

January 29, 2021

TRANSMITTAL VIA EMAIL 01/29/2021

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: 2020 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, 2020 to December 31, 2020.

This 2020 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 April and October 2020 semiannual groundwater monitoring events for the Lined Impoundment. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring constituents to determine if concentrations in detection monitoring well samples exceed background levels.

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



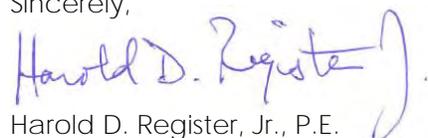
permitting program that would be deemed to be "equivalent to" or "as protective as" through an administrative application that would be reviewed and authorized by U.S. EPA.

The 2020 semiannual monitoring events were completed in April and October 2020 to comply with the CCR Rule. 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. Note that the October 2020 Data Summary will serve as a transition from the Sample Analysis Plan (2018 SAP)¹ and Statistical Evaluation Plan (2018 Stats Plan)² developed per the requirements of the Federal CCR rule, to data collection and reporting requirements per the EGLE-approved HMP. Data collection was completed, and data evaluation was initiated prior to approval of the November 2020 HMP; therefore, data were assessed in accordance with the 2018 SAP and 2018 Stats Plan. A summary of the first semiannual groundwater monitoring event is included in Enclosure 1. A summary of the second semiannual groundwater monitoring event is included in Enclosure 2.

Potential SSIs over background limits were again noted for various Appendix III constituents during the April and October 2020 detection monitoring events; however the January 2020 Alternate Source Demonstration continues to apply, which shows that 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 2020. Per the November 2020 HMP, quarterly monitoring will be performed at the Karn Lined Impoundment in 2021. The next annual monitoring report will cover monitoring conducted in the 2021 calendar year and will be submitted no later than January 31, 2022.

Sincerely,


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

¹ TRC. June 2018. Sample and Analysis Plan – Electric Generation Facilities RCRA CCR Detection Monitoring Program. DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.

² TRC. June 2018. Groundwater Statistical Evaluation Plan – DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.

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Landfill Operations Compliance
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Enclosures

1. May 2020 Detection Monitoring Data Summary, Consumers Energy, DE Karn Site, Lined Impoundment CCR Unit (TRC, July 2020)
2. October 2020 Detection Monitoring Data Summary, Consumers Energy, DE Karn Site, Lined Impoundment CCR Unit (TRC, January 2021)

cc: Mr. Phil Roycraft, EGLE Saginaw Bay District Office
Mr. Gary Schwerin, 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
Mr. Jacob Krenz, TRC

July 24, 2020

Harold Register
Environmental Services
Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

Subject: May 2020 Detection Monitoring Data Summary
Consumers Energy, DE Karn Site, Lined Impoundment CCR Unit

Dear Mr. Register:

Pursuant to the CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2019. This letter report has been prepared to provide the summary of the May 2020 assessment of groundwater monitoring results, data quality review, and statistical data evaluation. This letter also serves as the alternate source demonstration for potential statistically significant increases (SSIs) of Appendix III constituents over background levels, pursuant to §257.94(e)(2).

Detection Monitoring Sampling Summary

In accordance with §257.94, TRC conducted the first semi-annual detection monitoring event for the Karn Lined Impoundment on May 13 through May 15, 2020. The May 2020 event is the CCR detection monitoring compliance event; however, a supplemental sampling event was also conducted on March 11 and 12, 2020 to further assess changing site conditions relative to the dewatering and source removal from the Bottom Ash Pond. Background monitoring well DEK-MW-15003, downgradient monitoring wells DEK-MW-18001, OW-10, and OW-12, and supplemental monitoring well OW-11 were sampled in accordance with the *Sample Analysis Plan* (SAP) (TRC, June 2018). Additionally, a sample was collected from a sump in the secondary collection system (KLI-SCS) such that leachate chemistry could be compared to groundwater chemistry.

The May 2020 sampling event consisted of collecting static water level measurements from the Karn Lined Impoundment groundwater monitoring system. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. Monitoring wells were purged with peristaltic pumps or submersible pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2.

The groundwater samples were analyzed by the Consumers Energy Trail Street Laboratory for both Appendix III and IV constituents in accordance with the SAP. The radium analyses were performed by Eurofins TestAmerica Inc. The analytical results pertaining to the detection monitoring program are summarized in Table 3.

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

Groundwater Flow Rate and Direction

Groundwater elevation data collected during the March and May 2020 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 through May 2020 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 historically the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the pooled area is no longer present. The groundwater elevation data collected near the former bottom ash pond in March and May 2020 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 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 9 and May 11, 2020 in the vicinity of the Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0031 ft/ft and 0.0022 ft/ft, respectively. The gradients were calculated using the 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 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 0.16 ft/day or 57 ft/year in March 2020 and 0.11 ft/day or 40 ft/year in May 2020, 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 during this reporting period, 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 but is also attempting to reach a new equilibrium, as expected. The general flow direction 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.

Analytical Results Summary

Analytical data were found to be usable for assessment monitoring and displayed consistent trends with previous sampling events. The Data Quality Reviews for each event are included as Attachment A.



Time series plots of Appendix III data collected to-date are included as Attachment B. The concentrations of the Appendix III parameters in each of the detection monitoring wells were compared to the established statistical background limits. The comparisons are presented on Table 4. The statistical evaluation of the May 2020 Appendix III indicator parameters showed potential SSIs over background levels for:

- Calcium at OW-10;
- Boron and Fluoride at DEK-MW-18001; and
- pH and Sulfate at OW-12.

There were no SSIs over background levels for chloride or TDS at any of the downgradient wells.

In accordance with §257.94(e)(2), Consumers Energy may demonstrate that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. An Alternate Source Demonstration (ASD) has been prepared following the October 2019 sampling event to address the potential SSIs identified for boron, calcium, chloride, fluoride, sulfate and pH during prior detection monitoring events².

Next Steps

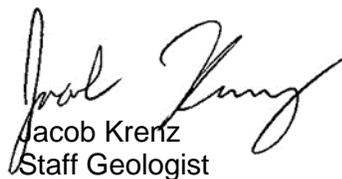
Pursuant to §257.94(e)(2), if a successful ASD is completed within 90 days of detecting an SSI over background, the CCR Unit may continue with the detection monitoring program. The ASD prepared following the October 2019 sampling event determined that the observed SSIs are not attributed to the Karn Lined Impoundment. Therefore, Consumers Energy will continue in a detection monitoring program at the Karn Lined Impoundment. The next semiannual detection monitoring event is scheduled for the fourth calendar quarter of 2020.

Sincerely,

TRC



Darby Litz
Hydrogeologist/Project Manager



Jacob Krenz
Staff Geologist

Attachments:

Table 1	Summary of Groundwater Elevation Data
Table 2	Summary of Field Parameter Results
Table 3	Summary of Groundwater Sampling Results (Analytical)
Table 4	Comparison of Appendix III Parameter Results to Background Limits – May 2020

² TRC. 2019. *Alternate Source Demonstration: October 2019 Detection Monitoring Sampling Event*, DE Karn Lined Impoundment, Consumers Energy Company, Essexville, Michigan. December 19.

Mr. Harold Register
Consumers Energy Company
July 24, 2020
Page 4

Figure 1 Site Location Map
Figure 2 Karn and Weadock Complex Map
Figure 3 Shallow Groundwater Contour Map – May 2020

Attachment A Data Quality Reviews
Attachment B Time Series Plots

cc: Brad Runkel, Consumers Energy
 Bethany Swanberg, Consumers Energy

Tables



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

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)	March 9, 2020		May 11, 2020	
				Depth to Water (ft BTOC)	Groundwater Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background							
MW-15002	587.71	Sand	580.9 to 570.9	6.11	581.60	5.53	582.18
MW-15008	585.36	Sand with clay	578.7 to 568.7	3.66	581.70	3.01	582.35
MW-15016	586.49	Sand	581.2 to 578.2	4.26	582.23	4.73	581.76
MW-15019	586.17	Sand and Sand/Clay	579.5 to 569.5	4.60	581.57	3.95	582.22
DEK Bottom Ash Pond							
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.08	584.79	6.15	584.72
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.71	583.33	27.48	583.56
DEK-MW-15005	589.72	Sand	572.3 to 567.3	8.32	581.40	7.24	582.48
DEK-MW-15006	589.24	Sand	573.0 to 568.0	7.83	581.41	6.72	582.52
DEK Bottom Ash Pond & Karn Lined Impoundment							
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.36	586.38	16.19	586.55
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.32	585.15	8.27	585.20
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.38	585.20	6.36	585.22
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.38	586.52	21.20	586.70
OW-12	603.07	Silty Sand	584.2 to 579.2	17.16	585.91	17.03	586.04
DEK Nature and Extent							
MW-01	597.02	Sand	573.0 to 570.0	15.45	581.57	14.60	582.42
MW-03	597.30	Sand	569.8 to 566.8	15.81	581.49	14.85	582.45
MW-06	589.43	Sand and Silty Sand	578.5 to 563.5	7.70	581.74	6.90	582.53
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	16.76	582.02	16.18	582.60
MW-10	596.97	Sand	582.5 to 572.5	14.84	582.13	14.20	582.77
MW-12	598.60	Sand	583.9 to 573.9	16.83	581.77	16.20	582.40
MW-14	594.36	Sand and Silty Clay	584.7 to 574.7	12.60	581.77	11.87	582.49
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	14.29	581.51	13.48	582.32
MW-22	598.99	Ash/Sand	571.4 to 568.4	15.92	583.07	15.60	583.39
MW-23	595.57	Ash/Sand	576.9 to 571.9	12.13	583.44	12.05	583.52
DEK Bottom Ash Pond and Lined Impoundment (water level only)							
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	15.78	581.56	14.95	582.39
MW-04	598.01	NR	569.5 to 564.5	16.52	581.49	15.60	582.41
MW-17	597.91	Sand	577.0 to 574.0	12.60	585.31	12.51	585.40
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	25.47	583.75	25.20	584.02
MW-19	597.28	NR	572.1 to 567.1	15.59	581.69	14.70	582.58
MW-20	631.44	Sand	582.3 to 579.3	51.11	580.33	50.35	581.09
MW-21	632.91	Sand	587.1 to 584.1	50.18	582.73	50.00	582.91
OW-01	630.17	NR	572.5 to 567.5	49.61	580.56	48.95	581.22
OW-02	598.01	Fly Ash	579.4 to 576.4	14.08	583.93	14.55	583.46
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	15.46	582.48	15.02	582.92
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	8.40	581.81	7.77	582.44
OW-05	593.53	Sand	576.9 to 571.9	11.50	582.03	11.10	582.43
OW-06	603.76	NR	580.9 to 575.9	20.20	583.80	20.45	583.31
OW-07	596.41	Ash	583.3 to 580.3	13.00	583.41	13.12	583.29
OW-08	593.93	NR	581.0 to 576.0	10.49	583.44	10.40	583.53
OW-09	593.45	NR	585.5 to 580.5	10.80	582.65	10.00	583.45
OW-13	588.52	NR	579.5 to 574.5	3.65	584.87	4.08	584.44
OW-15	587.75	NR	572.8 to 567.8	4.18	583.57	4.30	583.45

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: March & May 2020
 Karn Lined Impoundment - Essexville - RCRA CCR Monitoring Program
 Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Karn Lined Impoundment							
DEK-MW-15003	3/11/2020	0.25	-72.4	7.8	471	15.1	1.2
	5/14/2020	1.98	9.9	8.5	446	12.2	2.0
DEK-MW-18001	3/9/2020	0.23	-69.4	7.3	551	10.9	1.1
	5/14/2020	1.55	-71.0	7.7	840	9.3	3.8
KLI-SCS	3/11/2020	2.61	64.5	7.3	1,101	8.5	19.0
	5/13/2020	2.92	118.1	7.6	1,043	11.5	9.6
OW-10	3/11/2020	0.18	-21.3	7.2	895	10.4	8.3
	5/14/2020	0.82	131.1	7.3	1,252	9.3	16.0
OW-11	3/12/2020	0.39	47.2	8.8	345	10.7	3.0
	5/14/2020	0.83	152.1	8.5	819	10.2	3.0
OW-12	3/12/2020	0.68	-62.1	7.0	578	10.8	7.0
	5/14/2020	0.57	57.9	7.1	1,523	11.2	6.2

Notes:

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard Units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

Table 3
 Summary of Groundwater Sampling Results (Analytical): March 2020 - May 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

						Sample Location:		DEK-MW-15003		DEK-MW-18001		OW-10		OW-12	
						Sample Date:		3/11/2020	5/14/2020	3/9/2020	5/14/2020	3/11/2020	5/14/2020	3/12/2020	5/14/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background		downgradient							
Appendix III															
Boron	ug/L	NC	500	500	4,000	975	739	1,750	1,670	1,290	1,100	816	693		
Calcium	mg/L	NC	NC	NC	500	35.1	26.9	72.2	72.1	97.6	94.9	108	84.9		
Chloride	mg/L	250**	250	250	50	43.8	47.9	59.4	64.7	61.4	64.6	47.1	53.8		
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	1,090	< 1,000	< 1,000	< 1,000	< 1,000		
Sulfate	mg/L	250**	250	250	500	37.2	55.6	25.9	51.1	20.6	12.4	177	169		
Total Dissolved Solids	mg/L	500**	500	500	500	288	271	458	484	538	480	669	557		
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.8	8.5	7.3	7.7	7.2	7.3	7.0	7.1		
MI Part 115 Parameters															
Iron	ug/L	300**	300 ⁽¹⁾	300 ⁽¹⁾	500,000	269	98	843	962	982	950	7,630	4,430		

Notes:

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.

-- - 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)

- 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.

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.

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

Table 3
 Summary of Groundwater Sampling Results (Analytical): March 2020 - May 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Sample Location:		Sample Date:	
						OW-11	KLI-SCS	3/11/2020	5/14/2020
						Supplemental			
Appendix III									
Boron	ug/L	NC	500	500	4,000	2,740	2,900	477	347
Calcium	mg/L	NC	NC	NC	500	17.6	17.9	164	148
Chloride	mg/L	250**	250	250	50	65.1	79.3	19.4	22.9
Fluoride	ug/L	4,000	NC	NC	NC	2,850	4,510	< 1,000	< 1,000
Sulfate	mg/L	250**	250	250	500	24.9	25.7	281	284
Total Dissolved Solids	mg/L	500**	500	500	500	260	249	863	877
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	8.8	8.5	7.3	7.6
MI Part 115 Parameters									
Iron	ug/L	300**	300 ⁽¹⁾	300 ⁽¹⁾	500,000	38	< 20	906	617

Notes:

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.

-- - 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.

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

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.

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

Table 4
 Comparison of Appendix III Parameter Results to Background Limits – March 2020 & May 2020
 DE Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

		Sample Location:	DEK-MW-18001	OW-10	OW-12
		Sample Date:	5/14/2020	5/14/2020	5/14/2020
Constituent	Unit	UTL	Downgradient		
Appendix III					
Boron	ug/L	1,400	1,670	1,100	693
Calcium	mg/L	94.1	72.1	94.9	84.9
Chloride	mg/L	67.2	64.7	64.6	53.8
Fluoride	ug/L	1,000	1,090	< 1,000	< 1,000
Sulfate	mg/L	103	51.1	12.4	169
Total Dissolved Solids	mg/L	559	484	480	557
pH, Field	SU	7.3 - 8.4	7.7	7.3	7.1

Notes:

ug/L - micrograms per liter

mg/L - milligrams per liter

SU - standard units; pH is a field parameter

All metals were analyzed as total unless otherwise specified.

RESULT Shading and bold font indicates an exceedance of the Upper Tolerance Limit (UTL) using the number of significant figures in the UTL.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



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

TRC - GIS

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

DRAWN BY:	S. MAJOR
CHECKED BY:	J. KRENZ
APPROVED BY:	D. LITZ
DATE:	JULY 2020
PROJ. NO.:	367388.0001
FILE:	367388-001-004.mxd

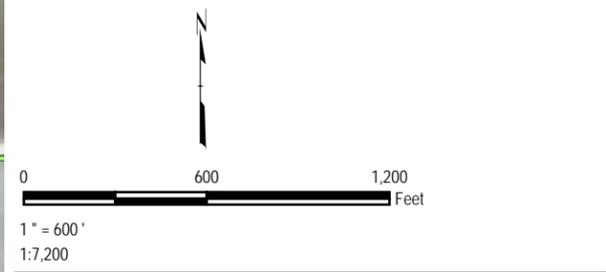
FIGURE 1



LEGEND

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- MONITORING WELL (STATIC ONLY)
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- SLURRY WALL (APPROXIMATE)
- EXTENT OF GEOSYNTHETICS (KARN LINED IMPOUNDMENT)
- GROUNDWATER ELEVATION CONTOUR (1' INTERVAL, DASHED WHERE INFERRED)
- (580.50)** GROUNDWATER ELEVATION (FEET)
- (NM)** NOT MEASURED

- ### NOTES
- BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
 - WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 - NOA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 - GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



PROJECT:		CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE:		SHALLOW GROUNDWATER CONTOUR MAP MAY 11, 2020	
DRAWN BY:	S. MAJOR	PROJ NO.:	367388.001
CHECKED BY:	J. KRENZ	FIGURE 3	
APPROVED BY:	D. LITZ		
DATE:	JULY 2020		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com	
FILE NO.:		367388-001-006.mxd	

Attachment A

Data Quality Reviews

Laboratory Data Quality Review Groundwater Monitoring Event March 2020 CEC DE Karn Lined Impoundment

Groundwater samples were collected by TRC for the March 2020 sampling event. Samples were analyzed for metals, alkalinity, anions, and total dissolved solids (TDS) by CE Laboratory Services in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 20-0231.

During the March 2020 sampling event, a groundwater sample was collected from each of the following wells:

- OW-10
- OW-11
- OW-12
- KLI-SCS
- DEK-MW-15003
- DEK-MW-18001

Each sample was analyzed for the following constituents:

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

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

Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017). 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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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 the laboratory. 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.

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 Piper Diagram, Appendix III, Appendix and IV constituents as well as iron, copper, nickel, silver, vanadium, and zinc 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

- Preparation dates were not provided by the laboratory. Since the analyses were performed within the preparation holding times, where applicable, there is no impact on data usability due to this issue.
- One equipment blank (EB-04) and one field blank (FB-04) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample OW-11 for mercury, metals, alkalinity, and anions.
 - The recoveries were within the acceptance limits with the exception of alkalinity in the MS and MSD which recovered above the acceptance limits. However, the laboratory stated in the case narrative and in an email during this review that it appears the spike amount was inadvertently doubled. Therefore, there is likely no impact on data usability based on this issue.
 - 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 with the exception of alkalinity, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-04/DEK-MW-15003. All criteria were met.

- Laboratory duplicate analyses were not performed on a sample from this data set.
- The laboratory RLs were at or below the project-required RLs with one exception. The nondetect RL for cadmium in sample OW-11 (0.5 ug/L) was raised by the laboratory due to matrix interference and thus, was above the project-specified RL (0.2 ug/L).

Laboratory Data Quality Review Groundwater Monitoring Event May 2020 CEC DE Karn Lined Impoundment

Groundwater samples were collected by TRC for the May 2020 sampling event. Samples were analyzed for 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) 20-0500. Samples were analyzed for radium 226, 228 and combined radium by Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in SDG 240-130404-1.

During the May 2020 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 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
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 USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) 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;
- 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.

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 and IV constituents as well as iron, copper, nickel, silver, vanadium, and zinc 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 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-228 was detected in MB 160-470963/20-A at 0.4163 +/- 0.243 pCi/L. No data were affected as radium-228 was not detected in any samples.
- One equipment blank (EB-01) and one field blank (FB-01) were collected. Target analytes were not detected in the equipment or field blank samples.

- 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-01 and OW-10; RPDs between the parent and duplicate sample were within the QC limits with the following exceptions:
 - The RPD for sulfate (55.4%) exceeded the acceptance limits. Potential uncertainty exists for all positive results for sulfate, as summarized in the attached table, Attachment 1. Results for sulfate in samples collected from OW-10, OW-11, OW-12, and the KLI-SCS are all within range of historical data and are deemed usable for their intended purposes.
 - The RPD for chromium (66.7%) exceeded the acceptance limits. Potential uncertainty exists for all positive results for chromium, as summarized in the attached table, Attachment 1. Results for chromium in samples collected from OW-10, OW-11, OW-12, and the KLI-SCS are all within range of historical data and are deemed usable for their intended purposes.
 - The RPD for copper (66.7%) exceeded the acceptance limits. Potential uncertainty exists for all positive results for copper, as summarized in the attached table, Attachment 1. Results for copper in samples collected from OW-10, OW-11, OW-12, and the KLI-SCS are all within range of historical data and are deemed usable for their intended purposes.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Samples did not undergo a 21-day wait period prior to radium-226 analysis; however, combined radium results were < 5 pCi/L so there is no impact on data usability.
- 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 OW-11 OW-12 KLI-SCS DUP-01	5/14/2020 5/14/2020 5/14/2020 5/14/2020 5/14/2020	Sulfate	Field duplicate analysis exceeds acceptance criteria (<30% RPD); indicates potential uncertainty in sulfate results. However, results were consistent with historical results; therefore, data usability is not affected.
OW-10 DUP-01	5/14/2020 5/14/2020	Chromium	Field duplicate analysis exceeds acceptance criteria (<30% RPD); indicates potential uncertainty in chromium results. However, results were consistent with historical results; therefore, data usability is not affected.
OW-10 KLI-SCS DUP-01	5/14/2020 5/14/2020 5/14/2020	Copper	Field duplicate analysis exceeds acceptance criteria (<30% RPD); indicates potential uncertainty in copper results. However, results were consistent with historical results; therefore, data usability is not affected.

Laboratory Data Quality Review Groundwater Monitoring Event May 2020 DE Karn Bottom Ash Pond/ Lined Impoundment

Groundwater samples were collected by TRC for the May 2020 sampling event. Samples were analyzed for 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) 20-0499. Samples were analyzed for radium 226, 228 and combined radium by Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in SDG 240-130413-1.

During the May 2020 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
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 USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) 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;
- 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.

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

This data usability report addresses the following items:

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

Review Summary

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

- The reviewed Appendix III and IV constituents as well as iron, copper, nickel, silver, vanadium, and zinc 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:

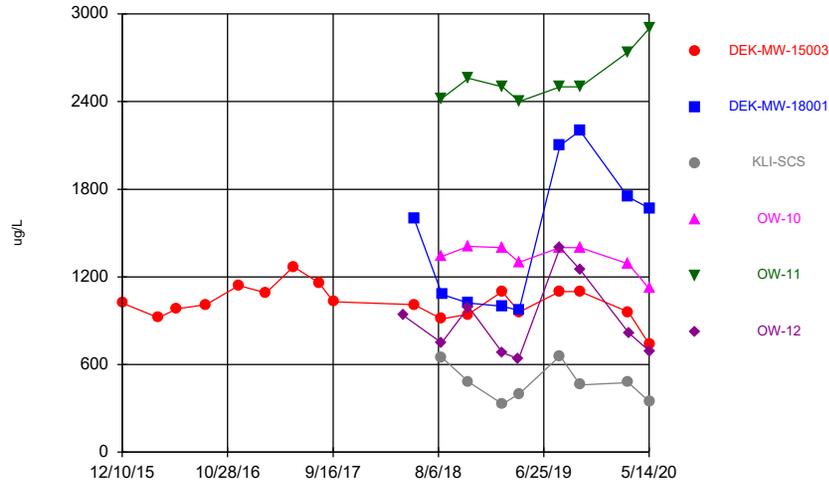
- A method blank was analyzed with each analytical batch for radium; target analytes were not detected in the method blank samples.
- An equipment blank was not collected in this data set.
- A field blank was not collected in this data set.
- The LCS and LCSD recoveries and relative percent differences (RPDs) for radium-226 analysis were within QC limits. The RPDs for radium-228 were within QC limits. Radium-228 recovered above the upper acceptance limit in LCSD 160-470952/2-A; no data are affected as radium-228 was not detected in the samples.

- MS and MSD analyses were performed on sample DEK-MW-18001 for metals, anions, and alkalinity. The recoveries were within the acceptance limits. 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 in this data set.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Samples did not undergo a 21-day wait period prior to radium-226 analysis; however, combined radium results were < 5 pCi/L so there is no impact on data usability.
- Carrier recoveries, where applicable, were within 40-110%.

