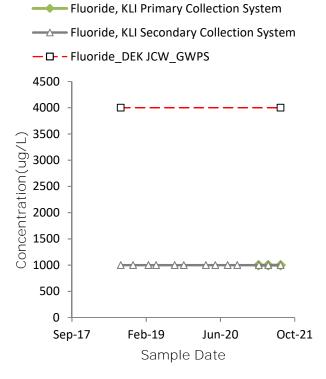


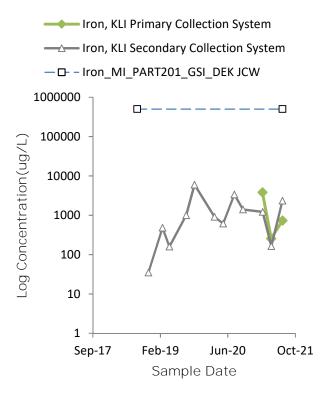


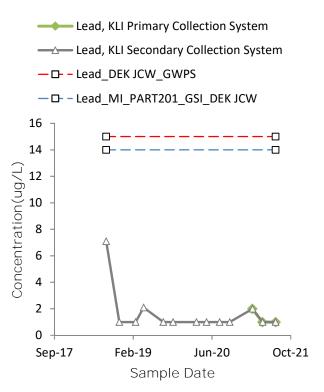


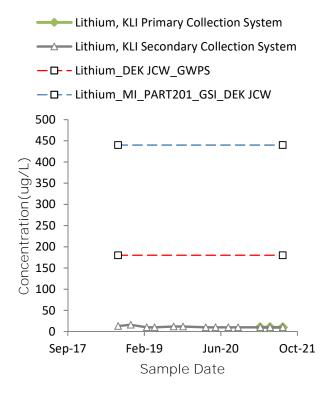


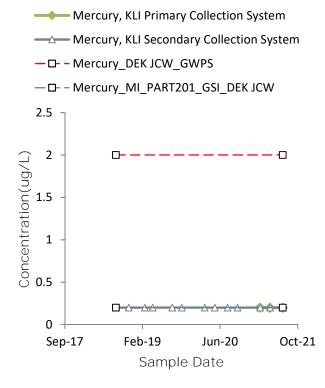


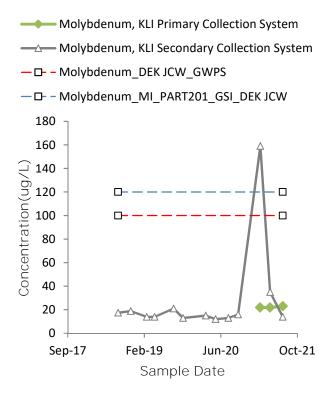


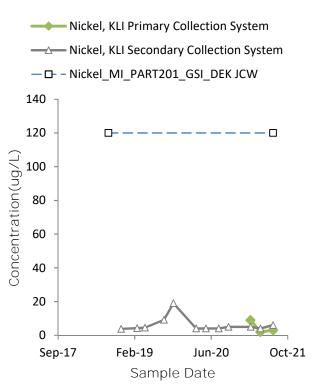


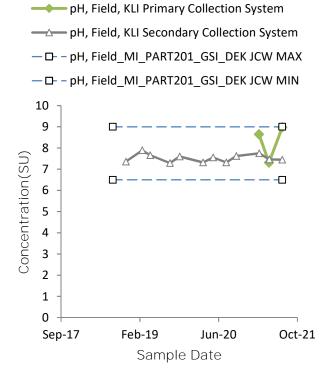


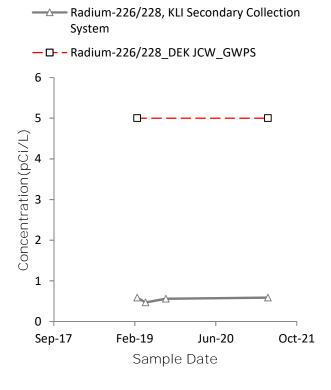


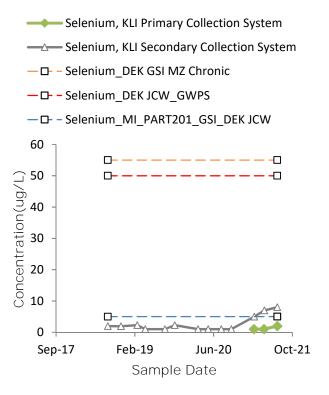


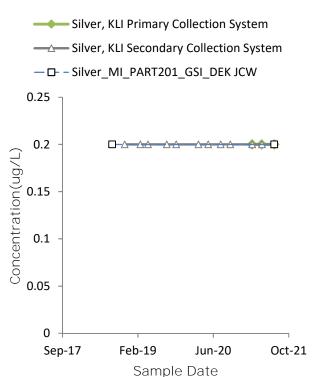


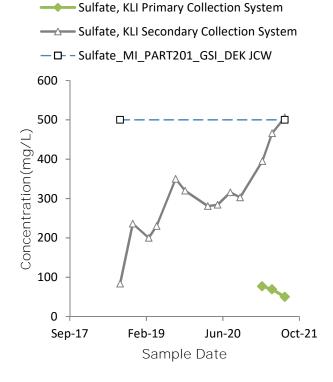


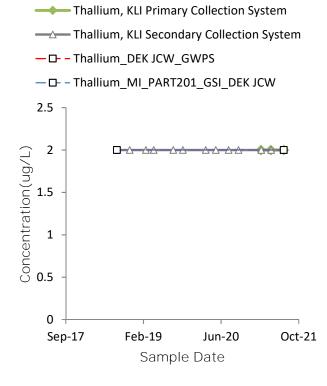






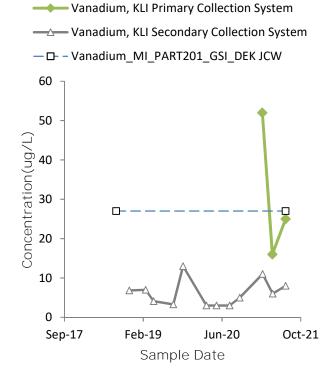


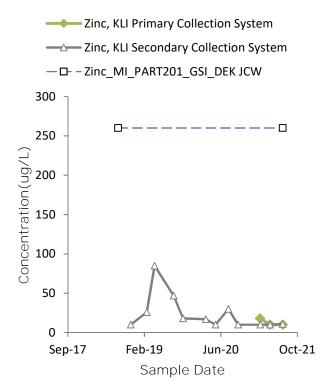




- Total Dissolved Solids, KLI Primary Collection System
- Total Dissolved Solids, KLI Secondary
  Collection System
- □ Total Dissolved Solids\_MI\_PART201\_GSI\_DEK JCW









January 28, 2022 VIA email: <u>BabcockL4@michigan.gov</u>

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

SUBJECT: DE KARN LINED IMPOUNDMENT LICENSE REQUIREMENTS - GROUNDWATER QUALITY

MONITORING RESULTS FOR FOURTH QUARTER 2021

Dear Ms. Babcock,

Attached you will find the above-referenced compliance monitoring report for the DE Karn Lined Impoundment (Report) to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. The monitoring event was conducted and the report was prepared by TRC under the direction of Consumers Energy Environmental Services. The report includes the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality - Office of Waste Management and Radiological Protection communication prescribing the format for solid waste disposal facility monitoring submittals.

This report was prepared in conformance with the *Karn Lined Impoundment Hydrogeological Monitoring Plan*, dated November 2020 ("HMP") that was approved by the MDEQ on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020. Should you have any questions regarding this submittal, please contact the undersigned at (517) 788-2982.

Sincerely,

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

Principal Engineer

Landfill Operations Compliance

Phone: (517) 788-2982

Email: harold.registerjr@cmsenergy.com

cc: Mr. Phil Roycraft, EGLE Saginaw Bay District Office (via email ROYCRAFTP@michigan.gov)

Mr. Mike Quigg, EGLE Saginaw Bay District Office (via email <a href="QuiggM@michigan.gov">QuiggM@michigan.gov</a>)

Mr. Caleb Batts, Consumers Energy (via email <a href="mailto:Caleb.Batts@cmsenergy.com">Caleb.Batts@cmsenergy.com</a>)

Encl: Karn Lined Impoundment - 4Q2021 Groundwater Monitoring Report

Karn Lined Impoundment – 4Q2021 Laboratory Analysis Data Spreadsheet



## Fourth Quarter 2021 Hydrogeological Monitoring Report

**DE Karn Lined Impoundment CCR Unit** 

**Essexville**, Michigan

January 2022

Darby Litz/

Project Manager/Hydrogeologist

## **Prepared For:**

Consumers Energy 1945 W. Parnall Road Jackson, MI 49201

## **Prepared By:**

TRC 1540 Eisenhower Place Ann Arbor, Michigan 48108

Graham Crockforg, C.P.G

Program Manager



## **TABLE OF CONTENTS**

1.0	Intro	duction					
	1.1 1.2	Statement of Adherence to Approved Hydrogeological Monitoring Plan  Program Summary					
	1.3	Site Overview					
	1.4	Geology/Hydrogeology					
2.0	Soco	and Collection System Monitoring					
2.0	3600	The Conection System Monitoring	•				
3.0	Grou	ındwater Monitoring	.!				
	3.1	Monitoring Well Network	.;				
	3.2	October 2021 Detection Monitoring Event	.;				
		3.2.1 Data Quality Review	. (				
		3.2.2 Groundwater Flow Rate and Direction	. 6				
4.0	Data	Evaluation					
4.0		Evaluation					
	4.1	Statistical Evaluation of Trends					
	4.2	Detection Monitoring Data Discussion					
	4.3	Alternate Source Demonstration	٠.				
5.0	Conc	clusions and Recommendations	1 (				
6.0	Refe	rences	11				
TAB	LES						
Table		Summary of Groundwater Elevation Data					
Table Table		Summary of Field Parameter Results: October 2021 Summary of Groundwater Sampling Results (Analytical): October 2021					
Table 3		Summary of Statistical Exceedances – October 2021					
FIGL	JRES						
Figur		Site Location Map					
Figur		Site Layout Map					
Figure 3		Shallow Groundwater Contour Map – October 2021					



## **APPENDICES**

Appendix A Laboratory Analytical Reports

Appendix B Field Notes

Appendix C Data Quality Reviews Appendix D Statistical Analysis

Appendix E Secondary Leachate Collection System Monitoring



## 1.0 Introduction

Pursuant to the Federal CCR Rule<sup>1</sup>, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2018. After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) on December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The amendments to the solid waste statute amended state groundwater monitoring requirements for coal ash impoundments; therefore, Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020 and incorporated, by reference, in Solid Waste Disposal Area Operating License No. 9629 issued on December 10, 2020.

## 1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This Fourth Quarter 2021 Karn Lined Impoundment Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to satisfy quarterly groundwater monitoring requirements during the active life of the coal ash impoundment. This Report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality (MDEQ) — Office of Waste Management and Radiological Protection, now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Facility Monitoring Submittals, dated July 5, 2013. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the facility's approved HMP that was approved by the EGLE on November 13, 2020. This HMP is compliant with the requirements set forth in Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act (NREPA), also known as Part 115 of PA 451 of 1994, as amended (Part 115) (a.k.a., Michigan Part 115 Solid Waste Management).

## 1.2 Program Summary

This Report provides results and summarizes the monitoring activities completed in the Fourth Quarter 2021 at the Karn Lined Impoundment located at 2742 Weadock Highway in Essexville, Michigan (Figure 1). Groundwater in the vicinity of the Karn Lined Impoundment has been documented to be affected by the management of CCR prior to the construction of the unit (January 2019, TRC). Given that the constituents associated with CCR currently managed at the Karn Lined Impoundment are indistinguishable from the constituents already present in groundwater from past operation of the former Karn Bottom Ash Pond, the compliance monitoring program for the Karn Lined Impoundment consists of two parts to evaluate if there are new releases from the unit:

<sup>&</sup>lt;sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended.



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

Based on sampling results for the fourth quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP.

#### 1.3 Site Overview

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

## 1.4 Geology/Hydrogeology

The majority of the Karn Lined Impoundment area is comprised of surficial CCR and sand fill, as described in the HMP. USGS topographic maps and aerial photographs dating back to 1938, in addition to field descriptions of subsurface soil at the site, indicate that the site was largely developed by reclaiming low-lands through construction of perimeter dikes and subsequent ash filling (AECOM, 2009).

The surficial fill consists of a mixture of varying percentages of ash, sand, and clay-rich fill ranging from 5 to 15 feet thick. Below the surficial fill, native alluvium and lacustrine soils are present at varying depths. Generally, there is a well graded sand unit present to depths of 10 to 30 feet below ground surface (ft bgs) overlying a clay till which is observed at depths ranging from 25 to 75 ft bgs. In general, the alluvium soils (sands) are deeper along the Saginaw River and there are shallower lacustrine deposits (clays, silts and sands deposited in or on the shores of glacial lakes) at other areas. The clay till acts as a hydraulic barrier that separates the shallow groundwater from the underlying sandstone. A sandstone unit, which is part of the Saginaw formation, was generally encountered at 80 to 90 ft bgs.

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



## 2.0 Second Collection System Monitoring

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

The Average Daily Flow Rate for the period from December 10, 2020 - January 6, 2021 was calculated as 137.0 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD. Although this calculated flow rate does not constitute the average flow rate for the previous three months per the definition of average daily flow rate under Part 115, Consumers provided a proactive notification and a preliminary written assessment of the flow rate exceedances to the EGLE January 15, 2021 and January 22, 2021, respectively. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. Following repairs to the liner, Consumers Energy continues to monitor improvements in the secondary collection system for improvements in the Daily Average Flow Rate. The Average Daily Flow Rate for December 2021 was calculated as 51.2 gallons per acre per day (GPAD), which exceeded the Response Action Flow Rate of 25 GPAD, as documented in the Consumers Energy Notification of Secondary Flow Rates, DE Karn Lined Impoundment (Type III Coal Ash Impoundment) WDS #392503 (Consumers Energy, December 7, 2021). The data presented in the letter indicate that the daily average flow rate on a weekly and monthly basis continues a decreasing trend following the short-term daily extraction for three weeks in September 2021 and weekly extraction in October and November 2021.

In response to the exceedance of the SCS Response Action Flow Rate), samples were collected from the surface water of the primary collection system (KLI-PCS) and from the secondary leachate collection system sump (KLI-SCS) in October 2021 to compare leachate chemistry to groundwater chemistry. The samples were analyzed for the following constituents:

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

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



- Arsenic is higher in groundwater than the secondary collection system: Arsenic was detected in both the primary and secondary collection systems at 3 ug/L and 2 ug/L, respectively, in October 2021. In contrast, the arsenic concentration observed in OW-12, the monitoring well located closest to the damaged liner areas, is 105 ug/L, which is consistent with concentrations observed in August 2020, before the liner damage occurred. Arsenic present in groundwater does not appear to be a result of a release from the unit.
- Vanadium is detected in the primary and secondary collection system and not in groundwater: Vanadium was present in the primary collection system sample at 25 ug/L in July 2021 and 23 ug/L in October 2021, which are higher than the vanadium concentrations in the secondary collection system (8 ug/L in July 2021 and 7 ug/L in October 2021). Vanadium was not detected in the well nearest the observed liner damage OW-12 (<2 ug/L).
- Secondary Collection System chemistry has not appreciably changed: The time series plots in Attachment A show relatively stable trends in chemistry for samples collected from the primary collection system, with the exception of TDS and sulfate. These also are the only two constituents in the secondary collection system sample were present above relevant criteria (i.e. GSI criteria) this event. In both cases the concentration in the primary collection system leachate is significantly lower in concentration suggesting that the elevated TDS and sulfate is not likely from the primary collection system leachate. The TDS and sulfate concentrations in the secondary collection system are also more closely linked to water coming through the system from the intake water than as a byproduct of the commingled ash and other waste products.

Water quality data collected for Fourth Quarter 2021 are included in the attached laboratory reports (Appendix A). Groundwater chemistry is discussed in Section 4.1. Groundwater conditions will continue to be monitored. Using the secondary collection system flow rates as a leak detection system was successful. The leak was identified in the fourth quarter of 2020, actions were promptly taken to address the leak. In January 2021, liner damage was noted in two areas denoted as Visual Observation Point No. 1 (VOP 1) and Visual Observation Point No. 2 (VOP 2). VOP 2 was repaired on March 10, 2021 and VOP 1 was repaired on May 24, 2021 as documented by Golder Associates Inc. Consumers Energy submitted the repair certification reports to the EGLE on May 25, 2021 and June 29, 2021, respectively. The results of the mitigation efforts continue to be monitored.

Consumers Energy continues to monitor the secondary collection system flow rates, record flow rates and head level on the secondary liner in the operating record and evaluate flow rate trends on a weekly basis. Written notifications of flow rates in the secondary collection system will be provided monthly and evaluations of the chemical characteristics of liquid in the secondary collection system will be reported quarterly. In addition, Consumers Energy continues to provide quarterly updates on remedial actions performed on the leachate collection system through the quarterly groundwater monitoring report required by the HMP.



## 3.0 Groundwater Monitoring

## 3.1 Monitoring Well Network

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

## 3.2 October 2021 Detection Monitoring Event

In accordance with the HMP, TRC conducted the fourth quarter 2021 monitoring event for the Karn Lined Impoundment on October 6<sup>th</sup> and 7<sup>th</sup>, 2021. In addition to the routine groundwater samples collected from the monitoring well network, a water sample was collected from a sump in the secondary collection system (KLI-SCS) and a surface water sample was collected from the primary collection system (KLI-PCS), as discussed in Section 2 above, such that leachate chemistry could be compared to groundwater chemistry. A sample of surface water was also collected from a ditch located north of the lined impoundment (SW-Ditch) to further evaluate site geochemistry (Figure 2). The SW-Ditch surface water grab sample represents water quality from the potentiometric high point adjacent to the Karn Lined Impoundment.

Groundwater samples collected during the October 2021 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents.

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



Samples were also analyzed for additional constituents including magnesium, sodium, potassium, and bicarbonate, carbonate, and total alkalinity to provide additional evaluation of groundwater chemistry. Analytical results from the fourth quarter 2021 monitoring event are included in the attached laboratory reports (Appendix A).

Static water level measurements were collected at all locations after equilibration to atmospheric pressure and immediately prior to purging. The depth to water was recorded to the nearest 0.01-ft in accordance with the procedures in the HMP. Groundwater purging and sampling were conducted in accordance with low-flow sampling protocol. Static water elevation data are included in the attached field records (Appendix B).

Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2. Field notes are included as Appendix B. The samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Porewater sample preparation and analyses were performed in accordance with SW-846 "Test Methods for Evaluation Solid Waste – Chemical / Physical Methods," USEPA (latest revision). TRC followed chain of custody procedures to document the sample handling sequence.

TRC also collected quality assurance/quality control (QA/QC) samples during the groundwater sampling event. The QA/QC samples consisted of one field blank, one equipment blank, one field duplicate (DEK-MW-15006 from adjacent Karn Bottom Ash Pond CCR Unit), and field matrix spike/matrix spike duplicate samples collected at DEK-MW-18001.

## 3.2.1 Data Quality Review

Data were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the HMP program. The data quality reviews for the Karn Lined Impoundment network wells are summarized in Appendix C.

#### 3.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the October 2021 groundwater monitoring events are provided in Table 1. The data were used to construct the groundwater contour map (Figure 3).

Groundwater elevations measured at the site in October 2021 are generally within the range of 581 to 587 feet above mean sea level (ft NAVD88) and groundwater is typically encountered at equal elevation relative to the surrounding surface water features measured by the NOAA gauging station data or within approximately 6 feet higher, flowing toward the bounding surface water features.

Although the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond historically created localized mounding of the potentiometric surface, the new Karn Lined



Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the former surface pool area is no longer present. The groundwater elevation data collected in October 2021 demonstrate a reduction in groundwater elevation measurements by several feet when compared to measurement taken in June 2018. 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 and DEK-MW-15003 delineate the newly established groundwater elevation high point that was previously centered over the former Karn Bottom Ash Pond with porewater flow generally flowing radially towards the adjacent surface water features from this newly established potentiometric "high", as illustrated in Figure 3.

The average hydraulic gradient observed on October 4, 2021 in the vicinity of the former Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0042 ft/ft. The gradients were calculated using the monitoring well pair DEK MW 15004/DEK-MW-15005, as well as the well water elevation difference and distance between DEK-MW-15003 and the discharge channel. The discharge channel surface water elevation was taken from the NOAA gauging station data on the same dates as the water level measurements. Using the mean hydraulic conductivity of 15 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.3, the estimated average seepage velocity was calculated to be 0.21 ft/day or 71 ft/year in October 2021 which is reduced relative to previous estimated seepage velocities (e.g., 0.33 ft/day or 120 ft/year August 2018).

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



#### 4.0 Data Evaluation

Based on sampling results for the fourth quarter 2021, the Karn Lined Impoundment remains in detection monitoring in accordance with the HMP. The following section summarizes the statistical approach applied to assess the fourth quarter 2021 groundwater data in accordance with the detection monitoring program.

Water quality data are included in the attached laboratory reports (Appendix A). Groundwater analytical data for the most recent quarterly monitoring event is summarized in Table 3 along with the associated Part 201 generic drinking water criteria, the generic GSI criteria, and the site-specific mixing-zone GSI criteria. Mixing-zone criteria are provided for the Karn-Weadock complex in the December 23, 2015 mixing zone determination that consists of arsenic, boron, and selenium. As such, arsenic, boron, and selenium are compared to site-specific mixing zone-based GSI criteria, and all other constituents are screened against generic GSI criteria. GSI compliance is evaluated through monitoring performed at the Karn Landfill in accordance with the EGLE-approved Consumers Energy's revised Karn Landfill HMP (Hydrogeological Monitoring Plan, Rev. 3, DE Karn Solid Waste Disposal Area) dated December 19, 2017.

#### 4.1 Statistical Evaluation of Trends

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

Time-series plots and statistical trend analyses are used to evaluate groundwater quality each quarter, which are included as Appendix D. Consumers Energy manages and evaluates its analytical data using Sanitas<sup>™</sup> Statistical Software (Sanitas<sup>™</sup>). Consumers Energy conducts intra-well trend analyses to examine data for each monitoring well-constituent pair in the groundwater monitoring system over time to determine if changes in water quality are occurring that may be associated with the Karn Lined Impoundment. Data from October 2019 through July 2021 were analyzed using Mann-Kendall and Sen's Slope at a significance level (α) of 0.025 per tail for each constituent/sampling point dataset to assess trends. Sen's Slope estimator was used to assess the magnitude of the slope and the Mann-Kendall test was used to determine if the slope was statistically significant. The graphical output of the Sen's Slope/Mann-Kendall trend tests and time series are presented in Appendix D. Appendix D also includes a table summarizing these trends and the associated statistical trend charts.



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

- A new, unconfirmed increasing trend in chloride was observed in monitoring well DEK-MW-15003.
- A continuous increasing trend in sulfate was observed in monitoring well DEK-MW-18001.
- A continuous increasing trend was observed for calcium in monitoring well OW-10. New, unconfirmed increasing trends were observed for chloride and total dissolved solids in monitoring well OW-10.
- Continuous increasing trends were observed for boron and pH in monitoring well OW-11.

## 4.2 Detection Monitoring Data Discussion

Although preliminary detection monitoring trends noted in Section 4.1 exist, the groundwater conditions do not conclusively indicate a release from the unit. Groundwater quality is generally consistent with previous monitoring events. The location of one of the identified liner damage locations was approximately 40-ft upgradient from monitoring well OW-12 and the second location was approximately 130-ft upgradient from monitoring well DEK-MW-18001. Both leaks have been repaired. Detection monitoring constituent concentrations at OW-12, located closest to the identified liner damage, exhibit no statistically significant increasing trends, indicating that if a release to groundwater occurred due to the apparent leak in the liner system, the effects on local groundwater quality at this point appear to be negligible. Additionally, concentrations of several constituents observed at upgradient well OW-11 are much higher than concentrations observed in the KLI-PCS and KLI-SCS, which support a source other than the Karn Lined Impoundment is affecting chemistry at OW-11. The change in sulfate at DEK-MW-18001 and calcium in monitoring well OW-10 are likely a result of changes in the groundwater flow regime or redox conditions as a result of the Bottom Ash Pond closure activities, rather than a result of a release from the unit. The increasing concentrations began around the time of the dewatering and excavation that occurred in the adjacent Bottom Ash Pond area (April through July 2019). well before a leak in the Karn Lined Impoundment liner system was noted through the increase in the SCS daily average flow rate observed in December 2020 as detailed in the Second Quarter 2021 Hydrogeological Monitoring Report (TRC, July 2021). The increasing trends at OW-10 and DEK-MW-18001 will continue to be evaluated within context of changes in the site operational status.

#### 4.3 Alternate Source Demonstration

At this time, Consumers Energy is continuing to assert an Alternate Source Demonstration (ASD), for the following, as detailed in the Second Quarter 2021 Hydrogeological Monitoring Report (TRC, July 2021):

- Sulfate in monitoring well DEK-MW-18001
- Calcium in monitoring well OW-10; and
- Boron and pH in monitoring well OW-11.

\_



## 5.0 Conclusions and Recommendations

Consumers Energy will continue the detection monitoring program for the Karn Lined Impoundment unit based on the data evaluations completed in Section 4.0 of this report in conformance with the Karn Lined Impoundment HMP. Although increasing trends for detection monitoring constituents were observed in three wells, these trends were found to not be a result of operation of the Karn Lined Impoundment. No SSIs over background limits were identified at the Karn Lined Impoundment during the July 2021 monitoring event. The use of secondary collection system flow rates as a leak detection system was successful. Increased flow rates observed in Q4 2020 triggered investigations by Consumers Energy that quickly identified deficiencies in the liner system and prompted actions to address the damaged liner. The results of the mitigation efforts continue to be monitored. The fourth quarter monitoring event is scheduled for October 2021.



## 6.0 References

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



## **Tables**

Table 1

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

	тос		Screen Interval	Octobe	er 4, 2021
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background	ļ	<u> </u>	<del> </del>	(,	(1.7)
MW-15002	587.71	Sand	580.9 to 570.9	6.68	581.03
MW-15008	585.36	Sand with clay	578.7 to 568.7	4.28	581.08
MW-15016	586.49	Sand	581.2 to 578.2	3.85	582.64
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	5.20	580.97
DEK Bottom Ash Pon	d		<del>!</del>		1
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.38	584.49
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.88	583.16
DEK-MW-15005	589.72	Sand	572.3 to 567.3	8.81	580.91
DEK-MW-15006	589.24	Sand	573.0 to 568.0	8.28	580.96
DEK Bottom Ash Pon	d & Karn Lined Im				
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.50	586.24
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.43	585.04
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.48	585.10
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.66	586.24
OW-12	603.07	Silty Sand	584.2 to 579.2	17.10	585.97
DEK Nature and Exter		, , , , , ,			
MW-01	597.02	Sand	573.0 to 570.0	16.24	580.78
MW-03	597.30	Sand	569.8 to 566.8	16.51	580.79
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	8.60	580.84
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	17.38	581.40
MW-10	596.97	Sand	582.5 to 572.5	15.95	581.02
MW-12	598.60	Sand	583.9 to 573.9	17.75	580.85
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	13.63	580.74
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	14.90	580.90
MW-22	598.99	Ash/Sand	571.4 to 568.4	16.54	582.45
MW-23	595.57	Ash/Sand	576.9 to 571.9	13.35	582.22
DEK Static Water Lev	el	1	l L		
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	16.56	580.78
MW-04	598.01	NR	569.5 to 564.5	17.22	580.79
MW-17	597.91	Sand	577.0 to 574.0	12.95	584.96
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.25	583.97
MW-19	597.28	NR	572.1 to 567.1	16.20	581.08
MW-20	632.75	Sand	582.3 to 579.3	52.02	580.73
MW-21	632.91	Sand	587.1 to 584.1	50.72	582.19
OW-01	631.33	NR	572.5 to 567.5	50.63	580.70
OW-02	598.01	Fly Ash	579.4 to 576.4	15.36	582.65
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	17.47	580.47
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	9.60	580.61
OW-05	593.53	Sand	576.9 to 571.9	11.10	582.43
OW-06	603.95	NR	580.9 to 575.9	21.38	582.57
OW-07	596.41	Ash	583.3 to 580.3	14.28	582.13
OW-08	593.93	NR	581.0 to 576.0	10.74	583.19
OW-09	593.45	NR NR	585.5 to 580.5	10.23	583.22
OW-13	588.52	NR	579.5 to 574.5	3.96	584.56
OW-15	587.75	NR	572.8 to 567.8	3.90	583.85

#### Notes:

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

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

NR: Not Recorded

Table 2

Summary of Field Parameters: October 2021 Fourth Quarter 2021 Quarterly Report Karn Lined Impoundment - Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Karn Lined Impoundm	nent						
DEK-MW-15003	10/7/2021	0.57	-210.3	8.3	461	20.8	2.0
DEK-MW-18001	10/7/2021	0.29	-158.5	7.4	850	14.3	2.2
KLI-PCS	10/6/2021	7.95	313.4	8.5	593	23.7	23.3
KLI-SCS	10/6/2021	2.21	158.3	7.2	1,759	20.2	0.8
OW-10	10/7/2021	0.23	-146.3	7.0	1165	14.3	6.9
OW-11	10/7/2021	0.65	-137.5	9.5	470	12.7	4.0
OW-12	10/7/2021	0.30	-140.3	7.2	976	16.9	5.9
SW-DITCH	10/6/2021	7.14	460.6	2.6	2,406	30.2	8.6

#### 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): October 2021 Fourth Quarter 2021

Karn Lined Impoundment - Essexville, Michigan

				·	Sample Location:	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12	KLI-SCS	KLI-PCS	SW-Ditch
					Sample Date:	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/6/2021	10/6/2021	10/6/2021
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^	upgradient	downg	radient	upgradient	downgradient		Supplemental	
Appendix III <sup>(1)</sup>													
Boron	ug/L	NC	500	500	4.000	976	1,370	1,400	3,580	1,060	640	682	201
Calcium	mg/L	NC	NC	NC	500EE	24.5	71	140	9.44	91.8	117	72	159
Chloride	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	50	54	55.2	87.5	64.6	56.1	52.1	44.5	42.9
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	3,310	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250 <sup>E</sup>	250 <sup>E</sup>	500EE	39.7	118	70.2	23.9	173	381	74.9	704
Total Dissolved Solids	mg/L	500**	500 <sup>E</sup>	500 <sup>E</sup>	500	253	494	668	227	585	1,330	372	1,020
pH, Field	SŬ	6.5 - 8.5**	6.5 - 8.5 <sup>E</sup>	6.5 - 8.5 <sup>E</sup>	6.5 - 9.0	8.3	7.4	7.0	9.5	7.2	7.2	8.5	2.6
Appendix IV <sup>(1)</sup>	•												
Antimony	ug/L	6	6.0	6.0	2.0	< 1	< 1	< 1	3	< 1	< 1	< 1	< 1
Arsenic	ug/L	10	10	10	10	481	85	4	738	105	2	3	3
Barium	ug/L	2,000	2,000	2,000	1,200	42	135	167	25	81	65	503	273
Beryllium	ug/L	4	4.0	4.0	33	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	ug/L	5	5.0	5.0	2.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/L	100	100	100	11	< 1	< 1	1	3	< 1	< 1	4	7
Cobalt	ug/L	NC	40	100	100	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	3,310	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	14	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
_ithium	ug/L	NC	170	350	440	19	24	38	< 10	32	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Molybdenum	ug/L	NC	73	210	120	28	< 5	< 5	236	17	12	21	5
Selenium	ug/L	50	50	50	5.0	1	2	4	5	2	7	2	2
Thallium	ug/L	2	2.0	2.0	2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Additional MI Part 115 <sup>0</sup>	2)												
ron	ug/L	300**	300E	300 <sup>E</sup>	500,000EE	103	1,190	1,730	64	6,110	251	441	895
Copper	ug/L	1,000**	1,000 <sup>E</sup>	1,000 <sup>E</sup>	20	< 1	< 1	2	< 1	< 1	3	3	13
Vickel	ug/L	NC	100	100	120	< 2	4	8	5	5	8	4	15
Silver	ug/L	100**	34	98	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vanadium	ug/L	NC	4.5	62	27	< 2	< 2	3	1,000	< 2	7	23	9
Zinc	ug/L	5,000**	2,400	5,000E	260	< 10	< 10	< 10	< 10	< 10	< 10	< 10	20

#### Notes:

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

SU - standard units; pH is a field parameter.