Attachment B

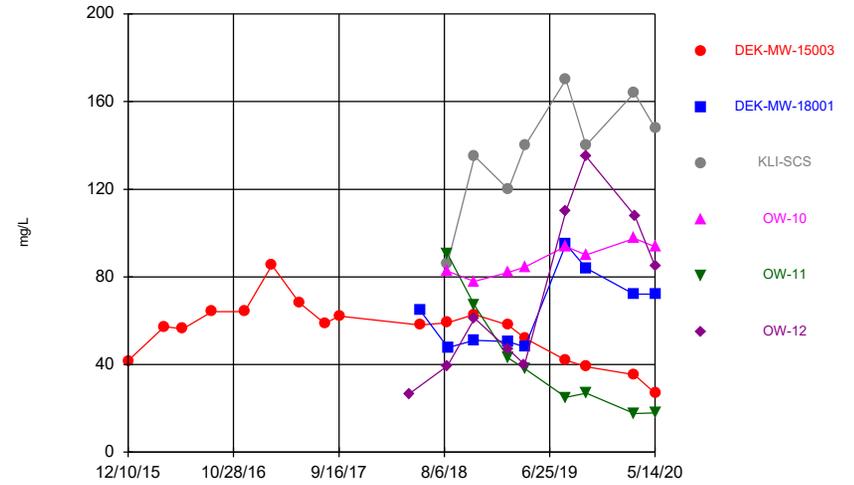
Time Series Plots

Boron, Total



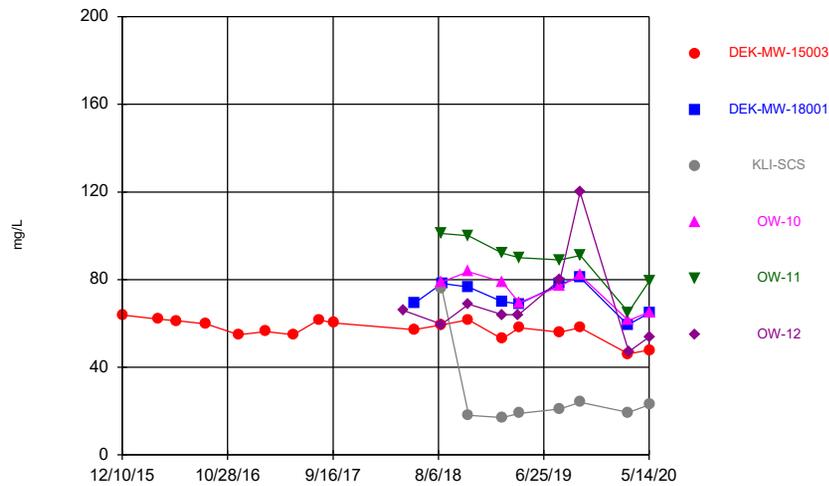
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Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

Calcium, Total



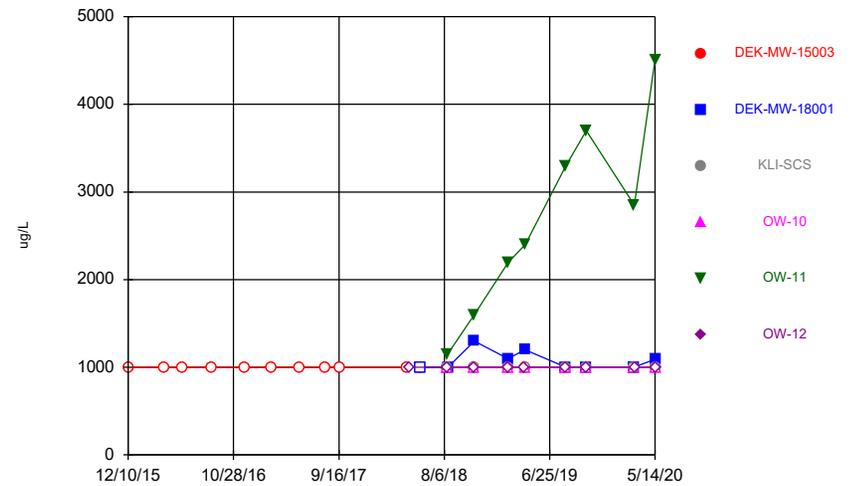
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Chloride



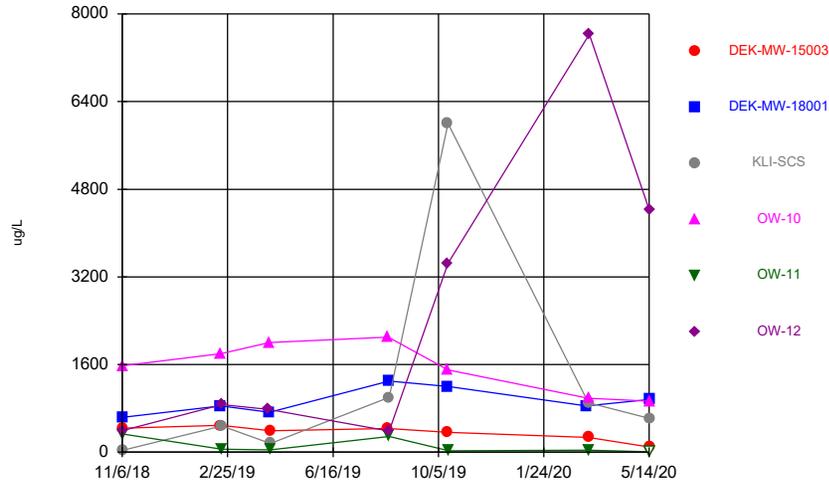
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Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

Fluoride



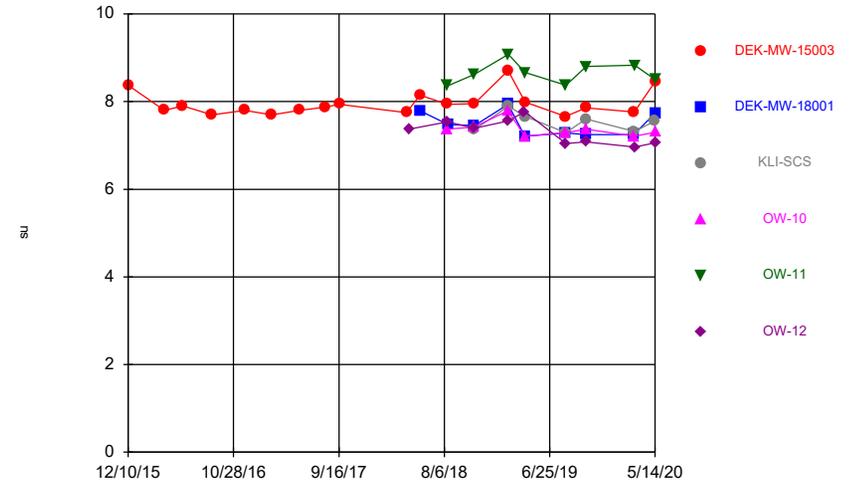
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Iron, Total



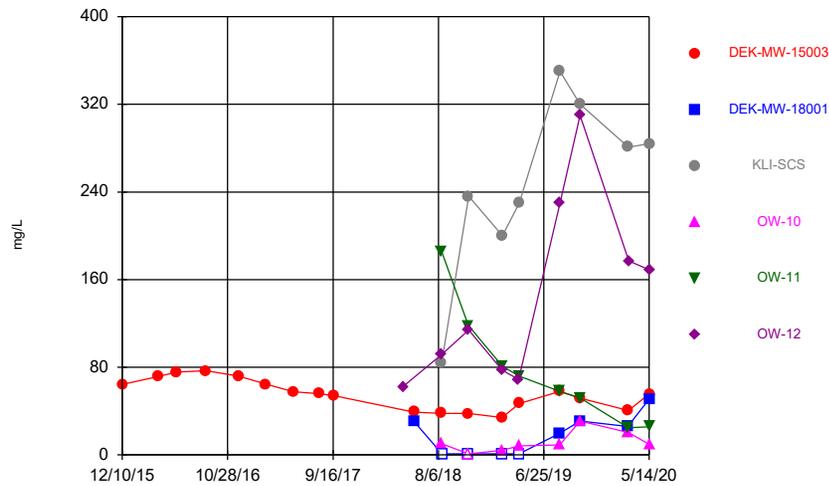
Time Series Analysis Run 7/9/2020 10:21 AM
 Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

pH, Field



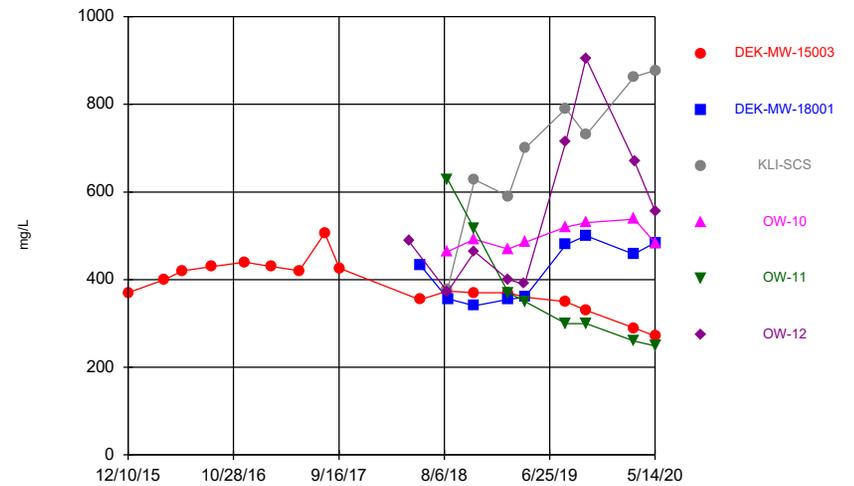
Time Series Analysis Run 7/9/2020 10:21 AM
 Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

Sulfate



Time Series Analysis Run 7/9/2020 10:21 AM
 Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

Total Dissolved Solids



Time Series Analysis Run 7/9/2020 10:21 AM
 Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev

January 29, 2021

Harold Register
Environmental Services
Consumers Energy
1945 W. Parnall Road
Jackson, MI 49201

VIA email: Harold.RegisterJR@cmsenergy.com

Subject: October 2020 Detection Monitoring Data Summary
Consumers Energy, DE Karn Site, Lined Impoundment CCR Unit

Dear Mr. Register:

Pursuant to the Federal CCR Rule¹, Consumers Energy initiated a detection monitoring program for the Karn Lined Impoundment that went into service on June 7, 2019. After establishing the groundwater monitoring system and detection monitoring project pursuant to the requirements and schedule of §257.90 - §257.94, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) December 28, 2018 to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. This alignment would ensure compliance with the CCR standards through a state-approved permitting program that would be deemed to be “equivalent to” or “as protective as” through an administrative application that would be reviewed and authorized by U.S. EPA. On November 6, 2020 Consumers Energy submitted the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (November 2020 HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on November 13, 2020.

Statement of Adherence to Approved Hydrogeological Monitoring Plan

This DE Karn October 2020 Detection Monitoring Data Summary (Report) has been prepared by TRC on behalf of Consumers Energy to present groundwater monitoring data collected from the DE Karn Lined Impoundment during the third and fourth calendar quarter of 2020. Note that this report will serve as a transition from the *Sample Analysis Plan* (2018 SAP)² and *Statistical Evaluation Plan* (2018 Stats Plan)³ developed per the requirements of the Federal CCR rule, to data collection and reporting requirements per the EGLE-approved HMP. Data collection was completed, and data evaluation was initiated prior to approval of the November 2020 HMP; therefore, data were assessed in accordance

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

² TRC. June 2018. Sample and Analysis Plan – Electric Generation Facilities RCRA CCR Detection Monitoring Program. DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.

³ TRC. June 2018. Groundwater Statistical Evaluation Plan – DE Karn Power Plant Lined Impoundment, Essexville, Michigan. Prepared for Consumers Energy Company.

with the 2018 SAP and 2018 Stats Plan. The secondary collection system monitoring outlined in the HMP began in December 2020 to adhere with the HMP requirements. This report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the July 5, 2013 Michigan Department of Environmental Quality - Office of Waste Management and Radiological Protection (MDEQ-OWMRP), now the EGLE Materials Management Division (MMD) communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 Format for Solid Waste Disposal Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ.

Detection Monitoring Sampling Summary

In accordance with §257.94, TRC conducted the first semi-annual detection monitoring event for the Karn Lined Impoundment on October 5 through 8, 2020, prior to the approval of the November 2020 HMP. The October 2020 event is the CCR detection monitoring compliance event; however, a supplemental sampling event was also conducted on August 3 through 5, 2020 to further assess changing site conditions relative to the dewatering and source removal from the Bottom Ash Pond. Background monitoring well DEK-MW-15003, downgradient monitoring wells DEK-MW-18001, OW-10, and OW-12, and supplemental monitoring well OW-11 were sampled in accordance with the 2018 SAP. Additionally, a sample was collected from a sump in the secondary collection system (KLI-SCS) such that leachate chemistry could be compared to groundwater chemistry. The locations of the monitoring wells are depicted on Figure 2. There were no changes to the groundwater monitoring system during the time period covered by this report. There were no wells that were installed or decommissioned.

The October 2020 sampling event consisted of collecting static water level measurements from the Karn Lined Impoundment groundwater monitoring system. Static water elevation data are summarized in Table 1 and groundwater elevation data are shown on Figure 3. Monitoring wells were purged with peristaltic pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Stabilized field parameters for each monitoring well are summarized in Table 2. Field notes are included as Attachment A.

The groundwater samples were analyzed by the Consumers Energy Trail Street Laboratory for both Appendix III and IV constituents in accordance with the SAP. The radium analyses were performed by Eurofins TestAmerica Inc. The analytical results pertaining to the detection monitoring program are summarized in Table 3.

Groundwater Flow Rate and Direction

Groundwater elevation data collected during the August and October 2020 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 August through October 2020 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 historically the point source discharge of sluiced bottom ash into the former Karn Bottom Ash Pond created localized mounding of the potentiometric surface, the new Karn Lined Impoundment went into service on June 7, 2018 and has been continuously collecting the process water and bottom ash that went into the former bottom ash pond. Since the former bottom ash pond is no longer being hydraulically loaded with sluiced ash and has been dewatered by gravity, the characteristic groundwater mound centered within the pooled area is no longer present. The groundwater elevation data collected from the former groundwater monitoring system of the former bottom ash pond in August and October 2020 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 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 August 3 and October 5, 2020 in the vicinity of the Karn Bottom Ash Pond and Karn Lined Impoundment is estimated at 0.0024 ft/ft and 0.0026 ft/ft, respectively. 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 0.12 ft/day or 43 ft/year in August 2020 and 0.13 ft/day or 48 ft/year in October 2020, 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 but is also attempting to reach a new equilibrium, as expected. The general flow direction 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.

Analytical Results Summary

Analytical data are included in Attachment B. Overall, data were found to be usable for assessment monitoring and displayed consistent trends with previous sampling events. The Data Quality Reviews for each event are included as Attachment C. The concentrations of the Appendix III parameters in each of the detection monitoring wells were compared to the established statistical background limits in accordance with the 2018 Stats Plan. The 2018 Stats Plan outlines an interwell statistical approach using data collected from monitoring well DEK-MW-15003 to determine the representative upgradient/background conditions. Downgradient groundwater data are compared to the established background levels, as presented on Table 4. An intrawell statistical approach was proposed in the November 2020 HMP given the recent changes in groundwater flow direction which demonstrate the potential for radial flow from the topographical and groundwater elevation high point located near the Lined Impoundment, as well as due to the documented groundwater impacts from the operation of the adjacent Karn Landfill and Karn Bottom Ash Pond. The approved intrawell statistical approach will be used to evaluate groundwater data collected in the first calendar quarter following approval of the 2020 HMP, which would be Q1 2021.

The statistical evaluation of the October 2020 Appendix III indicator parameters showed potential SSIs over background levels for:

- Calcium and Chloride at OW-10;
- Boron and Fluoride at DEK-MW-18001; and
- Sulfate at OW-12.

There were no SSIs over background levels for pH or TDS at any of the downgradient wells.

In accordance with §257.94(e)(2), Consumers Energy may demonstrate that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The Alternate Source Demonstration (ASD) prepared following the October 2019 sampling event to address the potential SSIs identified for boron, calcium, chloride, fluoride, sulfate and pH during prior detection monitoring events is still relevant and applicable⁴. Piper diagrams were prepared using the groundwater and KLI-SCS sample data collected during the August 2020 and October 2020 events (Attachment D). The leachate chemistry (KLI-SCS) is distinctly different from the groundwater chemistry observed at the Karn Lined Impoundment wells. The piper diagrams also illustrate that the groundwater chemistry observed at the downgradient wells are not uniquely different than the background well DEK-MW-15003, even if an individual downgradient concentration comparison to the established background levels indicates a potential SSI.

SCS Monitoring Program

During the third and fourth quarter events, samples from the secondary leachate collection system sump (KLI-SCS) were analyzed for:

- Primary Indicator Parameters: Section 11511a(3)(c) - Detection Monitoring Constituents

⁴ TRC. 2019. *Alternate Source Demonstration: October 2019 Detection Monitoring Sampling Event*, DE Karn Lined Impoundment, Consumers Energy Company, Essexville, Michigan. December 19.

- Alternative Indicator Parameters: Section 11519b(2) - Assessment Monitoring Constituents
- Optional Analyses in support of Piper or Stiff diagrams

Water quality data are included in the attached laboratory reports (Attachment B). As shown in Attachment D, the secondary collection system water chemistry is distinctly different from the groundwater chemistry from the downgradient monitoring wells of the groundwater monitoring system.

Consumers Energy initiated secondary collection system flow monitoring to comply with the EGLE-approved HMP in December 2020. Consumers Energy continues to comply with the requirements for unmonitorable units under Rule 437 of the Part 115 Rules. Notification and a written assessment of the flow rate exceedances have been submitted to the EGLE January 15, 2021 and January 22, 2021, respectively, and are included in Attachment E. Data from the October 2020 Karn Lined Impoundment Detection Monitoring Event shows that groundwater quality is consistent with previous monitoring events, which indicates 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. 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, and actions were promptly taken to address the leak. Short-term actions are consistent with these findings and balance the need for response actions with safe access and quality repairs once winter weather improves. Since then, Consumers Energy continues to track and provide written notifications of flow rates in the secondary collection system monthly, as well as evaluate and report the chemical characteristics of liquid in the secondary collection system 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 November 2020 HMP.

Next Steps

Pursuant to §257.94(e)(2), if a successful ASD is completed within 90 days of detecting an SSI over background, the CCR Unit may continue with the detection monitoring program. The ASD prepared following the October 2019 sampling event determined that the observed SSIs are not attributed to the Karn Lined Impoundment. Therefore, Consumers Energy will continue in a detection monitoring program at the Karn Lined Impoundment. The next detection monitoring event is scheduled for March 2021 and will include sampling of the secondary collection system, primary basin surface water, and nearby groundwater monitoring wells. Consumers Energy will continue to assess whether a release to groundwater occurred due to the apparent leak in the liner system and will evaluate potential effects on local groundwater quality.

Sincerely,

TRC



Darby Litz
Hydrogeologist/Project Manager



Jacob Krenz
Staff Geologist

Mr. Harold Register
Consumers Energy Company
January 29, 2021
Page 6

Attachments:

Table 1	Summary of Groundwater Elevation Data
Table 2	Summary of Field Parameter Results
Table 3	Summary of Groundwater Sampling Results (Analytical)
Table 4	Comparison of Appendix III Parameter Results to Background Limits – October 2020
Table 5	Summary of Statistical Exceedances – October 2020
Figure 1	Site Location Map
Figure 2	Karn and Weadock Complex Map
Figure 3	Shallow Groundwater Contour Map – October 5, 2020
Attachment A	Field Notes
Attachment B	Laboratory Analytical Reports
Attachment C	Data Quality Reviews
Attachment D	ASD Supporting Information
Attachment E	Secondary Leachate Collection System Monitoring

cc: Brad Runkel, Consumers Energy (via email: Bradley.Runkel@cmsenergy.com)

Tables



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

Well Location	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)	August 3, 2020		October 5, 2020	
				Depth to Water (ft BTOC)	Groundwater Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Background							
MW-15002 ⁽¹⁾	587.71	Sand	580.9 to 570.9	5.45	582.26	5.75	581.96
MW-15008 ⁽¹⁾	585.36	Sand with clay	578.7 to 568.7	2.85	582.51	3.29	582.07
MW-15016 ⁽¹⁾	586.49	Sand	581.2 to 578.2	5.20	581.29	3.94	582.55
MW-15019 ⁽¹⁾	586.17	Sand and Sand/Clay	579.5 to 569.5	3.87	582.30	4.25	581.92
DEK Bottom Ash Pond							
DEK-MW-15002	590.87	Sand	578.3 to 575.3	6.00	584.87	6.18	584.69
DEK-MW-15004	611.04	Sand	576.6 to 571.6	27.20	583.84	27.20	583.84
DEK-MW-15005	589.72	Sand	572.3 to 567.3	6.91	582.81	7.85	581.87
DEK-MW-15006	589.24	Sand	573.0 to 568.0	6.40	582.84	7.38	581.86
DEK Bottom Ash Pond & Karn Lined Impoundment							
DEK-MW-15003	602.74	Sand	578.8 to 574.8	16.01	586.73	16.20	586.54
DEK-MW-18001	593.47	Sand	579.2 to 574.2	8.08	585.39	8.31	585.16
OW-10	591.58	Silty Sand and Silty Clay	576.0 to 571.0	6.12	585.46	6.40	585.18
OW-11	607.90	Silt/Fly Ash	587.5 to 582.5	21.10	586.80	21.23	586.67
OW-12	603.07	Silty Sand	584.2 to 579.2	17.05	586.02	17.03	586.04
DEK Nature and Extent							
MW-01	597.02	Sand	573.0 to 570.0	14.20	582.82	15.10	581.92
MW-03	597.30	Sand	569.8 to 566.8	14.40	582.90	15.38	581.92
MW-06	589.44	Sand and Silty Sand	578.5 to 563.5	6.60	582.84	7.50	581.94
MW-08	598.78	Sand and Silty Clay	580.9 to 570.9	15.20	583.58	16.57	582.21
MW-10	596.97	Sand	582.5 to 572.5	14.10	582.87	15.33	581.64
MW-12	598.60	Sand	583.9 to 573.9	15.90	582.70	16.64	581.96
MW-14	594.37	Sand and Silty Clay	584.7 to 574.7	11.60	582.77	12.60	581.77
MW-16	595.80	Sand and Sand/Bottom Ash	584.1 to 574.1	13.07	582.73	13.89	581.91
MW-22	598.99	Ash/Sand	571.4 to 568.4	15.32	583.67	15.75	583.24
MW-23	595.57	Ash/Sand	576.9 to 571.9	12.20	583.37	12.41	583.16
DEK Static Water Level							
MW-02	597.34	Sand and Silty Clay	572.5 to 567.5	14.52	582.82	15.48	581.86
MW-04	598.01	NR	569.5 to 564.5	15.10	582.91	16.14	581.87
MW-17	597.91	Sand	577.0 to 574.0	12.51	585.4	12.67	585.24
MW-18	609.22	Silty Sand and Silty Clay	575.8 to 573.8	24.95	584.27	24.95	584.27
MW-19	597.28	NR	572.1 to 567.1	14.40	582.88	15.15	582.13
MW-20	632.75	Sand	582.3 to 579.3	50.02	582.73	50.80	581.95
MW-21	632.91	Sand	587.1 to 584.1	49.80	583.11	49.90	583.01
OW-01	631.33	NR	572.5 to 567.5	48.80	582.53	49.40	581.93
OW-02	598.01	Fly Ash	579.4 to 576.4	14.26	583.75	14.64	583.37
OW-03	597.94	Fly Ash and Sand	573.6 to 568.6	14.90	583.04	16.38	581.56
OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	7.45	582.76	8.48	581.73
OW-05	593.53	Sand	576.9 to 571.9	10.87	582.66	11.30	582.23
OW-06	603.95	NR	580.9 to 575.9	12.95	591.00	20.45	583.50
OW-07	596.41	Ash	583.3 to 580.3	13.10	583.31	13.28	583.13
OW-08	593.93	NR	581.0 to 576.0	10.37	583.56	11.58	582.35
OW-09	593.45	NR	585.5 to 580.5	10.12	583.33	10.18	583.27
OW-13	588.52	NR	579.5 to 574.5	3.39	585.13	3.80	584.72
OW-15	587.75	NR	572.8 to 567.8	3.25	584.5	4.30	583.45

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.

Table 2
 Summary of Field Parameter Results: August & October 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Karn Lined Impoundment							
DEK-MW-15003	8/3/2020	0.26	-127.1	7.9	438	17.6	0.7
	10/6/2020	2.21	-148.0	8.5	400	17.7	0.3
DEK-MW-18001	8/3/2020	0.14	-70.1	7.5	807	14.2	0.5
	10/6/2020	1.53	-141.8	7.6	813	13.0	1.4
KLI-SCS	8/5/2020	2.18	47.7	7.3	1,012	21.1	2.5
	10/8/2020	5.60	2.2	7.6	1,283	17.8	80
OW-10	8/4/2020	0.84	60.1	7.2	640	12.1	5.9
	10/8/2020	1.44	-117.5	7.4	948	12.9	6.7
OW-11	8/4/2020	0.81	81.8	9.1	339	13.3	4.7
	10/8/2020	1.50	-125.1	9.4	486	12.5	2.0
OW-12	8/3/2020	0.82	-87.1	7.1	751	20.6	5.1
	10/8/2020	1.32	-100.8	7.3	843	16.3	0.5

Notes:
 mg/L - Milligrams per Liter.
 mV - Millivolts.
 SU - Standard Units.
 umhos/cm - Micromhos per centimeter.
 °C - Degrees Celcius.
 NTU - Nephelometric Turbidity Unit.

Table 3
 Summary of Groundwater Sampling Results (Analytical): August & October 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

		Sample Location:				DEK-MW-15003		DEK-MW-18001		OW-10		OW-12	
		Sample Date:				8/3/2020	10/6/2020	8/3/2020	10/6/2020	8/4/2020	10/8/2020	8/3/2020	10/8/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI [^]	Background		Downgradient					
Appendix III													
Boron	ug/L	NC	500	500	4,000	798	842	1,770	1,740	1,210	1,400	798	851
Calcium	mg/L	NC	NC	NC	500 ^{EE}	31.4	29.7	68.7	71.7	110	102	109	79.6
Chloride	mg/L	250**	250 ^E	250 ^E	50	46.3	46.5	63.1	60.7	61.6	78.9	46.3	50
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	1,190	1,170	1,240	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250^E	250^E	500 ^{EE}	40.6	44.6	66.6	91.9	46.4	11.9	192	153
Total Dissolved Solids	mg/L	500**	500^E	500^E	500	291	237	498	476	562	527	696	492
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5^E	6.5 - 8.5^E	6.5 - 9.0	7.9	8.5	7.5	7.6	7.2	7.4	7.1	7.3
MI Part 115 Parameters													
Iron	ug/L	300**	300^E	300^E	500,000 ^{EE}	258	142	677	681	1,770	991	5,280	3,620

Notes:

- 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.
- * - 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).
- # - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and EGLE policy and procedure 09-014 dated June 20, 2012.
- ^E - Criterion is the aesthetic drinking water value per footnote (E).
- ^{EE} - Criterion is based on the total dissolved solids GSI value per footnote (EE).
- BOLD** 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 3
 Summary of Groundwater Sampling Results (Analytical): August & October 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

						Sample Location:			
						OW-11		KLI-SCS	
						Sample Date:			
						8/4/2020	10/8/2020	8/5/2020	10/8/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Supplemental			
Appendix III									
Boron	ug/L	NC	500	500	4,000	2,800	3,040	423	346
Calcium	mg/L	NC	NC	NC	500 ^{EE}	13.7	21.3	156	164
Chloride	mg/L	250 ^{**}	250 ^E	250 ^F	50	76	75.7	22.6	25.4
Fluoride	ug/L	4,000	NC	NC	NC	4,790	5,160	< 1,000	< 1,000
Sulfate	mg/L	250^{**}	250^E	250^F	500 ^{EE}	24.3	25.9	316	303
Total Dissolved Solids	mg/L	500^{**}	500^E	500^F	500	271	238	965	810
pH, Field	SU	6.5 - 8.5^{**}	6.5 - 8.5^E	6.5 - 8.5^E	6.5 - 9.0	9.1	9.4	7.3	7.6
MI Part 115 Parameters									
Iron	ug/L	300^{**}	300^E	300^E	500,000 ^{EE}	54	57	3,380	1,400

Notes:

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.

* - 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}.

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

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

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

BOLD 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
 Comparison of Appendix III Parameter Results to Background Limits – October 2020
 Karn Lined Impoundment – RCRA CCR Monitoring Program
 Essexville, Michigan

		Sample Location:	DEK-MW-18001	OW-10	OW-12
		Sample Date:	10/6/2020	10/8/2020	10/8/2020
Constituent	Unit	UTL	Downgradient		
Appendix III					
Boron	ug/L	1,400	1,740	1,400	851
Calcium	mg/L	94.1	71.7	102	79.6
Chloride	mg/L	67.2	60.7	78.9	50
Fluoride	ug/L	1,000	1,240	< 1,000	< 1,000
Sulfate	mg/L	103	91.9	11.9	153
Total Dissolved Solids	mg/L	559	476	527	492
pH, Field	SU	7.3 - 8.4	7.6	7.4	7.3

Notes:

ug/L - micrograms per liter

mg/L - milligrams per liter

SU - standard units; pH is a field parameter

All metals were analyzed as total unless otherwise specified.

RESULT Shading and bold font indicates an exceedance of the Upper Tolerance Limit (UTL) using the number of significant figures in the UTL.

Table 5
 Summary of Statistical Exceedances – October 2020
 Karn Lined Impoundment
 Essexville, Michigan

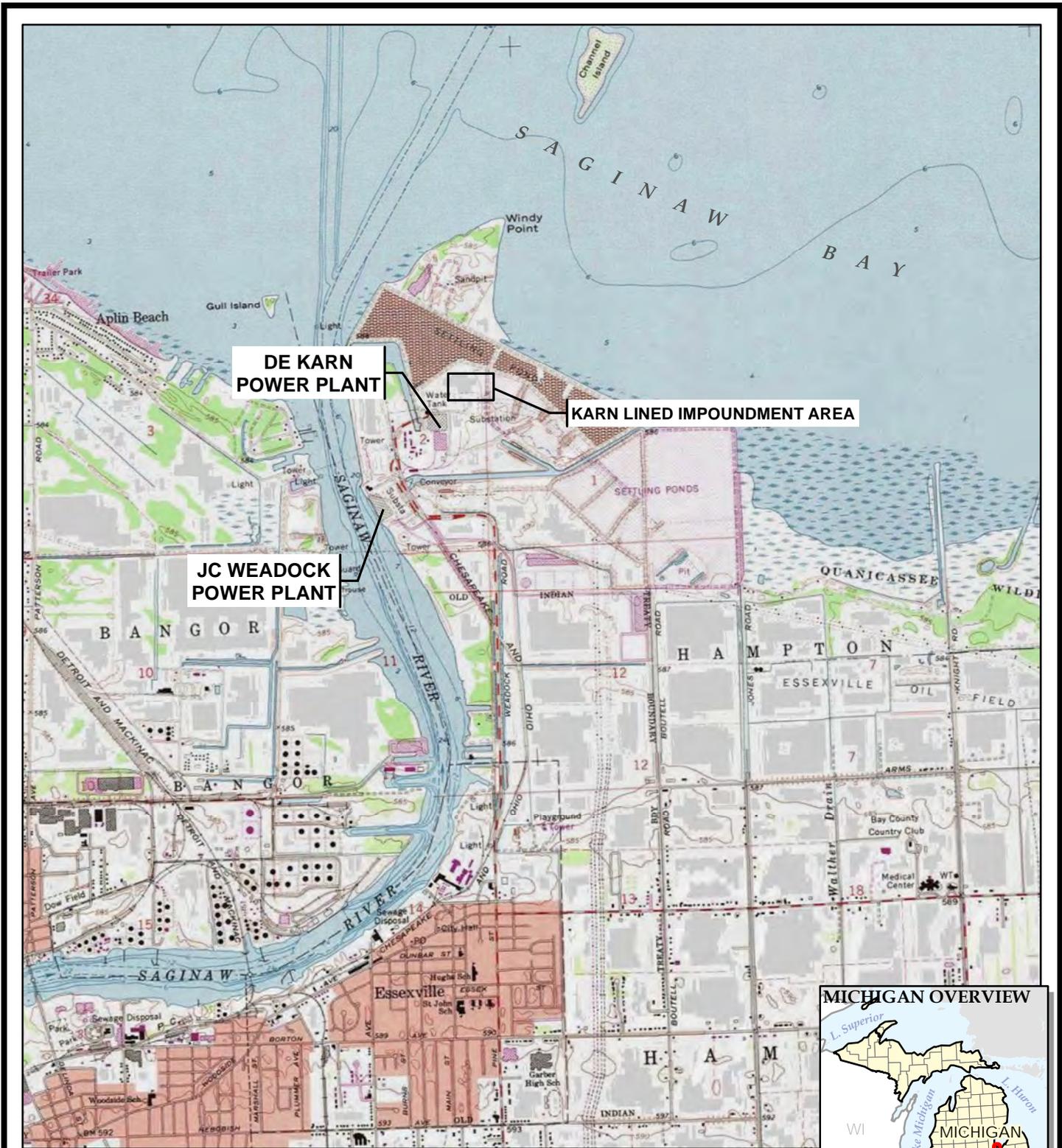
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
 SUMMARY OF STATISTICAL EXCEEDANCES

Data is in (X) ug/L or
 () mg/L
 unless otherwise stated

Facility: Karn Lined Impoundment – WDS# 392503

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2020 (bold >201)			
No Exceedances								

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080

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

TITLE:
SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	D. LITZ
APPROVED BY:	G. CROCKFORD
DATE:	AUGUST 2020
PROJ. NO.:	367388-001-002
FILE:	367388-001-007slm.mxd

FIGURE 1



LEGEND

- BACKGROUND MONITORING WELL
- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- JCW BOTTOM ASH POND MONITORING WELL
- JCW LANDFILL CCR WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- LEACHATE HEADWELL
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- SLURRY WALL (APPROXIMATE)
- LINED IMPOUNDMENT (COVENANT BOUNDARY)

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
4. A SINGLE WELL SYMBOL IS SHOWN FOR WELL PAIRS MW-01/MW-02, MW-03/MW-04, OW-02/MW-22, AND OW-07/MW-23 AS THE WELLS ARE LOCATED WITHIN 15-FT OF EACH OTHER.



PROJECT:		CONSUMERS ENERGY COMPANY DE KARN AND JC WEADOCK POWER PLANTS ESSEXVILLE, MICHIGAN	
TITLE:		KARN AND WEADOCK COMPLEX AREA	
DRAWN BY:	S. MAJOR	PROJ NO.:	367388-001
CHECKED BY:	J. KRENZ	FIGURE 2	
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2021		

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

FILE NO.: 367388-001-005.mxd



LEGEND

- DEK BOTTOM ASH POND & LINED IMPOUNDMENT MONITORING WELL
- DEK BOTTOM ASH POND MONITORING WELL
- DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- MONITORING WELL (STATIC ONLY)
- SURFACE WATER GAUGING STATION
- NATURE AND EXTENT WELL
- SLURRY WALL (APPROXIMATE)
- LINED IMPOUNDMENT (COVENANT BOUNDARY)
- GROUNDWATER ELEVATION CONTOUR (1' INTERVAL, DASHED WHERE INFERRED)
- (580.50) GROUNDWATER ELEVATION (FEET)

- ### NOTES
1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
 2. WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES COMPANY ON 11/4/2015.
 3. NOAA/NATIONAL OCEANIC SERVICE GREAT LAKES GAUGING STATION, ESSEXVILLE, MI (ID: 9075035).
 4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

1" = 600'
 1:7,200

PROJECT:		CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN	
TITLE:		SHALLOW GROUNDWATER CONTOUR MAP OCTOBER 5, 2020	
DRAWN BY:	S. MAJOR	PROJ NO.:	367388.0001
CHECKED BY:	J. KRENZ	FIGURE 3	
APPROVED BY:	D. LITZ		
DATE:	JANUARY 2021		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com	
FILE NO.:		367388-001-012.mxd	

Attachment A

Field Notes



PROJECT NAME:	CEC Karn BAP/LI: 2020 GW Compliance
PROJECT NUMBER:	367388.0001.0000 Phase 3 Task 1
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	8-3-2020 TO 8-5-2020
PURPOSE OF FIELDWORK:	Appendix III and IV CCR sampling
WORK PERFORMED BY:	Jake Krenz/Katy Reminga

Jacob King 8-18-20
SIGNED DATE

Katy Reminga 11/05/2020
CHECKED BY DATE



GENERAL NOTES

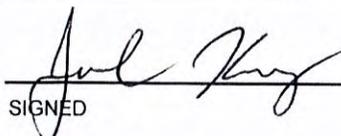
PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	DATE: 8-3-2020	TIME ARRIVED: 0730
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: skrenz	TIME LEFT: 1800

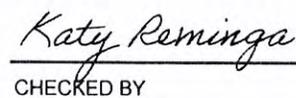
WEATHER		
TEMPERATURE: <u>75</u> °F	WIND: <u>10-15</u> MPH	VISIBILITY: <u>Rain AM / clear PM</u>
WORK / SAMPLING PERFORMED		
Sitewide water levels		
Collected samples from: DEK-MW-15003, DEK-MW-18001, DEK-MW-15002, DEK-MW-15005, OW-12		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
very hard Rain mid morning	waited it out for 15 mins

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
C. Bath	Consumers	Arsenic Speciation cooler shipment
D. Lite	TRC	site updates

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
purge water	DNM	purged to ground

 8-18-20
 SIGNED _____ DATE

 11/05/2020
 CHECKED BY _____ DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn LF: 2020 GW Compliance	MODEL: <i>istby smartROLLUP</i>	SAMPLER: JK/KR
PROJECT NO.: 367388.0000.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: <i>8-3-20</i>

PH CALIBRATION CHECK

pH7 (LOT #): <i>06C930</i> (EXP. DATE): <i>Mar/22</i>	pH 4/10 (LOT #): <i>06C473</i> (EXP. DATE): <i>Mar/22</i>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>7.00 / 7.00</i>	<i>4.00 / 4.00</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>1219</i>
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <i>06C673</i> (EXP. DATE): <i>Mar/21</i>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<i>1413 / 1413</i>	<i>23.9</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>1206</i>
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): <i>19E100362</i> (EXP. DATE): <i>2/2021</i>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<i>270 / 270</i>	<i>24.0</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>1224</i>
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
<i>7.68 / 7.68</i>	<i>23.1</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>1227</i>
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	
<i>/</i>		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <i>47102</i> (EXP. DATE): <i>Jun/18</i>	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>10.1 / 10.0</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	
<i>/</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED *Paul King* DATE *8-18-2020*

CHECKED BY *Katy Reminga* DATE *11/05/2020*



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW Compliance	MODEL: <u>Pro D55</u>	SAMPLER: JK/KR
PROJECT NO.: 367388.0001.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: <u>8/13/2020</u>

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL. RANGE	TIME
(LOT #): <u>06A811</u>	(EXP. DATE): <u>Jan 22</u>	(LOT #): <u>06A042</u>	(EXP. DATE): <u>Jan 22</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
<u>7.0 / 7.0</u>	<u>4.0 / 4.0</u>	<input checked="" type="checkbox"/>	WITHIN RANGE	<u>1:27 pm</u>	
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <u>99L652</u>	(°CELSIUS)		
(EXP. DATE): <u>Dec 20</u>			
POST-CAL. READING / STANDARD			
<u>1413 / 1413</u>	<u>22.2°C</u>	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

ORP CALIBRATION CHECK

14100796
27/2024

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
(LOT #): <u>14100796</u>	(°CELSIUS)		
(EXP. DATE): <u>8/27/2024</u>			
POST-CAL. READING / STANDARD			
<u>234.8 / 234.8</u>	<u>22.0°C</u>	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME
	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR			
<u>7.37 / 7.37</u>	<u>22.7°C</u>	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #):	(LOT #):		
(EXP. DATE):	(EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>9.90 / 10.0</u>	<u>0 → 1000</u>	<input checked="" type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

COMMENTS

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

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

Katy Reminga 8/13/2020
SIGNED DATE

Paul King 8-18-20
CHECKED BY DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW Compliance	MODEL: Pro.DSS	SAMPLER: JK/KR
PROJECT NO.: 367388.0001.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: 8-4-20 (51)

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL. RANGE	TIME
(LOT #): 06A811	(EXP. DATE): JAN 22	(LOT #): 0G473	(EXP. DATE): MAR 22		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
7.0 / 7.0	4.0 / 4.0	<input checked="" type="checkbox"/>	WITHIN RANGE	8:18 am	
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		
/	/	<input type="checkbox"/>	WITHIN RANGE		

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME	
(LOT #): 9GL652	(°CELSIUS)			
(EXP. DATE): DEC 20				
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
6.082 / 6.082	18.4°	<input checked="" type="checkbox"/>	WITHIN RANGE	8:02 am
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME	
(LOT #): 19M100996	(°CELSIUS)			
(EXP. DATE): 8/27/24				
POST-CAL. READING / STANDARD				
242.3 / 240.3	17.9°	<input checked="" type="checkbox"/>	WITHIN RANGE	8:22 am
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL. RANGE	TIME	
	(°CELSIUS)			
POST-CAL. READING / SATURATED AIR				
8.16 / 8.2	17.40	<input checked="" type="checkbox"/>	WITHIN RANGE	8:26 am
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME	
(LOT #):	(LOT #):			
(EXP. DATE):	(EXP. DATE):			
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
- 0.01 / 0.0	9.95 / 10.0	<input checked="" type="checkbox"/>	WITHIN RANGE	8:05 am
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	
/	/	<input type="checkbox"/>	WITHIN RANGE	

COMMENTS

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED Katy Reminga 8/4/2020 DATE

CHECKED BY Jon King 8-18-20 DATE



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: <u>DKR</u> DATE: <u>8-3-20</u>	BY: <u>KR</u> DATE: <u>11/05/2020</u>

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

PURGING	TIME: <u>1245</u>	DATE: <u>8-3-2020</u>	SAMPLE	TIME: <u>1323</u>	DATE: <u>8-3-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: <u>7.85</u> SU CONDUCTIVITY: <u>437.5</u> umhos/cm		
DEPTH TO WATER: <u>16.01</u> T/ PVC			ORP: <u>-127.1</u> mV DO: <u>0.26</u> mg/L		
DEPTH TO BOTTOM: <u>27.98</u> T/ PVC			TURBIDITY: <u>0.65</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>3.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>17.57</u> °C OTHER: _____		
COLOR: <u>clear</u> ODOR: <u>none</u>			COLOR: <u>clear</u> ODOR: <u>none</u>		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: <u>NA</u> FILTRATE ODOR: <u>NA</u>		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1248	100	6.80	384.6	-54.8	1.12	6.37	21.30	16.79	INITIAL
1253	100	7.51	398.1	-113.9	0.59	2.91	18.50	17.29	.5
1258	100	7.74	407.9	-131.9	0.43	2.81	17.97	17.62	1.0
1303	100	7.81	412.9	-130.5	0.32	2.48	17.97	17.90	1.5
1308	100	7.86	416.9	-135.1	0.28	1.82	17.90	17.98	2.0
1313	100	7.86	426.2	-129.2	0.26	1.29	18.02	18.01	2.5
1318	100	7.85	432.8	-127.4	0.25	1.05	17.74	18.05	3.0
1323	100	7.85	437.5	-127.1	0.26	0.65	17.57	18.05	3.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP: +/- 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
1	250mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125mL	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	60mL	VDA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-18-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: JK/KR	DATE: 8-3-20
	BY: KR	DATE: 11/05/2020

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

PURGING	TIME: <u>1355</u>	DATE: <u>8-3-20</u>	SAMPLE	TIME: <u>1416</u>	DATE: <u>8-3-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP			PH: <u>7.48</u> SU	CONDUCTIVITY: <u>806.6</u> umhos/cm	
<input type="checkbox"/> BAILER BAILER (DISPOSABLE)			ORP: <u>-70.1</u> mV	DO: <u>0.14</u> mg/L	
DEPTH TO WATER: <u>8.01</u> T/ PVC			TURBIDITY: <u>0.52</u> NTU		
DEPTH TO BOTTOM: <u>19.66</u> T/ PVC			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.20</u> °C	OTHER: _____	
VOLUME REMOVED: <u>4.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u>	ODOR: <u>none</u>	
COLOR: <u>clear</u>	ODOR: <u>none</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY			FILTRATE COLOR: <u>NA</u>	FILTRATE ODOR: <u>NA</u>	
<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1356	200	7.63	737.4	-49.9	1.35	1.50	21.22	8.11	INITIAL
1401	200	7.46	796.8	-64.9	0.24	0.76	15.51	8.15	1.0
1406	200	7.42	799.8	-68.3	0.18	0.63	14.65	8.17	2.0
1411	200	7.44	801.7	-69.1	0.15	0.54	14.37	8.18	3.0
1416	200	7.48	806.6	-70.1	0.14	0.52	14.20	8.18	4.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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
3	125mL	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	125mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250mL	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
6	60mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-18-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: <u>JKR</u> DATE: <u>8-3-20</u>	BY: <u>KR</u> DATE: <u>11/05/2020</u>

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

PURGING	TIME: <u>1456</u>	DATE: <u>8-3-20</u>	SAMPLE	TIME: <u>1538</u>	DATE: <u>8-3-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: <u>7.52</u> SU CONDUCTIVITY: <u>1280.6</u> umhos/cm		
DEPTH TO WATER: <u>5.88</u> T/ PVC			ORP: <u>-77.9</u> mV DO: <u>0.14</u> mg/L		
DEPTH TO BOTTOM: <u>15.69</u> T/ PVC			TURBIDITY: <u>0.78</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>15.02</u> °C OTHER: <u> </u>		
VOLUME REMOVED: <u>8</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u> ODOR: <u>none</u>		
COLOR: <u>clear</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: <u>NA</u> FILTRATE ODOR: <u>NA</u>		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- <u> </u>		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1458	200	7.34	1521.2	-52.9	0.81	4.27	18.44	6.05	INITIAL
1503	200	7.40	1557.8	-59.8	0.26	3.40	16.10	6.08	1
1508	200	7.40	1466.7	-67.2	0.21	2.67	15.65	6.10	2
1513	200	7.43	1430.3	-71.1	0.24	2.38	16.20	6.10	3
1518	200	7.46	1374.8	-71.7	0.19	1.62	15.76	6.10	4
1523	200	7.49	1344.5	-84.5	0.14	0.90	15.23	6.10	5
1528	200	7.51	1318.8	-77.6	0.15	2.27	15.28	6.10	6
1533	200	7.52	1297.7	-76.7	0.14	2.01	15.19	6.10	7
1538	200	7.52	1280.6	-77.9	0.14	0.78	15.02	6.10	8
1543									

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
1	250ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
1	125ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
1	125ml	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
				<input type="checkbox"/> Y <input type="checkbox"/> N										
				<input type="checkbox"/> Y <input type="checkbox"/> N										

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-20</u>	AIRBILL NUMBER: <u> </u>
COC NUMBER: <u> </u>	SIGNATURE: <u>Jul King</u>	DATE SIGNED: <u>8-13-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: JK/KR DATE: 8/3/20	BY: JK DATE: 8-18-20

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

PURGING	TIME: 6:00 pm <u>5:20 pm</u>	DATE: <u>8/3/2020</u>	SAMPLE	TIME: <u>5:20 pm</u>	DATE: <u>8/3/2020</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP			PH: <u>7.09</u> SU	CONDUCTIVITY: <u>751</u> umhos/cm	
<input type="checkbox"/> BAILER BAILER (DISPOSABLE)			ORP: <u>-87.1</u> mV	DO: 7.12 ^{KR} <u>0.82</u> mg/L	
DEPTH TO WATER: 17.0 <u>17.0</u> TI PVC			TURBIDITY: <u>5.08</u> NTU		
DEPTH TO BOTTOM: 23.45 <u>23.45</u> TI PVC			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>20.6</u> °C OTHER: _____		
VOLUME REMOVED: <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>clear</u> ODOR: <u>none</u>		
COLOR: <u>orange</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
4:33	200/min	7.03	780	-47.7	1.50	109.0	16.7	17.0	INITIAL
4:38		7.02	771	-64.4	1.40	64.6	16.7	17.0	1 L
4:43		7.02	784	-71.7	1.23	98.7	16.9	17.0	2 L
4:48		7.05	780	-81.3	1.13	158.0	16.7	17.0	3 L
4:53		7.06	772	-83.4	1.03	30.9	16.5	17.0	4 L
4:58		7.07	764	-83.5	1.00	64.2	16.4	17.0	5 L
5:03 ^{am}		7.08	762	-85.5	1.00	31.4	16.4	17.0	6 L
5:08		7.08	756	-86.7	0.91	9.98	16.5	17.0	7 L
5:13		7.09	755	-86.9	0.85	9.30	16.6	17.0	8 L
5:18		7.09	751	-87.1	0.82	5.08	16.4	17.0	9 L

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP: +/- 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	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
1	250	P	none (A)	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
1	250	P	none (B)	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
1	125	P	(A)	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										
2	60	VOA	(A)	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N										

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-20</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>KR</u>	DATE SIGNED: <u>8/05/2020</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: JK/KR DATE: 8-4-20	BY: SK DATE: 8-18-20