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

NC - no criteria

- \* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 21, 2021
- \*\* Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- ^- Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using hardness of 258 mg CaCO3/L (average of SW-01 [Lake Huron] and SW-02 [Saginaw River] collected in April 2018) per footnote {G} of Michigan

Part 201 criteria tables. Chromium GSI criterion based on hexavalent chromium per footnote {H}. GSI criterion is protective for

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

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

- # If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.
- <sup>E</sup> Criterion is the aesthetic drinking water value per footnote {E}.
- EE Criterion is based on the total dissolved solids GSI value per footnote {EE}.
- (1) 40 CFR Part 257 Appendix III Detection Monitoring Constituents and Appendix IV Assessment Monitoring Constituents.
- (2) Per Michigan Part 115 Amendments Public Act No. 640 of 2018 Section 11511a(3)(c) and 11519b(2) additional detection

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

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

RED value indicates an exceedance of the MCL.

All metals were analyzed as total unless otherwise specified.

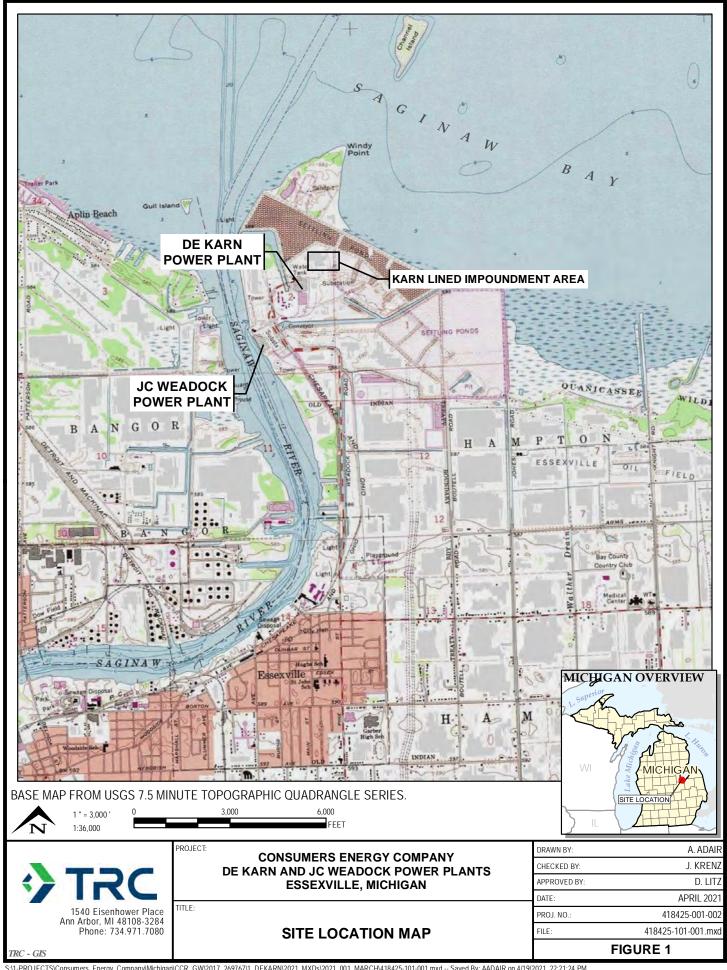
## Table 4

## Summary of Statistical Exceedances – October 2021 Karn Lined Impoundment Essexville, Michigan

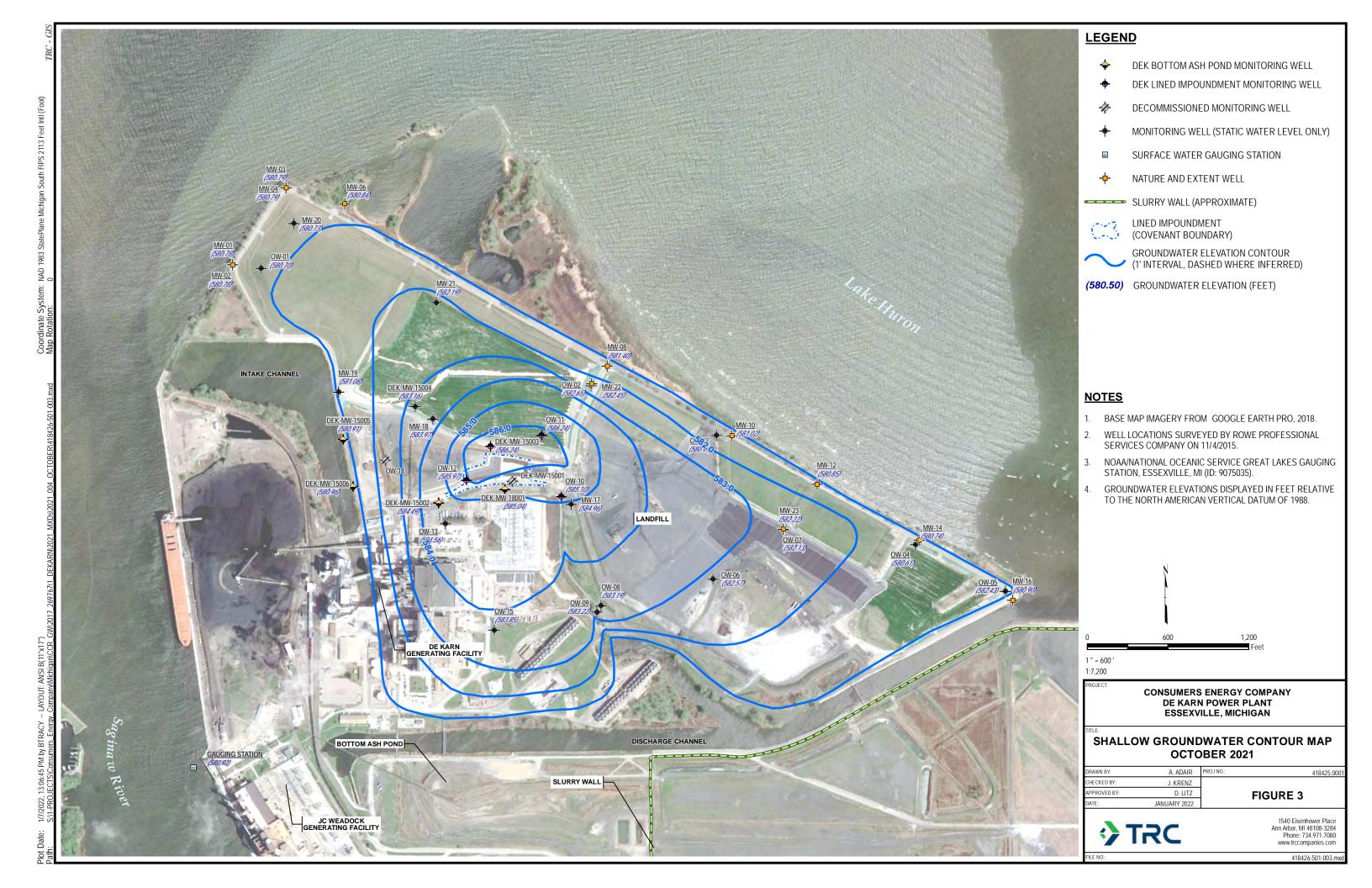
Y OF STATISTICAL EXCEE	Data is in unle	(X) ug/L ( ) mg/L ss otherwise	or stated							
II# I LOCATION I Parameter I (or 'C:C' tor I										
No Exceedances										
	Y OF STATISTICAL EXCEE	Y OF STATISTICAL EXCEEDANCES  Karn Lined Impoundment – WDS# 392503  Location Parameter	Y OF STATISTICAL EXCEEDANCES  Karn Lined Impoundment – WDS# 392503  Location Parameter Part 201 GRCC	Karn Lined Impoundment – WDS# 392503  Location Parameter Part 201 GRCC Statistical Limit (or 'CC' for Control Charts)	Y OF STATISTICAL EXCEEDANCES  Karn Lined Impoundment – WDS# 392503  Location Parameter Part 201 (or 'CC' for Control Charts) 3 Qtr. 2021 (bold >201)	Y OF STATISTICAL EXCEEDANCES  Karn Lined Impoundment – WDS# 392503  Location Parameter Part 201 GRCC Statistical Limit (or 'CC' for Control Charts) 3 Qtr. 2021 (bold >201) (bold >201)	Y OF STATISTICAL EXCEEDANCES  Karn Lined Impoundment – WDS# 392503  Location Parameter Part 201 GRCC Statistical Limit (or 'CC' for Control Charts)  Part 201 (bold >201) (bold >201) (bold >201)			



# **Figures**









# **Appendix A Laboratory Analytical Reports**



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

*Date:* October 31, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2021 Q4

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

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

**Chemistry Project: 21-1170** 

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 10/06/2021 and 10/07/2021, for the 4<sup>th</sup> Quarter monitoring 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 10/07/2021.

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

Reviewed and approved by:

Emil Blaj Sr. Technical Analyst Project Lead



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

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

#### **CASE NARRATIVE**

#### I. Sample Receipt

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

#### II. Methodology

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

#### III. Results/Quality Control

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

## **DEFINITIONS / QUALIFIERS**

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

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

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



## **Work Order Sample Summary**

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2021 DEK RCRA Lined Impoundment Wells

**Date Received:** 10/7/2021 **Chemistry Project:** 21-1170

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-1170-01	OW-10	Groundwater	10/07/2021 08:50 AM	DEK Lined Impoundment
21-1170-02	OW-11	Groundwater	10/07/2021 09:50 AM	DEK Lined Impoundment
21-1170-03	OW-12	Groundwater	10/07/2021 10:49 AM	DEK Lined Impoundment
21-1170-04	KLI-SCS	Groundwater	10/06/2021 08:44 AM	DEK Lined Impoundment
21-1170-05	KLI-PCS	Groundwater	10/06/2021 08:36 AM	DEK Lined Impoundment
21-1170-06	SW-DITCH	Groundwater	10/06/2021 08:14 AM	DEK Lined Impoundment



Report Date:

10/31/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

 Field Sample ID:
 OW-10
 Collect Date:
 10/07/2021

 Lab Sample ID:
 21-1170-01
 Collect Time:
 08:50 AM

<b>Result</b> ND	Flag	Units	RL	Analysis Date	Tracking
ND				-	_
		ug/L	0.2	10/14/2021	AB21-1014-03
ndix III-IV To	tal Metals	s Ехр	Aliquot #: 21-1	170-01-C01-A02	Analyst: EB
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	1.0	10/28/2021	AB21-1028-02
4		ug/L	1.0	10/28/2021	AB21-1028-02
167		ug/L	5.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
1400		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
140000		ug/L	1000.0	10/28/2021	AB21-1028-02
1		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	6.0	10/28/2021	AB21-1028-02
2		ug/L	1.0	10/28/2021	AB21-1028-02
1730		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
38		ug/L	10.0	10/28/2021	AB21-1028-02
18800		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	5.0	10/28/2021	AB21-1028-02
8		ug/L	2.0	10/28/2021	AB21-1028-02
7400		ug/L	100.0	10/28/2021	AB21-1028-02
4		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
70800		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
3		ug/L	2.0	10/28/2021	AB21-1028-02
ND		ug/L	10.0	10/28/2021	AB21-1028-02
e List, Cl, F,	SO4, Aqu	ieous	Aliquot #: 21-1	170-01-C02-A01	Analyst: DMW
Result	Flag	Units	RL	Analysis Date	Tracking
87500	_	ug/L	1000.0	10/14/2021	AB21-1014-08
		-			AB21-1014-08
70200		ug/L	1000.0	10/14/2021	AB21-1014-08
			Δliquot #- 21-1	170-01-C03-A01	Analyst: CLF
Result	Flag	Units			Tracking
	- 3			-	AB21-1011-04
	ND 4 167 ND 1400 ND 140000 1 ND 2 1730 ND 38 18800 ND 8 7400 4 ND 70800 ND 3 ND 3 ND 3 ND 3 ND 3 ND ND 3 ND	ND 4 167 ND 1400 ND 140000 1 ND 2 1730 ND 38 18800 ND 8 7400 4 ND 70800 ND 3 ND 3 ND 4 Result Flag 87500 ND 70200	ND	Result         Flag         Units         RL           ND         ug/L         1.0           4         ug/L         1.0           167         ug/L         5.0           ND         ug/L         5.0           ND         ug/L         20.0           ND         ug/L         0.2           140000         ug/L         1000.0           1         ug/L         1.0           ND         ug/L         1.0           ND         ug/L         20.0           ND         ug/L         1.0           38         ug/L         10.0           ND         ug/L         1000.0           ND         ug/L         1000.0           ND         ug/L         1.0           ND         ug/L         2.0           ND         ug/L         2.0           ND         ug/L         10.0           ND         ug/L         1000.0           ND	Result         Flag         Units         RL         Analysis Date           ND         ug/L         1.0         10/28/2021           4         ug/L         1.0         10/28/2021           167         ug/L         5.0         10/28/2021           ND         ug/L         1.0         10/28/2021           1400         ug/L         20.0         10/28/2021           ND         ug/L         0.2         10/28/2021           140000         ug/L         1000.0         10/28/2021           140000         ug/L         1000.0         10/28/2021           1 40000         ug/L         1.0         10/28/2021           1 40000         ug/L         1.0         10/28/2021           ND         ug/L         1.0         10/28/2021           1 730         ug/L         1.0         10/28/2021           ND         ug/L         1.0         10/28/2021           1 8800         ug/L         10.0         10/28/2021           ND         ug/L         10.0         10/28/2021           7400         ug/L         10.0         10/28/2021           ND         ug/L         1.0         10/28/2021     <



## **Analytical Report**

**Report Date:** 10/31/21

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

 Field Sample ID:
 OW-10
 Collect Date:
 10/07/2021

 Lab Sample ID:
 21-1170-01
 Collect Time:
 08:50 AM

Alkalinity by SM 2320B			Aliquot #: 21-1	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	368000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	368000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date:

10/31/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

 Field Sample ID:
 OW-11
 Collect Date:
 10/07/2021

 Lab Sample ID:
 21-1170-02
 Collect Time:
 09:50 AM

Mercury by EPA 7470A, Total, Aque	ous			Aliquot #: 21-1	170-02-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Mercury	ND		ug/L	0.2	10/14/2021	AB21-1014-03
Metals by EPA 6020B: CCR Rule Ap	pendix III-IV To	tal Metals	з Ехр	Aliquot #: 21-1	170-02-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	3		ug/L	1.0	10/28/2021	AB21-1028-02
Arsenic	738		ug/L	1.0	10/28/2021	AB21-1028-02
Barium	25		ug/L	5.0	10/28/2021	AB21-1028-02
Beryllium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Boron	3580		ug/L	20.0	10/28/2021	AB21-1028-02
Cadmium	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Calcium	9440		ug/L	1000.0	10/28/2021	AB21-1028-02
Chromium	3		ug/L	1.0	10/28/2021	AB21-1028-02
Cobalt	ND		ug/L	6.0	10/28/2021	AB21-1028-02
Copper	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Iron	64		ug/L	20.0	10/28/2021	AB21-1028-02
Lead	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Lithium	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Magnesium	1240		ug/L	1000.0	10/28/2021	AB21-1028-02
Molybdenum	236		ug/L	5.0	10/28/2021	AB21-1028-02
Nickel	5		ug/L	2.0	10/28/2021	AB21-1028-02
Potassium	3660		ug/L	100.0	10/28/2021	AB21-1028-02
Selenium	5		ug/L	1.0	10/28/2021	AB21-1028-02
Silver	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Sodium	66100		ug/L	1000.0	10/28/2021	AB21-1028-02
Thallium	ND		ug/L	2.0	10/28/2021	AB21-1028-02
Vanadium	1000		ug/L	2.0	10/28/2021	AB21-1028-02
Zinc	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Anions by EPA 300.0 CCR Rule Ana	lyte List, CI, F,	SO4, Aqı	ieous	Aliquot #: 21-1	170-02-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	64600		ug/L	1000.0	10/14/2021	AB21-1014-08
Fluoride	3310		ug/L	1000.0	10/14/2021	AB21-1014-08
Sulfate	23900		ug/L	1000.0	10/14/2021	AB21-1014-08
Total Dissolved Solids by SM 25400	;			Aliquot #: 21-1	170-02-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	227		mg/L	10.0	10/11/2021	AB21-1011-04



A CENTURY OF EXCELLENCE

## **Analytical Report**

Report Date: 10/31/21

Sample Site: **DEK Lined Impoundment** 

Laboratory Project: 21-1170 Collect Date: Field Sample ID: OW-11 10/07/2021 Lab Sample ID: 21-1170-02 Collect Time: 09:50 AM

Alkalinity by SM 2320B	Aliquot #: 21-1	Analyst: DLS			
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	75800	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	24200	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	51500	ug/L	10000.0	10/14/2021	AB21-1014-10



10/31/21



A CENTURY OF EXCELLENCE

Report Date:

Sample Site: Laboratory Project: **DEK Lined Impoundment** 21-1170

Collect Date: Field Sample ID: **OW-12** 10/07/2021 Lab Sample ID: 21-1170-03 Collect Time: 10:49 AM

Mercury by EPA 7470A, Total, Aqueou	IS			Aliquot #: 21-1	170-03-C01-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/14/2021	AB21-1014-03
Metals by EPA 6020B: CCR Rule Appe	endix III-IV To	tal Metals	з Ехр	Aliquot #: 21-1	170-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Arsenic	105		ug/L	1.0	10/28/2021	AB21-1028-02
Barium	81		ug/L	5.0	10/28/2021	AB21-1028-02
Beryllium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Boron	1060		ug/L	20.0	10/28/2021	AB21-1028-02
Cadmium	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Calcium	91800		ug/L	1000.0	10/28/2021	AB21-1028-02
Chromium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Cobalt	ND		ug/L	6.0	10/28/2021	AB21-1028-02
Copper	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Iron	6110		ug/L	20.0	10/28/2021	AB21-1028-02
Lead	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Lithium	32		ug/L	10.0	10/28/2021	AB21-1028-02
Magnesium	25800		ug/L	1000.0	10/28/2021	AB21-1028-02
Molybdenum	17		ug/L	5.0	10/28/2021	AB21-1028-02
Nickel	5		ug/L	2.0	10/28/2021	AB21-1028-02
Potassium	5450		ug/L	100.0	10/28/2021	AB21-1028-02
Selenium	2		ug/L	1.0	10/28/2021	AB21-1028-02
Silver	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Sodium	53800		ug/L	1000.0	10/28/2021	AB21-1028-02
Thallium	ND		ug/L	2.0	10/28/2021	AB21-1028-02
Vanadium	ND		ug/L	2.0	10/28/2021	AB21-1028-02
Zinc	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Anions by EPA 300.0 CCR Rule Analy	nions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aq		Aqueous Aliquot #: 21-1170-03-C02-A01		Analyst: DMW	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	56100		ug/L	1000.0	10/14/2021	AB21-1014-08
Fluoride	ND		ug/L	1000.0	10/14/2021	AB21-1014-08
Sulfate	173000		ug/L	1000.0	10/14/2021	AB21-1014-08
Total Dissolved Solids by SM 2540C				Aliquot #: 21-1	170-03-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	585		mg/L	10.0	10/11/2021	AB21-1011-04



A CENTURY OF EXCELLENCE

## **Analytical Report**

Report Date: 10/31/21

Sample Site:

Laboratory Project: **DEK Lined Impoundment** 21-1170 Field Sample ID: **OW-12** 

Collect Date: 10/07/2021 Collect Time: 10:49 AM

Lab Sample ID: 21-1170-03 Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot #: 21-1	170-03-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	200000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	200000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date:

10/31/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: KLI-SCS Collect Date: 10/06/2021 Lab Sample ID: 21-1170-04 Collect Time: 08:44 AM

Mercury         ND         ug/L         0.2         10/14/2021         AB21-1014-C           Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp         Aliquot #: 21-1170-04-C01-A02         Analyst: E           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Antimony         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Arsenic         2         ug/L         5.0         10/28/2021         AB21-1028-C           Bernillium         ND         ug/L         5.0         10/28/2021         AB21-1028-C           Borton         640         ug/L         20.0         10/28/2021         AB21-1028-C           Cadmium         ND         ug/L         0.0         10/28/2021         AB21-1028-C           Calcium         117000         ug/L         1.0         10/28/2021         AB21-1028-C           Cobalt         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-C           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-C           Lead	Mercury by EPA 7470A, Total, A	Aqueous			Aliquot #: 21-1	170-04-C01-A01	Analyst: CLH
Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp         Aliquot #: 21-1170-04-C01-A02         Analysis Date           Parameter(s)         Result         Flag         Units         R.         Analysis Date         Trackin           Antimony         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Arsenic         2         ug/L         5.0         10/28/2021         AB21-1028-0           Beryllium         ND         ug/L         5.0         10/28/2021         AB21-1028-0           Beryllium         ND         ug/L         20.0         10/28/2021         AB21-1028-0           Boron         640         ug/L         20.0         10/28/2021         AB21-1028-0           Cadmium         ND         ug/L         1000         10/28/2021         AB21-1028-0           Calcium         1170000         ug/L         1.0         10/28/2021         AB21-1028-0           Calcium         1170000         ug/L         1.0         10/28/2021         AB21-1028-0           Calcium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Calcium         ND         ug/L         1.0         10/28/2021         AB21-1028-0	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Antimony         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Arsenic         2         ug/L         1.0         10/28/2021         AB21-1028-C           Barium         65         ug/L         5.0         10/28/2021         AB21-1028-C           Beryllium         ND         ug/L         2.0         10/28/2021         AB21-1028-C           Borron         640         ug/L         0.2         10/28/2021         AB21-1028-C           Cadmium         ND         ug/L         0.2         10/28/2021         AB21-1028-C           Cadmium         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Calcium         117000         ug/L         1.0         10/28/2021         AB21-1028-C           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Cobalt         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Copper	Mercury	ND		ug/L	0.2	10/14/2021	AB21-1014-03
Antimony Antimony Arsenic  2 ug/L 1.0 10/28/2021 AB21-1028-C Barium 65 ug/L 5.0 10/28/2021 AB21-1028-C Beryllium ND ug/L 2.0 10/28/2021 AB21-1028-C Beryllium ND ug/L 2.0 10/28/2021 AB21-1028-C Cadmium ND ug/L 2.0 10/28/2021 AB21-1028-C Caloium ND ug/L 2.0 10/28/2021 AB21-1028-C Cobalt ND ug/L 4.0 10/28/2021 AB21-1028-C Copper 3 ug/L 1.0 10/28/2021 AB21-1028-C Copper 3 ug/L 1.0 10/28/2021 AB21-1028-C Lead ND ug/L 2.0 10/28/2021 AB21-1028-C Lead ND ug/L 2.0 10/28/2021 AB21-1028-C Magnesium ND ug/L 1.0 10/28/2021 AB21-1028-C Magnesium ND ug/L 1.0 10/28/2021 AB21-1028-C Magnesium 36200 ug/L 1000.0 10/28/2021 AB21-1028-C Molybdenum 12 ug/L 5.0 10/28/2021 AB21-1028-C Molybdenum 12 ug/L Nickel 8 ug/L 2.0 10/28/2021 AB21-1028-C Selenium 7 ug/L Nickel 8 ug/L 2.0 10/28/2021 AB21-1028-C Selenium 7 ug/L 1.0 10/28/2021 AB21-1028-C Selenium 7 ug/L 1.0 10/28/2021 AB21-1028-C Selenium 7 ug/L 1.0 10/28/2021 AB21-1028-C Selenium 7 ug/L 2.0 10/28/2021 AB21-1028-C Selenium 7	Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals			s Exp	Aliquot #: 21-1	170-04-C01-A02	Analyst: EB
Arsenic 2 ug/L 1.0 10/28/2021 AB21-1028-C Barium 655 ug/L 5.0 10/28/2021 AB21-1028-C Beryllium ND ug/L 1.0 10/28/2021 AB21-1028-C Boron 640 ug/L 20.0 10/28/2021 AB21-1028-C Cadmium ND ug/L 0.2 10/28/2021 AB21-1028-C Cadmium ND ug/L 0.2 10/28/2021 AB21-1028-C Calcium 117000 ug/L 1000.0 10/28/2021 AB21-1028-C Calcium 117000 ug/L 1.0 10/28/2021 AB21-1028-C Chromium ND ug/L 1.0 10/28/2021 AB21-1028-C Chromium ND ug/L 1.0 10/28/2021 AB21-1028-C Cobalt ND ug/L 1.0 10/28/2021 AB21-1028-C Copper 3 ug/L 1.0 10/28/2021 AB21-1028-C Iron 251 ug/L 20.0 10/28/2021 AB21-1028-C Lead ND ug/L 1.0 10/28/2021 AB21-1028-C Lead ND ug/L 1.0 10/28/2021 AB21-1028-C Magnesium ND ug/L 1.0 10/28/2021 AB21-1028-C Magnesium 36200 ug/L 1000.0 10/28/2021 AB21-1028-C Nickel 8 ug/L 2.0 10/28/2021 AB21-1028-C Nickel 8 ug/L 2.0 10/28/2021 AB21-1028-C Nickel 8 ug/L 2.0 10/28/2021 AB21-1028-C Selenium 7 ug/L 1.0 10/28/2021 AB21-1028-C Sodium 308000 ug/L 1000.0 10/28/2021 AB21-1028-C Thallium ND ug/L 2.0 10/28/2021 AB21-1028-C Thallium ND ug/L 3.0 10/28/2021	Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Barium         65         ug/L         5.0         10/28/2021         AB21-1028-0           Beryllium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Boron         640         ug/L         20.0         10/28/2021         AB21-1028-0           Cadmium         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Calcium         117000         ug/L         1000.0         10/28/2021         AB21-1028-0           Chromium         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-0           Loron         251         ug/L         20.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Molybdenum         12         u	Antimony	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Beryllium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Boron         640         ug/L         20.0         10/28/2021         AB21-1028-0           Cadmium         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Calcium         117000         ug/L         10.0         10/28/2021         AB21-1028-0           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         2.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Lithium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         1000.0         10/28/2021         AB21-1028-0           Mickel         8         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L </td <td>Arsenic</td> <td>2</td> <td></td> <td>ug/L</td> <td>1.0</td> <td>10/28/2021</td> <td>AB21-1028-02</td>	Arsenic	2		ug/L	1.0	10/28/2021	AB21-1028-02
Boron         640         ug/L         20.0         10/28/2021         AB21-1028-C           Cadmium         ND         ug/L         0.2         10/28/2021         AB21-1028-C           Calcium         117000         ug/L         1000.0         10/28/2021         AB21-1028-C           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Cobalt         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-C           Iron         251         ug/L         20.0         10/28/2021         AB21-1028-C           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-C           Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-C           Magnesium         36200         ug/L         10.0         10/28/2021         AB21-1028-C           Mickel         8         ug/L         2.0         10/28/2021         AB21-1028-C           Nickel         8         ug/L         1.0         10/28/2021         AB21-1028-C           Silver         ND         ug/L </td <td>Barium</td> <td>65</td> <td></td> <td>ug/L</td> <td>5.0</td> <td>10/28/2021</td> <td>AB21-1028-02</td>	Barium	65		ug/L	5.0	10/28/2021	AB21-1028-02
Cadmium         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Calcium         117000         ug/L         1000.0         10/28/2021         AB21-1028-0           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         20.0         10/28/2021         AB21-1028-0           Iron         251         ug/L         20.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         5.0         10/28/2021         AB21-1028-0           Mickel         8         ug/L	Beryllium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Calcium         117000         ug/L         1000.0         10/28/2021         AB21-1028-0           Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-0           Iron         251         ug/L         20.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         10.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         1.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Soliver         ND         ug	Boron	640		ug/L	20.0	10/28/2021	AB21-1028-02
Chromium         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-0           Iron         251         ug/L         20.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         1000.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         1.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.0         10/28/2021         AB21-1028-0           Sodium         308000 <td< td=""><td>Cadmium</td><td>ND</td><td></td><td>ug/L</td><td>0.2</td><td>10/28/2021</td><td>AB21-1028-02</td></td<>	Cadmium	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Cobalt         ND         ug/L         6.0         10/28/2021         AB21-1028-0           Copper         3         ug/L         1.0         10/28/2021         AB21-1028-0           Iron         251         ug/L         20.0         10/28/2021         AB21-1028-0           Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-0           Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         100.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Mickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         0.2         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Vanadium         7	Calcium	117000		ug/L	1000.0	10/28/2021	AB21-1028-02
Copper         3         ug/L         1.0         10/28/2021         AB21-1028-028-028-028-028-028-028-028-03-03-03-03-03-03-03-03-03-03-03-03-03-	Chromium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Iron	Cobalt	ND		ug/L	6.0	10/28/2021	AB21-1028-02
Lead         ND         ug/L         1.0         10/28/2021         AB21-1028-028-1           Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         1000.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analy	Copper	3		ug/L	1.0	10/28/2021	AB21-1028-02
Lithium         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Magnesium         36200         ug/L         1000.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analysis Date         Trackin           <	Iron	251		ug/L	20.0	10/28/2021	AB21-1028-02
Magnesium         36200         ug/L         1000.0         10/28/2021         AB21-1028-0           Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0 <tr< td=""><td>Lead</td><td>ND</td><td></td><td>ug/L</td><td>1.0</td><td>10/28/2021</td><td>AB21-1028-02</td></tr<>	Lead	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Molybdenum         12         ug/L         5.0         10/28/2021         AB21-1028-0           Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analysis: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0	Lithium	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Nickel         8         ug/L         2.0         10/28/2021         AB21-1028-0           Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0	Magnesium	36200		ug/L	1000.0	10/28/2021	AB21-1028-02
Potassium         3720         ug/L         100.0         10/28/2021         AB21-1028-0           Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0 <t< td=""><td>Molybdenum</td><td>12</td><td></td><td>ug/L</td><td>5.0</td><td>10/28/2021</td><td>AB21-1028-02</td></t<>	Molybdenum	12		ug/L	5.0	10/28/2021	AB21-1028-02
Selenium         7         ug/L         1.0         10/28/2021         AB21-1028-0           Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analysis CL           Parameter	Nickel	8		ug/L	2.0	10/28/2021	AB21-1028-02
Silver         ND         ug/L         0.2         10/28/2021         AB21-1028-0           Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analysis Date         Trackin	Potassium	3720		ug/L	100.0	10/28/2021	AB21-1028-02
Sodium         308000         ug/L         1000.0         10/28/2021         AB21-1028-0           Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analysis CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Selenium	7		ug/L	1.0	10/28/2021	AB21-1028-02
Thallium         ND         ug/L         2.0         10/28/2021         AB21-1028-0           Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DMI           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Silver	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Vanadium         7         ug/L         2.0         10/28/2021         AB21-1028-0           Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM'           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Sodium	308000		ug/L	1000.0	10/28/2021	AB21-1028-02
Zinc         ND         ug/L         10.0         10/28/2021         AB21-1028-0           Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Thallium	ND		ug/L	2.0	10/28/2021	AB21-1028-02
Anions by EPA 300.0 CCR Rule Analyte List, CI, F, SO4, Aqueous         Aliquot #: 21-1170-04-C02-A01         Analyst: DM           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Vanadium	7		ug/L	2.0	10/28/2021	AB21-1028-02
Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking           Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Tracking	Zinc	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Chloride         52100         ug/L         1000.0         10/14/2021         AB21-1014-0           Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Anions by EPA 300.0 CCR Rule	Analyte List, CI, F,	te List, Cl, F, SO4, Aqueous Aliquot #: 21-1170-04-C02-A0		170-04-C02-A01	Analyst: DMW	
Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Parameter(s)	Result	Flag	Units	-		Tracking
Fluoride         ND         ug/L         1000.0         10/14/2021         AB21-1014-0           Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin	Chloride	52100		ug/L	1000.0	10/14/2021	AB21-1014-08
Sulfate         381000         ug/L         1000.0         10/18/2021         AB21-1014-0           Total Dissolved Solids by SM 2540C         Aliquot #: 21-1170-04-C03-A01         Analyst: CL           Parameter(s)         Result         Flag         Units         RL         Analysis Date         Trackin				-			AB21-1014-08
Parameter(s) Result Flag Units RL Analysis Date Tracking	Sulfate	381000		-	1000.0	10/18/2021	AB21-1014-08
Parameter(s) Result Flag Units RL Analysis Date Tracking	Total Dissolved Solids by SM 2	540C			Aliquot #: 21-1	170-04-C03-A01	Analyst: CLH
	•		Flag	Units			Tracking
Total Dissolved Solids 1330 mg/L 10.0 10/11/2021 AB21-1011-0	Total Dissolved Solids	1330		mg/L	10.0	10/11/2021	AB21-1011-04