SAMPLE ID: <u>OW-10</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>8:46am</u>	DATE: <u>8/4/2020</u>	SAMPLE	TIME: <u>9:41am</u>	DATE: <u>8/4/2020</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)	PH: <u>7.15</u> SU	CONDUCTIVITY: <u>640</u> umhos/cm	ORP: <u>60.1</u> mV	DO: <u>0.84</u> mg/L	
DEPTH TO WATER: <u>5.95</u> T/ PVC	TURBIDITY: <u>5.88</u> NTU		<input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: <u>17.95</u> T/ PVC	TEMPERATURE: <u>12.1</u> °C		OTHER: _____		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>		ODOR: <u>none</u>		
VOLUME REMOVED: <u>11L</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR: _____ FILTRATE ODOR: _____		
COLOR: <u>clear</u> ODOR: <u>none</u>	TURBIDITY		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- <u>02</u>		
<input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
<u>8:46am</u>	<u>200ml</u>	<u>6.85</u>	<u>745</u>	<u>163.0</u>	<u>1.90</u>	<u>48.8</u>	<u>12.6</u>	<u>5.95</u>	INITIAL
<u>8:51am</u>		<u>6.86</u>	<u>688</u>	<u>147.2</u>	<u>1.73</u>	<u>12.0</u>	<u>12.5</u>	<u>5.95</u>	<u>1L</u>
<u>8:56am</u>		<u>6.98</u>	<u>657</u>	<u>109.1</u>	<u>1.19</u>	<u>49.2</u>	<u>12.4</u>	<u>5.94</u>	<u>2L</u>
<u>9:01am</u>		<u>7.02</u>	<u>652</u>	<u>82.5</u>	<u>1.07</u>	<u>40.0</u>	<u>12.4</u>	<u>5.95</u>	<u>3L</u>
<u>9:06am</u>		<u>7.06</u>	<u>647</u>	<u>42.0</u>	<u>0.98</u>	<u>31.2</u>	<u>12.2</u>	<u>5.95</u>	<u>4L</u>
<u>9:11am</u>		<u>7.08</u>	<u>647</u>	<u>10.1</u>	<u>0.94</u>	<u>25.0</u>	<u>12.3</u>	<u>5.95</u>	<u>5L</u>
<u>9:16am</u>		<u>7.11</u>	<u>646</u>	<u>-18.6</u>	<u>0.90</u>	<u>17.4</u>	<u>12.3</u>	<u>5.94</u>	<u>6L</u>
<u>9:21am</u>		<u>7.12</u>	<u>643</u>	<u>-36.6</u>	<u>0.88</u>	<u>12.7</u>	<u>12.3</u>	<u>5.95</u>	<u>7L</u>
<u>9:26am</u>		<u>7.13</u>	<u>641</u>	<u>-43.5</u>	<u>0.89</u>	<u>8.70</u>	<u>12.3</u>	<u>5.95</u>	<u>8L</u>
<u>9:31am</u>		<u>7.14</u>	<u>640</u>	<u>-51.5</u>	<u>0.87</u>	<u>6.98</u>	<u>12.3</u>	<u>5.95</u>	<u>9L</u>

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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
<u>2</u>	<u>250</u>	<u>P</u>	<u>(A)</u>	<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<u>2</u>	<u>250</u>	<u>P</u>	<u>(B)</u>	<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
<u>2</u>	<u>125</u>	<u>P</u>	<u>(A)</u>	<input type="checkbox"/> Y <input type="checkbox"/> N					<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
<u>4</u>	<u>60</u>	<u>VOA</u>	<u>(A)</u>	<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-20</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>KR</u>	DATE SIGNED: <u>8/05/2020</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: <u>JKR</u> DATE: <u>8-4-20</u>	BY: <u>KR</u> DATE: <u>11/05/2020</u>

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

PURGING	TIME: <u>1440</u>	DATE: <u>8-4-20</u>	SAMPLE	TIME: <u>1527</u>	DATE: <u>8-4-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: <u>9.12</u> SU CONDUCTIVITY: <u>338.7</u> umhos/cm		
DEPTH TO WATER: <u>21.15</u> T/ PVC			ORP: <u>81.8</u> mV DO: <u>0.81</u> mg/L		
DEPTH TO BOTTOM: <u>25.43</u> T/ PVC			TURBIDITY: <u>4.72</u> NTU		
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>13.3</u> °C OTHER: _____		
COLOR: <u>very light gray</u> ODOR: <u>none</u>			COLOR: <u>clear</u> ODOR: <u>none</u>		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: <u>clear</u> FILTRATE ODOR: <u>none</u>		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1442	100	9.14	366.8	101.0	1.87	97.2	15.6	21.87	INITIAL
1447	100	9.15	346.6	92.3	1.25	16.3	14.5	22.21	.5
1452	100	9.11	341.6	91.5	1.00	19.1	13.9	22.58	1.0
1457	100	9.09	339.4	90.5	0.94	12.8	13.7	22.80	1.5
1502	100	9.09	339.1	89.9	0.91	82.2	13.6	22.87	2.0
1507	100	9.09	338.1	88.2	0.93	39.3	13.3	22.96	2.5
1512	100	9.12	338.6	85.2	0.90	19.6	13.4	22.97	3.0
1517	100	9.11	339.7	84.7	0.87	9.72	13.3	22.97	3.5
1522	100	9.12	338.6	83.3	0.84	5.99	13.2	23.00	4.0
1527	100	9.12	338.7	81.8	0.81	4.72	13.3	22.95	4.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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		
1	250ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	40ml	VOA	E	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
1	125ml	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125ml	Plastic	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N		
1	125ml	↓	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125ml	Plastic	C	<input type="checkbox"/> Y <input type="checkbox"/> N		
2	60ml	VOA	A	<input type="checkbox"/> Y <input type="checkbox"/> N	1	125ml	Plastic	D	<input type="checkbox"/> Y <input type="checkbox"/> N		
1	40ml	VOA	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N		

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-4-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>Julie King</u>	DATE SIGNED: <u>8-18-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: <u>JKR</u> DATE: <u>8-4-20</u>	BY: <u>KR</u> DATE: <u>11/05/2020</u>

SAMPLE ID: <u>DEK-MW-15004</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1033</u>	DATE: <u>8-4-20</u>	SAMPLE	TIME: <u>1115</u>	DATE: <u>8-4-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: <u>7.44</u> SU CONDUCTIVITY: <u>637</u> umhos/cm		
DEPTH TO WATER: <u>27.15</u> T/ PVC			ORP: <u>-113.6</u> mV DO: <u>0.75</u> mg/L		
DEPTH TO BOTTOM: <u>47.76</u> T/ PVC			TURBIDITY: <u>1.33</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>8</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>16.2</u> °C OTHER: _____		
COLOR: <u>clear</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: <u>NA</u> FILTRATE ODOR: <u>NA</u>		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1035	200	7.39	663	38.1	1.45	20.7	16.9	27.34	INITIAL
1040	200	7.43	641	-58.6	1.10	6.80	16.2	27.34	1
1045	200	7.45	634	-96.1	0.89	3.90	16.0	27.34	2
1050	200	7.44	634	-104.2	0.84	2.91	16.1	27.34	3
1055	200	7.44	635	-107.7	0.82	13.8	16.1	27.34	4
1100	200	7.44	636	-110.1	0.78	20.2	16.1	27.34	5
1105	200	7.44	636	-110.9	0.77	3.87	16.2	27.34	6
1110	200	7.44	639	-111.8	0.76	1.62	16.3	27.34	7
1115	200	7.44	637	-113.6	0.75	1.33	16.2	27.34	8

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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
1	250ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125ml	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125ml	Plastic	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>8-13-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: <u>JK/KR</u> DATE: <u>8-4-20</u>	BY: <u>KR</u> DATE: <u>11/05/2020</u>

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

PURGING	TIME: <u>1142</u>	DATE: <u>8-4-20</u>	SAMPLE	TIME: <u>1219</u>	DATE: <u>8-4-20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: <u>7.76</u> SU CONDUCTIVITY: <u>881</u> umhos/cm		
DEPTH TO WATER: <u>6.23</u> T/ PVC			ORP: <u>-121.4</u> mV DO: <u>0.71</u> mg/L		
DEPTH TO BOTTOM: <u>21.50</u> T/ PVC			TURBIDITY: <u>1.18</u> NTU		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>14</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.3</u> °C OTHER: _____		
COLOR: <u>Clear</u> ODOR: _____			COLOR: <u>Clear</u> ODOR: <u>None</u>		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: <u>Clear</u> FILTRATE ODOR: <u>None</u>		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1144	400	7.76	892	38.5	1.21	7.39	14.6	6.38	INITIAL
1149	400	7.82	881	11.7	0.91	6.76	14.6	6.38	2
1154	400	7.82	873	-36.4	0.82	4.46	14.6	6.38	4
1159	400	7.80	871	-83.8	0.78	2.52	14.3	6.38	6
1204	400	7.77	873	-103.9	0.74	1.95	14.6	6.38	8
1209	400	7.78	874	-113.9	0.74	1.52	14.2	6.38	10
1214	400	7.77	871	-118.8	0.71	1.83	14.1	6.38	12
1219	400	7.76	881	-121.4	0.71	1.18	14.3	6.38	14

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F - EDTA									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		
3	2.5gal	Plastic	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125mL	Plastic	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
1	150mL	↓	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	125mL	Plastic	D	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
1	125mL		A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	60mL	VOPB	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
1	↓		B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	40mL	↓	C	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
1	↓		B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	1	40mL	↓	C	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N		

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>Paul Key</u>	DATE SIGNED: <u>8-18-20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: JK/KR	DATE: 8/5/2020

SAMPLE ID: EB-02 WELL DIAMETER: 2" 4" 6" OTHER _____

WELL MATERIAL: PVC SS IRON GALVANIZED STEEL OTHER _____

SAMPLE TYPE: GW WW SW DI LEACHATE OTHER _____

PURGING	TIME:	DATE:	SAMPLE	TIME: <u>2:46pm</u>	DATE: <u>8/5/2020</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)			PH: _____ SU CONDUCTIVITY: _____ umhos/cm ORP: _____ mV DO: _____ mg/L		
DEPTH TO WATER: _____ T/ PVC DEPTH TO BOTTOM: _____ T/ PVC			TURBIDITY: _____ NTU <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: _____ °C OTHER: _____		
VOLUME REMOVED: _____ <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: _____ ODOR: _____		
COLOR: _____ ODOR: _____			FILTRATE (0.45 um) <input type="checkbox"/> YES <input type="checkbox"/> NO		
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
Equipment Blank									
INITIAL									

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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
1	125 mL	A		<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	B		<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	↓	C		<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>8-5-2020</u>	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <u>KR</u>	DATE SIGNED: <u>8/05/2020</u>

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:		ANALYSIS REQUESTED					Page 1 of 1
Karn Lined Impoundment - 2020 Q3		20-0889		Total Metals	Anions	TDS	Alkalinity	SEND REPORT TO: CDBatts	
SAMPLING TEAM: <i>Katy Reminga + Jake Krenz</i>		DATE SHIPPED:	SITE SKETCHED ATTACHED? CIRCLE ONE:	YES	NO	REMARKS			
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS			
20-0889-01			GW	OW-10		5	X	X	X
-02			GW	OW-11		5	X	X	X
-03			GW	OW-12		5	X	X	X
-04	8/5/2020	2:50 pm	GW	KLI-SCS		5	X	X	X
-05			GW	DUP.		5	X	X	X
-06	8/5/2020	2:46 pm	W	EB-02		2	X	X	
-07			W	FB-		2	X	X	
RELINQUISHED BY: (SIGNATURE)		DATE/TIME:		RECEIVED BY: (SIGNATURE)		COMMENTS			
<i>Jake Krenz</i>		8-5-20/1600		<i>Fedex</i>		1-3-3 10-22 07/14 #015402			
RELINQUISHED BY: (SIGNATURE)		DATE/TIME:		RECEIVED BY: (SIGNATURE)		ORIGINAL TO LAB COPY TO CUSTOMER			
<i>FedEx</i>		8-4-2020 1045		<i>Olaf Hansen</i>					



PROJECT NAME:	CEC Karn BAP/LI: 2020 GW Compliance
PROJECT NUMBER:	367388.0001.0000 Phase 3 Task 1
PROJECT MANAGER:	Darby Litz
SITE LOCATION:	2742 Weadock Hwy Essexville, MI 48732
DATES OF FIELDWORK:	10/5/20 TO 10/12/20
PURPOSE OF FIELDWORK:	2SA20 sampling event
WORK PERFORMED BY:	Katy Reminga/Javier Jasso

SIGNED [Signature] 10/16/20 DATE

CHECKED BY [Signature] 10-27-20 DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	DATE: <u>10/5/20</u>	TIME ARRIVED: <u>0700</u>
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: <u>JJ ASI</u>	TIME LEFT: <u>1630</u>

WEATHER		
TEMPERATURE: <u>38</u> °F	WIND: <u>10</u> MPH	VISIBILITY: <u>clouds</u>

WORK / SAMPLING PERFORMED
<u>water level</u>

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>None</u>	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>N/A</u>	<u>nil</u>	

SIGNED [Signature] DATE 10/10/20

CHECKED BY [Signature] DATE 10-27-20



GENERAL NOTES

PROJECT NAME: CEC Kam BAP/LI: 2020 GW C	DATE: 10/16/20	TIME ARRIVED: 0610
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: JASS-	TIME LEFT: 1630

WEATHER		
TEMPERATURE: <u>50</u> °F	WIND: <u>15</u> MPH	VISIBILITY: <u>cloud</u>

WORK / SAMPLING PERFORMED
Wells Sampled = KFW ^{DFK} MW-18001, ms+msD, KFW ^{DFK} MW 15003 KFW ^{DFK} MW-15003, MW #1, Dup #01, MW 03, MW-06, MW-08 MW-16, ms+msD

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>None</u>	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS

SIGNED [Signature] 10/16/20 DATE

CHECKED BY [Signature] 10-27-20 DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	DATE: 10/7/20	TIME ARRIVED: 0615
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: JJASSC	TIME LEFT: 144 i

WEATHER		
TEMPERATURE: 54 °F	WIND: 15 MPH	VISIBILITY: 1000 ft

WORK / SAMPLING PERFORMED
MW-10, MW 12, 14, EB#02, EB#02 DEKmw-15001
DEKmw 15006 DEK-mw-15004, EB#02
Shipping Samples

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
None	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS

SIGNED [Signature] 10/6/20 DATE

CHECKED BY [Signature] 10-27-20 DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	DATE: 10/8/20	TIME ARRIVED: 0610
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: J. JASSO	TIME LEFT: 1420

WEATHER		
TEMPERATURE: <u>45</u> °F	WIND: <u>10</u> MPH	VISIBILITY: <u>cloudy</u>
WORK / SAMPLING PERFORMED		
mw-22, ow-10, Dup #01, ow-12, EBOI, FBOI mk I-SCS		
Shipping Samples		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS

SIGNED J. Jasso 10/10/20 DATE

CHECKED BY J. King 10-27-20 DATE



GENERAL NOTES

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C	DATE: 10/10/20	TIME ARRIVED: 07K
PROJECT NUMBER: 367388.0001.0000 Pha	AUTHOR: J. J. ASS	TIME LEFT: 1530

WEATHER		
TEMPERATURE: 40 °F	WIND: 15 MPH	VISIBILITY: Clearly

WORK / SAMPLING PERFORMED
LH-103, Dup, MS + MSD, LH-104 F.B#01, G-B#01
LH-101, mw-18, MS + MSD, mw-19 Dup #03, TB#03

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
None	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS

SIGNED [Signature] DATE 10/10/20

CHECKED BY [Signature] DATE 10-27-20



EQUIPMENT SUMMARY

PROJECT NAME: CEC Kam BAP/LI 2020 GW	SAMPLER NAME: Katy Reminga/Javier Jasso
PROJECT NO: 367388.0001.0000 Phase 3	

WATER LEVEL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

PURGING METHOD

PERISTALTIC PUMP/SUBMERSIBLE PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

SAMPLING METHOD

PERISTALTIC PUMP/SUMERSIBLE PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTRATION DEVICE	FILTER TYPE AND SIZE

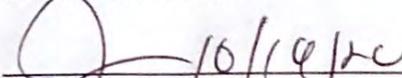
DEDICATED POLY TUBING	<input checked="" type="checkbox"/> LOW-FLOW SAMPLING EVENT
TUBING TYPE	

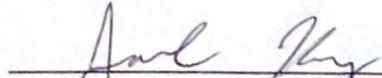
PURGE WATER DISPOSAL METHOD

- GROUND
 DRUM
 POTW
 POLYTANK
 OTHER _____

DECONTAMINATION AND FIELD BLANK WATER SOURCE

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE


 SIGNED _____ DATE 10/19/20


 CHECKED BY _____ DATE 10-27-20



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Kam BAP/LI: 2020 GW Compliance	MODEL:	D55 Pro	SAMPLER:	KR, JJ
PROJECT NO.:	367388.0001.0000 Phase 3 Task 1	SERIAL #:	TRC A2	DATE:	10/27/20

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL RANGE	TIME
(LOT #):	(EXP. DATE):	(LOT #):	(EXP. DATE):		
066300	7/1/21	96702	10/21		
POST-CAL. READING / STANDARD		POST-CAL. READING / STANDARD			
760	1700	400	1400	<input checked="" type="checkbox"/> WITHIN RANGE	0530
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(°CELSIUS)		
964331			
POST-CAL. READING / STANDARD			
1413	1413	<input checked="" type="checkbox"/> WITHIN RANGE	0530
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(°CELSIUS)		
P1016679			
POST-CAL. READING / STANDARD			
220	23.0	<input checked="" type="checkbox"/> WITHIN RANGE	0530
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(°CELSIUS)		
P1016679			
POST-CAL. READING / SATURATED AIR			
800	25.0	<input checked="" type="checkbox"/> WITHIN RANGE	0530
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #):	(EXP. DATE):		
A9319	11/21		
POST-CAL. READING / STANDARD			
0	10	<input checked="" type="checkbox"/> WITHIN RANGE	0530
200	200	<input checked="" type="checkbox"/> WITHIN RANGE	0530
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

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

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED Jr Collette DATE _____

CHECKED BY Joe King DATE 10-27-20



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Kam BAP/LI: 2020 GW Compliance	MODEL: <u>Pro DSS</u>	SAMPLER: KR, JJ
PROJECT NO.: 367388.0001.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: <u>10/7/20</u>

PH CALIBRATION CHECK

LOT #:	LOT #:	CAL RANGE	TIME
<u>pH 7</u> (LOT #): <u>066306</u> (EXP. DATE): <u>7/22</u>	<u>pH 4 / 10</u> (LOT #): <u>965702</u> (EXP. DATE): <u>10/21</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>700 / 700</u>	<u>400 / 400</u>	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

LOT #:	TEMPERATURE	CAL RANGE	TIME
<u>CAL READING</u> (LOT #): <u>965331</u> (EXP. DATE): <u>11/20</u>	(°CELSIUS)		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>1413 / 1413</u>	<u>NA</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

LOT #:	TEMPERATURE	CAL RANGE	TIME
<u>CAL READING</u> (LOT #): <u>10100679</u> (EXP. DATE): <u>04/24</u>	(°CELSIUS)		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>220 / 220</u>	<u>23.0</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

LOT #:	TEMPERATURE	CAL RANGE	TIME
<u>CAL READING</u> (LOT #):	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>8.19 / 8.19</u>	<u>24.0</u>	<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

LOT #:	LOT #:	CAL RANGE	TIME
<u>CALIBRATION READING (NTU)</u> (LOT #): <u>A9317</u> (EXP. DATE): <u>11/21</u>	(LOT #):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>0 / 0</u>	/	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0530</u>
<u>200 / 200</u>	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED [Signature] DATE 10/16/20

CHECKED BY [Signature] DATE 10-27-20



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Kam BAP/LI: 2020 GW Compliance	MODEL: <i>Pro DSS</i>	SAMPLER: KR, JJ
PROJECT NO.: 367388.0001.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: <i>10/8/20</i>

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL RANGE	TIME
(LOT #): <i>066306</i>	(EXP. DATE): <i>7/22</i>	(LOT #): <i>960702</i>	(EXP. DATE): <i>10/21</i>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
<i>700 / 700</i>	<i>1700 / 1700</i>	<i>400 / 400</i>	<i>1400 / 1400</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0520</i>
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
(LOT #): <i>9618331</i>	(°CELSIUS)		
POST-CAL. READING / STANDARD			
<i>1413 / 1413</i>	<i>NA</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0530</i>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
(LOT #): <i>19100679</i>	(°CELSIUS)		
POST-CAL. READING / STANDARD			
<i>220 / 220</i>	<i>22.0</i>	<input type="checkbox"/> WITHIN RANGE	<i>0520</i>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR			
<i>8.35 / 8.35</i>	<i>23.0</i>	<input checked="" type="checkbox"/> WITHIN RANGE	<i>0520</i>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): <i>A9317</i>	(LOT #):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<i>0 / 0</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	<i>0530</i>
<i>20 / 20</i>	<i>/</i>	<input type="checkbox"/> WITHIN RANGE	<i>0520</i>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED *[Signature]* DATE *10/10/20*

CHECKED BY *[Signature]* DATE *10-27-20*



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC Kam BAP/LI: 2020 GW Compliance	MODEL: Pro DSS	SAMPLER: KR, JJ
PROJECT NO.: 367388.0001.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: 10/12/20

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL. RANGE	TIME
(LOT #): 066306	(EXP. DATE): 7/22	(LOT #): 965702	(EXP. DATE): 10/21		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD				
700 / 700	400 / 400	<input checked="" type="checkbox"/>		WITHIN RANGE	0722
/	/	<input type="checkbox"/>		WITHIN RANGE	
/	/	<input type="checkbox"/>		WITHIN RANGE	
/	/	<input type="checkbox"/>		WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #): 96K331	(EXP. DATE): 11/20	(°CELSIUS)		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
1413 / 1413	1413	10.7	<input checked="" type="checkbox"/>	WITHIN RANGE 0725
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE

ORP CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #): 19100879	(EXP. DATE): 4/24	(°CELSIUS)		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD			
223 / 223	16.0		<input checked="" type="checkbox"/>	WITHIN RANGE 0725
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE

D.O. CALIBRATION CHECK

CAL. READING		TEMPERATURE	CAL. RANGE	TIME
(LOT #):	(EXP. DATE):	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR	POST-CAL. READING / SATURATED AIR			
8.31 / 8.31	16.0		<input checked="" type="checkbox"/>	WITHIN RANGE 0725
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE
/	/		<input type="checkbox"/>	WITHIN RANGE

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): A9317	(LOT #):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
0 / 0	/	<input checked="" type="checkbox"/>	WITHIN RANGE 0725
200 / 200	/	<input checked="" type="checkbox"/>	WITHIN RANGE 0725
/	/	<input type="checkbox"/>	WITHIN RANGE
/	/	<input type="checkbox"/>	WITHIN RANGE

COMMENTS

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

NOTES

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

SIGNED: [Signature] DATE: 10/16/20

CHECKED BY: [Signature] DATE: 10-27-20



WATER SAMPLE LOG

PROJECT NAME: DE KARN/JCWEADOCK LAND		PREPARED		CHECKED	
PROJECT NUMBER: 367388.0000.0000 PHASE 3 T		BY: JJ	DATE: 10/16/20	BY: JK	DATE: 10/27/20
SAMPLE ID: 6W-1D		WELL DIAMETER <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: 1103	DATE: 10/16/20	SAMPLE	TIME: 1148	DATE: 10/16/20
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: 7.31 SU CONDUCTIVITY: 843 umhos/cm			
		ORP: -100.8 mV DO: 1.32 mg/L			
DEPTH TO WATER: 1705 T/ PVC		TURBIDITY: 0.41 NTU			
DEPTH TO BOTTOM: NM T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 16.3 °C OTHER:			
VOLUME REMOVED: 9 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: 1100 ODOR: none			
COLOR: Brown ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR: FILTRATE ODOR:			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1103	2.4	7.54	1041	-103.5	7.75	1000	16.0	17.08	INITIAL
1108		7.30	865	-91.7	1.08	25.00	15.4	17.13	10
1113		7.30	841	-97.6	1.49	11.39	15.7	17.13	20
1118		7.30	857	-99.5	1.40	14.82	15.8	17.13	30
1123		7.29	854	-98.5	1.39	10.97	16.0	17.13	40
1128		7.30	854	-100.1	1.34	5.23	16.1	17.13	50
1133		7.31	847	-100.3	1.33	1.38	16.2	17.13	60
1138		7.31	844	-100.7	1.32	0.49	16.3	17.13	70
1143		7.31	843	-100.7	1.32	0.51	16.3	17.13	80
1148		7.31	843	-100.8	1.32	0.45	16.3	17.13	90

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	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
	40 mL	VOA	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	1	250 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
	40 mL	VOA	E	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	1L	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	125 mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125 mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Fedex	DATE SHIPPED: 10/18/20	AIRBILL NUMBER: N/A
COC NUMBER: N/A	SIGNATURE:	DATE SIGNED: 10/16/20



WATER SAMPLE LOG

PROJECT NAME: DE KARN/JCWEADOCK LAND		PREPARED		CHECKED	
PROJECT NUMBER: 367388.0000.0000 PHASE 3 T		BY: JJ	DATE: 10/16/20	BY: SK	DATE: 10/27/20
SAMPLE ID: 0w-10		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: 0859	DATE: 10/18/20	SAMPLE	TIME: 1004	DATE: 10/18/20
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: 7.38 SU CONDUCTIVITY: 948 umhos/cm			
		ORP: -117.5 mV DO: 1.44 mg/L			
DEPTH TO WATER: 6.33 T/ PVC		TURBIDITY: 6.61 NTU			
DEPTH TO BOTTOM: NM T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 12.9 °C OTHER:			
VOLUME REMOVED: 6.5 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: clear ODOR: none			
COLOR: clear ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR: FILTRATE ODOR:			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- #01			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0859	100	7.31	597	3.3	1.00	18.50	11.6	6.33	INITIAL
0904		7.27	1005	-26.6	2.11	17.89	12.4	7.30	1
0909		7.30	999	-55.0	1.72	18.72	12.5	7.45	1
0914		7.33	988	-80.0	1.60	19.76	12.5	7.50	1.1
0919		7.36	966	-102.1	1.54	19.10	12.5	7.55	2
0924		7.37	957	-110.0	1.54	16.00	12.6	7.55	2.5
0929		7.38	953	-115.0	1.49	10.00	12.6	7.60	3
0934		7.38	951	-117.0	1.44	9.85	12.7	7.65	3.5
0939		7.38	950	-116.9	1.44	7.40	12.7	7.65	4
0944		7.38	949	-117.9	1.44	7.79	12.6	7.65	4.5

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	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
	40 mL	VOA	E	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	2	35 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
	40 mL	VOA	E	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	2	1L	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
2	125 mL	VOA	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	125 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	125 mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Fedex	DATE SHIPPED: 10/18/20	AIRBILL NUMBER: N/A
COC NUMBER: N/A	SIGNATURE:	DATE SIGNED: 10/19/20



WATER SAMPLE LOG

PROJECT NAME: CEC Karn LF: 2020 GW Comp		PREPARED		CHECKED	
PROJECT NUMBER: 367388.0000.0000 P3 T1		BY: KR JJ JK	DATE: 10/8/2020	BY: SK	DATE: 10/27/20
SAMPLE ID: OW-11		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: 12:27pm	DATE: 10/8/2020	SAMPLE	TIME: 1338	DATE: 10/8/20
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)	PH: 9.38 SU		CONDUCTIVITY: 486.3 umhos/cm		
DEPTH TO WATER: 40.00 T/ PVC 22.33		ORP: -125.1 mV		DO: 1.50 mg/L	
DEPTH TO BOTTOM: NR T/ PVC		TURBIDITY: 2.00 NTU			
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
VOLUME REMOVED: 14 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 12.5 °C		OTHER: _____	
COLOR: gray		ODOR: none		GGOLOR: clear	
FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR: _____		FILTRATE ODOR: _____	
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
12:27pm	200/bbl	9.23	432	112.5	1.12	over	14.0	22.33	INITIAL
12:32pm		9.23	425	81.0	1.22	703	13.1	22.33	1 L
12:37pm		9.20	425	64.5	1.18	70.4	13.1	22.33	2 L
12:42pm		9.18	425	56.2	1.14	27.0	13.2	22.30	3 L
12:47pm		9.19	426	53.8	1.10	25.0	13.4	22.31	4 L
12:52pm		9.19	426	50.5	1.09	51.5	13.4	22.31	5 L
12:57pm		9.20	425	46.6	1.06	0.68	13.4	22.32	6 L
1:02pm		9.21	425	45.8	1.02	-26	12.9	22.32	7 L
1:07pm		9.22	423	43.9	0.96	68.12	12.6	22.32	8 L
1:12pm		9.40	494.1	-61.7	1.90	64.98	13.0	22.32	9 L

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 0.1 COND: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP: +/- 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
2	125	G	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	P	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250	P	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	P	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1 L	P	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: FedEx	DATE SHIPPED: 10-8-20	AIRBILL NUMBER: _____
COC NUMBER: _____	SIGNATURE: <i>John King</i>	DATE SIGNED: 10-27-20



WATER SAMPLE LOG

PROJECT NAME: CEC Kam BAP/LI: 2020 GW C	PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta	BY: KR, JJ DATE: 10/16/20	BY: JK DATE: 10/27/20

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

PURGING	TIME: <u>0640</u>	DATE: <u>10/16/20</u>	SAMPLE	TIME: <u>0715</u>	DATE: <u>10/16/20</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER BAILER (DISPOSABLE)	PH: <u>7.57</u> SU	CONDUCTIVITY: <u>813</u> umhos/cm	ORP: <u>-141.8</u> mV	DO: <u>1.53</u> mg/L	
DEPTH TO WATER: <u>825</u> T/ PVC	TURBIDITY: <u>1.31</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	TEMPERATURE: <u>13.0</u> °C	OTHER: _____			
WELL VOLUME: <u>NA</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>clear</u>	ODOR: _____			
VOLUME REMOVED: <u>4.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____ FILTRATE ODOR: _____			
COLOR: <u>clear</u> ODOR: <u>none</u>	TURBIDITY <input type="checkbox"/> NONE <input checked="" type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	COMMENTS: _____				

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0640	100	400	895	-65.9	6.70	33.95	13.2	825	INITIAL
0645		7.51	850	-151.6	2.00	4.70	13.1	830	.5
0650		7.55	820	-142.6	1.70	0.50	13.1	830	1
0655		7.55	821	-141.0	1.45	1.00	13.1	830	1.5
0700		7.56	818	-141.7	1.60	1.00	13.1	830	2
0705		7.56	815	-141.5	1.50	1.27	13.0	830	2.5
0710		7.56	814	-142.5	1.54	1.26	13.1	830	3
0715		7.56	813	-141.9	1.53	1.31	13.0	830	3.5
0720		7.57	813	-141.3	1.53	1.35	13.0	830	4
0725		7.57	813	-141.8	1.53	1.35	13.0	830	4.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES							
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
6	125ml	Clas	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	125	pl	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	125	pl	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250	pl	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1000	pl	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: <u>Fedex</u>	DATE SHIPPED: <u>10-8-20</u>	AIRBILL NUMBER: <u>NA</u>
COC NUMBER: <u>NA</u>	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10/16/20</u>



WATER SAMPLE LOG

PROJECT NAME: CEC Karn BAP/LI: 2020 GW C		PREPARED	CHECKED
PROJECT NUMBER: 367388.0001.0000 Phase 3 Ta		BY: KR (J)	DATE: 10/16/20
SAMPLE ID: DEK-mm15003		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER	
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER			
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER			
PURGING	TIME: 0915	DATE: 10/16/20	SAMPLE
			TIME: 0930
			DATE: 10/16/20
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP		PH: 8.54 SU	
<input type="checkbox"/> BAILER BAILER (DISPOSABLE)		CONDUCTIVITY: 400 umhos/cm	
DEPTH TO WATER: 16.00 T/ PVC		ORP: -148.0 mV	
DEPTH TO BOTTOM: NM T/ PVC		DO: 2.21 mg/L	
WELL VOLUME: NA <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TURBIDITY: 0.25 NTU	
VOLUME REMOVED: 1.5 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	
COLOR: Clear		TEMPERATURE: 17.7 °C	
ODOR: non		OTHER:	
FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR:	
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-	
COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0915	1cp	8.36	217	-90.1	9.00	2.00	17.7	16.08	INITIAL
0920		8.94	411	-148.0	2.25	0.50	17.7	16.85	.5
0925		8.54	404	-148.1	2.25	0.25	17.7	17.00	1
0930		8.54	400	-148.0	2.21	0.25	17.7	17.10	1.5
									2
									2.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1 COND.: +/- 3% ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10% or <= 10 TEMP.: +/- 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
2	125	GMS	A	<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	200	PI	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	125	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1000	PI	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Fedex	DATE SHIPPED: 10-8-20	AIRBILL NUMBER: NY
COC NUMBER: CVV	SIGNATURE:	DATE SIGNED: 10/16/20

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE: Karn Lined Impoundment – 2020 Q4				PROJECT NUMBER: 20-1110			ANALYSIS REQUESTED						Page 1 of 1	
SAMPLING TEAM:				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity	SEND REPORT TO: CDBatts		
												HD Register, TRC		
												PHONE: _____		
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS							REMARKS	
20-1110-01	10/8/12	1004	GW	OW-10		5	X	X	X	X				
-02	10/8/12	1338	GW	OW-11		5	X	X	X	X				
-03	10/8/12c	1148	GW	OW-12		5	X	X	X	X				
-04	10/8/12	1305	GW	KLI-SCS		5	X	X	X	X				
-05	10/8/12	—	GW	DUP- 01		5	X	X	X	X				
-06	10/8/12	1210	W	EB- 01		2	X	X						
-07	10/8/12	1215	W	FB- 01		2	X	X						
RELINQUISHED BY: (SIGNATURE) 			DATE/TIME: 10/9/12 1440			RECEIVED BY: (SIGNATURE) 10-09-20 12:45 			COMMENTS RECD ON 706 1.8-3.0 °C MUTE # 015484					
RELINQUISHED BY: (SIGNATURE)			DATE/TIME:			RECEIVED BY: (SIGNATURE)								

ORIGINAL TO LAB COPY TO CUSTOMER

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE: Karn Bottom Ash Pond & LI - 2020 Q4				PROJECT NUMBER: 20-1109			ANALYSIS REQUESTED							Page 1 of 1		
SAMPLING TEAM: <i>TRC</i>				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity					SEND REPORT TO: CDBatts
																HD Register, TRC
												PHONE: _____				
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS										REMARKS
20-1109-01	<i>10/6/20</i>	<i>0930</i>	GW	DEK-MW-15003		5	X	X	X	X						
-02	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001		5	X	X	X	X						
-03	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001 MS		4	X	X		X						
↓ -04	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001 MSD		4	X	X		X						
RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>				DATE/TIME: <i>10-7-2020/0143</i>		RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		COMMENTS <i>5.1°C</i> <i>* 015402</i>								
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)										

ORIGINAL TO LAB COPY TO CUSTOMER

Attachment B

Laboratory Analytical Reports

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: August 28, 2020

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2020 Q3

CC: BTRunkel, P22-120
HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
TRC Companies, Inc.
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 20-0888

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 08/03/2020, for the 3rd 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 08/05/2020.

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 2009 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

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

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q3-2020 DEK RCRA Bottom Ash Pond & LI Wells
Date Received: 8/5/2020
Chemistry Project: 20-0888

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-0888-01	DEK-MW-15003	Groundwater	08/03/2020 01:23 PM	DEKarn Bottom Ash Pond & Lined Impoundment
20-0888-02	DEK-MW-18001	Groundwater	08/03/2020 02:16 PM	DEKarn Bottom Ash Pond & Lined Impoundment
20-0888-03	DEK-MW-18001 MS	Groundwater	08/03/2020 02:16 PM	DEKarn Bottom Ash Pond & Lined Impoundment
20-0888-04	DEK-MW-18001 MSD	Groundwater	08/03/2020 02:16 PM	DEKarn Bottom Ash Pond & Lined Impoundment



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 20-0888-01
 Matrix: Groundwater

Laboratory Project: **20-0888**
 Collect Date: 08/03/2020
 Collect Time: 01:23 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0888-01-C01-A01 Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0888-01-C01-A02 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	355		ug/L	1	08/27/2020	AB20-0813-05
Barium	40		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	798		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	31400		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	ND		ug/L	1	08/27/2020	AB20-0813-05
Iron	258		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	21		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	5970		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	60		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	42		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	3640		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	45800		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0888-01-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	46300		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	40600		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0888-01-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	291		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
Field Sample ID: **DEK-MW-15003**
Lab Sample ID: 20-0888-01
Matrix: Groundwater

Laboratory Project: **20-0888**
Collect Date: 08/03/2020
Collect Time: 01:23 PM

Alkalinity by SM 2320B

Aliquot: 20-0888-01-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	85700		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	85700		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 20-0888-02
 Matrix: Groundwater

Laboratory Project: **20-0888**
 Collect Date: 08/03/2020
 Collect Time: 02:16 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0888-02-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0888-02-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	69		ug/L	1	08/27/2020	AB20-0813-05
Barium	129		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	1770		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	68700		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	ND		ug/L	1	08/27/2020	AB20-0813-05
Iron	677		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	27		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	14300		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	183		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	4560		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	71700		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0888-02-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	63100		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	1170		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	66600		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0888-02-C03-A01

Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	498		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
Field Sample ID: **DEK-MW-18001**
Lab Sample ID: 20-0888-02
Matrix: Groundwater

Laboratory Project: **20-0888**
Collect Date: 08/03/2020
Collect Time: 02:16 PM

Alkalinity by SM 2320B

Aliquot: 20-0888-02-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	240000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	240000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 20-0888-03
 Matrix: Groundwater

Laboratory Project: **20-0888**
 Collect Date: 08/03/2020
 Collect Time: 02:16 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0888-03-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	108		%	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0888-03-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	101		%	1	08/27/2020	AB20-0813-05
Arsenic	90		%	1	08/27/2020	AB20-0813-05
Barium	102		%	5	08/27/2020	AB20-0813-05
Beryllium	101		%	1	08/27/2020	AB20-0813-05
Boron	96		%	20	08/13/2020	AB20-0813-05
Cadmium	99.0		%	0.2	08/27/2020	AB20-0813-05
Calcium	120		%	1000	08/13/2020	AB20-0813-05
Chromium	91		%	1	08/27/2020	AB20-0813-05
Cobalt	90		%	6	08/27/2020	AB20-0813-05
Copper	90		%	1	08/27/2020	AB20-0813-05
Iron	92		%	20	08/27/2020	AB20-0813-05
Lead	96		%	1	08/27/2020	AB20-0813-05
Lithium	101		%	10	08/27/2020	AB20-0813-05
Magnesium	107		%	1000	08/13/2020	AB20-0813-05
Manganese	91		%	5	08/27/2020	AB20-0813-05
Molybdenum	101		%	5	08/27/2020	AB20-0813-05
Nickel	90		%	2	08/27/2020	AB20-0813-05
Potassium	107		%	100	08/13/2020	AB20-0813-05
Selenium	89		%	1	08/27/2020	AB20-0813-05
Silver	97.4		%	0.2	08/27/2020	AB20-0813-05
Sodium	112		%	1000	08/13/2020	AB20-0813-05
Thallium	97		%	2	08/27/2020	AB20-0813-05
Vanadium	94		%	2	08/27/2020	AB20-0813-05
Zinc	90		%	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0888-03-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	103		%	2000	08/14/2020	AB20-0813-02
Fluoride	101		%	1000	08/14/2020	AB20-0813-02
Sulfate	100		%	1000	08/14/2020	AB20-0813-02

Alkalinity by SM 2320B

Aliquot: 20-0888-03-C03-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	92		%	10000	08/11/2020	AB20-0810-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 20-0888-04
 Matrix: Groundwater

Laboratory Project: **20-0888**
 Collect Date: 08/03/2020
 Collect Time: 02:16 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0888-04-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	105		%	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0888-04-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	102		%	1	08/27/2020	AB20-0813-05
Arsenic	91		%	1	08/27/2020	AB20-0813-05
Barium	106		%	5	08/27/2020	AB20-0813-05
Beryllium	100		%	1	08/27/2020	AB20-0813-05
Boron	123		%	20	08/13/2020	AB20-0813-05
Cadmium	100		%	0.2	08/27/2020	AB20-0813-05
Calcium	119		%	1000	08/13/2020	AB20-0813-05
Chromium	91		%	1	08/27/2020	AB20-0813-05
Cobalt	90		%	6	08/27/2020	AB20-0813-05
Copper	90		%	1	08/27/2020	AB20-0813-05
Iron	90		%	20	08/27/2020	AB20-0813-05
Lead	96		%	1	08/27/2020	AB20-0813-05
Lithium	101		%	10	08/27/2020	AB20-0813-05
Magnesium	110		%	1000	08/13/2020	AB20-0813-05
Manganese	91		%	5	08/27/2020	AB20-0813-05
Molybdenum	103		%	5	08/27/2020	AB20-0813-05
Nickel	90		%	2	08/27/2020	AB20-0813-05
Potassium	111		%	100	08/13/2020	AB20-0813-05
Selenium	89		%	1	08/27/2020	AB20-0813-05
Silver	99.1		%	0.2	08/27/2020	AB20-0813-05
Sodium	114		%	1000	08/13/2020	AB20-0813-05
Thallium	96		%	2	08/27/2020	AB20-0813-05
Vanadium	94		%	2	08/27/2020	AB20-0813-05
Zinc	91		%	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0888-04-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	104		%	2000	08/14/2020	AB20-0813-02
Fluoride	100		%	1000	08/14/2020	AB20-0813-02
Sulfate	99		%	1000	08/14/2020	AB20-0813-02

Alkalinity by SM 2320B

Aliquot: 20-0888-04-C03-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	93		%	10000	08/11/2020	AB20-0810-09

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 20-0888

Inspection Date: 8.5.20 Inspection By: dmlw

Sample Origin/Project Name: Karn Bottom Ash Pond & LI

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx X UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: 395487297812 Shipping Form Attached: Yes _____ No _____

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

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

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed X

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

CoC X Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 1.8 - 3.2°C Samples Received on Ice: Yes X No _____

M&TE # and Expiration 015402 6/4/21

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or <u>60mL</u>)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>8</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other <u>250 ml</u>	<u>2</u>	_____	_____	_____	_____

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



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

SAMPLING SITE: Karn Bottom Ash Pond & LI - 2020 Q3				PROJECT NUMBER: 20-0888			ANALYSIS REQUESTED							Page 1 of 1			
SAMPLING TEAM: TRC				DATE SHIPPED: 8-4-20		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity						SEND REPORT TO: CDBatts
																	HD Register, TRC
													PHONE: _____				
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS									REMARKS		
20-0888-01	8-3-20	1323	GW	DEK-MW-15003		5	X	X	X	X							
-02	8-3-20	1416	GW	DEK-MW-18001		5	X	X	X	X							
-03	8-3-20	1416	GW	DEK-MW-18001 MS		4	X	X		X							
↓ -04	8-3-20	1416	GW	DEK-MW-18001 MSD		4	X	X		X							
RELINQUISHED BY: (SIGNATURE) <i>Paul King</i>			DATE/TIME: 8-4-20/1700			RECEIVED BY: (SIGNATURE) <i>Fedex</i>			COMMENTS								
RELINQUISHED BY: (SIGNATURE) <i>FedEx</i>			DATE/TIME: 8-5-2020 1130			RECEIVED BY: (SIGNATURE) <i>Chris Hansen</i>											
											ORIGINAL TO LAB	COPY TO CUSTOMER					

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: August 28, 2020

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2020 Q3

CC: BTRunkel, P22-120
HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
TRC Companies, Inc.
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 20-0889

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 08/04/2020 and 08/05/2020 for the 3rd 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 08/05/2020 and 08/06/2020.

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 2009 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

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

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q3-2020 DEK RCRA Lined Impoundment Wells
Date Received: 8/05/2020 and 08/06/2020
Chemistry Project: 20-0889

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-0889-01	OW-10	Groundwater	08/04/2020 09:41 AM	DEKarn Lined Impoundment
20-0889-02	OW-11	Groundwater	08/04/2020 03:27 PM	DEKarn Lined Impoundment
20-0889-03	OW-12	Groundwater	08/03/2020 05:20 PM	DEKarn Lined Impoundment
20-0889-04	KLI-SCS	Groundwater	08/05/2020 02:50 PM	DEKarn Lined Impoundment
20-0889-05	DUP-02	Groundwater	08/04/2020 12:00 AM	DEKarn Lined Impoundment
20-0889-06	EB-02	Water	08/05/2020 02:46 PM	DEKarn Lined Impoundment
20-0889-07	FB-02	Water	08/04/2020 03:27 PM	DEKarn Lined Impoundment



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 20-0889-01
 Matrix: Groundwater

Laboratory Project: **20-0889**
 Collect Date: 08/04/2020
 Collect Time: 09:41 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-01-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-01-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	5		ug/L	1	08/27/2020	AB20-0813-05
Barium	141		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	1210		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	110000		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	2		ug/L	1	08/27/2020	AB20-0813-05
Iron	1770		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	31		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	15500		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	169		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	3520		ug/L	100	08/13/2020	AB20-0813-05
Selenium	4		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	51800		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	4		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-01-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	61600		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	46400		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0889-01-C03-A01

Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	562		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **OW-10**
Lab Sample ID: 20-0889-01
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/04/2020
Collect Time: 09:41 AM

Alkalinity by SM 2320B

Aliquot: 20-0889-01-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	323000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	323000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 20-0889-02
 Matrix: Groundwater

Laboratory Project: **20-0889**
 Collect Date: 08/04/2020
 Collect Time: 03:27 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-02-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-02-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	2		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	523		ug/L	1	08/27/2020	AB20-0813-05
Barium	43		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	2800		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	13700		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	2		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	2		ug/L	1	08/27/2020	AB20-0813-05
Iron	54		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	13		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	1920		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	ND		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	407		ug/L	5	08/27/2020	AB20-0813-05
Nickel	3		ug/L	2	08/27/2020	AB20-0813-05
Potassium	3950		ug/L	100	08/13/2020	AB20-0813-05
Selenium	2		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	57000		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	351		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-02-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	76000		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	4790		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	24300		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0889-02-C03-A01

Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	271		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **OW-11**
Lab Sample ID: 20-0889-02
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/04/2020
Collect Time: 03:27 PM

Alkalinity by SM 2320B

Aliquot: 20-0889-02-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	44400		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	10700		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	33700		ug/L	10000	08/11/2020	AB20-0810-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 20-0889-03
 Matrix: Groundwater

Laboratory Project: **20-0889**
 Collect Date: 08/03/2020
 Collect Time: 05:20 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-03-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-03-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	111		ug/L	1	08/27/2020	AB20-0813-05
Barium	83		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	798		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	109000		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	2		ug/L	1	08/27/2020	AB20-0813-05
Iron	5280		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	34		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	34700		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	192		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	16		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	6090		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	52200		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-03-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	46300		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	192000		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0889-03-C03-A01

Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	696		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **OW-12**
Lab Sample ID: 20-0889-03
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/03/2020
Collect Time: 05:20 PM

Alkalinity by SM 2320B

Aliquot: 20-0889-03-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	223000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	223000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09



Analytical Report

Report Date: 08/28/20

Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **KLI-SCS**
Lab Sample ID: 20-0889-04
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/05/2020
Collect Time: 02:50 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-04-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-04-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	1		ug/L	1	08/27/2020	AB20-0813-05
Barium	82		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	423		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	156000		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	1		ug/L	1	08/27/2020	AB20-0813-05
Iron	3380		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	10		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	47400		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	162		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	13		ug/L	5	08/27/2020	AB20-0813-05
Nickel	4		ug/L	2	08/27/2020	AB20-0813-05
Potassium	5510		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	40600		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	3		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-04-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22600		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	316000		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0889-04-C03-A01

Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	965		mg/L	10	08/06/2020	AB20-0806-07



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **KLI-SCS**
Lab Sample ID: 20-0889-04
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/05/2020
Collect Time: 02:50 PM

Alkalinity by SM 2320B

Aliquot: 20-0889-04-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	309000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	309000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **DUP-02**
 Lab Sample ID: 20-0889-05
 Matrix: Groundwater

Laboratory Project: **20-0889**
 Collect Date: 08/04/2020
 Collect Time: 12:00 AM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-05-C01-A01 Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-05-C01-A02 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	4		ug/L	1	08/27/2020	AB20-0813-05
Barium	131		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	1240		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	107000		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	2		ug/L	1	08/27/2020	AB20-0813-05
Iron	1840		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	30		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	16200		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	168		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	3900		ug/L	100	08/13/2020	AB20-0813-05
Selenium	4		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	54900		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	3		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-05-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	62600		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	43700		ug/L	1000	08/14/2020	AB20-0813-02

Total Dissolved Solids by SM 2540C

Aliquot: 20-0889-05-C03-A01 Analyst: DLR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	572		mg/L	10	08/10/2020	AB20-0811-04



Analytical Report

Report Date: 08/28/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
Field Sample ID: **DUP-02**
Lab Sample ID: 20-0889-05
Matrix: Groundwater

Laboratory Project: **20-0889**
Collect Date: 08/04/2020
Collect Time: 12:00 AM

Alkalinity by SM 2320B

Aliquot: 20-0889-05-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	324000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity bicarbonate	324000		ug/L	10000	08/11/2020	AB20-0810-09
Alkalinity carbonate	ND		ug/L	10000	08/11/2020	AB20-0810-09