## **Analytical Report**

**Report Date:** 10/31/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: KLI-SCS Collect Date: 10/06/2021 Lab Sample ID: 21-1170-04 Collect Time: 08:44 AM

Alkalinity by SM 2320B			Aliquot #: 21-1	170-04-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	476000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	476000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date:

10/31/21



Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: KLI-PCS Collect Date: 10/06/2021
Lab Sample ID: 21-1170-05 Collect Time: 08:36 AM

Parameter(s)         Result         Flag         Units         RL         Analysis Date           Mercury         ND         ug/L         0.2         10/14/2021           Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp         Aliquot #: 21-1170-05-C01-A02           Parameter(s)         Result         Flag         Units         RL         Analysis Date           Antimony         ND         ug/L         1.0         10/28/2021           Arsenic         3         ug/L         1.0         10/28/2021           Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         1.0         10/28/2021           Beron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1.0         10/28/2021           Cohromium         4         ug/L         1.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Lead         ND         ug/L	Tracking AB21-1014-03  Analyst: EB  Tracking AB21-1028-02
Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp         Aliquot #: 21-1170-05-C01-A02           Parameter(s)         Result         Flag         Units         RL         Analysis Date           Antimony         ND         ug/L         1.0         10/28/2021           Arsenic         3         ug/L         1.0         10/28/2021           Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         1.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Magnesium         16100         ug/L         10.0 <t< th=""><th>Analyst: EB Tracking AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02</th></t<>	Analyst: EB Tracking AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02
Parameter(s)         Result         Flag         Units         RL         Analysis Date           Antimony         ND         ug/L         1.0         10/28/2021           Arsenic         3         ug/L         1.0         10/28/2021           Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         2.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         2.0         10/28/2021           Lead         ND         ug/L         10.0         10/28/2021           Lead         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         10.0         10/28/202	Tracking  AB21-1028-02  AB21-1028-02  AB21-1028-02  AB21-1028-02  AB21-1028-02  AB21-1028-02
Antimony         ND         ug/L         1.0         10/28/2021           Arsenic         3         ug/L         1.0         10/28/2021           Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         1.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         1.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         1.0         10/28/2021           Magnesium         16100         ug/L         10.0         10/28/2021	AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02
Arsenic         3         ug/L         1.0         10/28/2021           Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         1.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         1.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         10.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021	AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02
Barium         503         ug/L         5.0         10/28/2021           Beryllium         ND         ug/L         1.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         1.0         10/28/2021           Magnesium         16100         ug/L         100.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021	AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02
Beryllium         ND         ug/L         1.0         10/28/2021           Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         10.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         1.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021 <t< td=""><td>AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02</td></t<>	AB21-1028-02 AB21-1028-02 AB21-1028-02 AB21-1028-02
Boron         682         ug/L         20.0         10/28/2021           Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lead         ND         ug/L         10.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         100.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         1.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021	AB21-1028-02 AB21-1028-02 AB21-1028-02
Cadmium         ND         ug/L         0.2         10/28/2021           Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         1000.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         10.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021           Sodium         37200         ug/L         1000.0         10/28/2021           Thallium         ND         ug/L         2.0         10/28/2021	AB21-1028-02 AB21-1028-02
Calcium         72000         ug/L         1000.0         10/28/2021           Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         1000.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         100.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021           Sodium         37200         ug/L         1000.0         10/28/2021           Thallium         ND         ug/L         2.0         10/28/2021           Vanadium         23         ug/L         2.0         10/28/2021 <td>AB21-1028-02</td>	AB21-1028-02
Chromium         4         ug/L         1.0         10/28/2021           Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         1000.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         100.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021           Sodium         37200         ug/L         0.2         10/28/2021           Thallium         ND         ug/L         2.0         10/28/2021           Vanadium         23         ug/L         2.0         10/28/2021	
Cobalt         ND         ug/L         6.0         10/28/2021           Copper         3         ug/L         1.0         10/28/2021           Iron         441         ug/L         20.0         10/28/2021           Lead         ND         ug/L         1.0         10/28/2021           Lithium         ND         ug/L         10.0         10/28/2021           Magnesium         16100         ug/L         1000.0         10/28/2021           Molybdenum         21         ug/L         5.0         10/28/2021           Nickel         4         ug/L         2.0         10/28/2021           Potassium         4100         ug/L         100.0         10/28/2021           Selenium         2         ug/L         1.0         10/28/2021           Silver         ND         ug/L         0.2         10/28/2021           Sodium         37200         ug/L         1000.0         10/28/2021           Thallium         ND         ug/L         2.0         10/28/2021           Vanadium         23         ug/L         2.0         10/28/2021	AB21-1028-02
Copper       3       ug/L       1.0       10/28/2021         Iron       441       ug/L       20.0       10/28/2021         Lead       ND       ug/L       1.0       10/28/2021         Lithium       ND       ug/L       10.0       10/28/2021         Magnesium       16100       ug/L       1000.0       10/28/2021         Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	
Iron       441       ug/L       20.0       10/28/2021         Lead       ND       ug/L       1.0       10/28/2021         Lithium       ND       ug/L       10.0       10/28/2021         Magnesium       16100       ug/L       1000.0       10/28/2021         Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Lead       ND       ug/L       1.0       10/28/2021         Lithium       ND       ug/L       10.0       10/28/2021         Magnesium       16100       ug/L       1000.0       10/28/2021         Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Lithium       ND       ug/L       10.0       10/28/2021         Magnesium       16100       ug/L       1000.0       10/28/2021         Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Magnesium       16100       ug/L       1000.0       10/28/2021         Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Molybdenum       21       ug/L       5.0       10/28/2021         Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Nickel       4       ug/L       2.0       10/28/2021         Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Potassium       4100       ug/L       100.0       10/28/2021         Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Selenium       2       ug/L       1.0       10/28/2021         Silver       ND       ug/L       0.2       10/28/2021         Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Sodium       37200       ug/L       1000.0       10/28/2021         Thallium       ND       ug/L       2.0       10/28/2021         Vanadium       23       ug/L       2.0       10/28/2021	AB21-1028-02
Thallium         ND         ug/L         2.0         10/28/2021           Vanadium         23         ug/L         2.0         10/28/2021	AB21-1028-02
Thallium         ND         ug/L         2.0         10/28/2021           Vanadium         23         ug/L         2.0         10/28/2021	AB21-1028-02
Vanadium 23 ug/L 2.0 10/28/2021	AB21-1028-02
·	AB21-1028-02
3	AB21-1028-02
Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous Aliquot #: 21-1170-05-C02-A01	Analyst: DMW
Parameter(s) Result Flag Units RL Analysis Date	Tracking
Chloride 44500 ug/L 1000.0 10/14/2021	AB21-1014-08
Fluoride ND ug/L 1000.0 10/14/2021	AB21-1014-08
Sulfate 74900 ug/L 1000.0 10/14/2021	AB21-1014-08
Total Dissolved Solids by SM 2540C Aliquot #: 21-1170-05-C03-A01	Analyst: CLH
Parameter(s) Result Flag Units RL Analysis Date	Tracking
Total Dissolved Solids 372 mg/L 10.0 10/11/2021	



## **Analytical Report**

**Report Date:** 10/31/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: KLI-PCS Collect Date: 10/06/2021
Lab Sample ID: 21-1170-05 Collect Time: 08:36 AM

Alkalinity by SM 2320B			Aliquot #: 21-1	170-05-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	139000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	139000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date:

10/31/21



A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: SW-DITCH
Lab Sample ID: 21-1170-06

Collect Date: 10/06/2021
Collect Time: 08:14 AM

Mercury by EPA 7470A, Total, Aqu	10003			Aliquot #: 21-1	Analyst: CLH	
Parameter(s)	Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
Mercury	ND		ug/L	0.2	10/14/2021	AB21-1014-03
Metals by EPA 6020B: CCR Rule Appendix III-IV Total Metals Exp			s Ехр	Aliquot #: 21-1	170-06-C01-A02	Analyst: EB
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Antimony	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Arsenic	3		ug/L	1.0	10/28/2021	AB21-1028-02
Barium	273		ug/L	5.0	10/28/2021	AB21-1028-02
Beryllium	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Boron	201		ug/L	20.0	10/28/2021	AB21-1028-02
Cadmium	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Calcium	159000		ug/L	1000.0	10/28/2021	AB21-1028-02
Chromium	7		ug/L	1.0	10/28/2021	AB21-1028-02
Cobalt	ND		ug/L	6.0	10/28/2021	AB21-1028-02
Copper	13		ug/L	1.0	10/28/2021	AB21-1028-02
Iron	895		ug/L	20.0	10/28/2021	AB21-1028-02
Lead	ND		ug/L	1.0	10/28/2021	AB21-1028-02
Lithium	ND		ug/L	10.0	10/28/2021	AB21-1028-02
Magnesium	42200		ug/L	1000.0	10/28/2021	AB21-1028-02
Molybdenum	5		ug/L	5.0	10/28/2021	AB21-1028-02
Nickel	15		ug/L	2.0	10/28/2021	AB21-1028-02
Potassium	5730		ug/L	100.0	10/28/2021	AB21-1028-02
Selenium	2		ug/L	1.0	10/28/2021	AB21-1028-02
Silver	ND		ug/L	0.2	10/28/2021	AB21-1028-02
Sodium	64100		ug/L	1000.0	10/28/2021	AB21-1028-02
Thallium	ND		ug/L	2.0	10/28/2021	AB21-1028-02
Vanadium	9		ug/L	2.0	10/28/2021	AB21-1028-02
Zinc	20		ug/L	10.0	10/28/2021	AB21-1028-02
Anions by EPA 300.0 CCR Rule Ar	nalyte List, Cl, F,	SO4, Aqı	ieous	eous Aliquot #: 21-1170-06-C02-A01		Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Chloride	42900		ug/L	1000.0	10/14/2021	AB21-1014-08
Fluoride	ND		ug/L	1000.0	10/14/2021	AB21-1014-08
Sulfate	704000		ug/L	1000.0	10/14/2021	AB21-1014-08
Total Dissolved Solids by SM 2540	OC			Aliquot #: 21-1	170-06-C03-A01	Analyst: CLH
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking
Total Dissolved Solids	1020		mg/L	10.0	10/11/2021	AB21-1011-04



## **Analytical Report**

**Report Date:** 10/31/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment** Laboratory Project: **21-1170** 

Field Sample ID: SW-DITCH
Lab Sample ID: 21-1170-06

Collect Date: 10/06/2021
Collect Time: 08:14 AM

Alkalinity by SM 2320B			Aliquot #: 21-1	170-06-C04-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	ND	ug/L	10000.0	10/18/2021	AB21-1014-10
Alkalinity Bicarbonate	ND	ug/L	10000.0	10/18/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/18/2021	AB21-1014-10





**Report Date:** 10/31/21

Data Qualifiers	Exception Summary
	No exceptions occured.

CONSUMERS ENERGY

### Chemistry Department

#### General Standard Operating Procedure

PROC CHEM-1 2 01 PAGE 1 OF 2 REVISION 3 ATTACHMENT A

TITLE: SAMPLE LOG-IN – SHIPME	ENT INSPECTION FORM
Project Log-In Number: 21-1170 Inspection Date: 101921	Inspection By:
Sample Origin/Project Name:	<u> </u>
Shipment Delivered By: Enter the type of shipme	
	UPS Airborne
Tracking Number	Shipping Form Attached. Yes No
Shipping Containers: Enter the type and number	of shipping containers received
Cooler Cardboard Box Loose/Unpackaged Containers	_
Condition of Shipment: Enter the as-received con	ndtion of the shipment container
Damaged Shipment Observed: None	• • • • • • • • • • • • • • • • • • • •
Shipment Security: Enter if any of the shipping of	ontainers were opened before receipt.
Shipping Containers Received Opened	Sealed
Enclosed Documents: Enter the type of document	
	Air Data Sheet Other
Temperature of Containers: Measure the tempera As-Received Temperature Range 1.4-6 M&TE # and Expiration 016402 6.3	Samples Received on Ice Yes \( \seta \) No
Number and Type of Containers: Enter the total	number of sample containers received.
Container Type Water Soil	Other Broken Leaking
VOA (40mL (160mL) 11-12	
Quart/Liter (g/p)	
9-oz (amber glass jar)	
2-oz (amber glass)	
125 mL (plastic)	
24 mL vial (glass)	
Other	
- ···- · · · · · · · · · · · · · · · ·	

# **CHAIN OF CUSTODY**

Consumers Energy

### CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPLING SITE PROJECT NUMBER			ANALYSIS REQUESTED						_	Page 1 of 1						
DEK Lined Impoundment - 2021 Q4			21-1170										SEND REPORT TO CDBatts			
CE SAMPLE SAMPLE SAMPLE CONTROL# DATE TIME MATRIX		DATE SHIPPED	SIT		ATTACHED?	als							HD Register, TRC			
					CIRCLE YES	NO	Total Metals	su		Alkalınıty				PHONE		
		SAMPLE SAMPLE SAMPLE DATE TIME MATRIX	SAMPLE DESCRIPTION / LOCA	ATION	DEPTH (ft)	# OF CONTAINERS	Total	Amons	TDS	Alka				REMARKS		
21-1	170-01	10111	0 650	GW	OW-10			5	х	х	х	x				
	-02	cc (1	0950	GW	OW-11			5	х	х	x	х				
	-03	1111	1049	GW	OW-12			5	х	х	x	х				
	-04	10-6-21	0844	GW	KLI-SCS			5	x	x	x_	x				
	-05	10-6-21	0836	GW	KLI-PCS			5	x	х	х	x_				
	-06	10-6-21	0814	GW	SW-DITCH			5	х	x	х	x				
	-07			GW	DUP-KLI			5	х	х	х	х				Not Glieded
	-08			W	EB-KLI			1	х							1
	-09			W	FB-KLI			1	х							
LIN	QUISHEI	BY (SIGNA	TURE)	DATE/T	RECE   フ/)     (らか)	EIVED BY	(SIGNATUR	E)		2.4			1.C	OMMEN	TS	
LIN	QUISHEİ	BY (SIGNA	TURE)	DATE/T		EIVED BY	(SIGNATUR	E)			<b>沙</b>	०।ऽ५	32			
											Ol	RIGINA	L TO LA	в со	PY TO	CUSTOMER



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

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

*Date:* October 31, 2021

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2021 Q4

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

BLSwanberg, P22-119 TRC Companies, Inc.

1540 Eisenhower Place Ann Arbor, MI 48108

Chemistry Project: 21-1169

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 10/07/2021, for the 4<sup>th</sup> Quarter monitoring 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 10/07/2021.

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. <u>Sample Receipt</u>

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

#### II. Methodology

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

#### III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section; 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	<u>Description</u>
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte
LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

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



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

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2021 DEK RCRA Bottom Ash Pond & Lined Impoundment

**Date Received:** 10/7/2021 **Chemistry Project:** 21-1169

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	<u>Site</u>
21-1169-01	DEK-MW-15003	Groundwater	10/07/2021 07:27 AM	DEK Bottom Ash Pond & Lined Impoundment
21-1169-02	DEK-MW-18001	Groundwater	10/07/2021 06:32 AM	DEK Bottom Ash Pond & Lined Impoundment
21-1169-03	DEK-MW-18001 MS	Groundwater	10/07/2021 06:32 AM	DEK Bottom Ash Pond & Lined Impoundment
21-1169-04	DEK-MW-18001 MSD	Groundwater	10/07/2021 06:32 AM	DEK Bottom Ash Pond & Lined Impoundment



Report Date: 10/31/21

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Bottom Ash Pond & Lined Impoundment** Sample Site:

Laboratory Project: 21-1169 Field Sample ID: **DEK-MW-15003** Collect Date: 10/07/2021 Lab Sample ID: 21-1169-01 Collect Time: 07:27 AM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous					Analyst: CLH
Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
ND		ug/L	0.2	10/14/2021	AB21-1014-03
endix III-IV To	tal Metals	s Ехр	Aliquot #: 21-1	169-01-C01-A02	Analyst: EB
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	1.0	10/28/2021	AB21-1028-02
481		ug/L	1.0	10/28/2021	AB21-1028-02
42		ug/L	5.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
976		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
24500		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	6.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
103		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
19		ug/L	10.0	10/28/2021	AB21-1028-02
3970		ug/L	1000.0	10/28/2021	AB21-1028-02
28		ug/L	5.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
4520		ug/L	100.0	10/28/2021	AB21-1028-02
1		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
50100		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
ND		ug/L	10.0	10/28/2021	AB21-1028-02
te List, CI, F,	SO4, Aqu	ieous	Aliquot #: 21-1	169-01-C02-A01	Analyst: DMW
Result	Flag	Units	RL	Analysis Date	Tracking
54000		ug/L	1000.0	10/14/2021	AB21-1014-08
ND		ug/L	1000.0	10/14/2021	AB21-1014-08
39700		ug/L	1000.0	10/14/2021	AB21-1014-08
			Aliquot #: 21-1	169-01-C03-A01	Analyst: CLF
Result	Flag	Units	RL	Analysis Date	Tracking
	Result ND  Result ND  481 42 ND 976 ND 24500 ND ND 103 ND 19 3970 28 ND 4520 1 ND 50100 ND ND ND ND Ste List, CI, F, Result 54000 ND ND 39700	Result   Flag   ND	Result   Flag   Units   ND   ug/L	Result   Flag   Units   Units   RL	Result         Flag         Units         RL         Analysis Date           ND         ug/L         0.2         10/14/2021           endix III-IV Total Metals Exp         Aliquot #: 21-1169-01-C01-A02           Result         Flag         Units         RL         Analysis Date           ND         ug/L         1.0         10/28/2021           481         ug/L         1.0         10/28/2021           42         ug/L         5.0         10/28/2021           ND         ug/L         1.0         10/28/2021           976         ug/L         20.0         10/28/2021           ND         ug/L         0.2         10/28/2021           ND         ug/L         1.0         1



Report Date: 10/31/21

**Laboratory Services** A CENTURY OF EXCELLENCE

Laboratory Project: **DEK Bottom Ash Pond & Lined Impoundment** Sample Site: 21-1169

Field Sample ID: **DEK-MW-15003** Collect Date: 10/07/2021 Lab Sample ID: 21-1169-01 Collect Time: 07:27 AM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot #: 21-1	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	65200	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	65200	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date: 10/31/21

**Laboratory Services** A CENTURY OF EXCELLENCE

**DEK Bottom Ash Pond & Lined Impoundment** Sample Site:

Laboratory Project: 21-1169 Field Sample ID: **DEK-MW-18001** Collect Date: 10/07/2021 Lab Sample ID: 21-1169-02 Collect Time: 06:32 AM

Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous					Analyst: CLH
Result	Flag	Units	RL	<b>Analysis Date</b>	Tracking
ND		ug/L	0.2	10/14/2021	AB21-1014-03
ndix III-IV To	tal Metals	<b>Ехр</b>	Aliquot #: 21-1	169-02-C01-A02	Analyst: EE
Result	Flag	Units	RL	Analysis Date	Tracking
ND		ug/L	1.0	10/28/2021	AB21-1028-02
85		ug/L	1.0	10/28/2021	AB21-1028-02
135		ug/L	5.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
1370		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
71000		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	6.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
1190		ug/L	20.0	10/28/2021	AB21-1028-02
ND		ug/L	1.0	10/28/2021	AB21-1028-02
24		ug/L	10.0	10/28/2021	AB21-1028-02
12600		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	5.0	10/28/2021	AB21-1028-02
4		ug/L	2.0	10/28/2021	AB21-1028-02
3540		ug/L	100.0	10/28/2021	AB21-1028-02
2		ug/L	1.0	10/28/2021	AB21-1028-02
ND		ug/L	0.2	10/28/2021	AB21-1028-02
79300		ug/L	1000.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
ND		ug/L	2.0	10/28/2021	AB21-1028-02
ND		ug/L	10.0	10/28/2021	AB21-1028-02
e List, Cl, F,	SO4, Aqu	eous	Aliquot #: 21-1	169-02-C02-A01	Analyst: DMW
Result	Flag	Units	RL	Analysis Date	Tracking
55200		ug/L	1000.0	10/14/2021	AB21-1014-08
ND		ug/L	1000.0	10/14/2021	AB21-1014-08
118000		ug/L	1000.0	10/14/2021	AB21-1014-08
			Aliquot #: 21-1	169-02-C03-A01	Analyst: CLF
Result	Flag	Units	RL	Analysis Date	Tracking
494		mg/L	10.0	10/11/2021	AB21-1011-04
	ND  ndix III-IV To  Result  ND  85  135  ND  1370  ND  71000  ND  ND  1190  ND  24  12600  ND  4  3540  2  ND  79300  ND  ND  ND  ND  ND  ND  ND  ND  ND	ND  Indix III-IV Total Metals  Result Flag  ND  85  135  ND  1370  ND  71000  ND  ND  ND  1190  ND  24  12600  ND  4  3540  2  ND  79300  ND  ND  ND  ND  ND  ND  ND  ND  ND	ND	ND	ND



**Report Date:** 10/31/21

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: DEK Bottom Ash Pond & Lined Impoundment Laboratory Project: 21-1169

 Field Sample ID:
 DEK-MW-18001
 Collect Date:
 10/07/2021

 Lab Sample ID:
 21-1169-02
 Collect Time:
 06:32 AM

Matrix: Groundwater

Alkalinity by SM 2320B			Aliquot #: 21-1	Analyst: DLS	
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	192000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Bicarbonate	192000	ug/L	10000.0	10/14/2021	AB21-1014-10
Alkalinity Carbonate	ND	ug/L	10000.0	10/14/2021	AB21-1014-10



Report Date: 10/31/21

**Laboratory Services** A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** Laboratory Project:

Field Sample ID: DEK-MW-18001 MS

Lab Sample ID: 21-1169-03

Matrix: Groundwater

Alkalinity by SM 2320B

Parameter(s)

**Alkalinity Total** 

21-1169

Collect Date: 10/07/2021 Collect Time: 06:32 AM

Aliquot #: 21-1169-03-C03-A01

**Analysis Date** 

10/14/2021

RL

10000.0

**Analyst: DLS** 

AB21-1014-10

**Tracking** 

Mercury by EPA 7470A, Total, A	Aqueous	Aliquot #: 21-1	Analyst: CLH		
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Mercury	98.2	%	0.2	10/14/2021	AB21-1014-03
Metals by EPA 6020B: CCR Rul	e Appendix III-IV To	tal Metals Exp	Aliquot #: 21-1	1169-03-C01-A02	Analyst: EB
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Antimony	103	%	1.0	10/28/2021	AB21-1028-02
Arsenic	95	%	1.0	10/28/2021	AB21-1028-02
Barium	113	%	5.0	10/28/2021	AB21-1028-02
Beryllium	102	%	1.0	10/28/2021	AB21-1028-02
Boron	111	%	20.0	10/28/2021	AB21-1028-02
Cadmium	102	%	0.2	10/28/2021	AB21-1028-02
Calcium	113	%	1000.0	10/28/2021	AB21-1028-02
Chromium	105	%	1.0	10/28/2021	AB21-1028-02
Cobalt	105	%	6.0	10/28/2021	AB21-1028-02
Copper	98	%	1.0	10/28/2021	AB21-1028-02
Iron	113	%	20.0	10/28/2021	AB21-1028-02
Lead	82	%	1.0	10/28/2021	AB21-1028-02
Lithium	102	%	10.0	10/28/2021	AB21-1028-02
Magnesium	112	%	1000.0	10/28/2021	AB21-1028-02
Molybdenum	92	%	5.0	10/28/2021	AB21-1028-02
Nickel	101	%	2.0	10/28/2021	AB21-1028-02
Potassium	105	%	100.0	10/28/2021	AB21-1028-02
Selenium	91	%	1.0	10/28/2021	AB21-1028-02
Silver	88.6	%	0.2	10/28/2021	AB21-1028-02
Sodium	108	%	1000.0	10/28/2021	AB21-1028-02
Thallium	87	%	2.0	10/28/2021	AB21-1028-02
Vanadium	86	%	2.0	10/28/2021	AB21-1028-02
Zinc	110	%	10.0	10/28/2021	AB21-1028-02
Anions by EPA 300.0 CCR Rule	Analyte List, Cl, F,	SO4, Aqueous	Aliquot #: 21-1	1169-03-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	106	%	1000.0	10/14/2021	AB21-1014-08
Fluoride	92	%	1000.0	10/14/2021	AB21-1014-08
Sulfate	105	%	1000.0	10/14/2021	AB21-1014-08
Alleria to be CM 0000D			AU		

Result

98.0

Flag

Units

%



**Report Date:** 10/31/21

# Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment** 

110

Field Sample ID: DEK-MW-18001 MSD

Lab Sample ID: 21-1169-04

Matrix: Groundwater

Mercury

Laboratory Project: 21-1169

10/14/2021

Collect Date: 10/07/2021 Collect Time: 06:32 AM

AB21-1014-03

Mercury by EPA 7470A, Total, Aqueous

Aliquot #: 21-1169-04-C01-A01

Parameter(s)

Result

Flag

Units

RL

Analysis Date

Tracking

%

0.2

Parameter(s)ResultFlagUnitAntimony103%Arsenic86%	ts RL		
•		Analysis Date	Tracking
Arsenic 86 %	1.0	10/28/2021	AB21-1028-02
	1.0	10/28/2021	AB21-1028-02
Barium 96 %	5.0	10/28/2021	AB21-1028-02
Beryllium 105 %	1.0	10/28/2021	AB21-1028-02
Boron 112 %	20.0	10/28/2021	AB21-1028-02
Cadmium 99.7 %	0.2	10/28/2021	AB21-1028-02
Calcium 111 %	1000.0	10/28/2021	AB21-1028-02
Chromium 107 %	1.0	10/28/2021	AB21-1028-02
Cobalt 103 %	6.0	10/28/2021	AB21-1028-02
Copper 99 %	1.0	10/28/2021	AB21-1028-02
Iron 103 %	20.0	10/28/2021	AB21-1028-02
Lead 81 %	1.0	10/28/2021	AB21-1028-02
Lithium 103 %	10.0	10/28/2021	AB21-1028-02
Magnesium 116 %	1000.0	10/28/2021	AB21-1028-02
Molybdenum 94 %	5.0	10/28/2021	AB21-1028-02
Nickel 103 %	2.0	10/28/2021	AB21-1028-02
Potassium 107 %	100.0	10/28/2021	AB21-1028-02
Selenium 94 %	1.0	10/28/2021	AB21-1028-02
Silver 85.5 %	0.2	10/28/2021	AB21-1028-02
Sodium 110 %	1000.0	10/28/2021	AB21-1028-02
Thallium 85 %	2.0	10/28/2021	AB21-1028-02
Vanadium 87 %	2.0	10/28/2021	AB21-1028-02
Zinc 109 %	10.0	10/28/2021	AB21-1028-02

Anions by EPA 300.0 CCR Rule An	alyte List, Cl, F,	SO4, Aqueous	Aliquot #: 21-1	169-04-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Chloride	106	%	1000.0	10/14/2021	AB21-1014-08
Fluoride	92	%	1000.0	10/14/2021	AB21-1014-08
Sulfate	103	%	1000.0	10/14/2021	AB21-1014-08

Alkalinity by SM 2320B		A	liquot #: 21-1	169-04-C03-A01	Analyst: DLS
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking
Alkalinity Total	97.5	%	10000.0	10/14/2021	AB21-1014-10



**Report Date:** 10/31/21

Data Qualifiers	Exception Summary
	No exceptions occured.