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **EB-02**
 Lab Sample ID: 20-0889-06
 Matrix: Water

Laboratory Project: **20-0889**
 Collect Date: 08/05/2020
 Collect Time: 02:46 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-06-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-06-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	ND		ug/L	1	08/27/2020	AB20-0813-05
Barium	ND		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	ND		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	ND		ug/L	1	08/27/2020	AB20-0813-05
Iron	ND		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	ND		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	ND		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	ND		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-06-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	ND		ug/L	1000	08/14/2020	AB20-0813-02

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEKarn Lined Impoundment**
 Field Sample ID: **FB-02**
 Lab Sample ID: 20-0889-07
 Matrix: Water

Laboratory Project: **20-0889**
 Collect Date: 08/04/2020
 Collect Time: 03:27 PM

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-0889-07-C01-A01

Analyst: TMR

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03

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

Aliquot: 20-0889-07-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	08/27/2020	AB20-0813-05
Arsenic	ND		ug/L	1	08/27/2020	AB20-0813-05
Barium	ND		ug/L	5	08/27/2020	AB20-0813-05
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05
Boron	ND		ug/L	20	08/13/2020	AB20-0813-05
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Calcium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-05
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-05
Copper	ND		ug/L	1	08/27/2020	AB20-0813-05
Iron	ND		ug/L	20	08/27/2020	AB20-0813-05
Lead	ND		ug/L	1	08/27/2020	AB20-0813-05
Lithium	ND		ug/L	10	08/27/2020	AB20-0813-05
Magnesium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Manganese	ND		ug/L	5	08/27/2020	AB20-0813-05
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-05
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-05
Potassium	ND		ug/L	100	08/13/2020	AB20-0813-05
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-05
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-05
Sodium	ND		ug/L	1000	08/13/2020	AB20-0813-05
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-05
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-05
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-05

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

Aliquot: 20-0889-07-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	08/14/2020	AB20-0813-02
Fluoride	ND		ug/L	1000	08/14/2020	AB20-0813-02
Sulfate	ND		ug/L	1000	08/14/2020	AB20-0813-02



Analytical Report

Report Date: 08/28/20

Laboratory Services
A CENTURY OF EXCELLENCE

Data Qualifiers	Exception Summary
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No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 20-0889

Inspection Date: 8.5.20 Inspection By: dmw

Sample Origin/Project Name: Karn Lined Impoundment

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: 3954 8729 7823 Shipping Form Attached: Yes _____ No _____

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 2.1-4.6°C Samples Received on Ice: Yes No _____

M&TE # and Expiration 015402 6.4.21

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	<u>8</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>10</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other <u>250 ml</u>	<u>4</u>	_____	_____	_____	_____

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:			ANALYSIS REQUESTED							Page 1 of 1		
Karn Lined Impoundment – 2020 Q3				20-0889			Total Metals	Anions	TDS	Alkalinity						SEND REPORT TO: CDBatts
																HD Register, TRC
SAMPLING TEAM: TRC - Katy Reminga + Jake Krenz				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE:									PHONE: _____	
						YES NO									REMARKS	
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS										
20-0889-01	8/4/2020	9:41 am	GW	OW-10	17.95	5	X	X	X	X						
-02	8/4/2020	1527	GW	OW-11		5	X	X	X	X						
-03	8/3/2020	5:20 pm	GW	OW-12		5	X	X	X	X						
-04			GW	KLI-SCS		5	X	X	X	X						
-05	8/4/2020	1527	GW	DUP- 02		5	X	X	X	X						
-06	8/4/2020	1527	W	EB- 02		2	X	X								
-07	8/4/2020	1527	W	FB- 02		2	X	X								
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)				COMMENTS						
<i>Jul King</i>				8-4-20/1700		Fedex										
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)										
Fed Ex				8-5-2020 1130		CSepp/Hansen				ORIGINAL TO LAB COPY TO CUSTOMER						

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 20-0889

Inspection Date: 8/6/2020 Inspection By: CVH

Sample Origin/Project Name: K/W

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) _____

Tracking Number: 395523607081 Shipping Form Attached: Yes No _____

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

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

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 1.3-3.1°C Samples Received on Ice: Yes No _____

M&TE # and Expiration 015402/10-4-21

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	<u>2</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>4</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other <u>250mL HDPE</u>	<u>1</u>	_____	_____	_____	_____

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



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

SAMPLING SITE: Karn Lined Impoundment – 2020 Q3				PROJECT NUMBER: 20-0889			ANALYSIS REQUESTED							Page 1 of 1		
SAMPLING TEAM: <i>Katy Reminga + Jake Krenz</i>				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity					SEND REPORT TO: CDBatts
																HD Register, TRC
												PHONE: _____				
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS									REMARKS	
20-0889-01			GW	OW-10		5	X	X	X	X						
-02			GW	OW-11		5	X	X	X	X						
-03			GW	OW-12		5	X	X	X	X						
-04	<i>8/5/2020</i>	<i>2:50 pm</i>	GW	KLI-SCS		5	X	X	X	X						
-05			GW	DUP-		5	X	X	X	X						
-06	<i>8/5/2020</i>	<i>2:46 pm</i>	W	EB- 02		2	X	X								
-07			W	FB-		2	X	X								
RELINQUISHED BY: (SIGNATURE) <i>Jake Krenz</i>			DATE/TIME: <i>8-5-20/1600</i>			RECEIVED BY: (SIGNATURE) <i>Fedex</i>			COMMENTS <i>1-3-3.1K on ice #015402</i>							
RELINQUISHED BY: (SIGNATURE) <i>Fed Ex</i>			DATE/TIME: <i>8-6-2020 1045</i>			RECEIVED BY: (SIGNATURE) <i>AKeip Hansen</i>										

ORIGINAL TO LAB COPY TO CUSTOMER

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: October 30, 2020

Subject: RCRA GROUNDWATER MONITORING – KARN BAP & LINED IMP. WELLS – 2020 Q4

CC: BTRunkel, P22-120
HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
TRC Companies, Inc.
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 20-1109

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area on 10/06/2020, for the 4th 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 10/07/2020.

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 2009 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

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

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex

Work Order ID: Q4-2020 DEK RCRA Bottom Ash Pond & Lined Impoundment

Date Received: 10/9/2020

Chemistry Project: 20-1109

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-1109-01	DEK-MW-15003	Groundwater	10/06/2020 09:30 AM	DEK Bottom Ash Pond & Lined Impoundment
20-1109-02	DEK-MW-18001	Groundwater	10/06/2020 07:25 AM	DEK Bottom Ash Pond & Lined Impoundment
20-1109-03	DEK-MW-18001 MS	Groundwater	10/06/2020 07:25 AM	DEK Bottom Ash Pond & Lined Impoundment
20-1109-04	DEK-MW-18001 MSD	Groundwater	10/06/2020 07:25 AM	DEK Bottom Ash Pond & Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-15003**
 Lab Sample ID: 20-1109-01
 Matrix: Groundwater

Laboratory Project: **20-1109**
 Collect Date: 10/06/2020
 Collect Time: 09:30 AM

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

Aliquot: 20-1109-01-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	393		ug/L	1	10/12/2020	AB20-1012-08
Barium	40		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	842		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	29700		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	ND		ug/L	1	10/12/2020	AB20-1012-08
Iron	142		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	19		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	4430		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	59		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	4880		ug/L	100	10/13/2020	AB20-1012-08
Selenium	ND		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	42800		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	ND		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1109-01-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1109-01-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	46500		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	1190		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	44600		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1109-01-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	237		mg/L	10	10/09/2020	AB20-1009-15



Analytical Report

Report Date: 10/30/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
Field Sample ID: **DEK-MW-15003**
Lab Sample ID: 20-1109-01
Matrix: Groundwater

Laboratory Project: **20-1109**
Collect Date: 10/06/2020
Collect Time: 09:30 AM

Alkalinity by SM 2320B

Aliquot: 20-1109-01-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	53600		ug/L	10000	10/16/2020	AB20-1013-18
Alkalinity bicarbonate	53600		ug/L	10000	10/16/2020	AB20-1013-18
Alkalinity carbonate	ND		ug/L	10000	10/16/2020	AB20-1013-18

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001**
 Lab Sample ID: 20-1109-02
 Matrix: Groundwater

Laboratory Project: **20-1109**
 Collect Date: 10/06/2020
 Collect Time: 07:25 AM

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

Aliquot: 20-1109-02-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	85		ug/L	1	10/12/2020	AB20-1012-08
Barium	136		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	1740		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	71700		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	ND		ug/L	1	10/12/2020	AB20-1012-08
Iron	681		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	26		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	14200		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	ND		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	5720		ug/L	100	10/13/2020	AB20-1012-08
Selenium	1		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	71300		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	ND		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1109-02-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1109-02-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	60700		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	1240		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	91900		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1109-02-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	476		mg/L	10	10/09/2020	AB20-1009-15



Analytical Report

Report Date: 10/30/20

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
Field Sample ID: **DEK-MW-18001**
Lab Sample ID: 20-1109-02
Matrix: Groundwater

Laboratory Project: **20-1109**
Collect Date: 10/06/2020
Collect Time: 07:25 AM

Alkalinity by SM 2320B

Aliquot: 20-1109-02-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	210000		ug/L	10000	10/16/2020	AB20-1013-18
Alkalinity bicarbonate	210000		ug/L	10000	10/16/2020	AB20-1013-18
Alkalinity carbonate	ND		ug/L	10000	10/16/2020	AB20-1013-18

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MS**
 Lab Sample ID: 20-1109-03
 Matrix: Groundwater

Laboratory Project: **20-1109**
 Collect Date: 10/06/2020
 Collect Time: 07:25 AM

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

Aliquot: 20-1109-03-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	106		%	1	10/12/2020	AB20-1012-08
Arsenic	97		%	1	10/12/2020	AB20-1012-08
Barium	103		%	5	10/12/2020	AB20-1012-08
Beryllium	106		%	1	10/12/2020	AB20-1012-08
Boron	116		%	20	10/12/2020	AB20-1012-08
Cadmium	103		%	0.2	10/12/2020	AB20-1012-08
Calcium	115		%	1000	10/13/2020	AB20-1012-08
Chromium	99		%	1	10/12/2020	AB20-1012-08
Cobalt	97		%	6	10/12/2020	AB20-1012-08
Copper	96		%	1	10/12/2020	AB20-1012-08
Iron	101		%	20	10/13/2020	AB20-1012-08
Lead	100		%	1	10/12/2020	AB20-1012-08
Lithium	103		%	10	10/12/2020	AB20-1012-08
Magnesium	104		%	1000	10/13/2020	AB20-1012-08
Molybdenum	105		%	5	10/12/2020	AB20-1012-08
Nickel	98		%	2	10/12/2020	AB20-1012-08
Potassium	106		%	100	10/13/2020	AB20-1012-08
Selenium	95		%	1	10/12/2020	AB20-1012-08
Silver	101		%	0.2	10/12/2020	AB20-1012-08
Sodium	107		%	1000	10/13/2020	AB20-1012-08
Thallium	101		%	2	10/12/2020	AB20-1012-08
Vanadium	100		%	2	10/12/2020	AB20-1012-08
Zinc	97		%	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1109-03-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	101		%	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1109-03-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	115		%	2000	10/13/2020	AB20-1013-09
Fluoride	104		%	1000	10/13/2020	AB20-1013-09
Sulfate	108		%	1000	10/13/2020	AB20-1013-09

Alkalinity by SM 2320B

Aliquot: 20-1109-03-C03-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	94		%	10000	10/16/2020	AB20-1013-18

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Bottom Ash Pond & Lined Impoundment**
 Field Sample ID: **DEK-MW-18001 MSD**
 Lab Sample ID: 20-1109-04
 Matrix: Groundwater

Laboratory Project: **20-1109**
 Collect Date: 10/06/2020
 Collect Time: 07:25 AM

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

Aliquot: 20-1109-04-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	108		%	1	10/12/2020	AB20-1012-08
Arsenic	98		%	1	10/12/2020	AB20-1012-08
Barium	103		%	5	10/12/2020	AB20-1012-08
Beryllium	106		%	1	10/12/2020	AB20-1012-08
Boron	120		%	20	10/12/2020	AB20-1012-08
Cadmium	104		%	0.2	10/12/2020	AB20-1012-08
Calcium	117		%	1000	10/13/2020	AB20-1012-08
Chromium	101		%	1	10/12/2020	AB20-1012-08
Cobalt	96		%	6	10/12/2020	AB20-1012-08
Copper	98		%	1	10/12/2020	AB20-1012-08
Iron	101		%	20	10/13/2020	AB20-1012-08
Lead	102		%	1	10/12/2020	AB20-1012-08
Lithium	105		%	10	10/12/2020	AB20-1012-08
Magnesium	104		%	1000	10/13/2020	AB20-1012-08
Molybdenum	107		%	5	10/12/2020	AB20-1012-08
Nickel	99		%	2	10/12/2020	AB20-1012-08
Potassium	109		%	100	10/13/2020	AB20-1012-08
Selenium	97		%	1	10/12/2020	AB20-1012-08
Silver	101		%	0.2	10/12/2020	AB20-1012-08
Sodium	108		%	1000	10/13/2020	AB20-1012-08
Thallium	102		%	2	10/12/2020	AB20-1012-08
Vanadium	102		%	2	10/12/2020	AB20-1012-08
Zinc	99		%	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1109-04-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	94.7		%	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1109-04-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	113		%	2000	10/13/2020	AB20-1013-09
Fluoride	104		%	1000	10/13/2020	AB20-1013-09
Sulfate	106		%	1000	10/13/2020	AB20-1013-09

Alkalinity by SM 2320B

Aliquot: 20-1109-04-C03-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	93		%	10000	10/16/2020	AB20-1013-18

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

No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 20-1109

Inspection Date: 10-07-2020

Inspection By: WKK 10072020

Sample Origin/Project Name: KARN BOTTOM ASH POND & LI-2020 Q4

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) JAKE KRENZ

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

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____

Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 5.1°C Samples Received on Ice: Yes No _____

M&TE # and Expiration 015402 06/04/2021

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	<u>6</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>8</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other <u>250 mL</u>	<u>2</u>	_____	_____	_____	_____

PH VERIFIED < 2 CAT# 13-640-511 LOT# 230418
10-07-20

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE: Karn Bottom Ash Pond & LI - 2020 Q4				PROJECT NUMBER: 20-1109			ANALYSIS REQUESTED							Page 1 of 1		
SAMPLING TEAM: <i>TRC</i>				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity					SEND REPORT TO: CDBatts
PHONE: _____																
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS										REMARKS
20-1109-01	<i>10/6/20</i>	<i>0930</i>	GW	DEK-MW-15003		5	X	X	X	X						
-02	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001		5	X	X	X	X						
-03	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001 MS		4	X	X		X						
↓ -04	<i>11 11</i>	<i>0725</i>	GW	DEK-MW-18001 MSD		4	X	X		X						
RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>				DATE/TIME: <i>10-7-2020/0143</i>		RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		COMMENTS <i>5.1°C</i> <i>* 015402</i>								
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)										

ORIGINAL TO LAB COPY TO CUSTOMER

To: CDBatts, Karn/Weadock

From: EBlaj, T-258

Date: October 30, 2020

Subject: RCRA GROUNDWATER MONITORING – KARN LINED IMPOUNDMENT – 2020 Q4

CC: BTRunkel, P22-120
HDRegister, P22-521
BLSwanberg, P22-119

Darby Litz, Project Manager
TRC Companies, Inc.
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 20-1110

TRC Environmental, Inc. conducted groundwater monitoring at the DE Karn Lined Impoundment area on 10/08/2020 for the 4th 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 10/09/2020.

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 2009 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead



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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

III. Results/Quality Control

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

DEFINITIONS / QUALIFIERS

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

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

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

Customer Name: Karn/Weadock Complex
Work Order ID: Q4-2020 DEK RCRA Lined Impoundment Wells
Date Received: 10/11/2020
Chemistry Project: 20-1110

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-1110-01	OW-10	Groundwater	10/08/2020 10:04 AM	DEK Lined Impoundment
20-1110-02	OW-11	Groundwater	10/08/2020 01:38 PM	DEK Lined Impoundment
20-1110-03	OW-12	Groundwater	10/08/2020 11:48 AM	DEK Lined Impoundment
20-1110-04	KLI-SCS	Groundwater	10/08/2020 01:05 PM	DEK Lined Impoundment
20-1110-05	DUP-01	Groundwater	10/08/2020 12:00 AM	DEK Lined Impoundment
20-1110-06	EB-01	Water	10/08/2020 12:10 PM	DEK Lined Impoundment
20-1110-07	FB-01	Water	10/08/2020 12:15 PM	DEK Lined Impoundment

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-10**
 Lab Sample ID: 20-1110-01
 Matrix: Groundwater

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 10:04 AM

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

Aliquot: 20-1110-01-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	3		ug/L	1	10/12/2020	AB20-1012-08
Barium	129		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	1400		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	102000		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	1		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	1		ug/L	1	10/12/2020	AB20-1012-08
Iron	991		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	30		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	15600		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	ND		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	4980		ug/L	100	10/13/2020	AB20-1012-08
Selenium	2		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	60500		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	3		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-01-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-01-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	78900		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	ND		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	11900		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1110-01-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	527		mg/L	10	10/13/2020	AB20-1013-12



Analytical Report

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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **OW-10**
Lab Sample ID: 20-1110-01
Matrix: Groundwater

Laboratory Project: **20-1110**
Collect Date: 10/08/2020
Collect Time: 10:04 AM

Alkalinity by SM 2320B

Aliquot: 20-1110-01-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	335000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity bicarbonate	335000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity carbonate	ND		ug/L	10000	10/20/2020	AB20-1020-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-11**
 Lab Sample ID: 20-1110-02
 Matrix: Groundwater

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 01:38 PM

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

Aliquot: 20-1110-02-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	1		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	557		ug/L	1	10/12/2020	AB20-1012-08
Barium	50		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	3040		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	21300		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	1		ug/L	1	10/12/2020	AB20-1012-08
Iron	57		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	17		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	2270		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	407		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	4890		ug/L	100	10/13/2020	AB20-1012-08
Selenium	3		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	56900		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	180		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-02-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-02-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	75700		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	5160		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	25900		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1110-02-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	238		mg/L	10	10/13/2020	AB20-1013-12



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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **OW-11**
Lab Sample ID: 20-1110-02
Matrix: Groundwater

Laboratory Project: **20-1110**
Collect Date: 10/08/2020
Collect Time: 01:38 PM

Alkalinity by SM 2320B

Aliquot: 20-1110-02-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	50500		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity bicarbonate	29100		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity carbonate	21400		ug/L	10000	10/20/2020	AB20-1020-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **OW-12**
 Lab Sample ID: 20-1110-03
 Matrix: Groundwater

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 11:48 AM

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

Aliquot: 20-1110-03-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	114		ug/L	1	10/12/2020	AB20-1012-08
Barium	71		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	851		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	79600		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	ND		ug/L	1	10/12/2020	AB20-1012-08
Iron	3620		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	31		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	23700		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	24		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	5620		ug/L	100	10/13/2020	AB20-1012-08
Selenium	ND		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	48200		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	ND		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-03-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-03-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	50000		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	ND		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	153000		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1110-03-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	492		mg/L	10	10/13/2020	AB20-1013-12



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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **OW-12**
Lab Sample ID: 20-1110-03
Matrix: Groundwater

Laboratory Project: **20-1110**
Collect Date: 10/08/2020
Collect Time: 11:48 AM

Alkalinity by SM 2320B

Aliquot: 20-1110-03-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	176000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity bicarbonate	176000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity carbonate	ND		ug/L	10000	10/20/2020	AB20-1020-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **KLI-SCS**
 Lab Sample ID: 20-1110-04
 Matrix: Groundwater

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 01:05 PM

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

Aliquot: 20-1110-04-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	1		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	2		ug/L	1	10/12/2020	AB20-1012-08
Barium	84		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	346		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	164000		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	2		ug/L	1	10/12/2020	AB20-1012-08
Iron	1400		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	ND		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	48000		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	16		ug/L	5	10/12/2020	AB20-1012-08
Nickel	5		ug/L	2	10/12/2020	AB20-1012-08
Potassium	5780		ug/L	100	10/13/2020	AB20-1012-08
Selenium	1		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	40500		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	5		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-04-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-04-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	25400		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	ND		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	303000		ug/L	1000	10/14/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1110-04-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	810		mg/L	10	10/13/2020	AB20-1013-12



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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **KLI-SCS**
Lab Sample ID: 20-1110-04
Matrix: Groundwater

Laboratory Project: **20-1110**
Collect Date: 10/08/2020
Collect Time: 01:05 PM

Alkalinity by SM 2320B

Aliquot: 20-1110-04-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	312000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity bicarbonate	312000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity carbonate	ND		ug/L	10000	10/20/2020	AB20-1020-09



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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **DUP-01**
 Lab Sample ID: 20-1110-05
 Matrix: Groundwater

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 12:00 AM

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

Aliquot: 20-1110-05-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	3		ug/L	1	10/12/2020	AB20-1012-08
Barium	130		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	1260		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	109000		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	1		ug/L	1	10/12/2020	AB20-1012-08
Iron	1040		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	30		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	16100		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	ND		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	6040		ug/L	100	10/13/2020	AB20-1012-08
Selenium	2		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	62300		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	3		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-05-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-05-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	79900		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	1180		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	11300		ug/L	1000	10/13/2020	AB20-1013-09

Total Dissolved Solids by SM 2540C

Aliquot: 20-1110-05-C03-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	525		mg/L	10	10/13/2020	AB20-1013-12



Analytical Report

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Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
Field Sample ID: **DUP-01**
Lab Sample ID: 20-1110-05
Matrix: Groundwater

Laboratory Project: **20-1110**
Collect Date: 10/08/2020
Collect Time: 12:00 AM

Alkalinity by SM 2320B

Aliquot: 20-1110-05-C04-A01

Analyst: DLS

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Alkalinity total	334000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity bicarbonate	334000		ug/L	10000	10/20/2020	AB20-1020-09
Alkalinity carbonate	ND		ug/L	10000	10/20/2020	AB20-1020-09

Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **EB-01**
 Lab Sample ID: 20-1110-06
 Matrix: Water

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 12:10 PM

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

Aliquot: 20-1110-06-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	ND		ug/L	1	10/12/2020	AB20-1012-08
Barium	ND		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	ND		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	ND		ug/L	1	10/12/2020	AB20-1012-08
Iron	ND		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	ND		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	ND		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	ND		ug/L	100	10/13/2020	AB20-1012-08
Selenium	ND		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	ND		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-06-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-06-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	ND		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	ND		ug/L	1000	10/13/2020	AB20-1013-09

Laboratory Services
A CENTURY OF EXCELLENCE

Sample Site: **DEK Lined Impoundment**
 Field Sample ID: **FB-01**
 Lab Sample ID: 20-1110-07
 Matrix: Water

Laboratory Project: **20-1110**
 Collect Date: 10/08/2020
 Collect Time: 12:15 PM

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

Aliquot: 20-1110-07-C01-A01

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Antimony	ND		ug/L	1	10/12/2020	AB20-1012-08
Arsenic	ND		ug/L	1	10/12/2020	AB20-1012-08
Barium	ND		ug/L	5	10/12/2020	AB20-1012-08
Beryllium	ND		ug/L	1	10/12/2020	AB20-1012-08
Boron	ND		ug/L	20	10/12/2020	AB20-1012-08
Cadmium	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Calcium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Chromium	ND		ug/L	1	10/12/2020	AB20-1012-08
Cobalt	ND		ug/L	6	10/12/2020	AB20-1012-08
Copper	ND		ug/L	1	10/12/2020	AB20-1012-08
Iron	ND		ug/L	20	10/13/2020	AB20-1012-08
Lead	ND		ug/L	1	10/12/2020	AB20-1012-08
Lithium	ND		ug/L	10	10/12/2020	AB20-1012-08
Magnesium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Molybdenum	ND		ug/L	5	10/12/2020	AB20-1012-08
Nickel	ND		ug/L	2	10/12/2020	AB20-1012-08
Potassium	ND		ug/L	100	10/13/2020	AB20-1012-08
Selenium	ND		ug/L	1	10/12/2020	AB20-1012-08
Silver	ND		ug/L	0.2	10/12/2020	AB20-1012-08
Sodium	ND		ug/L	1000	10/13/2020	AB20-1012-08
Thallium	ND		ug/L	2	10/12/2020	AB20-1012-08
Vanadium	ND		ug/L	2	10/12/2020	AB20-1012-08
Zinc	ND		ug/L	10	10/12/2020	AB20-1012-08

Mercury by EPA 7470A, Total, Aqueous

Aliquot: 20-1110-07-C01-A02

Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	10/15/2020	AB20-1015-06

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

Aliquot: 20-1110-07-C02-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/13/2020	AB20-1013-09
Fluoride	ND		ug/L	1000	10/13/2020	AB20-1013-09
Sulfate	ND		ug/L	1000	10/13/2020	AB20-1013-09

Data Qualifiers	Exception Summary
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No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 20-1110

Inspection Date: 10-09-2020 Inspection By: [Signature]

Sample Origin/Project Name: KARN LINED IMPOUNDMENT - 2020 Q4

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx UPS _____ USPS _____ Airborne _____
Other/Hand Carry (whom) _____
Tracking Number: 3976 3811 4077 Shipping Form Attached: Yes No _____

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

Cooler Cardboard Box _____ Custom Case _____ Envelope/Mailer _____
Loose/Unpackaged Containers _____ Other _____

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

Damaged Shipment Observed: None Dented _____ Leaking _____
Other _____

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

Shipping Containers Received: Opened _____ Sealed

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

CoC Work Request _____ Air Data Sheet _____ Other _____

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

As-Received Temperature Range 1.8-3.0 °C Samples Received on Ice: Yes No _____
M&TE # and Expiration 215484 10-01-2021

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

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	<u>10</u>	_____	_____	_____	_____
Quart/Liter (g/p)	_____	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>14</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other	<u>5</u>	_____	_____	_____	_____

PH VERIFY < 2 10-09-2020 [Signature]
FISHER # 13-640-511 LOT # 230418 EXP: 10-30-21

CHAIN OF CUSTODY



CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

SAMPLING SITE: Karn Lined Impoundment – 2020 Q4				PROJECT NUMBER: 20-1110			ANALYSIS REQUESTED							Page 1 of 1
SAMPLING TEAM:				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO		Total Metals	Anions	TDS	Alkalinity	SEND REPORT TO: CDBatts		
												HD Register, TRC		
								PHONE: _____			REMARKS			
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS								
20-1110-01	10/8/2	1004	GW	OW-10		5	X	X	X	X				
-02	10/8/2	1338	GW	OW-11		5	X	X	X	X				
-03	10/8/2	1148	GW	OW-12		5	X	X	X	X				
-04	10/8/2	1305	GW	KLI-SCS		5	X	X	X	X				
-05	10/8/2	—	GW	DUP- 01		5	X	X	X	X				
-06	10/8/2	1210	W	EB- 01		2	X	X						
-07	10/8/2	1215	W	FB- 01		2	X	X						
RELINQUISHED BY: (SIGNATURE) 			DATE/TIME: 10/9/2 1440		RECEIVED BY: (SIGNATURE) 10-09-20 12:45 			COMMENTS RECTD ON FCG 1.8-3.0 °C MATE # 015484						
RELINQUISHED BY: (SIGNATURE)			DATE/TIME:		RECEIVED BY: (SIGNATURE)			ORIGINAL TO LAB COPY TO CUSTOMER						

ANALYTICAL REPORT

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

Laboratory Job ID: 240-138055-1

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:
12/16/2020 11:33:48 AM*

Kris Brooks, Project Manager II
(330)966-9790
Kris.Brooks@Eurofinset.com

LINKS

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results through
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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.