150 500 mL (plastic)

Other \_\_\_\_

PROC CHEM-1 2.01 PAGE 1 OF 2 REVISION 3

General Standard Operating Procedure

General Standard Opera	ATTA  LE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM  ct Log-In Number: 21-1169 ction Date: 10 0 2	ATTACHMENT A
ATTACE  ITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM  Toject Log-In Number: 21-1169  spection Date: 10 0 2 Inspection By: 11 Inspection By: 12 Inspection By: 14 Inspection By: 15 Inspection By: 16 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection By: 17 Inspection		
Project Log-In Number: 21-1169  Inspection Date: 10   6   21 In  Sample Origin/Project Name: DLK BH+1	nspection By: WH	
Shipment Delivered By: Enter the type of shipment carrier		
Pony FedEx UPS Other Franc Carry (whom)	USPS	Airborne
Shipping Containers: Enter the type and number of shipping	g containers received	
Damaged Shipment Observed. None	Dented	Leaking
Shipment Security: Enter if any of the shipping containers v	were opened before regeipt	
	/	
, · · · · · · · · · · · · · · · · · · ·	-	Other
	<del>-</del>	
As-Received Temperature Range 2.4 -5.3 &	Samples Received on Ice.	Yes_ <b>y</b> No
		,
•	f sample containers received	
- 0	Other	Broken Leaking
<del>-</del> /		
9-oz (amber glass jar)		
· · · · · · · · · · · · · · · · · · ·		<del></del>
125 mL (plastic)		, <del></del>
24 mL vial (glass)	<del> </del>	

# **CHAIN OF CUSTODY**



### **CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

AMPL	NG SITI	Е	·		PROJECT NUMBER		·····				ANAL	YSIS R	EQUES	STED	_	Page 1 of 1
DEK	Botton	n Ash Poi	nd & LI – 202	1 Q4	21-1	169										SEND REPORT TO CDBatts
MPL	NG TEA	AM			DATE SHIPPED SITE SKETCHED ATTACHED? CIRCLE ONE			tals			λ				HD Register, TRC	
							YES	NO	Total Metals	Anions	ro	Alkalınity				PHONE
CONT	E ROL#	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCAT	ION	DEPTH (ft)	# OF CONTAINERS	Tota	Ani	Anio	Alk				REMARKS
21-1	69-01	iohhi	0787	GW	DEK-MW-15003			5	х	х	x	x				
	-02	a v	6633	GW	DEK-MW-18001	_		5	х	х	x	х				
	-03	011		GW	DEK-MW-18001 MS			5	х	х		х				
<b>↓</b>	-04	1611	des	GW	DEK-MW-18001 MSD			5	х	х		х		Ì		
															_	
		<del></del>														
			-				_		-						-	
			<del> </del>						-						_	
															$\dashv$	
				<u> </u>											-	
LINQ	UISHED	BY (SIGN	ATURE)	DATE/T	IME RECEIV	ED BY	(SIGNATUR	E)						COM	MENTS	
6		7	,			9	4.	,	د	٠.٧٠	٠.	5.3	٠.			
ELINQ	USHED	DY (SIGN	ATURE)	10[7 DATE/T		ED B	(SIGNATUR	 E)	-	ę	z 0   3	402	•			
						V		•								
											_ 0	RIGINA	AL TO I	ĹAB	COPY	TO CUSTOMER



# **Appendix B Field Notes**



PROJECT NAME:	CEC Karn BAP/LI: 2021 GW Compliance
PROJECT NUMBER:	418425.0001.0000
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy
one room.	Essexville, MI 48732
·	
DATES OF FIELDWORK:	TO
	2nd Semi Annual Sampling event
PURPOSE OF FIELDWORK:	
	Andrew WhaleyJake Krenz, Javier Jasso
WORK PERFORMED BY:	

Jul My 10-20-21 SIGNED DATE

Checked By Date Date



PROJECT NAME:	CEC Karn LF: 2021 GW	Compliand DATE:	10-4-21	TIME ARRIVED: 0800
PROJECT NUMBER:	418425.0000.0	0000 AUTHO	DR: 3. Krenz	TIME LEFT: /€Ø○
		WEATH	ER	
TEMPERATURE: 6	<del>'</del>	20 MPH	VIS	BILITY: Rain / cloudy
		RK/SAMPLING		
1. Wholey n	ecitived site	traking		
collected son	uple (from	MW-01, M	~-07, MW~0	6, MW-08, MW-10
MW-12, JUP.	- ferimeter Dike	MW-07 F	Feld Ms, Me	6, mw-08, mw-10, ~03 Field MS)
	H-41			
Contected O	all samples	HOM FOR	n <u>BHP</u> well.	s as well
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	2c samples.			
PROBI	LEMS ENCOUNTERED	)	CORRE	CTIVE ACTION TAKEN
	<b>λ 1</b> Δ		Λ.	1A
	<del>UM</del>			
		COMMUNIC	ATION	
NAME	REPRESENTING		SUBJECT / C	OMMENTS
C. Builts	CEC	site train	in stran Sin	g in and out
,				
	INVESTIG	ATION DERIVE	WASTE SUMMARY	
WASTE MATRIX	QUANTITY		СОММЕ	ENTS
purpe water	DNM	purged	to ground	
•			· · · · · · · · · · · · · · · · · · ·	
		-		
The R	in 10-20	0-21	Aw	10:29:2
SIGNED	0	DATE	CHECKED BY	DATE

V REVISED 04/2019



PROJECT NAME:	CEC Karn LF: 2021 GW	Compliand DATE:	10-6-21	TIME ARRIVED: 7:15
PROJECT NUMBER:	418425.0000.0	OOOO AUTHO	DR: AW/JK	TIME LEFT: 5:30
		WEATH	ER	
TEMPERATURE: 6P	°F WIND:	10W MPH	Visi	BILITY: 10W
		ORK / SAMPLING		
Finished	perimeter ty hand-	dike u	rells	
Ll Hg ci	sty hand-	Clean	hand we	23)
Interior	Lanfill we	// C		
Bachground	wells			
collected Kar	n Influent, s	w-Ditch,	KLI-SCS, and	KLI-PES samples
Collected >	unbles from	MW - 18 a	nd Mw - 19	
PROB	LEMS ENCOUNTERED	)	CORREC	CTIVE ACTION TAKEN
		:		
		COMMUNIC	ATION	
NAME	REPRESENTING		SUBJECT / CO	DMMENTS
Jake	TrL	Llean	Wand / D	orrty hand
C. Benty	CEC	check	in fout (50	
	L. INVESTIG	ATION DEBUGE		
WASTE MATRIX	QUANTITY	ATION DERIVED	WASTE SUMMARY COMME	NTS
1.	10-21-21		11 0	1/1/200
SIGNED	10-17-11	DATE	CHECKED BY	10-20. DATE
ISED 04/2019				UAIL



	WEA LOW M ORK/SAMPLI  Ind wel  That w  Cadook	uere so	vis MED	to	Low hotel	1030
wasachgscul StHes F	LOW M ORK/SAMPLI nd wel that w eadock	NG PERFOR	ent-	to goth	hotel ex LL	ltg.
wasachgscul StHes F	orkisampli nd wel That w eadock	NG PERFOR	ent-	to goth	hotel ex LL	Hg
Background StHes T	nd wel that w eadock	uere so	ent to	goth	ex Lh	Hg
ottles in	that well-	vere so	10	goth	ex Lh	Hg
@ Wa	Cadock		10	goth	ex Lh	Hg
		LF				
ENCOUNTERE	D		CORREC	CTIVE AC	TION TAKE	:N
ENCOUNTEREI	D		CORREC	CTIVE AC	TION TAKE	N
			CONNE	OTTVE AC	- TION TAKE	
	· · · · · · · · · · · · · · · · · · ·					
***************************************			•••			
	COMMUN	VICATION				
EPRESENTING			SUBJECT / C			
RC	Clean	Hand 1	Dict	Ha	od	
······································						
INVESTIC	ATION DEDN	CD WASTE				
	T DERIV	ED WASTE				
	1					
			Λ.	$\sim$	0	
<u> </u>	15-29-21		fart		Kan	10-20
	DATE	сн≢с	KED BY			DATE
	INVESTIC	INVESTIGATION DERIV	INVESTIGATION DERIVED WASTE	INVESTIGATION DERIVED WASTE SUMMARY QUANTITY  COMME	INVESTIGATION DERIVED WASTE SUMMARY QUANTITY  COMMENTS  COMMENTS  COMMENTS  COMMENTS	RC Clean Hand Disty Hand  INVESTIGATION DERIVED WASTE SUMMARY QUANTITY COMMENTS  W-29-21  And Derived Waste Summary  And Derived Waste Summary  Comments



PROJECT NAME:	CEC KARN LF 2021 G	W SAM DAT	E: 1017	1)1	TIME ARRIVED	25-11
PROJECT NUMBER:	418425.0000.00	000 AUT	HOR: JJAS	so	TIME LEFT: (	250
		WEA <sup>1</sup>				· · · · · · · · · · · · · · · · · · ·
TEMPERATURE: ( )	°F WIND:		PH	VISIBILITY:	< 1000g	
		RK / SAMPLII			<u> </u>	
WATER LEVELS	****	IN / SAMPLI	10 FERFOR	TICU		
	1.001					`
WELLS SAMPLED	bk- ma 1	8001 N	<u>u sam</u>	50/1500	b, ow-10,	<u>िल १।</u>
06-17						
			474			
PROBL	EMS ENCOUNTERED	)		CORRECTIVE	ACTION TAKEN	
$\bigcap C$	Π					
		COMMUN				
NAME C R LLC	REPRESENTING			SUBJECT / COMMEN	NTS	
C. Batts	CEC	<u> </u>	ck in la	o wt		
	:					
	INVESTIG	ATION DERIV	ED WASTE !	SUMMARY		
WASTE MATRIX	QUANTITY	!		COMMENTS		
NA						
purge water	NM	pur	red t	o ground	<b></b>	
				1 0	2	
	10/14/20			Lare	they	10-20
SIGNED		DATE	СНЕС	KED BY	0	DATE
/ISED 04/2010			1	J		



### **EQUIPMENT SUMMARY**

PROJECT NAME:	CEC KAI	RN LF 2021 GW C	SAMPLER NAME:	JJASSO/J. Krenz	- //
PROJECT NO.:	418425.0	0000.0000	SAMPLER NAME.	JASSO/ (), KVEAT	7 H. Whatey
WATER LEVEL MEAS	UREMENTS CO	OLLECTED WITH:			
HEF	RON DIPPER-T			TRC A2	
NAME AND MODEL OF I	NSTRUMENT		SERIAL NUMBER	(IF APPLICABLE)	
PRODUCT LEVEL MEA	ASUREMENTS	COLLECTED WIT	TH:		
	HERON			TRC A2	
NAME AND MODEL OF I	NSTRUMENT	***************************************	SERIAL NUMBER	(IF APPLICABLE)	
DEPTH TO BOTTOM (	F WELL MEAS	SUREMENTS COL	LECTED WITH:		
HEF	RON DIPPER-T			TRC A2	
NAME AND MODEL OF I	STRUMENT		SERIAL NUMBER	(IF APPLICABLE)	
PURGING METHOD					
PERI	STALTIC PUMF	Bladder 1	pump Crewfal)	TRC A2	
NAME AND MODEL OF P	UMP OR TYPE C	OF BAILER	SERIAL NUMBER	(IF APPLICABLE)	
SAMPLING METHOD					
PERI	STALTIC PUMF	<b>D</b>		TRC A2	
NAME AND MODEL OF P	UMP OR TYPE C	F BAILER	SERIAL NUMBER	(IF APPLICABLE)	
Geotech	skposable	filter		.45 micron	
NAME AND MODEL OF F	ILTERATION DE	VICE	FILTER TYPE ANI	D SIZE	1,
DEDICA	TED POLY TUE	BING	✓ LOW-	FLOW SAMPLING EVENT	
TUBING TYPE			-		
PURGE WATER DISPO	SAL METHOD	) .			
☑ GROUND	DRUM	□ ротw	POLYTANK	OTHER	
DECONTAMINATION A	ND FIELD BLA	NK WATER SOU	RCE		
LABORA	TORY PROVID	DED	L	ABORATORY PROVIDE	)
POTABLE WATER SOUR	CE		DI WATER SOUR	CE	
SIGNES	<u>)</u> /o	114/25	- Jul	Jang .	10-20-21
SIGNED	•	DATE	CHECKED BY		DATE
SED 04/2019			v		

PROJECT NAME:	CEC Karn LF: 2021 GW Co	mpliance	***************************************	MODEL: YST	Pro	Dei	SAMPLER:	AW, JJ,	ĺĸ)
PROJECT NO.:	418425.0000.0000			SERIAL#: Re	ntal		DATE: 10-4-	21	
PH	CALIBRATION CHECK		,	<u> </u>	SPECI	FIC CONDU	CTIVITY CALIBI	RATION C	HECK
pH 7	pH 4 / 10		<u> </u>	]	CAL. RE	ADING	TEMPERATURE		<u> </u>
(LOT#): 16 \$ 360	(LOT #): 166 680	CAL.		(LOT #):	160	700		CAL.	
(EXP. DATE): APR/10	(EXP. DATE): APR/O)	RANGE	TIME	(EXP. D	ATE): AP	r/22	(°CELSIUS)	RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		l	POST-	CAL. READI	NG / STANDARD			
7.01 17.01	4.0014.00	WITHIN RANGE	1050	13	74 /	1374	24.4	2 WITHIN RANGE	1045
/	/	WITHIN RANGE			1	•		WITHIN RANGE	
/	1	☐ WITHIN RANGE			1	•		WITHIN RANGE	
	1	☐ WITHIN RANGE			1			WITHIN RANGE	
ORP	CALIBRATION CHECK					D.O. CAL	BRATION CHEC	K	
CAL. READING	TEMPERATURE	-			CAL. RE	ADING	TEMPERATURE		
(LOT#): 19 E 100362	(6051 0410)	CAL.						CAL.	
(EXP. DATE): 11/12	(°CELSIUS)	RANGE	TIME				(°CELSIUS)	RANGE	TIME
POST-CAL. READING / STANDARD		1		POST-CA	L. READING	SATURATED AIR	,		
215.5 /215.5	19.9	WITHIN RANGE	1052	8	74 /	8.74	14.6	WITHIN RANGE	1054
1		WITHIN RANGE			1			WITHIN	
/		WITHIN RANGE			1			WITHIN	
. /		WITHIN RANGE			/			WITHIN	
TURBID	ITY CALIBRATION CHEC		L	· •			COMMENTS	104102	
CALIBRATION	READING (NTU)	<u> </u>	l	∏ AU	TOCAL S	OLUTION	STANDARD	SOLUTION (	SI
(LOT#): NI water	(LOT #): P (007	CAL.	TIME		(LOT #): (EXP. DATE):				······································
(EXP. DATE)	(EXP. DATE): Jun /23	RANGE		15.7			LIST LOT NUMBERS AND EXPIRATION DATE UNDER CALIBRATION CHECK		
POST-CAL. READING / STANDARD	POST-CAL READING / STANDARD			ļ <del></del>		ARAMETERS	CALIBRATIO	N RANGES (1	)
0.0 /0.0	100.0 /100.0	WITHIN RANGE	1055		рН		pH: +/- 0.2 S.U		-
1	/	WITHIN	1033		CON	,	COND: +/- 1% OF	CAL, STAN	IDARD
7	1	WITHIN			ORP		ORP: +/- 25 mV		
1	,	WITHIN			D.O.		D.O.: VARIES		
	NOTES	TOMOZ			TURE			CAL, STAN	DARD
	5								
					*********		(1) CALIBRATION RAN THE MODEL OF THE V		
	ROBLEMS ENCOUNTERED					0000000	/C ARTIONS		
						CORRECTA	E ACTIONS		<del></del>
						<del></del>		***************************************	
			<del></del>						······································
1.2.C	V In	-20-2	)1		1	. 1		احد	79.2
SIGNED	10	DATE	-1	CH	ECKED	BY BY			CI- L
$\mathcal{A}_{\mathcal{A}}$	$\mathcal{U}$			0.					w/11/6

PROJECT NAME:	CEC Karn BAP/LI: 2021 GV	V Complian	ce	MODEL:	YSI PN	DSS	SAMPLER:	AW, OB.	H-
PROJECT NO.:	418425.0001.0000			SERIAL #	#: T <del>RO /</del>	+2 Rental	DATE: ιΟ.	-6-21	
PH (	CALIBRATION CHECK				SPE	CIFIC CONDU	CTIVITY CALIBI	RATION C	HECK
pH 7 (LOT #):   6	pH 4/10 (LOT #):   G \ 680 (EXP. DATE): APK /27 POST-CAL. READING/STANDARD	CAL. RANGE	TIME		(LOT #): <b>( 6 )</b> (EXP. DATE):	READING 700 APR /2 2 EADING/STANDARD	TEMPERATURE	CAL. RANGE	TIME
7,01 /7.01	4.00 14.00	WITHIN RANGE	0743	1		/ 1374	24.4	WITHIN RANGE	0740
/	1	WITHIN			•	1		WITHIN RANGE	
1	1	WITHIN RANGE				1		WITHIN RANGE	
1	1	WITHIN				1		WITHIN RANGE	
ORP	CALIBRATION CHECK		<b>.</b>	J		D.O. CAL	IBRATION CHE		
CAL. READING	TEMPERATURE			]	CAL.	READING	TEMPERATURE		
(LOT #):\4 E 100369 (EXP. DATE): \1/22	(°CELSIUS)	CAL. RANGE	TIME			· · · · ·	(°CELSIUS)	CAL. RANGE	TIME
POST-CAL READING / STANDARD		DEST MATERIAL	ļ			DING /SATURATED AIR		G A WITTI IN	
215.7/215.7	20,0	WITHIN RANGE	0746	-	8.81	18.81	19.8	WITHIN	0750
1		RANGE WITHIN				1		RANGE WITHIN	
		RANGE WITHIN		_		,		RANGE WITHIN	
		RANGE	<u> </u>	]		1		RANGE	
	TY CALIBRATION CHEC	K					COMMENTS		
	READING (NTU)		` `		_	AL SOLUTION	✓ STANDARD	SOLUTION (	S)
(EXP. DATE): water	(LOT #): \$1007 (EXP. DATE): 301/27	CAL. RANGE	TIME		(LOT #): (EXP. DATE):		LIST LOT NUMBERS / UNDER CALIF		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	1			CALIBRATE	D PARAMETERS	CALIBRATI	ON RANGES <sup>(*</sup>	)
0.0/0.0	(00.0 / (00.0)	WITHIN RANGE	0753		pl	4	pH: +/- 0.2 S.	U.	·
1	1 .	WITHIN RANGE			□ c	OND	COND: +/- 1% O	F CAL. STAN	IDARD
1	1	WITHIN RANGE			□ 0	RP	ORP: +/- 25 m\	/	
1	1	WITHIN RANGE			D	.O.	D.O.: VARIES		
	NOTES	<del></del>	<del></del>		□ т	URB	TURB: +/- 5% O	F CAL. STAN	IDARD
				 		<sup>(1)</sup> C <b>ALIB</b> RATION RAI THE MODEL OF THE			
Pi	ROBLEMS ENCOUNTERED			<u> </u>		CORRECTI	VE ACTIONS		
	<del></del>	•							
***************************************									•
Jvl J	10-	⊋υ~↓ DATE	.1	•	CHECK	AW		lo:	29.Z
77	U	JAIL			STILON				DAIL

							_		
PROJECT NAME:	CEC Karn LF: 2021 GW Co	mpliance		MODEL: YST ASO D	SS SAMP	LER:	J. LUÇWA	К	
PROJECT NO.:	418425.0000.0000			SERIAL #: Rental	DATE	10-6-	-21		
	CALIBRATION CHECK			SPECIFIC (	CONDUCTIVI	TY CALIBR	RATION CI	HECK	
(LOT #): (CD CC (EXP. DATE): APR (CD CC) POST-CAL. READING / STANDARD	(LOT #): 1 5680 (EXP. DATE): A (TV/2)	CAL. RANGE	TIME	CAL, READIN (LOT#): 1 (LGE Z) (EXP. DATE): 1 (MGY) POST-CAL, READING/ST	IG TEMF	PERATURE	CAL. RANGE	TIME	
7.03/7.03	9.00 19.00	WITHIN	C:30	I I		. lo	WITHIN	0650	
1	1	WITHIN RANGE		/			WITHIN RANGE		
	1	WITHIN RANGE		/			☐ WITHIN RANGE		
1	1	WITHIN RANGE		/			WITHIN RANGE		
ORP	CALIBRATION CHECK			D.	O. CALIBRAT	ION CHEC	K		
CAL READING (LOT#): 19 F (COS67 (EXP. DATE): 7/27/17	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	CAL. READIN	•	PERATURE	CAL. RANGE	TIME	
POST-CAL READING/STANDARD				POST-CAL. READING /SATU	JRATED AIR				
212.51212.5	17.9	WITHIN RANGE	OHO	8.79 1 8	4.79	- 6	WITHIN RANGE	0655	
		RANGE		/			L RANGE		
		☐ WITHIN RANGE					WITHIN RANGE		
/		WITHIN RANGE		/			WITHIN RANGE		
	TY CALIBRATION CHEC	K				MENTS			
	READING (NTU)			AUTOCAL SOLUT	TION 🗸	STANDARD	SOLUTION (	<u>s)</u> /	7
(LOT#): (EXP. DATE):	(LOT#): 13 CC7 (EXP. DATE): 5(4) 23	CAL. RANGE	TIME	(LOT #): (EXP, DATE):	LIST LO	T NUMBERS A UNDER CALIB			) Hurve
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			CALIBRATED PARAM	ETERS	CALIBRATIC	N RANGES <sup>(1)</sup>		Solut
UCO 10,00	100011000	WITHIN RANGE	0645		PHI	/+/- 0.2 S.U	J.	-	used
1		WITHIN RANGE		COND	COND	₩/- 1% OF	CAL. STAN	DARD	usea
1	1	☐ WITHIN RANGE		□ ORP	ORA;	+/- 25 mV			
1	1	WITHIN RANGE		□ p.9/	D.O.;	VARIES			
	NOTES			_ TUFB	TURB:	+/- 5% OF	CAL STAN	DARD	
						IBRATION RAN ODEL OF THE V			
					I				
Pl	ROBLEMS ENCOUNTERED			c	CORRECTIVE ACTION	ONS			
COULIN U	leely	( <u>() - (</u> 0 -	<del>-</del> 2(	CHECKED BY	e;	Dig	- ic	<u>2</u> DATE	i

PH CAL  PH 7  (LOT #): (C 360 (LOT  (EXP. DATE): AP23  POST-CAL READING / STANDARD  /  ORP CAL  CAL. READING (LOT #): 19 F 100362  (EXP. DATE): 77722  POST-CAL. READING / STANDARD  218.1 / 213.1	RALIBRATION CHECK  PH 4 / 10  OT #):   C	CAL. RANGE  WITHIN RANGE  WITHIN RANGE  WITHIN RANGE  RANGE  CAL. RANGE	TIME		SP CAL LOT#): W EXP. DATE): POST-CAL. F	ECIFI REAL May READING	IC CONDU	DATE: UC - CTIVITY CALIB TEMPERATURE (*CELSIUS)	RATION C	HECK TIME
PH 7 (LOT #): (C 360 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (LOT #): 19 F 100362 (EXP. DATE): 177722 POST-CAL. READING / 1 2 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	PH 4 / 10 DT #): IC S & CC KP. DATE): APR. Z S POST-CAL. READING / STANDARD  /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE CAL. RANGE	% <b>3</b> Ø		CAL LOT#): W EXP. DATE): POST-CAL. F	REAL MAY	DING ZOS /Z} S/STANDARD	TEMPERATURE	CAL. RANGE  WITHIN RANGE  WITHIN RANGE  WITHIN RANGE	
(LOT #): (C 360 (LOT (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DATE): AP23 (EXP. DAT	OT #): (3 ) SPC  KP. DATE): APR. Z.S  POST-CAL. READING / STANDARD  /	RANGE WITHIN RANGE WITHIN RANGE WITHIN RANGE CAL. RANGE	% <b>3</b> Ø		LOT#): (C EXP. DATE): POST-CAL.F	Neg READING	で多 (で) S/STANDARD	(°CELSIUS)	CAL. RANGE  WITHIN RANGE  WITHIN RANGE  WITHIN RANGE	TIME
/ / / ORP CAI CAL. READING (LOT #): 19 F LOSC2 (EXP. DATE): 7/7/72 POST-CAL. READING / STANDARD  2/\$, 1 / 2/3, 1 / /	/ / / ALIBRATION CHECK TEMPERATURE (*CELSIUS)	WITHIN RANGE WITHIN RANGE WITHIN RANGE CAL. RANGE				/ / /	115	18.1	RANGE WITHIN RANGE WITHIN RANGE	0645
/ ORP CAI CAL. READING (LOT #): 19 F 10362 (EXP. DATE): 77772 POST-CAL. READING / STANDARD  213,1 / 213,1 /	/ / / ALIBRATION CHECK TEMPERATURE (*CELSIUS)	WITHIN RANGE WITHIN RANGE WITHIN RANGE CAL. RANGE			CAL	/ / /			RANGE WITHIN RANGE	
CAL READING (LOT #): 19 F COSC2 (EXP. DATE): 7/27/22  POST-CAL READING/STANDARD  218,1 / 2:13,1 /	TEMPERATURE (*CELSIUS)	WITHIN RANGE WITHIN RANGE CAL. RANGE	TIME		CAL	1			WITHIN RANGE	
CAL READING (LOT #): 19 F COSC2 (EXP. DATE): 7/27/22  POST-CAL READING/STANDARD  218,1 / 2:13,1 /	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	] <u>[</u> ] [	CAL	1				<b></b>
CAL READING (LOT #): 19 F LOGIC  (EXP. DATE): 7/27/22  POST-CAL READING/ STANDARD  213.1 / 2:13.1  /	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	] [	CAL				RANGE	i
(LOT #): 19 F 10362 (EXP. DATE):7/27/22 POST-CAL READING/STANDARD	(°CELSIUS)	RANGE	TIME		CAL		D.O. CALI	BRATION CHE		<u> </u>
(EXP. DATE):7/27/22  POST-CAL. READING / STANDARD  2/3, / / 2/3,   / / / / / / / / / / / / / / / / / /		RANGE	TIME			. REA	DING	TEMPERATURE		
213.1 / 213.1 /	18.0	I <b>₩</b> wmнiis						(°CELSIUS)	CAL. RANGE	TIME
/ / / / / / / / / / / / / / / / / / /	18.0		•				SATURATED AIR	10.0	WITHIN	- ( -0
/ / / / / / / / / / / / / / / / / / /		YA RANGE	635		\$.70	' '	8.70	19.6	RANGE	0650
/ / TURBIDITY	****	☐ RANGE				1			RANGE	
/ TURBIDITY		RANGE				1		w	L RANGE	
TURBIDITY		WITHIN RANGE		l					☐ WITHIN RANGE	
TURBIDITY CALIBRATION CHECK CALIBRATION READING (NTU)				1 Fi	T) AUTOG	AL 00	LUTION	COMMENTS  STANDARD	SOLUTION (	· · · · · · · · · · · · · · · · · · ·
	OT#): AICO7	CAL.			AU100 LOT#):	AL SU	EUTION	LIST LOT NUMBERS	1	
N/# 1	(P. DATE): Jon/23	RANGE	TIME	i l'	(EXP. DATE):		UNDER CALIBRATION CHECK			
	OST-CAL, READING / STANDARD				CALIBRAT	ED PA	RAMETERS	CALIBRAT	ION RANGES (	1)
0.00 10.00 b	100,001 100,00	WITHIN RANGE	9610			Н		pH: +/- 0.2 S	S.U.	
1	1	WITHIN RANGE				COND		COND: +/- 1% (	OF CAL. STAN	IDARD
1	1	WITHIN RANGE		]		ORP		ORP: +/- 25 m	V	
1	1	WITHIN RANGE		]		0.0.		D.O.: VARIES		
	NOTES			1		TURB		TURB: +/- 5% (	OF CAL. STAN	IDARD
			 _			<sup>(1)</sup> CALIBRATION RATHE MODEL OF THE				
· · · · · · · · · · · · · · · · · · ·					•					
PROBL					CORRECTI	VE ACTIONS				
						Λ				
SIGNED	10.7	29-21 DATE			CHEC	KELI	Le	- King	- 1	<u>0~20</u>

PROJECT NAME:	CEC KARN LF 2021 GW C		MODEL: 3	<del>/315</del> 56 }{,	I Po	sed 6	SAMPLER:	JJASS0			
PROJECT NO.:	418425.0000.0000		SERIAL#				DATE: 10/7	14			
PH	CALIBRATION CHECK			,	SPE	CIFIC	CONDU	CTIVITY CALIBI	RATION C	HECK	
pH 7 (LOT #): (OT) (EXP. DATE): U53 POST-CAL. READING / STANDARD	pH 4 / 10 (LOT #):   (D) (44 C) (EXP. DATE): ([52] POST-CAL. READING / STANDARD	CAL. RANGE	TIME		(LOT #): (6F 7-C63 (EXP. DATE): 5 / 3) POST-CAL. READING / STANDARD		TEMPERATURE	CAL. RANGE	TIME		
700 1700	400/400	WITHIN RANGE	अर्		1403	114	417	<i>NA</i>	WITHIN RANGE	७५०	
	/	RANGE WITHIN				1			RANGE WITHIN		
,	,	RANGE WITHIN RANGE				,			RANGE WITHIN RANGE		
ORP	CALIBRATION CHECK					D	.O. CAL	BRATION CHEC			
CAL. READING (LOT #): DRIBOO? (EXP. DATE): 27 2 5 POST-CAL. READING/STANDARD	OT #): DRISO O O (*CELSIUS)  EXP. DATE): 2/ O (*CELSIUS)  POST-CAL, READING/STANDARD				CAL. I	READIN	-	TEMPERATURE	CAL. RANGE	TIME	
28,086	27.0	WITHIN RANGE	051		8.51		51	220	WITHIN RANGE	051	
· /		RANGE WITHIN RANGE	<del></del>			1			RANGE WITHIN RANGE		
1		WITHIN RANGE				1			WITHIN RANGE		
	ITY CALIBRATION CHEC	K			_			COMMENTS			
	READING (NTU)				AUTOCA	T SOLO	ITION	<b>⊠</b> STANDARD	SOLUTION (	S)	
(LOT #): {} (007 (EXP. DATE): {{}}	(LOT #): (EXP. DATE):	CAL, RANGE	TIME	i 1	(LOT #): (EXP. DATE):			LIST LOT NUMBERS A UNDER CALIB			
POST-CAL READING/STANDARD	POST-CAL, READING / STANDARD				CALIBRATED PARAMETERS			CALIBRATION RANGES (1)			
010		WITHIN RANGE	0915		☐ pH			pH: +/- 0.2 S.U			
100/100	/	TRANGE WITHIN	0911		CC OF	DND	-	COND: +/- 1% OF ORP: +/- 25 mV	CAL. STAN	IDARD	
<del>'</del> ,	,	RANGE WITHIN RANGE			o.			D.O.: VARIES			
	NOTES				П ти	JRB		TURB: +/- 5% OF	CAL STAN	IDARD	
							(1) CALIBRATION RAN THE MODEL OF THE V				
· F	PROBLEMS ENCOUNTERED						CORRECTIV	/E ACTIONS			
				•••••					······································		
	10/14			1		e	My	- 10	-1 m		
SIGNED	J,	DATE			снебк	ED BY		0		DATE	



#### **WATER LEVEL DATA**

PROJECT NAME:	CEC Karn	BAP/LI: 2021 GW	/ Compliance		DATE:				
PROJECT NUMBER:	418425.00	01.0000			AUTHO	R: Andrew Wha	aleyJake Krenz, .		
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)		DEPTH TO PRODUCT (FEET)	WATER ELEVATION		
DE Karn Bottom Ash F	Pond								
DEK-MW-15002	0928	700	6.38	15	.75				
DEK-MW-15004	1001		27.88	4	1,80				
DEK-MW-15005	0934	8.81		22.23					
DEK-MW-15006	0936	V	<del>8.86</del> 8.28	21.50					
DE Karn Bottom Ash F	ond and Lir	ned Impoundmer	nt						
DEK-MW-18001	0940	Toc	8,43	19.	65				
DEK-MW-15003	0952	TOC	16.50	27	87				
Karn Lined Impoundm	ent								
OW-10		TOC							
OW-11									
OW-12		J							
Background									
MW-15002	0845	TOC	6.68	19.	95				
MVV-15008	0807		4.28	17.	40				
MW-15016	0857		3.85	8.1					
MW-15019	0832	V	5.20	16.	85				
				· · · · · · · · · · · · · · · · · · ·					
	-								

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

10.29.21

REVISED 04/2019

### TAC

PROJECT NAME: CEC Karn LF: 2021 GW Compl PREPARED CHECKED									
PROJECT NUMBER:	418425.0000.000	0 BY: <b>(</b>	W, JJ, JK DATE: (O	6-21 BY:	ZK	DATE: 10-20-21			
SAMPLE ID: ML	1 -1500 8	WELL DIAMET	ER: 🗸 2" 🗌 4" 📗	] 6" □ OTH	ER				
WELL MATERIAL:	✓ PVC SS	☐ IRON ☐ GALVA	NIZED STEEL	□ отн	ER				
SAMPLE TYPE:	☑ GW □ WW	SW DI	LEACHATE	□ отн	ER				
PURGING	TIME:1542	DATE LO-671	SAMPLE	TIME: 160	<b>Z</b> DA	1560J:3TA			
	PUMP PERISTAL	TIC PUMP	PH: <u>6.62</u> s			umhos/cm			
	BAILER				<u>0.46</u> mg	/L			
DEPTH TO WATER: _	<u> </u>		1.1	<u>′0</u> мти _		_			
DEPTH ТО ВОТТОМ: _	17.40 T/ PVC			GHT	MODERATE	☐ VÉRY			
WELL VOLUME:	NA LITERS			<u>@0</u> °C	OTHER:				
VOLUME REMOVED: _	4 Stiters	GALLONS	COLOR: LLEGG		ODOR:	-			
COLOR: <u>El</u>	leoc	ODOR:	FILTRATE (0.45 um)	YES	Ŋ NO				
<b>&gt;</b> <i>D</i>	TURBIDITY		FILTRATE COLOR:		FILTRATE ODG	PR:			
NONE SLIG	HT MODERATI	E VERY	QC SAMPLE: MS	/MSD	DUP-				
DISPOSAL METHOD: [	X GROUND ☐ DR	UM 🗌 OTHER	COMMENTS:	ist .					
TIME PURGE	PH CONDUCTIV	/ITY ORP	D.O. TURBIDITY	TEMPERATU	RE WATER	CUMULATIVE			
(ML/MIN)	(SU) (umhos/cr		mg/L) (NTU)	(°C)	LEVEL (FEET)	PURGE VOLUME (GAL OF L)			
1542 200	6,99 966	<del>· · · · · · · · · · · · · · · · · · · </del>	10 3.65	17.5	9.30	INITIAL			
100 100	4		A 1 1 1						
<del></del>			0.76 3.91	16.0	1.3	7			
1	6.65 1184		1.54 7.86	15.8	4.31				
	6.63 1192	-929 0	49 12.4	17.2	4.34	3			
1602 200	662 1202	-93.6 O	46 10.70	Ve.O	4.34	4			
NOTE: STABIL	JZATION TEST IS CO	MPLETE WHEN 3 SUC	CESSIVE READINGS A	RE WITHIN T	HE FOLLOWING	G LIMITS:			
pH: +/- <b>0.1</b> Co	OND.: +/- <b>3</b> % O	RP: +/- <b>10 M√</b> D.O.:	+/- <b>0.3</b> TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-			
BOTTLES FILLED E	PRESERVATIVE CODI	ES A - NONE B -	HNO3 C - H2SO4	D - NaOl	H E-HC	L F			
NUMBER SIZE	TYPE PRESERV	ATIVE FILTERED	NUMBER SIZE	TYPE	PRESERVATI	VE FILTERED			
2 600	VOA A	□Y X N				□Y □N			
	Dlastx B	□ Y X N				□Y □N			
	plashe A					ПАШИ			
	prosect A								
1 200 mL	~ <del>} </del>				www.moderation.com/moderate and display depth on the content of the distribution in				
SHIPPING METHOD:		1	2-7-21	AIRBILL I	NUMBFR:				
	a group on	<del>-</del>	1			2971			
COC NUMBER: SIGNATURE: Au DATE SIGNED: 0-29-71									

# ◆ TRC

PROJECT NAME: CEC Karn LF: 2021 GW Compl	ROJECT NAME: CEC Karn LF: 2021 GW Compl PREPARED CHECKED									
PROJECT NUMBER: 418425.0000.0000	BY: A	Ŋ, JJ, JK	DATE:0.7	-21	ву: 3	ik	DATE:10-20-21			
SAMPLE ID: MW 15019 WELL	DIAMETE	ER: ✓ 2"	4" [	6" 🗌	OTHER					
j	GALVAN	NIZED STE	EL		OTHER					
SAMPLE TYPE:	DI	LE	ACHATE		OTHER					
PURGING TIME 0750 DATE: 10-7	-21				016		TE:10-7.7]			
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER			. <u>44</u> su 72.2 mV			TY: <u>15°7°</u> 13°				
DEPTH TO WATER: 5.13 T/ PVC		TURBIDIT	ry: 1.22	NTL	J					
DEPTH TO BOTTOM: 16.85 T/ PVC		NONE	SLIG	HŢ	□ мог	DERATE	☐ VERY			
WELL VOLUME: NA LITERS GALLO	NS	TEMPERA	TURE: 15	7	°С ОТЬ	HER:	Maria Section			
VOLUME REMOVED: Z LITERS GALLO	NS	COLOR:	Liear		ODO	OR:				
COLOR: Law ODOR:		FILTRATE	(0.45 um)	YES	; <b>X</b>	NO				
TURBIDITY		FILTRATE	COLOR:	enio.	FIĻī	TRATE ODO	R:			
NONE SLIGHT MODERATE VEF	₹Y	QC SAME	PLE: MS/N	MSD	X	DUP-024				
DISPOSAL METHOD: GROUND DRUM OTHER	l	COMMEN	ITS: DE	r S	LW	Backg	roomd			
TIME PURGE PH CONDUCTIVITY ORP		1	TURBIDITY		RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME			
(ML/MIN) (SU) (umhos/cm) (mV)	1 (1	mg/L)	(NTU)	1/1	°C)	(FEET)	(GAL OR (L)) INITIAL			
	10	95 1	106	19,	8	5.12	INITIAL			
0755 20 6.39 1216 -43.6	0	101	.11/	15.	<del></del>	5.13				
CDa 40 6.47 1822 -614	_0	154 1	125	15:	<u></u>	5.13	7			
0805 200 6.43 1828 -69.9	0	49 1	Co	15.	2	5.13	3			
0810 200 6.44 1829 -72.	20	48 1.	22	15.	2	5.18	4			
	_			***************************************	·······					
				<del>~</del>						
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:  pH: +/- 0.1 COND.: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % or = 10 TEMP.: +/-</td										
BOTTLES FILLED PRESERVATIVE CODES A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F			
	ERED	NUMBER		TYP	$-\tau$	ESERVATI				
9 100 NOH A DY	ДN						□Y □N			
2 125 Plaste A DY	N						□Y □N			
2 200 Mastil A DY	N	***************************************					□Y □N			
	MN	<del></del>		***************************************						
7 1000 PLUSTIC B DY										
SHIPPING METHOD: Lab Drop off DATE SHIPPE	:D: 1	0-7-2	21	AIRI	BILL NUM	BER: -				
COC NUMBER: SIGNATURE: 10-7-21   DATE SIGNED: 10-7-21   DATE SIGNED: 10-7-21										

PROJECT NAME:	ROJECT NAME: CEC Karn LF: 2021 GW Compl PREPARED CHECKED								
PROJECT NUMBER	R: 41842	5.0000.0000		BY: Æ	W.Ju, Ji	K DATE:しっ	7-7/BY:	ZK	DATE:10-20-21
SAMPLE ID: MV	V 150	00 Z	WELL 0	DIAMET	ER: 🗸	2"	6" OT	HER	
	✓ PVC	□ss □	IRON 🔲	GALVA	NIZED S	TEEL	ТО	HER	
SAMPLE TYPE:	☑ GW	□ ww □	sw 🔲	DI		LEACHATE	🗌 от	HER	
PURGING	TIME:63	xj& D/	ATE: 10 - 1	7.21	S	AMPLE	TIME:	D.	ATE: 10-7-Z1
	PUMP	PERISTALTIC I	PUMP			7.00 s	U CONDU	JCTIVITY: <u>414</u>	umhos/cm
METHOD:	BAILER				ORP:	-1069 m	V DO:	<u>Ο.ζο</u> <sub>mg</sub>	g/L
DEPTH TO WATER:		T/ PVC			TURBIL		NTU		
<b>DEPTH TO BOTTOM:</b>	19.95	T/ PVC			NON	······································	GHT _	MODERATE	VERY
WELL VOLUME:	NA	LITERS	☐ GALLOI	NS	TEMPE		<u>,,,</u> ∘c	OTHER: _	
VOLUME REMOVED:	<u> </u>	LITERS	☐ GALLOI	NS	COLOF	r: <u>lleo</u>	<u>~</u>	ODOR:	
COLOR:	leco	00	OR:		FILTRA	TE (0.45 um)	YES	[XX NO	
,	TURI	BIDITY			FILTRAT	TE COLOR:		FILTRATE OD	OR:
NONE SLI	GHT 🗌	MODERATE	☐ VEF	RY	QC SAI	MPLE: MS	/MSD	DUP- 🔾	4
DISPOSAL METHOD:	GROUN	ND 🗌 DRUM	OTHER		сомм	ENTS:	kadon	Sample	5
TIME PURGE	PH	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPERAT	URE WATER	CUMULATIVE
RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	1	mg/L)	(NTU)	(°C)	LEVEL (FEET)	PURGE VOLUME
0848 200	7:04	1090	-96.1		80	1.5 D	16.6	6.64	INITIAL
0853 700	7.02		-84.			7.92	16.1	7	<del>  </del>
		455	-95	<u> </u>	2.67				.,
	7.01	183	-00		.57	7.50	16.6	6.90	2
0903 200	7.01	166	111	Δ	2.54	1.78	16.6	6.90	3
CA08 200	7,00	919	-101.	90	50	3.23	16.5	6.90	4
		***************************************							
		ı							
							**************************************		
			<u> </u>						
MOTE: STAR	II IZATION "	TEST IS COMP	ETE WHEN	3 8110	CESSIVE	E DEADINGS A	DE WITHIN	THE FOLLOWIN	L IMITS:
	COND.: +/-		+/- 10		+/- 0.3			= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-
BOTTLES FILLED	PRESERVA	ATIVE CODES	A - NONE	Ŕ-	HNO3	C - H2SO4	D - NaC	)H E - H(	CL F
NUMBER SIZE	TYPE	PRESERVATI			NUMBE		TYPE	PRESERVAT	
2 60	VOI	/1	ПУ	TX N	<u> </u>	125		·	N C Y
1 00		/		<b>Z</b> II-	<del>                                     </del>		Plastic		V WN
1 125 B DY MN DY DN									
7.5	1 250 / A DY DN DY DN								
4 1000		<u> }</u>	Y	X N	<u> </u>	1			
SHIPPING METHOD: Lab Drop off DATE SHIPPED: 10-7-21 AIRBILL NUMBER:									
COC NUMBER:									

→ TRC

PROJECT NAME: CEC Karn LF: 2021 GW Compl PREPARED CHECKED										
PROJECT NUMBER: 418425.0000.0000 BY:	W, JJ, JK DATE: 0-7-7/ BY: 3K DATE:	0-20-21								
SAMPLE ID: MW - 15016 WELL DIAMET	ER: 🗸 2" 🗌 4" 📗 6" 📗 OTHER									
WELL MATERIAL:	NIZED STEEL OTHER									
SAMPLE TYPE:	LEACHATE OTHER									
PURGING TIME: 09 45 DATE: 10-7-21	SAMPLE TIME: LOCO DATE: O	. 7-2(								
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	PH:         C. 9 & SU         CONDUCTIVITY:         14 98           ORP:         71.2         mV         DO:         0.59         mg/L	umhos/cm								
DEPTH TO WATER: $4.17$ T/ PVC	TURBIDITY: 1.47 NTU									
DEPTH TO BOTTOM: 8,10 T/ PVC	NONE SLIGHT MODERATE	VERÝ								
WELL VOLUME: NA LITERS GALLONS	TEMPERATURE: 17,4 °C OTHER:									
VOLUME REMOVED:	COLOR: Clear ODOR:									
COLOR: LICAS ODOR:	FILTRATE (0.45 um) YES NO	***************************************								
TURBIDITY	FILTRATE COLOR:   FILTRATE ODOR:									
NONE SLIGHT MODERATE VERY	QC SAMPLE: MS/MSD DUP-									
DISPOSAL METHOD: GROUND DRUM OTHER	COMMENTS: -									
TIME PURGE PH CONDUCTIVITY ORP (ML/MIN) (SU) (umhos/cm) (mV) (	D.O.   TURBIDITY   TEMPERATURE   LEVEL   PURG	ULATIVE E VOLUME IL OR								
		IITIAL								
0950 200 693 1495 -370 0	069 4.36 17.5 4.12 1									
	158 3.13 17.5 4.12 2	VI. I. A. V. I. The Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the Colonia of the C								
	0.54 1.71 17.5 11.61 3									
	54 1.51 17.4 4.41 4	***************************************								
	5.59 1.47 17.4 4.41 5									
1010 200 1019 14 18 011.20										
NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:										
	+/- 0.3 TURB: +/- 10 % or = 10 TEMP.:</td <td>+/-</td>	+/-								
	HNO3 C - H2SO4 D - NaOH E - HCL F -									
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER SIZE TYPE PRESERVATIVE F	ILTERED								
7 60 VOA A 🗆 Y 🗆 N		Y   N								
1 125 Plastic A DY XIN		Y N								
1 125   B   Y   X   N		Y   N								
1 250 A DY XIN		Y DN								
2 1000 B 0 X N		Y   N								
SHIPPING METHOD: Las Dop off DATE SHIPPED: 10-7-21 AIRBILL NUMBER:										
COC NI IMBED: SIGNATURE: DATE SIGNED: 10-7-21										

PROJECT	ROJECT NAME: CEC Karn BAP/LI: 2021 GW C PREPARED CHECKED									
PROJEC1	NUMBER	R: 41842	5.0001.0000	ВҮ	: XXX;(f)	, dd - DATE: 10-	-6-21 BY: AC	ل	DATE\0. 29.21	
SAMPLE	ID: Sh	1-8:40	ch	WELL DIA	METER:	<del>/ 2"-</del>	] 6" 🔀 OTHER	/\	1/1	
WELL MAT	ERIAL:	<del>V P</del> ∀€	ss [	IRON 🔲 GA	LVANIZED	STEEL	✓ OTHER		A	
SAMPLE T	YPE: •	☑ <del>CW</del>	□ww 🗵	sw □ di		LEACHATE	OTHER			
PUR	GING	TIME:	D	ATE:		SAMPLE	TIME: 0814		TE: 10-6-21	
PURGE METHOD		PUMP BAILBR	PERISTALTIC	PUMP	PH: ORP	.11	SU CONDUCTIV	/ITY: <u>246</u> 		
DEPTH TO			T//PVC			BIDITY: 8.6				
DEPTH TO	воттом:		T/ BYE		<b>Ø</b> N			DERATE	☐ VERY	
WELL VOL	UME:	\ NA	LITERS	GALLONS		PERATURE: 30		HER:		
VOLUME	REMOVED:	<u> </u>	LITERS	GALLONS	COL	or: <u>Clear</u>	OD	OR: <u>/</u>	rove	
COLOR:				OOR:	FILTE	RATE (0.45 um)	YES 🔀	NO		
		TUR	BIDITY		FILTR	ATE COLOR:	FIL	TRATE ODC	DR:	
NONE	SLI	GНТ 🗌	MODERATE	☐ VERY	QC S	SAMPLE: MS	S/MSD	DUP-		
DISPOSAL	METHOD:	GROU	ND DRUM	OTHER	СОМ	MENTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O.	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)	
0814	NA	2.59	2408	460.6	7.14	8.60	30.2	NA	INITIAL	
0071	1071	g	<i>a</i> 10 6	700.6	1 701	10.0		7073		
					-					
					<del> </del>			-	<u> </u>	
					ļ					
***************************************	***************************************		·							
L	OTE. STAD		TECTIC COMP	LETE MUEN-2-	OHECECI	VE DEADINGS A	RE-WITHIN-THE-	FOLL OWING	LIMATE.	
* <del>0 +</del>						3 TURB: 1/-			TEMP: +/	
BOTTLES	S FILLED	PRESERVA	ATIVE CODES	A - NONE	B - HNO	3 C - H2\$O4	D - NaOH	E - HC	L F	
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILTERI		<del></del>	<del> </del>	RESERVATI		
2	60ml	Vo A	A		N			1-1		
	125mL	Plastie	B							
1	125mL	1,100,57,0	À							
<del> </del>		<del>                                     </del>	A		N			***************************************		
	1 250~L V F									
SHIPPING METHOD: Lab Drap off DATE SHIPPED: 10-7-21 AIRBILL NUMBER:										
	COC NUMBER: SIGNATURE: DATE SIGNED: W-20-21									

PROJECT	CEC K	arn BAP/LI: 20	021 GW C	-	PRE	PARED		CHECKED			
PROJECT	NUMBER	R: 41842	5.0001.0000	В	ſ: <del>A</del>	₩ <b>,</b> ØØ,₩	- DATE://0	6~31 BY: A	ess	DATE: 10-29-71	
SAMPLE	ID: KL	I - PC	S	WELL DIA	MET	ER: 🗸 🕯	<u>a"                                    </u>	6" 🗵 OTHE	R .	NA	
WELL MAT	ERIAL: +-	<del>√ PVC</del>	ss 🗆	IRON G	ALVAI	NIZED ST	EEL	✓ OTHE	R /	IA	
SAMPLE T	YPE:	<del>⊘ cw</del>		SW 🗌 DI			EACHATE	OTHE	R		
PUR	SING	TIME:	DA	TE:			MPLE	TIME: OB	· •	TE: 10-6-21	
PURGE METHOD		PUMP BAILER	PERISTALTIC I	PUMP			12 //	U CONDUCT	7, 95 mg		
DEPTH TO	WATER		T PVC			TURBID	ITY: 27.29			***************************************	
DEPTH TO	воттом:	<del>\</del>	T PVC			П иои	_		MODERATE	☐ VERY	
WELL VOL	UME:	NA	LITERS	GALLONS	3	TEMPER	ATURE: 2	<b>7.</b> 35 ℃ 0	OTHER: _		
VOLUME I	REMOVED:		LITERS	GALLONS	3	COLOR	Chew		DDOR:	none	
COLOR:	<u> </u>	ew	OD	OR: <b>10~</b>	_	FILTRAT	E (0.45 um)	YES [	<b>∑</b> NO		
		TUR	BIDITY			FILTRAT	E COLOR:		FILTRATE ODC	DR:	
NONE	<b>- ⊠</b> ″s⊔	GHT 🗌	MODERATE	☐ VERY		QC SAM	IPLE: 🗌 MS	/MSD [	DUP-		
DISPOSAL	. METHOD:	🔀 GROU	ND 🗌 DRUM	OTHER		COMME	NTS:				
TIME	PURGE RATE	PH (SU)	CONDUCTIVITY	ORP		D.O.	TURBIDITY	TEMPERATUR	LEVEL	CUMULATIVE PURGE VOLUME (GAL OR L)	
0876	(ML/MIN)	8.50	(umhos/cm)	313.4		mg/L)	23. 25	23.7	(FEET)	(GAL OR L)	
0076	דן טן	0.50	317	>17.7			κ,, -,	J->. 1	1001		
					+						
				·				• •			
	:										
***************************************											
***************************************	***************************************		······································		1						
					1						
					+						
	_	-	TEST IS COMPI 3 % ORP:								
<u> </u>											
BOTTLES			ATIVE CODES	· , · · ·		HNO3	C - H2SO4		E - HC		
NUMBER	SIZE	TYPE	PRESERVATI		- 1	NUMBE	R SIZE	TYPE	PRESERVATI	<del></del>	
<u>3</u>	bomb	VOA	A		() N						
}	DSmc	Plustie	В		) N					□Y □N	
1	PSINL		A		N				***************************************	Y N	
1	250mL	V	A		N					□ Y □ N	
SHIPPING	SHIPPING METHOD: Lab Drop of DATE SHIPPED: 10-7-21 AIRBILL NUMBER:										
	COC NUMBER (DATE CIONER) (O - 2 - 24										
300 1101/11	DATE SIGNATURE: DATE SIGNED: 10-20-1										

PROJECT NAME: CEC Karn BAP/LI: 2021 GW						PR	EPARED		CHECKED			
PROJECT	Г NUMBE	R: 41842	5.0001.000	0	BY:	444, (B)-	H DATE: 10	6-21	BY: Ac	S	DATE:10.29.21	
SAMPLE	ID: KL	I -S	CS	WELL I	DIAME	TER:	2" 4"	6" 🔀	OTHER	1	JA.	
WELL MAT		- <del>⊘ PVG</del>	SS	☐ IRON ☐	GALV	'ANIZED S	STEEL	X	OTHER	Ni	4	
SAMPLE T	YPE:	<del>∐-cw</del>	□ww	□ sw □	DI		LEACHATE	×	OTHER	Seconda	ary Sump	
PUR	GING	TIME:		DATE:		S	AMPLE	TIME:	0844	DA	TE:/0-6-21	
PURGE METHOD	_	PUMP	PERISTALT	IC PUMP		PH:				TY: 1754		
DEPTH TO	<u></u>	BAILER	T/ PVC			TURBI	/A /7	ov   DO: 7 NTU	***************************************	<u>≽≀</u> mg.	/L	
<del>                                     </del>	о вот ом		T/ P/VC			_  ∑_NO		GHT		DERATE	☐ VERY	
WELL VOL	.UME:	J <sub>NA</sub>	LITERS	GALLO	NS	ТЕМРЕ	RATURE: 2	0,2	°С ОТ⊦	IER:		
VOLUME I	REMOVED:		LITERS	GALLO	NS	COLO	R: eleer		ODO	DR:	none	
COLOR:	_cl	eer		ODOR: 100	<u>e</u> _	FILTRA	TE (0.45 um)	YES	<b>Z</b>	NO		
		TUR	BIDITY			FILTRA	TE COLOR:	<u> </u>	FILT	TRATE ODO	R:	
NONE		IGHT 🗌	MODERATE	□ VEF	RY	QC SA	MPLE: MS	/MSD		DUP-		
DISPOSAL	L METHOD:	<b>⊠</b> GROU	ND DRU	JM OTHER	₹	COMM	ENTS:					
TIME	PURGE RATE	PH ·	CONDUCTIV	TTY ORP		D.O.	TURBIDITY	TEMPE	RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME	
	(ML/MIN)	(SU)	(umhos/cm	n) (mV)		( mg/L)	(NTU)	(1	°C)	(FEET)	(GAL OR L)	
0844	NA	7.20	1759	158.3		2.21	0.77	: 20	0,2	NA	INITIAL	
			1 1									
											,	
							***************************************					
	***************************************											
			,		_							
					_							
							······································				***************************************	
L N	OTE: STAD	II IZATION	TEST IS COL	MDI ETE WILEN	12611	CCESSIVI	E DEADINGS A	DE WITI	IIN THE P	OL L OWNE	L IMITO.	
pH: +/-		COND.: +/-		MPLETE WHEN RP: +/- 10		).: +/- <b>0.3</b>			or =</td <td></td> <td>э LIWII 15: TEMP.: +/-</td>		э LIWII 15: TEMP.: +/-	
BOTTLES				S A-NONE								
NUMBER	<del></del>	TYPE	PRESERV		ERED	- HNO3	C - H2SO4 ER SIZE	TYP	NaOH F PR	E - HC ESERVATI		
2	bonk	VOA	A		<b></b> N	ļ	-K SIZE	1115		ESERVAII	VE FILTERED	
		Plastic			区 N					·		
<del>                                     </del>	125ml 125ml	1	<u>/</u>		X N							
	250mL		))  }		N K					······································		
	430W C	<b></b>										
CHIDDING												
	SHIPPING METHOD: Lab Arep of DATE SHIPPED: 10-7-21 AIRBILL NUMBER:											
COC NUME	BER:	<		SIGNATURE:	<del>/</del>	ful	/ pluz	DAT	E SIGNED	): <u> </u>	(0-20-21	
//CED 04/00					()	/	U					

WA	7	ER	SA	MP	LE	LO	G
----	---	----	----	----	----	----	---

	PROJECT NAME: CEC KARN LF 2021 GW COM PREPARED CHECKED .														
	PROJEC <sup>*</sup>	T NUMBE		25.0000.0000	ВУ			. (1-4 BY: /		0.000					
			1/ 100	- f						DATE 10:29-21					
<u>ر</u> ې	SAMPLE	<u>~</u> _	-   Be	<del>70  </del>	· · · · · · · · · · · · · · · · · · ·	THE AMERICAN THE SPECIAL PROPERTY.	] 2"	6" OTHE		**************************************					
1800	WELL MAT		✓ PVC ✓ GW	□ss □	IRON ∐ GA SW □ DI	LVANIZED :	LEACHATE	U OTHE	Access of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control	and the and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second					
								OTHE							
W.		GING	TIMEOU		ATE (6 (7 ())		SAMPLE	TIME: O(6)	7	ATEM ()/)					
DEK-	PURGE METHO		PUMP BAILER	PERISTALTIC	PUMP	I come normal	-156.5 n	_	TIVITY: 0	umhos/cm g/L					
	DEPTH TO			T/ PVC		TURB	DITY: 3, 0	Y <sub>NTU</sub>	***************************************	The state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second st					
	DEPTH TO	BOTTOM	:[Gie L	T/ PVC		(J) NO	_		ODERATE	☐ VERY					
	WELL VOL	.UME:	N/A	LITERS	GALLONS	TEMPE	TEMPERATURE: LUCA COTHER:								
	VOLUME	REMOVED		✓ LITERS	GALLONS	COLO	COLOR: COLOR: AOK								
	COLOR:		1004		OR: 1016	FILTRA	FILTRATE (0.45 um) YES NO								
		r <b>i</b>		BIDITY		1	TE COLOR:		ILTRATE ODG	)R:					
	NONE	SL METHOD	: GROU	MODERATE ND DRUM	VERY		MPLE: MS	/MSD [	DUP-						
	DISPOSAL		. J GROU	ND DROM	OTHER	COMIN	COMMENTS:								
	TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATUR	LEVEL	PURGE VOLUME					
İ	. [~~]	(ML/MIN)	(SU)	au &	(mV) _9 G	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)					
- {	560-1	39	40	873		90	<u>370</u>	12/	850	INITIAL					
ſ	2002		720		-(346)-	130	221	14.6	860						
i	0417		23,2	656	145.0	043	2.14	144	860	3					
	des)		131	861	-1580	036	2.48	14. >	860	2					
	Xed?		ブるく	- A	-158.0	030	2.25	143	166c	9					
	CE35		7.35	६५०	- 158.5	029	224	14.3	(8Cec						
				: : :	nakat u ar <del>an saka</del> aannin kan kagaapa		-	- - Management i and randomic or order 1871 a feet on		-6-					
į		******************************	) 	·	THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROPERTY OF THE PERSONNEL PROP		e delle martinement film is manuscritt menser as pyro, gyg.	: : : Therefore observation of the contract of the con-	tin este la la participa de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capacida de la capac						
		tell but at agenticating		Communicates de contra de la consecución de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra del la contra del la contra del la contra de la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contr	etti valta valta etti on tirallari viri diri anan esse		o - Michael Anderson o Land Mathematical Language page	, parameter sa mantena a santa a san	ene dia minimakan di kana amat memperinakan	Constitution of the second					
L		·						· ·	:	:					
	N0 pH: +/-		BILIZATION COND.: +/-	TEST IS COMPL		UCCESSIV			E FOLLOWING /= محد	G LIMITS: TEMP∴+ <del>/0:5°C-</del> -					
ĺ	BOTTLES	S FILLED	PRESERV	3%, ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	10 E - HC	L F-					
Ì	NUMBER	SIZE	TYPE	PRESERVATIV		-γ	· · · · · · · · · · · · · · · · · · ·		PRESERVATI						
ľ	Q	125 mL	VOA	A		N		L		TY N					
ľ	3	125 mL	PLASTIC	Α	- <del></del>	N	The Company of the Company	tamente en la electrica de la l'adoption de la compa	mert find med 4. 4 of committee move						
	3	125 mL	PLASTIC	В		N	TOTAL CONTRACT CONTRACTOR AND THE STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE	CONTRACT IN STREET, SECTION OF	and remaining review						
ŀ	6	1 L	PLASTIC	В		N	Miletary - Valency (Europe Macanines - Julie	-embendarial in milenna in the last in the contract	maka kuma san maga maga a						
	[	250	PI	A		N		regularism in the distribution of a spinor of it.	hadra - res senandanavena - r v - re	□Y □N					
Ī	SHIPPING	METHOD:	FEI	D EX DA	TE SHIPPED:	11	11	AIRBILL NU	JMBER: N//	4					
Ì	COC NUME	BER:	N/A		SNATURE:		1411	DATE SIGN		Ital					

_	
ᡯ	
ð	
بۆ	
ī	
3	
Ĭ	
¥	

	TR(	us i		WATER	SAMP	LE LOG	ı							
PROJECT	NAME:	CEC I	KARN LF 20	21 GW COM	PR	EPARED			CHEC	KED				
PROJECT	NUMBER	R: 41842	5.0000.0000	ВҮ	JJASSO	DATE: LO	417	3Y: 3/	۷	DATE:10-20-2				
SAMPLE	0,02	<del>(15c</del>	<b>#</b> 3	WELL DIA	METER: 🗸	2"	6" 🗌	OTHER						
WELL MATE	RIAL:	✓ PVC	☐ss [	☐ IRON ☐ GA	LVANIZED S	STEEL		OTHER	, a <del>t our meter out his t</del>	ক্ষাৰ্থ কৰা কৰা কৰা কৰিবলৈ কৰা কৰা কৰা কৰা কৰা কৰা কৰা কৰা কৰা কৰা				
SAMPLE TY	PE:	☑ GW	ww [	]sw □ di		LEACHATE		OTHER	i deli e de e e e e e e e e e e e e e e e e e	an inches una pierre i de di nel cue ci ne compaño.				
PURG	iNG	TIME: ()	707	DATE: 16(7/)	ı s	AMPLE	TIME:	(57)	. <b>7</b> D.	ATE: /0(2/3 K				
PURGE	1	PUMP	PERISTALTI		PH:	831 s	U CON	IDUCTIVI	<del>'</del> _ 'υ	umhos/cm				
METHOD:		BAILER		<u></u>	ORP:	-210·1 m	V_ DO:	<u>ئ</u>	5 mg	g/L				
DEPTH TO	WATER:	16.50	T/ PVC		TURBI	DITY: 1.9	NTU							
DEPTH TO	BOTTOM:	<u> 276.</u>	T/ PVC		4 MO		GHT		DERATE	VERY				
WELL VOLU	ME:	N/A	LITERS	GALLONS	TEMPE		<u> </u>	C OTH	IER:					
VOLUME R	EMOVED:		✓ LITERS	GALLONS	COLO	COLOR: COLOR: NO 10								
COLOR:		war		DDOR: NO (U	_ FILTRA	TE (0.45 um)	YES		NO	er, tamme, le qu'ent mantenant mantenant entre en				
			BIDITY			TE COLOR:			RATE OD	DR:				
NONE	Z SLI		MODERATE	☐ VERY			/MSD		DUP-					
DISPOSALI		☑ GROU	ND DRU	M  OTHER	СОММ	ENTS:								
TIME	PURGE RATE	PH	CONDUCTIVI		D.O.	TURBIDITY	TEMPE	RATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME				
	(MLMIN)	(SU)	(umhos/cm)	<del>'</del>	( mg/L)	(NTU)		C)	(FEET)	(GAL OR L)				
6707	(4)_	8.0	471	-105.7	9.0	6.00	20	إستنسب أسيس		INITIAL				
0712		<u>B.33</u>	456	-193.	1.00	1.85	20.		17.60	. \				
0717		6.37	457	-2100	076	30	***************	8	1795					
6737		731	459	1-26.1	600	18(_	20		1811	h				
1650		8.31	461	₹10·3	<u>U57</u>	1.91	20	·V	1876	·····				
		1-1-1-1	! !			V.4	omenica is communicate of the		na - wa maa na caasa a	2+				
		and the contractions	·	M MR (mint a norma relativistica de mante de seguir		Transfer and the Parallel and the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Co				-3-				
and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th		- N. TORAN-SANSKIE - L. MILLE VINNESS		· · · · · · · · · · · · · · · · · · ·				PROGRAMMA SETTINGEN SE TO STOCK S	·					
Amerika dhafali da imramosa sayarayad	But an specimens		Carrier and a game as a constant							Charles de Company II.				
				_										
ио.	TE: STABI	ILIZATION	TEST IS COM	PLETE WHEN 3 S	SUCCESSIVE	E READINGS A	RE WITH	IN THE F	OLLOWIN	G LIMITS:				
pH: +/- <b>0</b>	.1 (	COND.: +/-	40% OR	P: +/- 4 <del>0%</del> D	.O.: +/ <del>40.</del>	TURB: +/-	10 %	or =-</td <td>10</td> <td>TEMP.: +/0.5°C</td>	10	TEMP.: +/0.5°C				
BOTTLES	FILLED	PRESERV	ATIVE CODES		B - HNO3	C - H2SO4	D - N	laOH	E - HO	CL F				
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILTERE	D NUMBI	ER SIZE	TYPE	PR	ESERVAT	IVE FILTERED				
2	125 mL	VOA	А	_ Y _/	N					☐Y ☐ N				
(	125 mL	PLASTIC	A	<del>- 2</del>	N				report to 1 g/F sartymospenings	□Y □ N				
ķ	125 mL	PLASTIC	В	□ Y 🗸	N	MA MAL TERMINA CONTRACTOR A WY		inne area		□Y □ N				
2	1 L	PLASTIC	В	□ Y 🗸	N		د در جهل بنده طروعهستاند.	and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th	y II a ndi e nudere inhael a	□Y □N				
	PODE PALABORE N. P. SEMPRES Q.	of the section of the party of the	THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PE	□ Y □	N	ung Artikk () redrikteder men is er stenenenseren is f			***************************************	□Y □N				
SHIPPING M	ETHOD:	EEI	D EX	DATE SHIPPED:	15	Λ	AIRB	ILL NUMI	BER: N/	Δ				
COC NUMBE	to the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contrac	N/A	J L/	SIGNATURE:	$\sim$		and the statement	SIGNE						
		14/2			-/				1014	*// }/				

	And the second	
1 1		
20		
da"	1 11 6 35.53	

PROJECT NAME: CEC KARN LF 2021 GW COM	PREPARED CHECKED											
PROJECT NUMBER: 418425.0000.0000 BY:	JJASSO DATE OLL A BY: JK DATE: 10-20-21											
SAMPLE ID: O W- (O) WELL DIAME	THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY O											
THE WARREN THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE	ANIZED STEEL U OTHER											
SAMPLE TYPE:	LEACHATE OTHER											
PURGING TIME ON TO DATE (017/)/	SAMPLE TIME: 0850 DATE: (U/7/)											
PURGE ☑ PUMP PERISTALTIC PUMP METHOD: ☐ BAILER	ORP: - 144.3 mV DO: 033 mg/L											
DEPTH TO WATER: 6-49 T/ PVC	TURBIDITY: 4 40 NTU											
DEPTH TO BOTTOM: 1795 T/ PVC	HNONE SLIGHT MODERATE VERY											
WELL VOLUME: N/A LITERS GALLONS	TEMPERATURE: (4) °C OTHER:											
VOLUME REMOVED: U( ULITERS GALLONS	COLOR: (COLV ODOR: NO.K											
COLOR: CLOCK ODOR: NOW	FILTRATE (0.45 um) YES NO											
TURBIDITY FILTRATE COLOR: FILTRATE ODOR: FILTRATE ODOR:												
NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP-												
DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:												
TIME PURGE PH CONDUCTIVITY ORP	D.O. TURBIDITY TEMPERATURE WATER CUMULATIVE PURGE VOLUME											
	(mg/L) (NTU) (°C) (FEET) (GAL OR L)											
N80510P 691 1254 -75.1 8	3.80 80 (6.8 GUI INITIAL											
	JBG 7.79 [4.1 7.40 , i											
	550 18.20 14.4 7.65 1											
	534 250 143 7.76 1.T											
	133 27.0 143 785 )											
1830 7.00 1271 -13250	36 19-0 143 7.90 2.1											
	029 100 143 7.90 3											
	26 70 143 793 35											
	25 70 143 7.93 4											
The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa	523 690 143 7.93 4.5											
	CESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:											
pH: +/- <b>0.1</b> COND.: +/- <b>40</b> % ORP: +/- <b>10</b> % D.O	: +/- <del>10 %</del> TURB: +/- 10 % or = 5 TEMP: +/<del - 0.5°C											
BOTTLES FILLED PRESERVATIVE CODES A - NONE B	HNO3 C - H2SO4 D - NaOH E - HCL F											
NUMBER SIZE TYPE PRESERVATIVE FILTERED	NUMBER         SIZE         TYPE         PRESERVATIVE         FILTERED											
<b>↑</b> 125 mL VOA A ☐ Y ☑ N	YN											
( 125 mL PLASTIC A —☐ 1/2 N	□ Y □ N											
│ 125 mL PLASTIC B ☐ Y ☑ N												
1L PLASTIC B Y N	□Y □N											
□Y □ N												
SHIPPING METHOD:FED EX DATE SHIPPED:	AIRBILL NUMBER: N/A											
COC NUMBER:N/A SIGNATURE:	DATE SIGNED:											

39	1 H A						4-55		
PROJEC	T NAME:	CEC I	KARN LF 2021	GW COM	PR	EPARED	CHEC	KED	
PROJEC	TNUMBE	R: 41842	5.0000.0000	В	Y: JJASS	DATE	14/X(BY:	<b>3</b> K	DATE: 10-20-21
SAMPLE	ID: B	w-1	(	WELL DI	AMETER: 🗸	2"	] 6" 🔲 ОТІ	HER	
WELL MAT		✓ PVC	□ss □	IRON G	ALVANIZED S	STEEL	ОТІ	HER	Productive Control with the Control of the Control
SAMPLE T	YPE:	☑ GW	□ww □	sw 🔲 🗅	)	LEACHATE	П ОТІ	-IER	er was und west and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s
PUR	GING	TIME:00	ii\ DA	TE (0(7)		AMPLE	TIME: 60	150 0	ATE: KOL7 ()
PURGE METHO			PERISTALTIC F	PUMP	Printed Company			CTIVITY: 4	76 umhos/cm
		BAILER			- 1.00may acre 1 m -		V DO:	<u>bor</u> mg	/L
		21.4			TURBI				<b>—</b>
		<u> 25.4</u>			<b>∄</b> •00		GHT 📗	MODERATE	VERY
WELL VOL		N/A	☐ LITERS	GALLON		RATURE: ()		OTHER:	<u> </u>
	REMOVED	arno	· <del></del>	GALLON:					101U
COLOR:	_12		<del></del>	OR: MON		TE (0.45 um)	∐ YES	[]-ио	St. 1987 B. St. St. St. St. St. St. St. St. St. St
   □ NONE	اه []		BIDITY MODERATE	<b>Z</b> -VERY	· · · · · · · · · · · · · · · · · · ·	TE COLOR: MPLE: MS	/MSD	FILTRATE ODG	DR: :
		GROUI		OTHER	COMM		/WISD		
	PURGE				T COMM			I MAYATES	OUBLE ATO
TIME	RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATI	LEVEL	CUMULATIVE PURGE VOLUME
~ · -	(ML/MIN)	(SU)	(umhos/cm)	(mV)	( mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
0915	رهې	9.48	300	71012	7.0	900	15.6	31.61	INITIAL
0920		9.42	468	-109.3	1.16	535	12.9	22.90	
0935		9,58	467	-101.7	1.19	43.71	12.40	2340	
6936		9.55	Contraction of the property of	-114.0	0910	JO.0	いるこ	23.40	1,1
0135		9,54	469	-135.1	070	20.0	15.7	27.50	2
0440		<i>૦</i> , ૬૪	470	-137.0	065	50	しない	23 Le	2.1
0941		9,53	470	-137. C	064	4.0	12.7	2370	7
0950		9.53	470	-1775	065	40	12.7	2380	3. \
that but to tress one			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	entranta vanda e sa terane e e as se an	THE CONTRACTOR OF THE CONTRACTOR	a wanaman change with the	Tanananalar ian aran ing ma		Consequent Community Living
				_				•	
N	OTE: STAB	ILIZATION	TEST IS COMPL	ETE WHEN 3	SUCCESSIV	E READINGS A	RE WITHIN T	HE FOLLOWING	G LIMITS:
pH: +/-	0.1	COND.: +/-	40% ORP:	+/- 40% 10MV	D.O.: +/10-	TURB: +/-	<b>10</b> % or	=</td <td>TEMP<del>:: +/ - 0.5°C</del></td>	TEMP <del>:: +/ - 0.5°C</del>
BOTTLES			ATIVE CODES		B - HNO3	C - H2SO4	D - NaOl	<i>10</i> H E-HC	L F
NUMBER	SIZE	TYPE	PRESERVATIV	/E FILTER	ED NUMB	ER SIZE	TYPE	PRESERVATI	
2	125 mL	VOA	А	Y	 ] N				YN
	125 mL	PLASTIC	A	<del> </del>	] N		- 1000100 00 00 00 00 00 00 00 00 00 00 0	COMMITTERS IN A 201 AND ADDRESS AND A	□Y □ N
7	125 mL	PLASTIC	В		] N	nter man expensive e manuscripteriste	-Michigan on course Plantaine	ACT OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PRO	
う	1 L	PLASTIC	В				response contract at an age of	Contraction of the Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Contract Co	
	250	i71	<b>Q</b>	☐ Y Z	<del>] N</del>		THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NAME OF THE PERSON NA	n - public is - con to distribution (control ) co	□Y □N
SHIPPING		FE	D EX DA	TE SHIPPED:	10	1	AIRBILL	NUMBER: N/	A /
COC NUME	BER:	N/A		SNATURE:		$\dot{\wedge}$	DATE SI		11.1/n7
<u></u>	<del></del>	14//	•		-V-/				'Y  //
					V				

# 1/ Inc

PROJECT NA	ME:	CEC I	(ARN LF 2021	GW COM	PREPARED CH						IECKED			
PROJECT NU	MBER	R: 41842	5.0000.0000	ВУ	<b>/</b> :	JJASS0	DATELO(	(lsl)	BY:	ZK	DATE:10-20-21			
SAMPLE ID: ( WELL MATERIA SAMPLE TYPE:	L:	>- <b>/</b> > ✓ PVC ✓ GW	ss	WELL DIA IRON GA SW DI	ALVAI	VIZED ST	2"	] 6"	OTHER OTHER OTHER	n e elektronis en sentra en distributor e designativo de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta de la co	and the same and an array of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of t			
PURGINO	3	TIME: 10	19 04	TE(O(2/2	) (	SA	AMPLE	TIME:	1049	I DA	TE: (0 (7 /)(			
PURGE METHOD:	<u> </u>		PERISTALTIC		_ \	PH:	7. (%) s		NDUCTIV	ITY: <u>47</u>	umhos/cm			
DEPTH TO WA	TER:	17.16	T/ PVC			TURBID	ITY: 5.8	NTU	na in had in the second devicable.	egissent version over 100 gen	h. With an Milh I black thing the property spring of			
DEPTH TO BOT	TOM:	3301	T/ PVC			NON		GHT	□ мо	DERATE	VERY			
WELL VOLUME:		N/A	LITERS	GALLONS		TEMPER			OTI					
VOLUME REMO	VED:		✓ LITERS	GALLONS		COLOR		ecv	ODO		1016			
COLOR: _				OR: <b><u>00 iC</u></b>	_	FILTRAT	E (0.45 um)	∐ YES	<b>W</b>	NO	- 1987/1977 Company of the State of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of			
TURBIDITY FILTRATE COLOR: FILTRATE ODOR:														
DISPOSAL MET		<del></del>		COMME		/IVISD		DOP-	<del></del>					
DUI				OTHER	<del></del>	T				I MATER	CUBALLI ATRA			
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GAL OR L)														
		(SU) 7.9~	(umhos/cm)	-131-7 (m/s)		ng/L)   . <b>()</b>	(NTU)		<u>)</u>	(FEET)	(GAL OR L) INITIAL			
		7.17	966	-138.8	<b></b>		760	16.	سندا به سرخ معاسد	17:00				
1034	operation and the		947			44	63.0	16		1765	(0			
1024		7.16 7.16	900 1 G73	-135.0			17.90	16		176	શ્રે.ડ વ્યુટ			
1034		7.18	976	-140.0		37	(e.o		,	1705				
1039		7.18	M. 411 MA 12 MARIE AND AND AND AND AND AND AND AND AND AND	-1400	• • • • • • • •	<u>ገ ነ</u>	<u>(4.0</u>	١7.		1761	<b>9</b> .0			
1044		1:	976	-1403	<u>0</u>	10	5.81	ί ψ,	٠	1765	J.V			
1049			to Madharlastrate assessment as a page (	endad i administración adeptica e activa activa	د. مسریات					710x	9:4			
		e montant extent compañ :	Martin Artificial State Control of the						angelig lenggery elyer		to come to the part and considering the action of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the			
amilio delle si i ristar elerciae disse se	Later Processes 1 11.			MARLONIA CONTRACTOR OF SECURIOR	d	-		allaharda" -da arar issa			ent desperation of the control of the control of			
							-			:				
PH: +/- 0.1		COND.: +/-•	TEST IS COMPL 10% ORP: 3%			ESSIVE +/- <del>10</del> %			or =-</td <td></td> <td>B LIMITS: TEMP:: +/<del>0:5°C-</del></td>		B LIMITS: TEMP:: +/ <del>0:5°C-</del>			
BOTTLES FILL	ED E	PRESERVA	ATIVE CODES	A - NONE	В-	НИОЗ	C - H2SO4	D - N	laOH	E - HC	L F			
NUMBER SIZ	ZE	TYPE	PRESERVATIV	/E FILTERE	D	NUMBE	R SIZE	TYPE	PR	ESERVATI	/E FILTERED			
<u>.</u> 2 125	mL	VOA	Α	□Y ☑	N				- Landard & Companyor van	FORE C. V. are decreased, equals	_ Y _ N			
( 125	mL	PLASTIC	A	VY V	N		etho terdenaka i sommelikannya yati		DOWN THE PROPERTY OF THE PARTY		□ Y □ N			
125	mL	PLASTIC	В	UY V	N	ar saria sa sa sa sa sa sa sa sa sa sa sa sa sa	THE COURSE SERVICE SERVICES AND ADDRESS OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF T	manari 2 - 24 aw 8 - 1		n i a cha number d'hane as m	□Y □ N			
2 1	L	PLASTIC	В	_ Y 🗸	N		NEW COMMISSION AND ADDRESS OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF T			Michigan Transport	□Y □N			
12	<del>س</del>	01	ρ		_N		<del></del>				☐ Y ☐ N			
SHIPPING METH	IOD:	FEC	EX DA	TE SHIPPED:		VI	1	AIRB	ILL NUM	BER: N/A				
COC NUMBER:		N/A	SIC	SNATURE:	7			DATI	SIGNED	D: je	14/1			

WATER SAMPLE LOG GEC Karn-LF: 2021 GW Compl **CHECKED** PROJECT NAME: **PREPARED** 418425.0000.0000 BY: -AW; JJ; JK) DATE:10-4-21 BY: الم PROJECT NUMBER: DATE: 13.29.21 SAMPLEID: DEK-MW-15004 WELL DIAMETER: ✓ 2" 🔲 4" 🔲 6" 🔲 OTHER ☐ IRON ☐ GALVANIZED STEEL OTHER WELL MATERIAL: √ PVC □ ss  $\square$ ww □ sw ☐ LEACHATE OTHER SAMPLE TYPE: ☑ GW **PURGING** TIME: 14 14 DATE: 10-4-21 SAMPLE TIME: 1446 DATE: 10-4-21 7.12 √ PUMP PERISTALTIC PUMP CONDUCTIVITY: SU umhos/cm **PURGE** METHOD: 0.49 ORP: -125.6 mV DO: BAILER mg/L TURBIDITY: 1.36 DEPTH TO WATER: 27.87 T/ PVC DEPTH TO BOTTOM: 41.80 T/ PVC X NONE SLIGHT ■ MODERATE ☐ VERY LITERS **GALLONS** TEMPERATURE: 15.6 OTHER: WELL VOLUME: NA ✓ LITERS **GALLONS** Chew VOLUME REMOVED: COLOR: ODOR: nome ODOR: 10me Clear NO NO COLOR: FILTRATE (0.45 um) 🔲 YES **TURBIDITY** FILTRATE COLOR: FILTRATE ODOR: □ DUP-🔀 NONE ☐ SLIGHT ☐ MODERATE ☐ VERY QC SAMPLE: MS/MSD DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS: CUMULATIVE WATER **PURGE** CONDUCTIVITY TURBIDITY TEMPERATURE ORP D.O. РΗ TIME LEVEL **PURGE VOLUME** RATE (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GAL OR L) 2.31 28,13 INITIAL  $\mathcal{L}_{00}$ 2,20 7.45 -108.4 15,9 692 2.14 7.38 -137,1 0.78 15.6 28.13 693 1426 200 Д 2.59 7.23 700 - 131.8 16.11 200 0.61 15, 6 28.13 697 7,14 -128.3 0,51 1.95 15.5 200 28.17 1436 1441 7,11 696 0.48 15,5 28,13 200 -126.0 1,47 5 1446 698 15.6 200 ひしる -125.6 0.49 136 2813 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: pH: +/- 0.1 COND .: +/- 3 % ORP: +/- 10 D.O.: +/- 0.3 TURB: +/- 10 % or </= 10 TEMP.: +/-**BOTTLES FILLED** PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 E - HCL D - NaOH NUMBER NUMBER **PRESERVATIVE FILTERED** SIZE **TYPE PRESERVATIVE FILTERED** SIZE **TYPE** NOA |Y|**⊠** N CONL N K 150mL Plastic A N X 125 mL A M 125mL В N X 16 SHIPPING METHOD: Fedex DATE SHIPPED: 10-6-21 AIRBILL NUMBER: DATE SIGNED: COC NUMBER: SIGNATURE: 10-20-21

TRC Kurn BAP/LI WATER SAMPLE LOG

PROJECT	NAME:	CECT	arn LF: 202	1 GW Comp	1	PRI	EPARED	*	CHECKED						
PROJECT	NUMBER	R: 41842	0000 <del>,0000</del>		BY: -AW, JJ, (IR) DATE: 10-4-21 BY: AU DATE: 6.29.21										
SAMPLE	ID: DEN	K-MW	-15003	) WELL	DIAME	ΓER: 🔽	2" 4"	6" OTH	ER						
WELL MAT		✓ PVC	□ss [	IRON [	] GALVA	NIZED S	TEEL	□ отн	ER						
SAMPLE T	YPE:	☑ GW	□ww [	]sw [	] DI		LEACHATE	□ отн	ER						
PUR	SING	TIME:	316	DATE: 10-	4-21		AMPLE	TIME: 173		ATE:10-4-21					
PURGE METHOD	_	PUMP BAILER	PERISTALTIO	CPUMP			<u> 7.11                                   </u>		TIVITY: <u>88°</u> 0,41 mg						
DEPTH TO	WATER:	6.32	T/ PVC			TURBII	1 1								
DEPTH TO	воттом:	15.70	T/ PVC			Юи 🔼	MODERATE	☐ VERY							
WELL VOL	UME:	NA	LITERS	GALLO	ONS	ТЕМРЕ	RATURE:	<u>5.6</u> °c	OTHER: _						
VOLUME F	REMOVED:	_4_	🔀 LITERS	GALLO	ONS	COLOF	: Chear		ODOR:	none					
COLOR: CHEAT ODOR: NOTE FILTRATE (0.45 um) YES X NO															
TURBIDITY FILTRATE COLOR: FILTRATE ODOR:															
<u> </u>	NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP-														
DISPOSAL	DISPOSAL METHOD: Organic DRUM OTHER COMMENTS: Field Blank Collected														
TIME	TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME														
1317	(ML/MIN) LUU	(SU) 7.42	(umhos/cm)	-29.		( mg/L)  ,10	(NTU) 2.75	16.3	6,54	(GAL OR L) INITIAL					
	300	7.20	904	-94.5		2755			6.54	1					
1322							3,24	15.6		2					
1327	700	J'16	904	-107.		841	5.11	15.7	6,54	3					
1332	200	7.14	884	-114.		,42	6.95		6.54	4					
1337	200	7.11	884	- 116.	<u>۲   c</u>	,41	1.64	15.6	6.54	7					
							······	***************************************							
								···							
N	OTE: STAB	ILIZATION '	TEST IS COM	PLETE WHE	N 3 SUC	CESSIVI	E READINGS A	RE WITHIN TI	HE FOLLOWING	G LIMITS:					
pH: +/-	0.1	COND.: +/-	3 % OR	P: +/- <b>10</b>	D.O.	: +/- 0.3	TURB: +/-	<b>10</b> % or	= 10</td <td>TEMP.: +/-</td>	TEMP.: +/-					
BOTTLES	SFILLED	PRESERV	ATIVE CODES	S A - NONE	В	- HNO3	C - H2SO4	D - NaOH	E - HC	L F					
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILT	ERED	NUMBI	ER SIZE	TYPE	PRESERVAT	VE FILTERED					
2	60ml	VOA	Ą	□Y	N	1	125mL	Plastic	ß	□ Y X N					
]	250mL	Plastic	A	□ Y	N K	1		5	<u> </u>	□Y □N					
1	ASML	1	A		ĭX N		Field	Blunk		□Y □N					
	asml	V	ß	□Y	ľ <b>∑</b> N					□Y □N					
2	14	1/	Š	□Y	X N					□Y □N					
SHIPPING	METHOD:	Fedex		DATE SHIPP	ED:	10-	6-21	AIRBILL N	NUMBER:						
COC NUME	BER:			SIGNATURE		Lat	7/	DATE SIG	ENED:	10-20-21					
					7	7	0	<u> </u>							

TRC Kern BAP/LE WATER SAMPLE LOG

PROJECT	NAME:	CEC #	Carn LF: 2021	GW Compl		KED									
PROJECT	NUMBER	R: 41842	5. <del>0000.</del> 0000		BY: A	w, JJ,(J	DATE:10-	4-21	BY: Aw		DATE O. 29.21				
SAMPLE	ID: DEK	- MW-	15006	WELL	DIAME	ER: 🗸	2"	6"	OTHER						
WELL MAT	ERIAL:	☑ PVC	ss [	IRON	GALVA	NIZED S	TEEL		OTHER						
SAMPLE T	YPE:	☑ GW	□ww □	] sw 🔲	DI		LEACHATE		OTHER						
PUR	GING	TIME: 12	06	ATE: 10-4	-21	<u> </u>	AMPLE	TIME:	1232		ATE: 10~4-2)				
PURGE METHOD		PUMP BAILER	PERISTALTIC	PUMP		PH: ORP:	umhos/cm								
DEPTH TO	WATER:	8.17	T/ PVC			ORP: <u>-100.0</u> mV DO: <u>0,35</u> mg/L  TURBIDITY: <u>3.76</u> NTU									
DEPTH TO	воттом:	21.56	T/ PVC			X NONE									
WELL VOL	UME:	NA	LITERS	☐ GALLO	NS	TEMPE	RATURE: <u>/</u>	1.8	℃ от⊦	IER: _					
VOLUME F			LITERS	GALLO	NS	COLOF	e: <u>Chear</u>		ODC	DR:	none				
COLOR:		theur	0	DOR: Non	<u>e</u>	FILTRA	TE (0.45 um)	YES		NO					
			BIDITY				E COLOR:			RATE ODO					
MONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD CDP- DEKBAD  DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS:															
DISPOSAL	DIDGE MATER CHAILATIVE														
TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE LEVEL PURGE VOLUME															
	(ML/MIN)	(SU)	(umhos/cm)	(mV)		mg/L)	(NTU)		°C)	(FEET)	(GAL OR L)				
1207	200	7.32	1048	-71.3	<u>-</u> _	.78	3,25		<u>,                                    </u>	8,25	INITIAL				
1212	200	7,41	992	-119,		.56	3.54	14	,9	8.25	)				
1217	200	7.32	954	-106		,45	2.92	14	19	8.32	2				
1333	200	7.30	940	-94,	λ (	0,39	3.01	14.	9	8,25	3				
13-27	200	7.38	428	- 100	8 0	137	3.08	14.	9	8.25 4					
1232	200	7.30	925	- 100.	0 0	.35	3,76	14.	8	8.25	5				
N	OTE: STAB	ILIZATION	TEST IS COMP	LETE WHEN	1 3 SUC	CESSIVE	E READINGS A	RE WITI	HIN THE F	OLLOWING	G LIMITS:				
pH: +/-	0.1	COND.: +/-	3 % ORF	: +/- 10	D.O.	+/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-				
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	В-	HNO3	C - H2SO4	D -	NaOH	E - HC	L F				
NUMBER	SIZE	TYPE	PRESERVAT	IVE FILT	ERED	NUMBE	R SIZE	TYP	E PR	ESERVATI	VE FILTERED				
4	60mL	VoA	A	□Y	Μ X						□ Y □ N				
4	14	Plastix	ß	ΠY	N K						□Y □N				
2	250mL	1	A		Ŋ N										
2	125mL		ß		X N						□Y □N				
2	125mL	<b>V</b>	A	□Y	X N						□Y □N				
SHIPPING	METHOD:	Fedex		ATE SHIPPE	D:	10-6	21	AIR	BILL NUMI	BER:					
COC NUME	BER:			IGNATURE:		he	Hom	DAT	TE SIGNED	D: /	0-20-21				
٠			1							<del>-</del>					

\* TRC Kern BAPILE WATER SAMPLE LOG

PROJECT	ΓNAME:	CEC F	<del>(arn L</del> F: 202	1 GW Compl		KED									
PROJECT	Г NUMBE	R: 41842	0000 <del>0000</del> .5		BY:	,tt-;WA	DATE: 10-	4-21	BY: Au	7	DATE: 60.29.71				
SAMPLE	ID: DEK	- MIV-	15005	WELL	DIAME	TER: 🗸	2"	6"	OTHER						
WELL MAT	ERIAL:	✓ PVC	□ss [	IRON 🗌	GALV	ANIZED S	STEEL		OTHER						
SAMPLE T	YPE:	☑ GW	□ww [	」sw □	DI		LEACHATE		OTHER	OTHER					
PUR	GING	TIME:	123	DATE: 10-4	-21	S	AMPLE	TIME:	1139		ATE: 10-4-21				
PURGE METHOD	): □	PUMP BAILER	PERISTALTI	C PUMP		PH: ORP:		SU CON	IDUCTIV	1TY: <u>72</u> 40 mg					
DEPTH TO	WATER:	8.18	T/ PVC			TURBI									
DEPTH TO	BOTTOM:	22.29	T/ PVC			Ø NO	NE SL	GHT	□ мо	DERATE	☐ VERY				
WELL VOL	UME:	NA	LITERS	GALLO	NS	TEMPE	RATURE: 1	<u>4,3                                    </u>	с отн	HER: _					
VOLUME	REMOVED:	3	LITERS	GALLO		COLO	R: <u>clear</u>		ODO	OR:	none				
COLOR:	<u>_</u>	lear		DDOR:non	<u>e_</u>	FILTRA	ATE (0.45 um)	YES	<u> </u>	NO					
			BIDITY	_		FILTRATE COLOR: FILTRATE ODOR:									
NONE			MODERATE	VEF		+		/MSD		DUP-					
DISPOSAL	METHOD:	<b>X</b> GROUI	ND DRU	M U OTHER		COMM	IENTS:				×				
TIME	TIME PURGE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE WATER CUMULATIVE LEVEL PURGE VOLUME														
	(ML/MIN)	(SU)	(umhos/cm)	.(mV)		( mg/L)	(NTU)	(°'	C)	(FEET)	(GAL OR L)				
1124	200	6.65	737	-55.1		167	35,21	14.	8	9.01	INITIAL				
1129	200	7.00	737	-96.9	,	0.64 2.08		14.	4	9.01	1				
1134	200	7.05	721	-101.	<b>7</b>	0,46	1.94	14.3		9.01	2				
1139	200	7.06	724	-103		040	1.58	14,		9.01	3				
					$\neg \vdash$										
			***************************************		_										
									TOTAL CONTRACTOR OF THE STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET						
		<u> </u>							_	<u> </u>					
							E READINGS A								
pH: +/-		COND.: +/-		P: +/- 10	D.O.	: +/- 0.3	TURB: +/-	10 %	or =</td <td>10</td> <td>TEMP.: +/-</td>	10	TEMP.: +/-				
BOTTLES			ATIVE CODES	A - NONE	В	- HNO3	C - H2SO4	D - N	laOH	E - HC	L F				
NUMBER	SIZE	TYPE	PRESERVA	TIVE FILTE	RED	NUMB	ER SIZE	TYPE	E PR	ESERVATI	VE FILTERED				
<u>ۍ</u>	60mL	VO A	A	Y	Ø N						Y N				
1	250mL	plastic	A	□ Y	□ <b>X</b> N						□Y □N				
).	125mL		A	□ Y	<b>⊠</b> N						□Y □N				
1	125mL		B	□ Y	N						□Y □N				
2	16	<b>√</b>	B	ΠY	Ŋ <b>K</b>						□Y □N				
SHIPPING	METHOD:	Feche	<	DATE SHIPPE	D:	10-6	-21	AIRB	ILL NUMI	BER: «					
COC NUME	BER:			SIGNATURE:		ful	Um	DATE	E SIGNE		10-20-21				
					7	/	F								

M SAMPLING SITE: SAMPLING TEAM: RELINQUISHED BY: (SIGNATURE) RELINQUISHED BY: (SIGNATURE) DEK Bottom Ash Pond - 2021 Q4 CE CONTROL# 21-1168-01 10-4-31 Consumers Energy 404 -02 10-4-21 H46 18-4-21 10-4-21 16-4-21 SAMPLE DATE 16-4-31 Fed Ox 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533 1337 737 からなり 5211 SAMPLE TIME CONSUMERS ENERGY COMPANY – LABORATORY SERVICES SAMPLE MATRIX DATE/TIME /16/5 DATE/TIME: GW GW G₩ G₩ € ₹ 10-07-21 DATE SHIPPED: PROJECT NUMBER: SAMPLE DESCRIPTION / LOCATION DEK-MW-15002 FB-DEK-BAP DUP-DEK-BAP DEK-MW-15006 DEK-MW-15005 DEK-MW-15004 CHAIN OF CUSTODY 11:30 RECEIVED BY: (SIGNATURE) RECEIVED BY: (SIGNATURE) 21-1168 Trechex SITE SKETCHED ATTACHED? CIRCLE ONE: DEPTH (ft) # OF CONTAINERS Ŷ U Ġ Ŋ × × × × × × Total Metals × × × × × Anions ANALYSIS REQUESTED × × × × × TDS ORIGINAL TO LAB COPY TO CUSTOMER × × × × × Alkalinity COMMENTS PHONE: SEND REPORT TO: CDBatts HD Register, TRC REMARKS Page 1 of 1

<u>ሂ1-1168 Page 18 of 18</u>

30136

RELINQUISHED BY (SIGNATURE) SAMPLING SITE RELINQUISHED BY (SIGNATURE) SAMPLING TEAM CE CONTROL# DEK Bottom Ash Pond & LI - 2021 Q4 21-1169-01 (ot-1h) Consumers Energy -04 ((11 -02/07 -03 (1 11 SAMPLE DATE 135 WEST TRAIL ST., JACKSON, MI 49201 dez 6693 SAMPLE TIME 563 CONSUMERS ENERGY COMPANY - LABORATORY SERVICES SAMPLE MATRIX DATE/TIME DATE/TIME G₩ 10/7/21 GW G₩ GW DATE SHIPPED PROJECT NUMBER SAMPLE DESCRIPTION / LOCATION DEK-MW-18001 DEK-MW-18001 MSD DEK-MW-18001 MS DEK-MW-15003 CHAIN OF CUSTODY RECEIVED BY (SIGNATURE) RECEIVED BY (SIGNATURE) 21-1169 SITE SKETCHED ATTACHED?
CIRCLE ONE DEPTH (ft) (517) 788-1251 # OF CONTAINERS S S × × × × Total Metals アイで × × × × Anions 大のなりつと FAX (517) 788-2533 ANAL YSIS REQUESTED × × TDS - S.3°c ORIGINAL TO LAB × × Alkalinity × COMMENTS COPY TO CUSTOMER PHONE HD Register, TRC SEND REPORT TO CDBatts Page I of I REMARKS

_																					<u>) (</u>	/ >		Γ
	RELINQ		į	RELINOUISHED BY				-		_		! 				21-11	CE CONTROL#	SAIMPLING LEAIM		DEK 1	SAMPLING SITE		Con	
	UISHEĎ		Q	JISHED				-09	-08	9	8	65	-0 <u>+</u>	-03	-02	70-01	OL#	NG I EA		Lined I	AG SITE	1	Sums	
	RELINQUISHEĎ BY (SIGNATURE)	1	/ V	_		 					-06 10-6-21	10-6-21	-04 [0-6-2]	1113	-02 (1 (1)	21-1170-01 tchb(	SAMPLE DATE	×		DEK Lined Impoundment - 2021 Q4			Consumers Energy	
	NATURI			(SIGNATURE)			-				1180		<u> </u>	Įυ	Q	L	├			lment -		135	\ag	
	<u>.</u>		1 3								五	9836	4480	lowa	0880	0.98	SAMPLE TIME			- 2021		WES	CC	
	DATE/TIME	\ 	ic	DATE				₹.	W	GW.	GW	GW	GW	GW	G₩	GW	SAMPLE MATRIX		_	24	-	135 WEST TRAIL ST., JACKSON, MI 49201	CONSUMERS ENERGY COMPANY – LABO	
	TIME		10/7/21				-											DAI	1		PROJ	AIL S	ME	 
		(2x)	12					FB-KLI	EB-KLI	DUP-KLI	SW-DITCH	KLI-PCS	KLI-SCS	OW-12	OW-11	OW-10	MPLEL	DAIESHERED	CTIMAN		PROJECT NUMBER	ST., J	RSE	
		0									ITCH	S	Ç	2	,		SAMPLE DESCRIPTION / LOCATION				ABER.	ACK	NE	CHAIN OF CUST
-	RE			Z.													TON / Lo					SON	<b>RGY</b>	
	RECEIVED # (SIGNATURE)		•	RECEIVED BY (SIGNATURE)								į					CATION		-	71-11/U	21	, MI	CO	
7	By (Sic	<	1	BY (SIG	-	_											-	911E 9F	713 TATE	=	3 .	4920]	MPA	H
	NATUR		•	NATUR													DEPTH (ft)	YES				•	XN	$\mathbf{C}$
	Ē		Į	e												5	# OF CONTAINERS	CIRCLE ONE  YES NO				(517	-LA	US
									1	5	5	5	5	ν.	(A)		OF		1			(517) 788-1251		
			v					×	×	×	×	×	×	×	×	×	Tot	al Metals				-125	RATORY SERVICES	OD
			ع. <del>4</del> °و							×	×	×	×	×	×	×	$\vdash$	ions	·		A.	•	OR	Y
014	ORIG	ō.	ょ							×	×	×	*	×	×	×	TD				NALYS	FΑ	YS	
	ORIGINAL TO LAR	1. chs10 *	S. 3. C							×	×	×_	×	×	×	×	Alk	alinity			ANALYSIS REQUESTED	FAX (517) 788-2533	ERI	
1	AY. C	7	Ċ	ا اع				ļ 													UESTE	517)	ЛC	
				COMMENTS																	В	788-	S	
	OT Vac		į	S	<del></del>																	2533		
0001	COPY TO CUSTOMER			Ì						Not								PHONE	- 	e s		<b></b>		
	MER							<b> </b>									REN	HU Register, I KC		END RE	Page			
								'		Glieded							REMARKS			SEND REPORT TO CDBatts	Page 1 of 1			
										~										6				

21-1170 Page 19 of 19

SAMPLING SITE:

DEK & JCW B:

SAMPLING TEAM: SAMPLING TEAM: DEK & JCW Background- 2021 Q4 RELINQUISHED BY: (SIGNATURE) RELINQUISHED BY: (SIGNATURE) CE CONTROL # 21-1171-01 10-7-7 AOS CE SAMPLE SONTROL # DATE Consumers Energy -05/10-7-21 -04 (b-7-21 081C -02 10-6-21 1602 03 01 112-1-01 100 3000 11.7.01 BOOS 135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533 SAMPLE TIME CONSUMERS ENERGY COMPANY – LABORATORY SERVICES SAMPLE MATRIX G₩ DATE/TIME: DATE/TIME: GW GW GW GW × 10/07/21 DATE SHIPPED: PROJECT NUMBER: SAMPLE DESCRIPTION / LOCATION MW-15008 MW-15002 FB- MW-15702 DUP-Background MW-15019 MW-15016 CHAIN OF CUSTODY (530 RECEIVED BY: (SIGNATURE) RECEIVED BY: (SIGNATURE) 21-1171 SITE SKETCHED ATTACHED? CIRCLE ONE: DEPTH (ft) # OF CONTAINERS 8 S 7 × × × × × × Total Metals 5.850 × × × × × × Anions よのうとうが ANALYSIS REQUESTED × × × × × TDS ORIGINAL TO LAB × × × × × Alkalinity COMMENTS COPY TO CUSTOMER PHONE: **CDBatts** HD Register, TRC SEND REPORT TO: REMARKS Page 1 of 1

33/36

4101 Shuffel Street NW North Canton, OH 44720 **Eurofins TestAmerica, Canton** 

Phone: 330-497-9396 Fax: 330-497-0772 DEK-MW-15004 MI. 48108-7080 DEK-MW-15006 DEK-MW-15005 DEK-MW-15002 Sample Identification 734-971-7080(Tel) 734-971-9022(Fax) Ann Arbor 1540 Eisenhower Place Client Information
Client Contact: Empty Kit Relinquished by: Possible Hazard Identification
Non-Hazard Flammable DUP-DEK-BAP Deliverable Requested: I, II, III, IV, Other (specify) ompany:
RC Environmental Corporation lacob Krenz (arn/Weadock CCR DEK Bottom Ash Pond Krenz@trccompanies.com Custody Seals Intact: Custody Seal No.: Skin Irritant Poison B 표 8 # Due Date Requested: Phone: SSOW#: Project #: 24024154 WO# TAT Requested (days) Compliance Project: Sample Date 12-4-21 10-4-21 12-4-21 15-4-21 10-4-21 Unknown 7,54-395 ام چ 9441 -7 7 125 Sample Time 2851 A Yes Radiological 4084-そろけ 1105 1/00 A No G=grab) B7=Thesis, A=Ab (C=comp, Sample Preservation Code: 6 P 9 6 C Company Company Water Water Matrix Water Water Water Water Kris.Brooks@Eurofinset.com Lab PM: Brooks, Kris M 2 NN <u>₹</u> Time: Ž ٤ Special Instructions/QC Requirements: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mont Perform MS/MSD (Yes or No) × メ × Cooler Temperature(s) °C and Other Remarks × 903.0, Ra226Ra228\_GFPC O 904.0 - Standard Target List Analysis Requested Buch なく 240-157688 Chain of Custody Canel Tracking No(s) State of Origin. Method of Shipment Profinery-2 10/7/21 Total Number of containers A - HCL B - NaDH C - Zn Acetate D - Ntiric Acid E - NaHSO4 F - MeOH G - Amehor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA COC No: 240-87196-29052.1 Preservation Codes: Page 1 of 1 00 Special Instructions/Note: M · Hexane
N · None
O · AsNaO2
P · Na2O4S
O · Na2SO3
R · Na2SO3
S · H2SO4
I · TSP Dodecahydrate
U · Acetione
V · MCAA
W · OH 4.5
Z · other (specify) E7.7 Months

Ver: 06/08/2021

🔆 eurofins

MCHIGAN

**Chain of Custody Record** 

Environment Testing America

Eurofins TestAmerica, Canton 4101 Shuffel Street NW North Canton. OH 44720 Phone: 330-497-9396 Fax: 330-497-0772

# **Chain of Custody Record**

🔆 eurofins Environment Testing America

	ICamalar L			
Client Information	Andrew w.	Brooks, Kris M	Carrier Tracking No(s):   COC No:   240-87168-33282.1	282.1
Client Contact: Jacob Krenz		urofinset.com	State of Origin: Page: Page 1 of 1	
Company TRC Environmental Corporation.	PWSID:	Analysis	Reguested Job#:	
Address 1540 Eisenhower Place	Due Date Requested:	13 sec. 1	Preservation Codes:	odes:
Cay Ann Arbor	TAT Requested (days):		A-HCL B-NaOH	M - Hexane
State. Zip: M1, 48108-7080	Compliance Project: A Yes A No		D. Ninc Acid	P - Na204S
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	- 1		F - MeOH G - Amchior	
	WO#:		H - Ascorbic Acid	
Project Name:	Project #:	or N		W - pH 4-5
Ram/Weadock CCR Background Well	24024154	es c		Z - other (specify)
Sire:	SSOW#:	1SD (Y 228_G	of con Otter	
Sample identification	Sample   Sample   Matrix Type   (W-make). Sample   C=comp, O-membed. Sample   G=crah) st-t	ield Filtered erform MS/M 03.0, Ra226Ra 04.0 - Standard	otal Number (	
	Preserva	X	1	pocial insuractions/note:
MW-15002	10-7-21 0908 6 water	ler XXX	7.	
MW-15008	166-21 1602 / Water	iter × ×	2	
MW-15016	1000	ier .	7	
MW-15019	6-74 0810 / Water	ter Y	17	
DUP-04		řer	7	
EB-04	10-7-11 1010 C Water			
	+	(er		
		240-157750 Chain of Custody	of Custody	
Possible Havard Identification				
ant	Poison B Hohmown Radiological	Sample Disposal ( A fee may be ass	er than	1 170
Other (specify)	4	Requirem	posai by Lau Alchive For	Months
Empty Kit Relinquished by:	Date:	Time:	Method of Shipment	
Reinquished by.	Date Time: Company	Received by	Datertine / / / / / / / / / / /	Company
Reinquished by BY	] هي	y Received by	Date/fime:	Company C
Reinquished by WM	Date/Time: 10/6/7/ 1343 Company	Y Receivage	77	Company
Custody Seals Intact: Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		6 6 ()

Ver: 06/08/2021

35/36

OW-10 EB-KLI KLI-DUP OW-12 OW-11 North Canton, OH 44720 Phone: 330-497-9396 Fax: 330-497-0772 Relinquished by: mpty Kit Relinquished by Deliverable Requested: I, II, III, IV, Other (specify) Non-Hazard Identification

Non-Hazard Flammable Non-Hazard Sample Identification JKrenz@trccompanies.com MI. 48108-7080 Ann Arbor elinquished by: 734-971-7080(Tel) 734-971-9022(Fax) itate, Zip: 1540 Eisenhower Płace Jacob Krenz Client Information
Client Contact: Ompany:
RC Environmental Corporation. arn/Weadock CCR Karn Lined Impoundment Custody Seals Indect/ inquished by: 525. Custody Seal No.: S Skin Irritant Paison B Project #: 24024154 SSOW#: (0/2/1) CIPICI ₩o# 15-6-21 Due Date Requested: Sample Date Compliance Project: FAT Requested (days) AULR 10.8.21 \_\_\_\_ 01812 Unknown 40376 ~ Date: 1230 080 ころこ Oils Sample Time J Yes A No Radiological 255 ってい 545  $\sim$ ر د د (C=comp, G=grab) Sample Type Preservation Code: 0 G C 6 Company Company Company Water Matrix Water Water Water Water Water Kris.Brooks@Eurofinset.com Brooks, Kris M Time Field Filtered Sample (Yes or No) Special Instructions/QC Requirements: Z Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Month Perform MS/MSD (Yes or No) Received by: Received by: × Cooler Temperature(s) °C and Other Remarks Received by:/ 903.0, Ra226Ra228\_GFPC × 904.0 - Standard Target List Analysis Requested 240-157745 Chain of Custody State of Origin: Carrier Tracking No(s) Method of Shipment Date/Gne: Date/Tigle: つ つ う gare/Lime 13 **Total Number of containers** A - HCL
B - NaOH
C - Zn Acetate
D - Miric Acid
E - NaHSOd
F - MeOH
G - Amchlor
H - Ascorbic Acid 1-Ice J-DI Water K-EDTA L-EDA Page 1 of 1 COC No: 240-87198-29054,1 reservation Codes: 0 Special Instructions/Note:  $\tilde{\Sigma}$ Ì M-Hexane
N-None
O-AsNaO2
P-Na2O4S
O-Na2SO3
R-Na2SO3
R-Na2SO3
S-N2SO4
T-TSP Dodecahydrate
U-Acedone
U-Acedone
V-MCAA
W-pH 4-5
Z-other (specify) Company Months

Ver: 06/08/202

MICHIGAN

**Chain of Custody Record** 

4101 Shuffel Street NW

**Eurofins TestAmerica, Canton** 

🔆 eurofins

**Environment Testing** 

36/36

Mag 0/01/16/1	Datefline:	Reprived by Cooler Temperature(s) °C and Othe	Company GTA	1345	Date/Time:   0/8/2/	Custody Seals Mact: Custody Seal No.:
Company C	Date/Time:	Received by	Company	1152	10.8.21	Reinquistrator Fy
174 Company	Date/Time:	Received by	Company	m	Date(Tights /)	H
	Method of Shipment:	À	Time:	*	Date:	Empty Kit Relinquished by:
are retained longer than 1 month)  Archive For Months	Disposal By Lab	Return To Client Special Instructions/QC Require	ļ	Radiological	Poison B Unknown	ble Skin Irritant
	ain of Custody		R			Possible Hazard Identification
1.65						
V. 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1						
			- Water 1	1	150	BEKNILLEON INC. JUNES
U		1	Water ひん	0 (609)		DEK-MW-18001
			Water	(4/0)	[c/712]	DEK-MW-15003
X		ם ם	Preservation Code:	/_\		
Total Number  Special Instructions/Note:		903.0, Ra226Ra 904.0 - Standard	Sample Matrix en SM Type (www.in. iii m SM C=comp, ownside of the SM G=grab) BT-Tusue, (w/w/) iii B.	Sample Type Sample (C=comp,	Sample Date 1	Sample Identification
of con Other:					SSOW#:	Site
tain L - EDA Z - other (specify)			-		Project #: 24024154	Project Name: Karn/Weadock CCR DEK Bottom Ash Pond & I
J - DI Water			_		₩O #:	JKrenz@trccompanies.com
G - Amchlor S - H2SQ4 H - Ascorbic Acid T - TSP Dodecahydrate			o)		TBD #	734-971-7080(Tel) 734-971-9022(Fax)
O - Nitric Acid P - Na204S E - NaHS04 O - Na2S03				A Yes A No	llance Project:	State, Zio: MI, 48108-7080
B - NaOH N · None C - Zn Acetate O · AsNaO2					TAT Requested (days):	City Ann Arbor
ation Code					Due Date Requested:	1540 Eisenhower Place
3ob #:	Requested	nalysis		PWSID		TRC Environmental Corporation.
Page: Page 1 of 1	State of Origin:	E-Mail: Kris.Brooks@Eurofinset.com	E-Mail: Kris.Brooks	,,	Phone: 734 404	Client Contact: Jacob Krenz
COC No: 240-87197-29053.1	Carrier Tracking No(s):	s M	Lab PM: Brooks, Kris M	JAST	Sampler ON Y	Client Information
Environment Testing America	SGAZ		Chain of Custody Record	ain of Cu	Ch	Eurofins TestAmerica, Canton 4101 Shuffel Street NW North Canton, OH 44720 Phone: 330-497-9396 Fax: 330-497-0772



# Appendix C Data Quality Reviews

# Laboratory Data Quality Review Groundwater Monitoring Event October 2021 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the October 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The radium analyses were subcontracted to Eurofins-TestAmerica in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 21-1169 and 240-157754-1.

During the October 2021 sampling event, a groundwater sample was collected from each of the following wells:

DEK-MW-15003

DEK-MW-18001

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

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

# **Data Usability Review Procedure**

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks, 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, 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. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated for the metals, anions, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of 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 method blank was analyzed with each analytical batch for radium. Radium was not detected in the method blanks.
- A field blank was not collected with this data set.
- An equipment blank was not collected with this data set.
- The LCS/LCSD recoveries and relative percent differences (RPDs) for the radium analyses were within QC limits with the following exception. The percent recovery for radium 228

(127%) in LCS 160-531998/1-A was above the acceptance criteria (75-125%); therefore, the positive detection of radium 228 in sample DEK-MW-18001 is potentially biased high as summarized in the attached table, attachment 1.

- MS and MSD analyses were performed on sample DEK-MW-18001 for total metals, anions, and alkalinity. The recoveries were within the acceptance limits. RPDs were not provided by the laboratory (CE) and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Carrier recoveries, where applicable, were within 40-110%.

## Attachment 1

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

Samples	Collection Date	Analyte	Non-Conformance/Issue
DEK-MW-18001	10/7/2021	Radium 228	Percent recovery in LCS above criteria; result is potentially biased high.

# Laboratory Data Quality Review Groundwater Monitoring Event October 2021 DE Karn Lined Impoundment

Groundwater, water, and surface water samples were collected by TRC for the October 2021 sampling event. Samples were analyzed for total metals, anions, total dissolved solids, and alkalinity by Consumers Energy (CE) Laboratory Services in Jackson, Michigan. The radium analyses were subcontracted to Eurofins-TestAmerica in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 21-1170 and 240-157745-1.

During the October 2021 sampling event, a groundwater sample was collected from each of the following wells:

OW-10

OW-11

■ OW-12

During the October 2021 sampling event, the following water/surface water samples were collected:

KLI-SCS

KLI-PCS

SW-DITCH

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

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals	SW-846 6020B/7470A
Alkalinity (Bicarbonate, Carbonate, and Total)	SM 2320B
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

# **Data Usability Review Procedure**

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

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

- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- 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.

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, TDS, and alkalinity analyses.

This data usability report addresses the following items:

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

# **Review Summary**

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

- The reviewed Appendix III, IV, optional Piper diagram analyses, and additional Part 115 constituents will be utilized for the purposes of the detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection or monitoring statistical program, findings below may be used to support the removal of outliers.

# **QA/QC Sample Summary**

- A method blank was analyzed with each analytical batch for radium. Radium was not detected in the method blanks.
- A field blank was not collected with this data set. Total metals were not detected in the blank sample collected during the same event at an adjacent unit (FB-DEK-BAP).
- An equipment blank was not collected with this data set. Total metals were not detected in the blank sample collected during the same event at an adjacent unit (EB-JCW-BAP).

- The LCS/LCSD recoveries and relative percent differences (RPDs) for the radium analyses were within QC limits with the following exception. The percent recovery for radium 228 (127%) in LCS 160-531998/1-A was above the acceptance criteria (75-125%); therefore, positive detections for radium 228 in groundwater samples are potentially biased high as summarized in the attached table, attachment 1.
- MS and MSD analyses were not performed on a sample from this data set.
- A field duplicate pair was not collected with this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Carrier recoveries, where applicable, were within 40-110%.

## Attachment 1

Summary of Data Non-Conformances for Groundwater Analytical Data DE Karn Lined Impoundment – RCRA CCR Monitoring Program Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue	
OW-10	10/6/2021	Radium 228	Percent recovery in LCS above criteria; results are potentially biased high.	
OW-12	10/6/2021	Naululli 220		



# **Appendix D Statistical Analysis**

## Appendix D

# Statistical Summary for DE Karn Lined Impoundment Fourth Quarter 2021

Data from March 2020 to October 2021

	Karn Lined Impoundment Wells									
PARAMETER	Range, Test, or Limit	DEK-MW-15003	DEK-MW-18001	OW-10	OW-11	OW-12				
Boron	Trend	0	0	0	↑ <sup>ASD</sup>	0				
Calcium	Trend	<b>↓</b>	0	↑ <sup>ASD</sup>	<b>↓</b>	0				
Chloride	Trend	<b>^*</b>	0	<b>^*</b>	0	0				
Fluoride	Trend	O*	0	O*	0	O*				
Iron	Trend	0	0	0	0	0				
pН	Trend	0	0	0	↑ <sup>ASD</sup>	0				
Sulfate	Trend	0	↑ <sup>ASD</sup>	0	0	0				
Total Dissolved Solids	Trend	0	0	<b>^</b> *	<u> </u>	0				

#### Notes:

O\* = Non-detect

O = No trend

= Upward trend, continuous

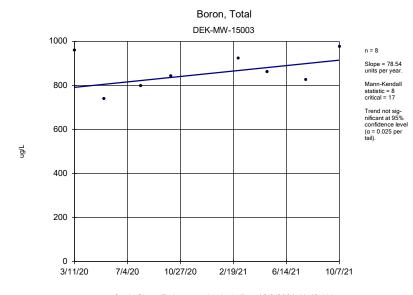
↑\* = Upward trend, new

= Upward trend, confirmed

= Downward trend, continuous

↓\* = Downward trend, new

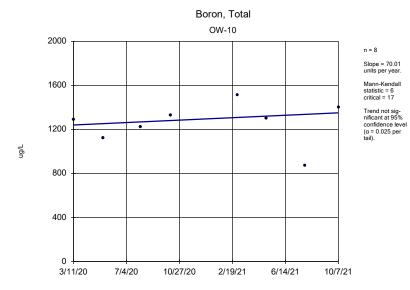
↑ ASD = Alternate Source Demonstration (Second Quarter 2021 Hydrogeological Monitoring Report for the Karn Lined Impoundment CCR Unit, TRC, July 2021.)



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

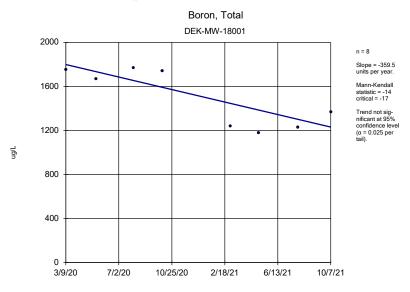
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA



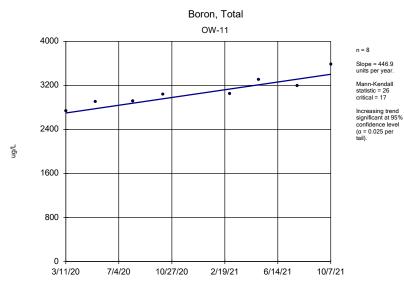
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



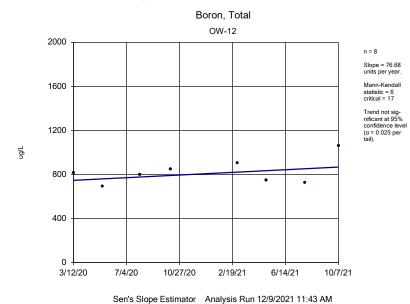
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

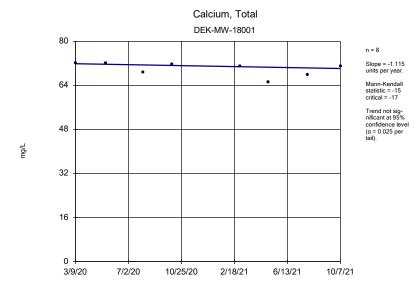
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

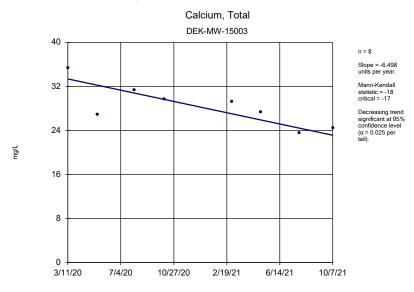


#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA



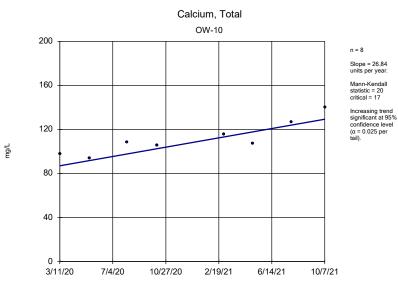
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



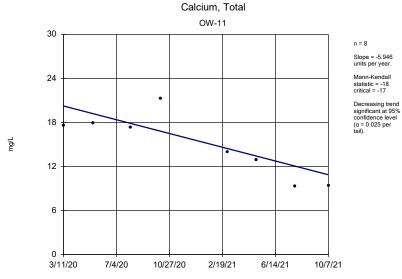
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

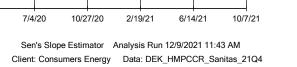
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



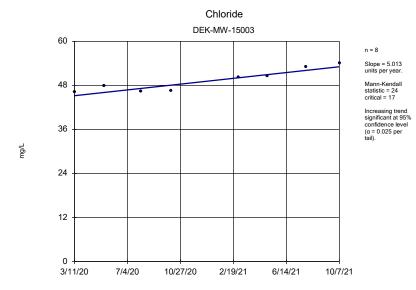
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



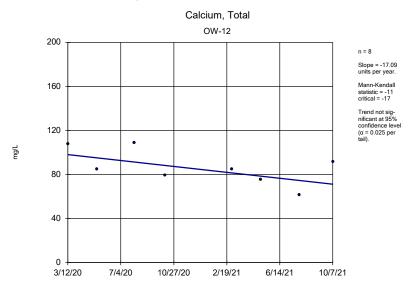


#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA

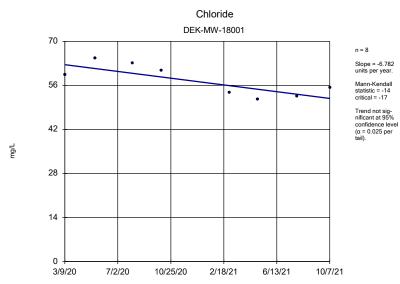


Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

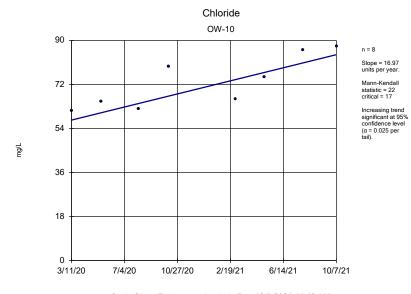


Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

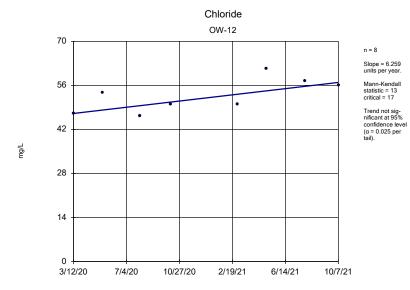
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

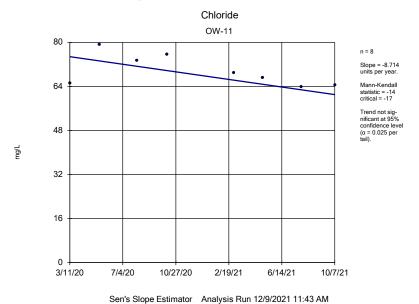
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



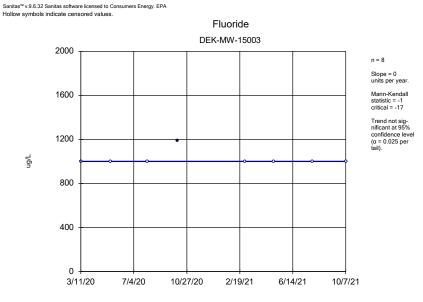


Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



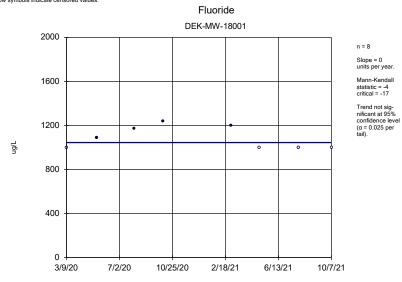
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

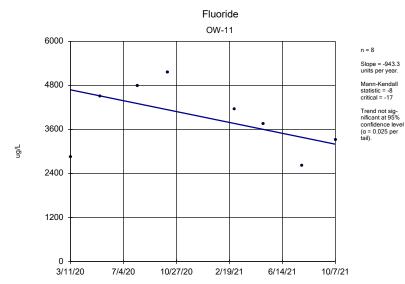
Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

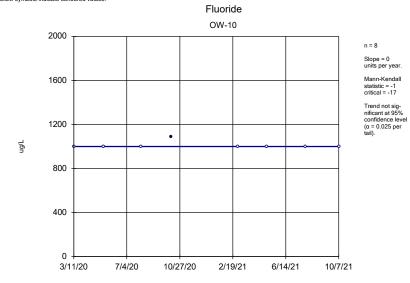
Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

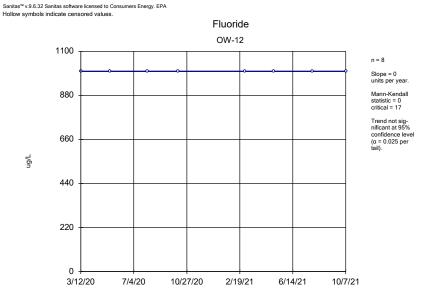
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

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



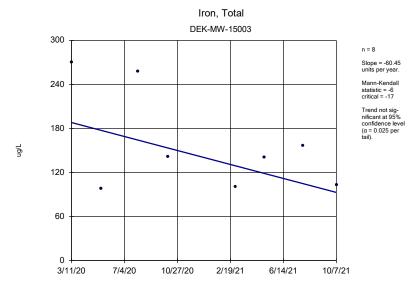
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

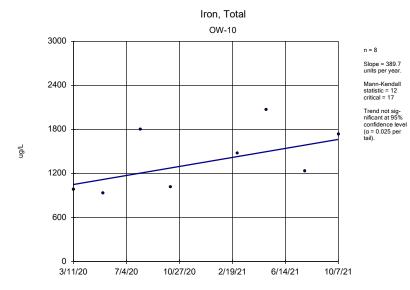
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

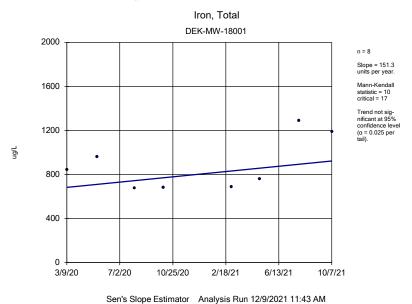
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA

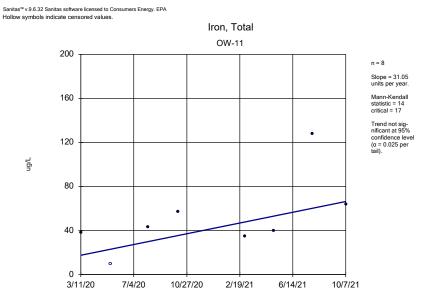


Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

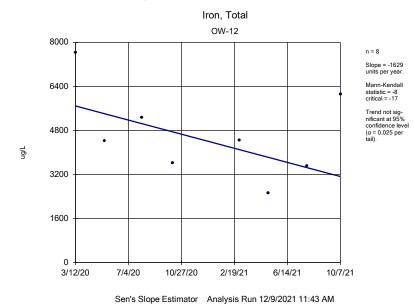


Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

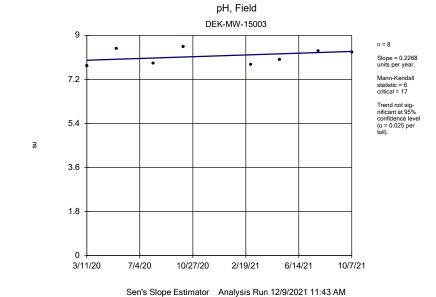


Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

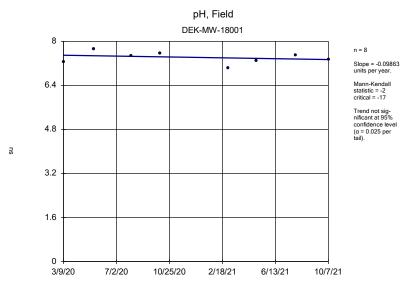


Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



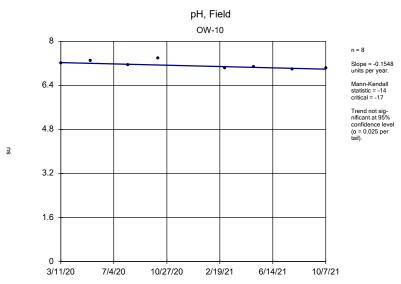
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4





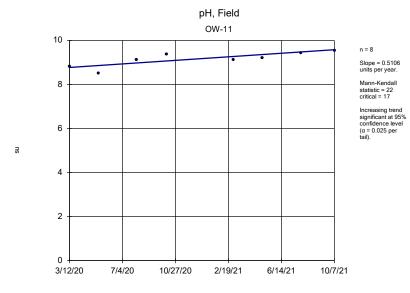
Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:43 AM

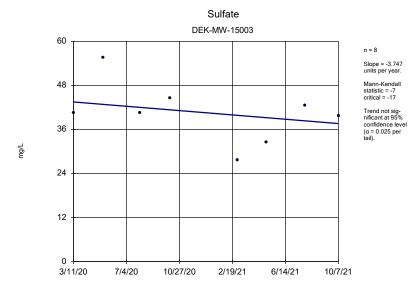
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

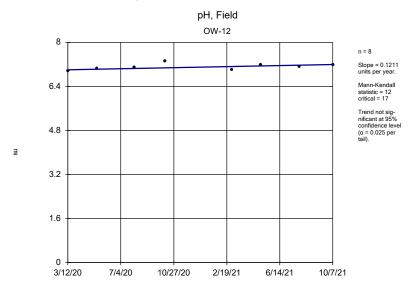
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA

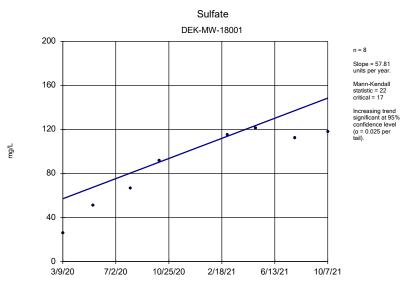


Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

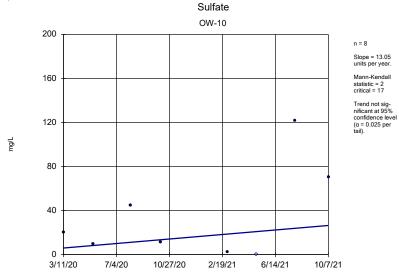


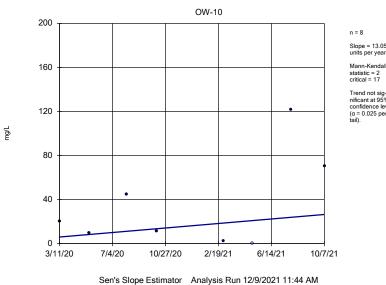
Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



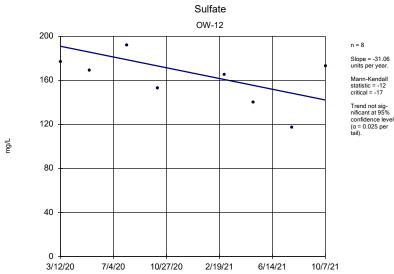


Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

## OW-11 30 Slope = -0.009837 units per year. 24 Mann-Kendall statistic = 0 critical = 17 Trend not sig-nificant at 95% confidence level 18 (α = 0.025 per tail). mg/L 12 6 3/11/20 7/4/20 10/27/20 6/14/21 10/7/21 2/19/21 Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

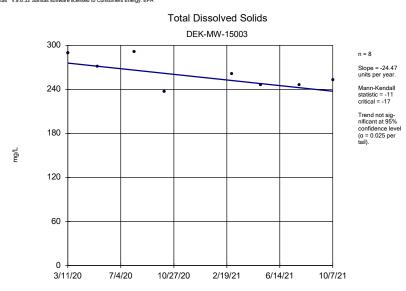
Sulfate



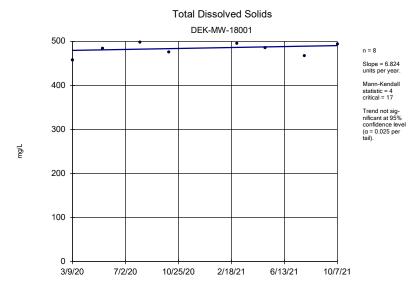


Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

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



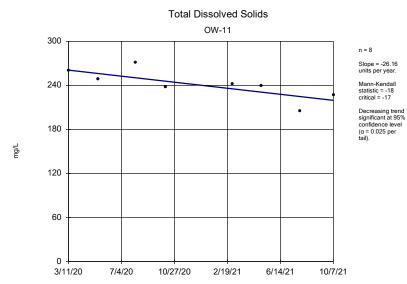
Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

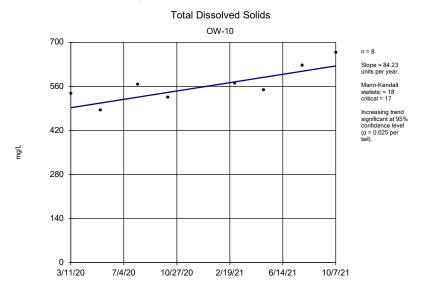
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

#### Sanitas™ v.9.6.32 Sanitas software licensed to Consumers Energy. EPA



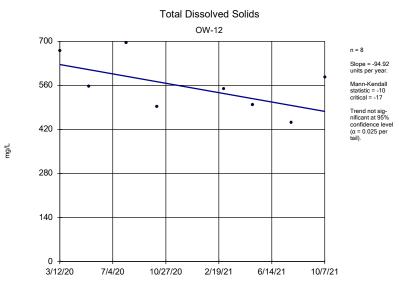
Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4



Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

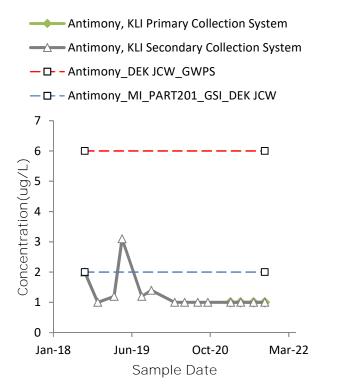


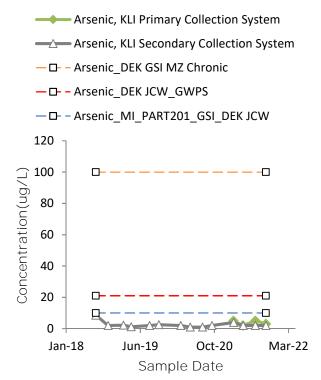
Sen's Slope Estimator Analysis Run 12/9/2021 11:44 AM

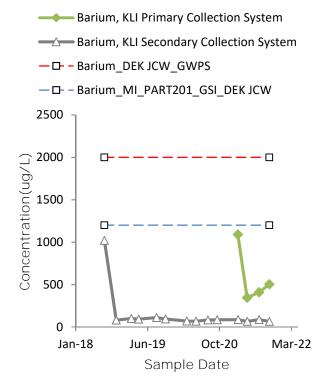
Client: Consumers Energy Data: DEK\_HMPCCR\_Sanitas\_21Q4

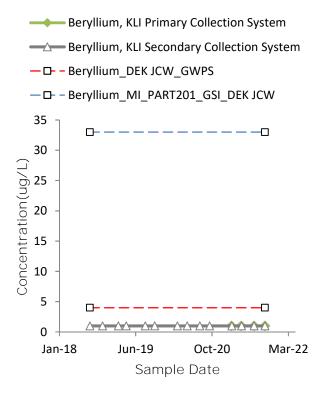


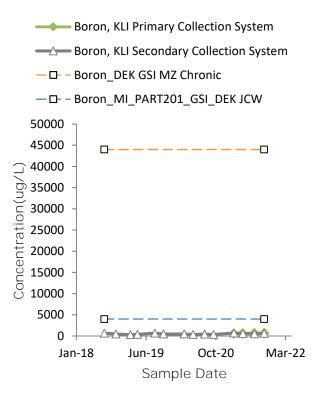
# Appendix E Secondary Leachate Collection System Monitoring

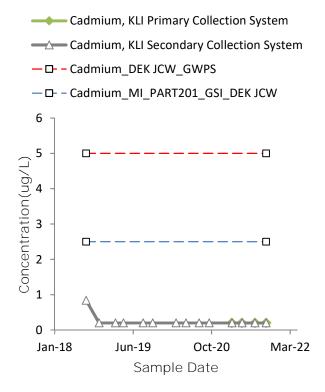


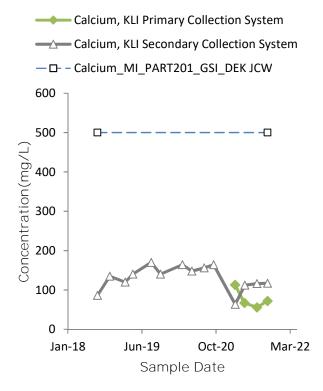


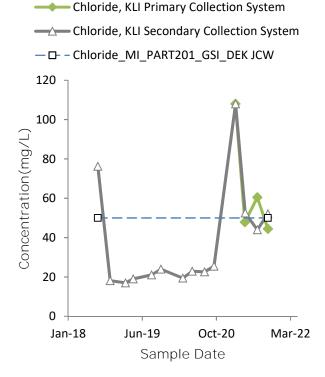


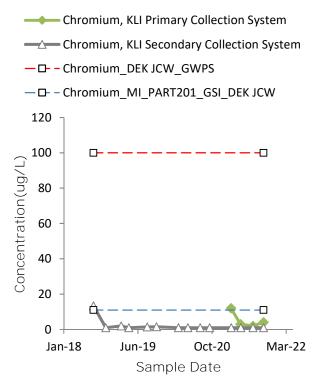


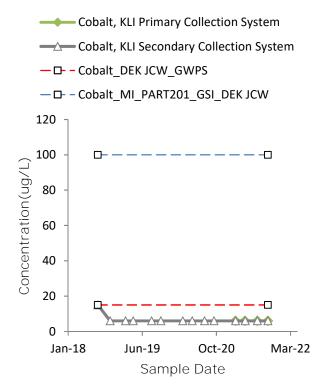


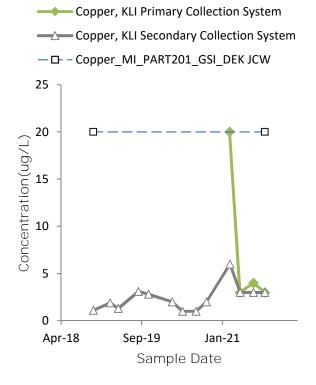


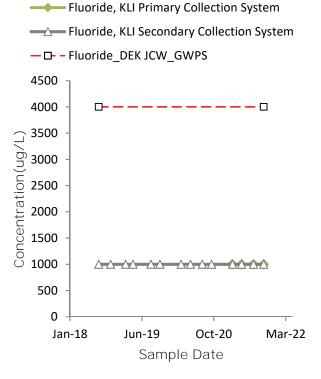












Iron, KLI Primary Collection System
Iron, KLI Secondary Collection System
Iron, KLI Secondary Collection System
Iron\_MI\_PART201\_GSI\_DEK JCW

1000000

100000

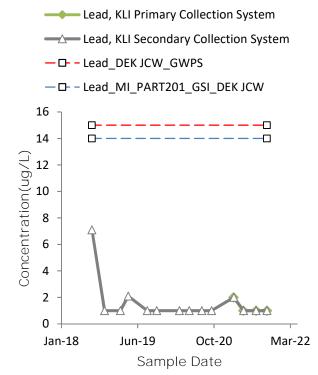
10000

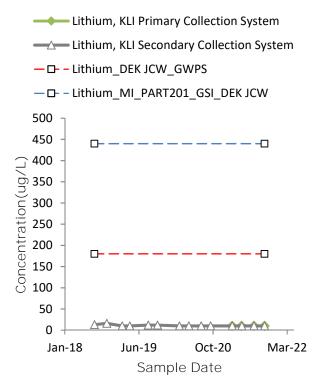
1000

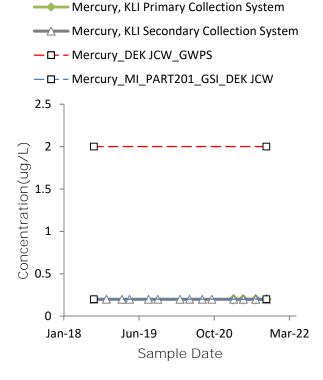
1000

Apr-18 Sep-19 Jan-21

Sample Date







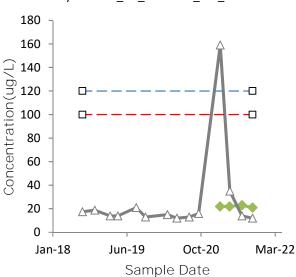
Molybdenum, KLI Primary Collection SystemMolybdenum, KLI Secondary Collection System

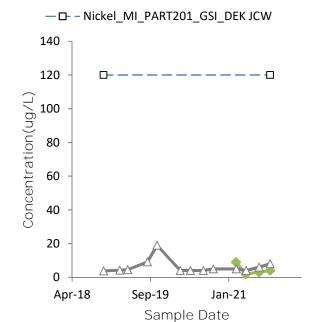
Nickel, KLI Primary Collection System

Nickel KLI Secondary Collection System

— □- - Molybdenum\_DEK JCW\_GWPS

— □ - Molybdenum\_MI\_PART201\_GSI\_DEK JCW



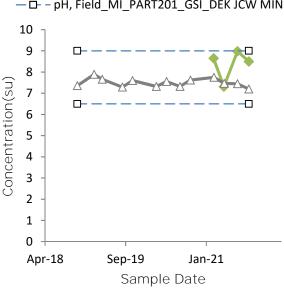


pH, Field, KLI Primary Collection System

pH, Field, KLI Secondary Collection System

pH, Field\_MI\_PART201\_GSI\_DEK JCW MAX

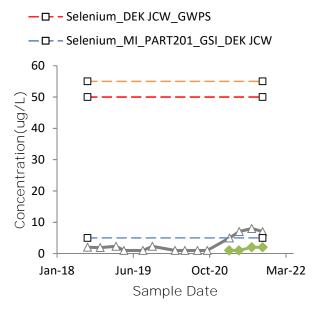
pH, Field\_MI\_PART201\_GSI\_DEK JCW MIN

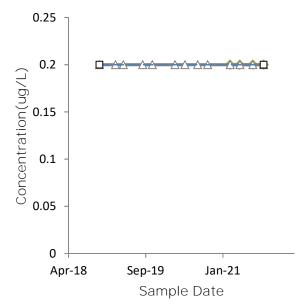


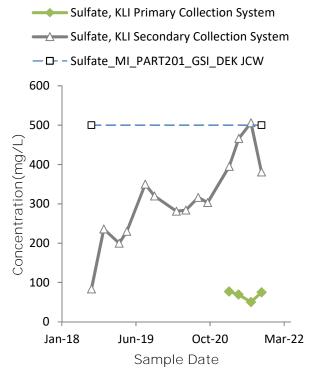
Radium-226/228, KLI Secondary Collection

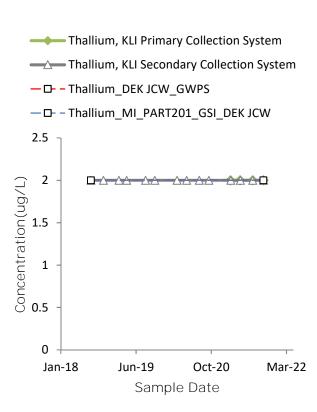
Selenium, KLI Primary Collection System
Selenium, KLI Secondary Collection System
Selenium\_DEK GSI MZ Chronic

Silver, KLI Primary Collection System
Silver, KLI Secondary Collection System
Silver\_MI\_PART201\_GSI\_DEK JCW









- Total Dissolved Solids, KLI Primary Collection System
- Total Dissolved Solids, KLI Secondary Collection System
- □ Total Dissolved Solids\_MI\_PART201\_GSI\_DEK