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Definitions/Glossary

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

Job ID: 240-138055-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

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

Case Narrative

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

Job ID: 240-138055-1

Job ID: 240-138055-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

Job Narrative 240-138055-1

Comments

The 903.0 Radium-226, 904.0 Radium-228, and Ra226Ra228 Combined Radium-226 and Radium-228 analyses were performed at the Eurofins TestAmerica, St. Louis laboratory.
No additional comments.

Receipt

The samples were received on 10/10/2020 9:50 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 5.5° C.

RAD

Method 903.0: 900 prep batch 160-486962

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 (240-138055-1) and DEK-MW-18001 (240-138055-2)

Method 904.0: 904/9320 Prep batch 160-488922

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 (240-138055-1) and DEK-MW-18001 (240-138055-2)

Method PrecSep_0: Radium 228 Prep Batch 488922:

Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-15003 (240-138055-1) and DEK-MW-18001 (240-138055-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep_0: Radium 228 Prep Batch 160-488922:

The following samples were prepared at a reduced aliquot to insure sufficient volume remains if needed for analysis: DEK-MW-15003 (240-138055-1) and DEK-MW-18001 (240-138055-2).

Method PrecSep_0: Radium 228 Prep Batch 160-488922:

The following samples contained a slight yellow discoloration: DEK-MW-18001 (240-138055-2).

Method PrecSep STD: Radium 226 Prep Batch 160-486962:

Insufficient sample volume was available to perform a sample duplicate for the following samples: DEK-MW-15003 (240-138055-1) and DEK-MW-18001 (240-138055-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Radium 226 Prep Batch 160-486962:

The following samples contained a slight yellow discoloration: DEK-MW-18001 (240-138055-2).

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

Method Summary

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

Job ID: 240-138055-1

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



Sample Summary

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

Job ID: 240-138055-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-138055-1	DEK-MW-15003	Water	10/06/20 09:30	10/10/20 09:50	
240-138055-2	DEK-MW-18001	Water	10/06/20 07:35	10/10/20 09:50	

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

Client Sample Results

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

Job ID: 240-138055-1

Client Sample ID: DEK-MW-15003

Lab Sample ID: 240-138055-1

Date Collected: 10/06/20 09:30

Matrix: Water

Date Received: 10/10/20 09:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.305	U	0.241	0.243	1.00	0.628	pCi/L	10/27/20 12:49	12/15/20 20:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	49.9		40 - 110					10/27/20 12:49	12/15/20 20:22	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.139	U	0.295	0.295	1.00	0.504	pCi/L	11/12/20 06:43	12/08/20 12:44	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.9		40 - 110					11/12/20 06:43	12/08/20 12:44	1
Y Carrier	109		40 - 110					11/12/20 06:43	12/08/20 12:44	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.166	U	0.381	0.382	5.00	0.628	pCi/L		12/16/20 09:12	1

Client Sample Results

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

Job ID: 240-138055-1

Client Sample ID: DEK-MW-18001

Lab Sample ID: 240-138055-2

Date Collected: 10/06/20 07:35

Matrix: Water

Date Received: 10/10/20 09:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.129	U	0.259	0.260	1.00	0.473	pCi/L	10/27/20 12:49	12/15/20 20:24	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	56.6		40 - 110					10/27/20 12:49	12/15/20 20:24	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.463		0.280	0.283	1.00	0.426	pCi/L	11/12/20 06:43	12/08/20 12:44	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.0		40 - 110					11/12/20 06:43	12/08/20 12:44	1
Y Carrier	108		40 - 110					11/12/20 06:43	12/08/20 12:44	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.591		0.381	0.384	5.00	0.473	pCi/L		12/16/20 09:12	1

Tracer/Carrier Summary

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

Job ID: 240-138055-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)							
240-138055-1	DEK-MW-15003	49.9							
240-138055-2	DEK-MW-18001	56.6							
LCS 160-486962/1-A	Lab Control Sample	73.6							
LCS 160-486962/2-A	Lab Control Sample Dup	51.3							
MB 160-486962/23-A	Method Blank	66.0							

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)						
240-138055-1	DEK-MW-15003	80.9	109						
240-138055-2	DEK-MW-18001	90.0	108						
LCS 160-488922/1-A	Lab Control Sample	88.8	93.8						
LCS 160-488922/2-A	Lab Control Sample Dup	81.8	110						
MB 160-488922/21-A	Method Blank	93.6	105						

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

QC Sample Results

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

Job ID: 240-138055-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-486962/23-A
Matrix: Water
Analysis Batch: 491763

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 486962

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.04795	U	0.260	0.260	1.00	0.536	pCi/L	10/27/20 12:49	12/15/20 20:40	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	66.0		40 - 110				10/27/20 12:49		12/15/20 20:40	1

Lab Sample ID: LCS 160-486962/1-A
Matrix: Water
Analysis Batch: 491775

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 486962

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.19		1.38	1.00	0.375	pCi/L	90	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	73.6		40 - 110						

Lab Sample ID: LCSD 160-486962/2-A
Matrix: Water
Analysis Batch: 491775

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 486962

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	9.807		1.48	1.00	0.494	pCi/L	86	75 - 125	0.13	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	51.3		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-488922/21-A
Matrix: Water
Analysis Batch: 491169

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 488922

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.02189	U	0.258	0.258	1.00	0.457	pCi/L	11/12/20 06:43	12/08/20 12:49	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	93.6		40 - 110				11/12/20 06:43		12/08/20 12:49	1
Y Carrier	105		40 - 110				11/12/20 06:43		12/08/20 12:49	1

QC Sample Results

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

Job ID: 240-138055-1

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

Lab Sample ID: LCS 160-488922/1-A
Matrix: Water
Analysis Batch: 491172

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 488922

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	10.1	8.844		1.11	1.00	0.514	pCi/L	87	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	88.8		40 - 110
Y Carrier	93.8		40 - 110

Lab Sample ID: LCSD 160-488922/2-A
Matrix: Water
Analysis Batch: 491172

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 488922

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	10.1	8.407		1.05	1.00	0.459	pCi/L	83	75 - 125	0.20	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	81.8		40 - 110
Y Carrier	110		40 - 110

QC Association Summary

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

Job ID: 240-138055-1

Rad

Prep Batch: 486962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-138055-1	DEK-MW-15003	Total/NA	Water	PrecSep STD	
240-138055-2	DEK-MW-18001	Total/NA	Water	PrecSep STD	
MB 160-486962/23-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-486962/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-486962/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

Prep Batch: 488922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-138055-1	DEK-MW-15003	Total/NA	Water	PrecSep_0	
240-138055-2	DEK-MW-18001	Total/NA	Water	PrecSep_0	
MB 160-488922/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-488922/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-488922/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 240-138055-1

Client Sample ID: DEK-MW-15003

Lab Sample ID: 240-138055-1

Date Collected: 10/06/20 09:30

Matrix: Water

Date Received: 10/10/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:22	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:44	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Client Sample ID: DEK-MW-18001

Lab Sample ID: 240-138055-2

Date Collected: 10/06/20 07:35

Matrix: Water

Date Received: 10/10/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:24	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:44	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 240-138055-1

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	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-20
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	04-01-21
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	02-28-21
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	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	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

Eurofins TestAmerica Canton Sample Receipt Form/Narrative Login #: 138055
Canton Facility

Client TRC Environmental Site Name _____ Cooler unpacked by: Tammy Rago
Cooler Received on 10-10-20 Opened on 10-10-20
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

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

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____
Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
IR GUN# IR-11 (CF +0.9 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
IR GUN #IR-12 (CF +0.5 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 2 Yes No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)? Yes No
10. Were correct bottle(s) used for the test(s) indicated? Yes No
11. Sufficient quantity received to perform indicated analyses? Yes No
12. Are these work share samples and all listed on the COC? Yes No
If yes, Questions 13-17 have been checked at the originating laboratory.

13. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC907861
14. Were VOAs on the COC? Yes No
15. Were air bubbles >6 mm in any VOA vials? Larger than this. Yes No NA
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
17. Was a LL Hg or Me Hg trip blank present? Yes No

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

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by: Rago
missing sample - DEK-RW 18001 MS + MSD

19. SAMPLE CONDITION
Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

20. SAMPLE PRESERVATION
Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____
VOA Sample Preservation - Date/Time VOAs Frozen: _____

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Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-138055-1

Login Number: 138055

List Number: 2

Creator: Mazariegos, Leonel A

List Source: Eurofins TestAmerica, St. Louis

List Creation: 10/14/20 01:09 PM

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

ANALYTICAL REPORT

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

Laboratory Job ID: 240-138056-1
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:
12/16/2020 11:36:30 AM

Kris Brooks, Project Manager II
(330)966-9790
Kris.Brooks@Eurofinset.com

LINKS

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results through
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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.



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Definitions/Glossary

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

Job ID: 240-138056-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
X	Carrier is outside acceptance limits.

Glossary

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

Case Narrative

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

Job ID: 240-138056-1

Job ID: 240-138056-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

Job Narrative 240-138056-1

Comments

The 903.0 Radium-226, 904.0 Radium-228, and Ra226Ra228 Combined Radium-226 and Radium-228 analyses were performed at the Eurofins TestAmerica, St. Louis laboratory.
No additional comments.

Receipt

The samples were received on 10/10/2020 9:50 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 5.5° C.

RAD

Method 903.0: 900 Prep batch: 160-486962

The Barium carrier recovery is outside the lower control limit (40%) for the following samples: OW-10 (240-138056-1) and OW-11 (240-138056-2). There was physical evidence of matrix interference apparent during the initial preparation of the sample. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.

Method 903.0: 900 prep batch 160-486962

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 (240-138056-1), OW-11 (240-138056-2), OW-12 (240-138056-3), DUP-01 (240-138056-4) and EB-01 (240-138056-5)

Method 904.0: 904/9320 Prep batch 160-488922

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 (240-138056-1), OW-11 (240-138056-2), OW-12 (240-138056-3), DUP-01 (240-138056-4) and EB-01 (240-138056-5)

Method PrecSep_0: Radium 228 Prep Batch 488922:

Insufficient sample volume was available to perform a sample duplicate for the following samples: OW-10 (240-138056-1), OW-11 (240-138056-2), OW-12 (240-138056-3), DUP-01 (240-138056-4) and EB-01 (240-138056-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep_0: Radium 228 Prep Batch 160-488922:

The following samples were prepared at a reduced aliquot to insure sufficient volume remains if needed for analysis: OW-10 (240-138056-1), OW-11 (240-138056-2), OW-12 (240-138056-3), DUP-01 (240-138056-4) and EB-01 (240-138056-5).

Method PrecSep_0: Radium 228 Prep Batch 160-488922:

The following samples contained a slight yellow discoloration: OW-10 (240-138056-1) and DUP-01 (240-138056-4).

Method PrecSep STD: Radium 226 Prep Batch 160-486962:

Insufficient sample volume was available to perform a sample duplicate for the following samples: OW-10 (240-138056-1), OW-11 (240-138056-2), OW-12 (240-138056-3), DUP-01 (240-138056-4) and EB-01 (240-138056-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep STD: Radium 226 Prep Batch 160-486962:

The following samples contained a slight yellow discoloration: OW-10 (240-138056-1) and DUP-01 (240-138056-4).

Method PrecSep STD: Radium 226 prep batch 160-486962

The Barium carrier recovery is outside the lower control limit (40%) for the following samples: OW-10 (240-138056-1) and OW-11 (240-138056-2). After the Barium Sulfate precipitation the barium pellet visibly looked a little bit smaller than that of the QC samples.

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

Method Summary

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

Job ID: 240-138056-1

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

Sample Summary

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

Job ID: 240-138056-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-138056-1	OW-10	Water	10/08/20 10:04	10/10/20 09:50	
240-138056-2	OW-11	Water	10/08/20 13:38	10/10/20 09:50	
240-138056-3	OW-12	Water	10/08/20 11:48	10/10/20 09:50	
240-138056-4	DUP-01	Water	10/08/20 00:00	10/10/20 09:50	
240-138056-5	EB-01	Water	10/08/20 12:10	10/10/20 09:50	

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Client Sample Results

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

Job ID: 240-138056-1

Client Sample ID: OW-10
Date Collected: 10/08/20 10:04
Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-1
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.406	U	0.492	0.494	1.00	0.809	pCi/L	10/27/20 12:49	12/15/20 20:24	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	31.7	X	40 - 110					10/27/20 12:49	12/15/20 20:24	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.469	U	0.312	0.315	1.00	0.479	pCi/L	11/12/20 06:43	12/08/20 12:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.1		40 - 110					11/12/20 06:43	12/08/20 12:45	1
Y Carrier	105		40 - 110					11/12/20 06:43	12/08/20 12:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.875		0.583	0.586	5.00	0.809	pCi/L		12/16/20 09:12	1

Client Sample Results

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

Job ID: 240-138056-1

Client Sample ID: OW-11

Lab Sample ID: 240-138056-2

Date Collected: 10/08/20 13:38

Matrix: Water

Date Received: 10/10/20 09:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.123	U	0.328	0.328	1.00	0.616	pCi/L	10/27/20 12:49	12/15/20 20:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	37.0	X	40 - 110					10/27/20 12:49	12/15/20 20:25	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.174	U	0.244	0.244	1.00	0.469	pCi/L	11/12/20 06:43	12/08/20 12:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.4		40 - 110					11/12/20 06:43	12/08/20 12:45	1
Y Carrier	105		40 - 110					11/12/20 06:43	12/08/20 12:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.0510	U	0.409	0.409	5.00	0.616	pCi/L		12/16/20 09:12	1

Client Sample Results

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

Job ID: 240-138056-1

Client Sample ID: OW-12
Date Collected: 10/08/20 11:48
Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-3
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.193	U	0.244	0.244	1.00	0.403	pCi/L	10/27/20 12:49	12/15/20 20:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	57.5		40 - 110					10/27/20 12:49	12/15/20 20:25	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0619	U	0.261	0.261	1.00	0.457	pCi/L	11/12/20 06:43	12/08/20 12:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.8		40 - 110					11/12/20 06:43	12/08/20 12:45	1
Y Carrier	108		40 - 110					11/12/20 06:43	12/08/20 12:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.254	U	0.357	0.357	5.00	0.457	pCi/L		12/16/20 09:12	1

Client Sample Results

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

Job ID: 240-138056-1

Client Sample ID: DUP-01

Lab Sample ID: 240-138056-4

Date Collected: 10/08/20 00:00

Matrix: Water

Date Received: 10/10/20 09:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.343	U	0.306	0.307	1.00	0.457	pCi/L	10/27/20 12:49	12/15/20 20:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	52.2		40 - 110					10/27/20 12:49	12/15/20 20:25	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0337	U	0.340	0.340	1.00	0.600	pCi/L	11/12/20 06:43	12/08/20 12:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	78.2		40 - 110					11/12/20 06:43	12/08/20 12:45	1
Y Carrier	99.8		40 - 110					11/12/20 06:43	12/08/20 12:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.376	U	0.457	0.458	5.00	0.600	pCi/L		12/16/20 09:12	1

Client Sample Results

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

Job ID: 240-138056-1

Client Sample ID: EB-01

Lab Sample ID: 240-138056-5

Date Collected: 10/08/20 12:10

Matrix: Water

Date Received: 10/10/20 09:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.00609	U	0.181	0.181	1.00	0.392	pCi/L	10/27/20 12:49	12/15/20 20:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	59.2		40 - 110					10/27/20 12:49	12/15/20 20:25	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.306	U	0.302	0.303	1.00	0.489	pCi/L	11/12/20 06:43	12/08/20 12:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.3		40 - 110					11/12/20 06:43	12/08/20 12:45	1
Y Carrier	99.4		40 - 110					11/12/20 06:43	12/08/20 12:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.300	U	0.352	0.353	5.00	0.489	pCi/L		12/16/20 09:12	1

Tracer/Carrier Summary

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

Job ID: 240-138056-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
240-138056-1	OW-10	31.7 X	
240-138056-2	OW-11	37.0 X	
240-138056-3	OW-12	57.5	
240-138056-4	DUP-01	52.2	
240-138056-5	EB-01	59.2	
LCS 160-486962/1-A	Lab Control Sample	73.6	
LCSD 160-486962/2-A	Lab Control Sample Dup	51.3	
MB 160-486962/23-A	Method Blank	66.0	

Tracer/Carrier Legend
Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
240-138056-1	OW-10	79.1	105
240-138056-2	OW-11	86.4	105
240-138056-3	OW-12	84.8	108
240-138056-4	DUP-01	78.2	99.8
240-138056-5	EB-01	83.3	99.4
LCS 160-488922/1-A	Lab Control Sample	88.8	93.8
LCSD 160-488922/2-A	Lab Control Sample Dup	81.8	110
MB 160-488922/21-A	Method Blank	93.6	105

Tracer/Carrier Legend
Ba = Ba Carrier
Y = Y Carrier

QC Sample Results

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

Job ID: 240-138056-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-486962/23-A
Matrix: Water
Analysis Batch: 491763

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 486962

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.04795	U	0.260	0.260	1.00	0.536	pCi/L	10/27/20 12:49	12/15/20 20:40	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	66.0		40 - 110		10/27/20 12:49	12/15/20 20:40	1			

Lab Sample ID: LCS 160-486962/1-A
Matrix: Water
Analysis Batch: 491775

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 486962

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.19		1.38	1.00	0.375	pCi/L	90	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	73.6		40 - 110						

Lab Sample ID: LCSD 160-486962/2-A
Matrix: Water
Analysis Batch: 491775

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 486962

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	9.807		1.48	1.00	0.494	pCi/L	86	75 - 125	0.13	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	51.3		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-488922/21-A
Matrix: Water
Analysis Batch: 491169

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 488922

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.02189	U	0.258	0.258	1.00	0.457	pCi/L	11/12/20 06:43	12/08/20 12:49	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	93.6		40 - 110		11/12/20 06:43	12/08/20 12:49	1			
Y Carrier	105		40 - 110		11/12/20 06:43	12/08/20 12:49	1			

QC Sample Results

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

Job ID: 240-138056-1

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

Lab Sample ID: LCS 160-488922/1-A
Matrix: Water
Analysis Batch: 491172

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 488922

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	10.1	8.844		1.11	1.00	0.514	pCi/L	87	75 - 125
LCS LCS									
Carrier	%Yield	Qualifier	Limits						
Ba Carrier	88.8		40 - 110						
Y Carrier	93.8		40 - 110						

Lab Sample ID: LCSD 160-488922/2-A
Matrix: Water
Analysis Batch: 491172

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 488922

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	10.1	8.407		1.05	1.00	0.459	pCi/L	83	75 - 125	0.20	1
LCSD LCSD											
Carrier	%Yield	Qualifier	Limits								
Ba Carrier	81.8		40 - 110								
Y Carrier	110		40 - 110								

QC Association Summary

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

Job ID: 240-138056-1

Rad

Prep Batch: 486962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-138056-1	OW-10	Total/NA	Water	PrecSep STD	
240-138056-2	OW-11	Total/NA	Water	PrecSep STD	
240-138056-3	OW-12	Total/NA	Water	PrecSep STD	
240-138056-4	DUP-01	Total/NA	Water	PrecSep STD	
240-138056-5	EB-01	Total/NA	Water	PrecSep STD	
MB 160-486962/23-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-486962/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-486962/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

Prep Batch: 488922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-138056-1	OW-10	Total/NA	Water	PrecSep_0	
240-138056-2	OW-11	Total/NA	Water	PrecSep_0	
240-138056-3	OW-12	Total/NA	Water	PrecSep_0	
240-138056-4	DUP-01	Total/NA	Water	PrecSep_0	
240-138056-5	EB-01	Total/NA	Water	PrecSep_0	
MB 160-488922/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-488922/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-488922/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 240-138056-1

Client Sample ID: OW-10

Date Collected: 10/08/20 10:04

Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:24	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Client Sample ID: OW-11

Date Collected: 10/08/20 13:38

Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:25	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Client Sample ID: OW-12

Date Collected: 10/08/20 11:48

Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:25	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Client Sample ID: DUP-01

Date Collected: 10/08/20 00:00

Date Received: 10/10/20 09:50

Lab Sample ID: 240-138056-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:25	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Lab Chronicle

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

Job ID: 240-138056-1

Client Sample ID: EB-01

Lab Sample ID: 240-138056-5

Date Collected: 10/08/20 12:10

Matrix: Water

Date Received: 10/10/20 09:50

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Prep	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Total/NA	Analysis	903.0		1	491775	12/15/20 20:25	SCB	TAL SL
Total/NA	Prep	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Total/NA	Analysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	491990	12/16/20 09:12	SCB	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 240-138056-1

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	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-20
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	04-01-21
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	02-28-21
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	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	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

46755
Chain of Custody Record
0.3/12

Client Information Client Contact: Jacob Krenz Company: TRC Environmental Corporation. Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080(Tel) 734-971-9022(Fax) Email: JKrenz@trccompanies.com Project Name: Karm/Weadock CCR Karn Lined Impoundment Site:		Lab PM: Brooks, Kris M E-Mail: Kris.Brooks@Eurofinset.com Carrier Tracking No(s): COC No: 240-75416-29054.1 Page: Page 1 of 1 Job #:	
Due Date Requested: TAT Requested (days): PO #: 135139 WO #: Project #: 24024154 SSO#:		Analysis Requested Total Number of Containers:	
Sample Identification		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Sample ID OW-10 OW-11 OW-12 DUP-01 EB-01	Sample Date 10/18/20 10/18/20 10/18/20 10/18/20 10/18/20	Sample Time 1004 1330 1140 - 1320	Sample Type (C=comp, G=grab) G G G G G
Matrix (W=water, S=solid, O=oil, BT=tissue, A=air) Water Water Water Water Water Water		Field Filtered Sample (Yes or No) Yes Yes Yes Yes Yes Yes	
Perform MS/MSD (Yes or No) Yes Yes Yes Yes Yes Yes		903.0, Ra226Ra228, GPC 904.0 - Standard Target List D D	
Special Instructions/Note: 240-138056 Chain of Custody		Special Instructions/Note: 240-138056 Chain of Custody	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested: I, II, III, IV, Other (specify)			
Empty Kit Relinquished by:			
Relinquished by: [Signature] Date/Time: 10/19/20 0730 Company: TRC		Received by: [Signature] Date/Time: 10/19/20 0735 Company: Eurofins	
Relinquished by: [Signature] Date/Time: 10/19/20 0630 Company: Eurofins		Received by: [Signature] Date/Time: 10-10-20 950 Company: ETA	
Relinquished by: [Signature]			
Custody Seals Intact: A Yes A No		Custody Seal No.:	



Canton Facility
 Client TRC Environmental Site Name _____ Cooler unpacked by: Jamy Page
 Cooler Received on 10-10-20 Opened on 10-10-20
 FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____
 Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
 COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-11 (CF +0.9 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
 IR GUN #IR-12 (CF +0.5 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 2 Yes No
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
 -Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)? Yes No
 4. Did custody papers accompany the sample(s)? Yes No
 5. Were the custody papers relinquished & signed in the appropriate place? Yes No
 6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
 7. Did all bottles arrive in good condition (Unbroken)? Yes No
 8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
 9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N) and sample type of grab/comp (Y/N)? Yes No
 10. Were correct bottle(s) used for the test(s) indicated? Yes No
 11. Sufficient quantity received to perform indicated analyses? Yes No
 12. Are these work share samples and all listed on the COC? Yes No
 If yes, Questions 13-17 have been checked at the originating laboratory.

13. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC907861
 14. Were VOAs on the COC? Yes No
 15. Were air bubbles >6 mm in any VOA vials? Larger than this. Yes No NA
 16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
 17. Was a LL Hg or Me Hg trip blank present? Yes No

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

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

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by: _____

19. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
 Sample(s) _____ were received in a broken container.
 Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

20. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
 Time preserved: _____ Preservative(s) added/Lot number(s): _____
 VOA Sample Preservation - Date/Time VOAs Frozen: _____

Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
OW-10	240-138056-A-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
OW-10	240-138056-B-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
OW-11	240-138056-A-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
OW-11	240-138056-B-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
OW-12	240-138056-A-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
OW-12	240-138056-B-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DUP-01	240-138056-A-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DUP-01	240-138056-B-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
EB-01	240-138056-A-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
EB-01	240-138056-B-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

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Chain of Custody Record



Client Information (Sub Contract Lab)		Lab PM: Brooks, Kris M	Carrier Tracking No(s): 240-126446.1
Client Contact: Shipping/Receiving		E-Mail: Kris.Brooks@Eurofinset.com	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):	Job #: 240-138056-1
Address: 13715 Rider Trail North,		Analysis Requested	
City: Earth City		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S D - Nitric Acid E - NaHSO4 Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: MO, 63045		Total Number of containers	
Phone: 314-298-9566(Tel) 314-298-8757(Fax)		903.0/PreSep_STD Standard Target List	
Email:		904.0/PreSep_0 Standard Target List	
Project #: 24024154		Perform MS/MSD (Yes or No)	
Site: Karn/Weadock CCR Groundwater Monitoring		Field Filtered Sample (Yes or No)	
SSOW#:		Special Instructions/Note:	
Sample Identification - Client ID (Lab ID)		TVA protocol - Ra-226+228 action limit at 5.0 pCi/L	
OW-10 (240-138056-1)	Sample Date: 10/8/20	Sample Time: 10:04 Eastern	2
OW-11 (240-138056-2)	Sample Date: 10/8/20	Sample Time: 13:38 Eastern	2
OW-12 (240-138056-3)	Sample Date: 10/8/20	Sample Time: 11:48 Eastern	2
DUP-01 (240-138056-4)	Sample Date: 10/8/20	Sample Time: Eastern	2
EB-01 (240-138056-5)	Sample Date: 10/8/20	Sample Time: 12:10 Eastern	2
<p>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/tests/matrix 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 compliance to Eurofins TestAmerica.</p>			
Possible Hazard Identification			
Unconfirmed			
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2			
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <i>[Signature]</i>		Date/Time: 12-12-20 10:18	
Relinquished by: FEDEX		Company: Company	
Relinquished by:		Date/Time: 10/18/2020 0922	
Relinquished by:		Company: Company	
Custody Seals Intact: Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:	
Δ Yes Δ No			



Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-138056-1

Login Number: 138056

List Number: 2

Creator: Mazariegos, Leonel A

List Source: Eurofins TestAmerica, St. Louis

List Creation: 10/14/20 12:18 PM

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

Attachment C Data Quality Reviews

Laboratory Data Quality Review Groundwater Monitoring Event August 2020 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the August 2020 sampling event. Samples were analyzed for 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) 20-0888.

During the August 2020 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, 2017). The following items were included in the evaluation of the data:

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

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

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

This data usability report addresses the following items:

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

Review Summary

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

- The reviewed Appendix III, IV, optional Piper Diagram analyses, and additional Part 115 constituents will be utilized for the purposes of 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 in this data set.
- An equipment blank was not collected in 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. 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 samples was not collected with this data set.
- The RL for the nondetect results for zinc in both groundwater samples was 30 ug/L which is above the requested RL of 10 ug/L.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review Groundwater Monitoring Event August 2020 DE Karn Lined Impoundment

Groundwater samples were collected by TRC for the August 2020 sampling event. Samples were analyzed for 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) 20-0889.

During the August 2020 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 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, 2017) 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;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

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

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- One field blank (FB-02) and one equipment blank (EB-02) sample was collected. Target analytes were not detected in the blanks.
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were DUP-02 and OW-10; RPDs between the parent and duplicate sample were within the QC limits.
- Zinc for all groundwater samples was reported as non-detect below 30 ug/L which is above the requested RL of 10 ug/L.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review Groundwater Monitoring Event October 2020 DE Karn Bottom Ash Pond and Lined Impoundment

Groundwater samples were collected by TRC for the October 2020 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) 20-1109 and 240-138055-1.

During the October 2020 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
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, 2017) 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. 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:

- Method blanks were analyzed for the radium analyses. Target analytes were not detected in the method blanks.
- A field blank was not collected in this data set.
- An equipment blank was not collected in this data set.
- An LCS and LCSD were analyzed with each analytical batch for radium; the LCS and LCSD recoveries were within QC limits.

- 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.
- Carrier recoveries, where applicable, were within 40-110%.

Laboratory Data Quality Review Groundwater Monitoring Event October 2020 DE Karn Lined Impoundment

Groundwater samples were collected by TRC for the October 2020 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) 20-1110 and 240-138056-1.

During the October 2020 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 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
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, 2017) 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:

- Method blanks were analyzed for the radium analyses. Target analytes were not detected in the method blanks.
- One field blank (FB-01) and one equipment blank (EB-01) sample were collected. Target analytes were not detected in these blanks.
- The LCS and LCSD recoveries and relative percent differences (RPDs) for radium 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-01 and OW-10; 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% with the following exceptions.
 - The barium carrier recoveries in samples OW-10 (31.7%) and OW-11 (37%) were below the acceptance limits for the radium 226 analyses. The non-detect results for radium 226 are potentially biased low, as summarized in the attached Table 1.

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	10/8/2020	Radium 226	Barium carrier recoveries below acceptance limit (<40%). Non-detect results are potentially biased low.
OW-11	10/8/2020		

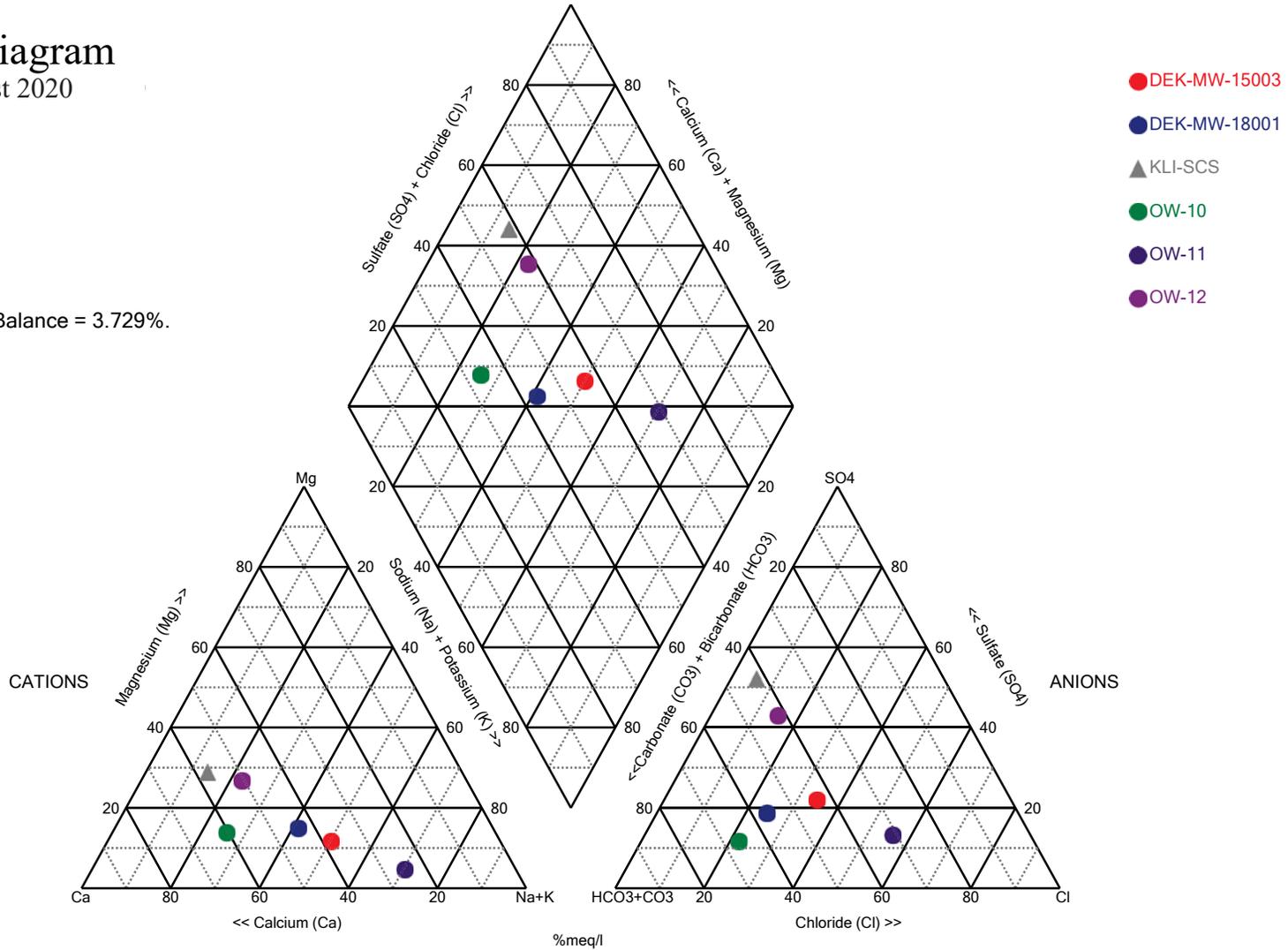
Attachment D

ASD Supporting Information

Piper Diagram

August 2020

Cation-Anion Balance = 3.729%.



Analysis Run 1/13/2021 11:47 AM

Client: Consumers Energy Data: DEK_CCR_Sanitas_20.11.18

Piper Diagram

Analysis Run 1/13/2021 11:49 AM

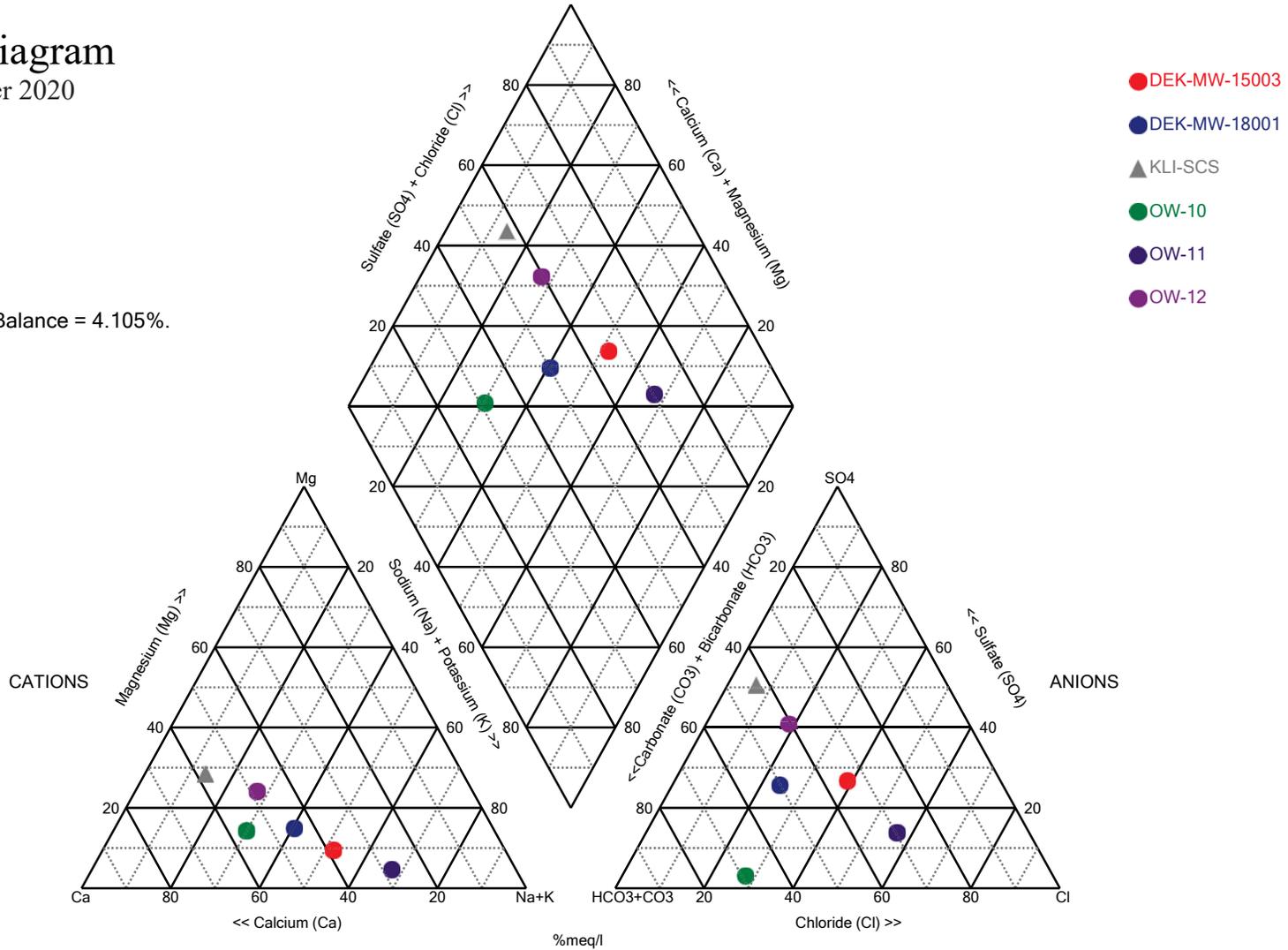
Client: Consumers Energy Data: DEK_CCR_Sanitas_20.11.18

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
DEK-MW-15003	45.8	3.64	31.4	5.97	46.3	40.6	85.7	10
DEK-MW-18001	71.7	4.56	68.7	14.3	63.1	66.6	240	10
KLI-SCS	40.6	5.51	156	47.4	22.6	316	309	10
OW-10	51.8	3.52	110	15.5	61.6	46.4	323	10
OW-11	54.05	3.755	17.3	2.035	73.45	24.4	18.35	27.55
OW-12	52.2	6.09	109	34.7	46.3	192	223	10

Piper Diagram

October 2020

Cation-Anion Balance = 4.105%.



Analysis Run 1/13/2021 11:49 AM

Client: Consumers Energy Data: DEK_CCR_Sanitas_20.11.18

Piper Diagram

Analysis Run 1/13/2021 11:50 AM

Client: Consumers Energy Data: DEK_CCR_Sanitas_20.11.18

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
DEK-MW-15003	42.8	4.88	29.7	4.43	46.5	44.6	53.6	10
DEK-MW-18001	71.3	5.72	71.7	14.2	60.7	91.9	210	10
KLI-SCS	40.5	5.78	164	48	25.4	303	312	10
OW-10	60.5	4.98	102	15.6	78.9	11.9	335	10
OW-11	56.9	4.89	21.3	2.27	75.7	25.9	29.1	21.4
OW-12	48.2	5.62	79.6	23.7	50	153	176	10

Attachment E

Secondary Leachate Collection System Monitoring

January 15, 2021

TRANSMITTAL VIA EMAIL 01/15/2021

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

NOTIFICATION OF ACTION FLOW RATE EXCEEDED FOR SECONDARY COLLECTION SYSTEM OF DE KARN LINED IMPOUNDMENT, ESSEXVILLE, MICHIGAN; WASTE DATA SYSTEM NUMBER 392503

Dear Mr. Roycraft,

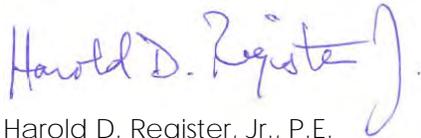
This letter serves as written notification that Consumers Energy has determined that the Response Flow Rate of the DE Karn Lined Impoundment Secondary Collection System that also serves as a leak detection system exceeded the Average Daily Flow Rate of 25 gallons per acre per day (GPAD) calculated on a monthly average (tabulated below). The Average Daily Flow Rate for the period from December 10, 2020 – January 6, 2021 was calculated as 137.0 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 is providing this proactive notification based on the trending weekly recorded volume presented below.

Date	Totalizer Reading (Cumulative Gallons)	Total Volume Removed (Gallons)	Average Daily Volume Removed (Gallons/Day)	KLI Area (Acres)
12/10/2020	59.02	Start	Start	1.25
12/16/2020	830.93	771.91	128.65	1.25
12/23/2020	1677.73	846.8	120.97	1.25
12/30/2020	2640.62	962.89	137.56	1.25
1/6/2021	3758.43	1117.81	159.70	1.25

Consumers was issued Solid Waste Disposal Area Operating License Number 9629 on December 10, 2020 to operate the Karn Lined Impoundment initiating requirements to record amount of liquid removed from the system sump at least weekly. Records of liquid volume removed prior to December 10, 2020 indicate the Average Daily Flow Rate, normalized on a monthly basis, ranged from 1 – 5 GPAD. Based on previous observations, length of operation of the Karn Lined Impoundment, and sudden increase in liquid volume removed on a weekly basis, Consumers

has contracted leak detection services that commenced on January 13, 2021. A preliminary written assessment will be provided as a follow up to this notification by January 22, 2021. 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: harold.registerjr@cmsenergy.com

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

January 22, 2021

TRANSMITTAL VIA EMAIL 01/22/2021

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

PRELIMINARY WRITTEN ASSESSMENT 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 preliminary written assessment following Consumers Energy’s review of the response flow rate of the DE Karn Lined Impoundment Secondary Collection System, as discussed in the proactive notification provided to EGLE on January 15, 2021. The secondary collection system also serves as a leak detection system and recently exceeded the Average Daily Flow Rate of 25 gallons per acre per day (GPAD) calculated for the period from December 10, 2020 – January 6, 2021.

R 299.4437(b)(i) Amount of Liquids Removed from Leak Detection System

The table provided in the January 15th notification has been updated to reflect two additional weeks of information collected. Based on the totalizer reading, 6,202 gallons have been removed from the leak detection system from December 10, 2020 – January 20, 2021.

Date	Total Volume Removed (Gallons)	Average Daily Volume Removed (Gallons/Day)	KLI Area (Acres)
12/10/2020	Start	Start	1.25
12/16/2020	771.91	128.65	1.25
12/23/2020	846.8	120.97	1.25
12/30/2020	962.89	137.56	1.25
1/6/2021	1117.81	159.70	1.25
01/13/2021	1145	163.6	1.25
01/20/2021	1358	194	1.25

R 299.4437(b)(ii) Likely Sources of Liquids, Depth of Leachate in Secondary Collection System

Water quality data and trends for the secondary collection system (Attachment A) from the start of operation have been analyzed for detection and assessment monitoring constituents for coal ash impoundments approved in the *Karn Lined Impoundment Hydrogeological Monitoring Plan* (TRC, 2020). 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 regional background in the case of total dissolved solids.

The depth of the liquids in the secondary collection system has been estimated at 0.25-ft based on weekly recorded volumes removed from the secondary. Instrumentation to gauge and routinely gauge the depth of liquid in the secondary collection system more precisely will be installed as part of the short-term actions taken.

R 299.4437(b)(iii) Possible Location, Size, and Cause of Any Leaks

Consumers Energy commissioned a leak detection survey for the primary liner system by Leak Location Services, Inc. conducted on January 13, 2021. The results of the survey (Attachment B) did not find any leaks in the primary geomembrane to a sensitivity of 0.055-inch diameter that could be detected within a 5-foot wide transect. However, the results report also noted that location scan was not able to be completed within 30-feet of the of the concrete-lined area (loading area for bottom ash) on the western side of the Karn Lined Impoundment due to an interfering signal from the electrically grounded concrete producing a false positive audible signal (suggesting a leak) that could not be resolved.

Subsequent inspection by plant staff yielded visual identification of damage to the primary liner system on January 21, 2021 at the point where the bottom ash is first discharged into the primary basin (Attachment C, Drawing 695-1278). The current estimate of the size of the leak is approximately four to six inches (Attachment C, Picture 01). Based on the average daily volume of liquids removed starting on December 10, 2020, the damage identified to the primary liner system is the likely pathway for increased secondary collection system liquids recovery.

Evaluation of the damage to the primary liner system is still underway. A preliminary assessment of the cause for the damage to the geomembrane and concrete appears to be due to erosion from the discharge of bottom ash piping into the pond (Attachment C, Picture 02). This area of the bottom ash pond was reinforced based on the discharge occurring in this location and the



operation of heavy equipment necessary to excavate and stage bottom ash prior to hauling for disposal at the Weadock Landfill.

R 299.4437(b)(iv) Short-term Actions Taken and Planned

- 1) Consumers Energy contracted a leak detection contractor that completed an electrical resistivity leak detection survey for the portion of the lined impoundment that does not have concrete above the primary liner. Inspection efforts by Consumers Energy have yielded the visual identification of damage to the primary liner system approximately 1-ft above the base at the point where the bottom ash is discharged into the basin. Consumers is continuing to assess the damage to the liner system.
- 2) Due to current weather conditions, Consumers Energy has isolated the apparent leak in the liner system by backfilling with AquaBlok™ Composite Particle System (Bentonite Aggregate) and covering the surface with a steel plate (Appendix C, Picture 02) to temporarily mitigate the leakage into the secondary collection system and prevent further erosion to the primary liner system.
- 3) Consumers Energy reviewed water quality time series data from liquid recovered from the secondary collection system (Attachment A) and determined that constituents present do not exceed Groundwater Protection Standard or generic GSI criteria. Water quality sampling for 1st quarter will commence in March 2021 and will include sampling of the secondary collection system, primary basin surface water, and nearby groundwater monitoring wells. Analysis and updates will be reported in the 1st Quarter 2021 Quarterly Monitoring Report that will be submitted to the Department by April 30, 2021.
- 4) Consumers Energy will record the liquids removed on a weekly basis to evaluate the improvements from backfilling the apparent leak in the primary liner system with AquaBlok™ Composite Particle System. The volume of liquid removal will be recorded in the operating record weekly and be provided to EGLE in writing on a monthly basis in conformance with the reporting exceedances of the Response Flow Rate.
- 5) Consumers Energy will secure contractors to complete repairs to the liner system once the winter weather improves to allow for access to safely complete the work and weather conditions to ensure the best certified quality assurance controls for construction, especially relative to geomembrane liner seaming.



This preliminary written assessment serves as the initial steps Consumers Energy has undertaken in anticipation of conducting response actions upon reviewing the response flow rate in light of the average daily volume removed on a weekly basis starting on December 10, 2020. Data from 4th Quarter 2020 Karn Lined Impoundment Detection Monitoring Event shows that groundwater quality is consistent with previous monitoring events which indicates that if a 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. 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. Short-term actions are consistent with these findings and balance the need for response actions with safe access and quality repairs once winter weather improves.

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

Sincerely,

A handwritten signature in blue ink that reads "Harold D. Register, Jr." with a stylized flourish at the end.

Harold D. Register, Jr., P.E.
Principal Engineer
Landfill Operations Compliance
Phone: (517) 788-2982
Email: harold.registerjr@cmsenergy.com

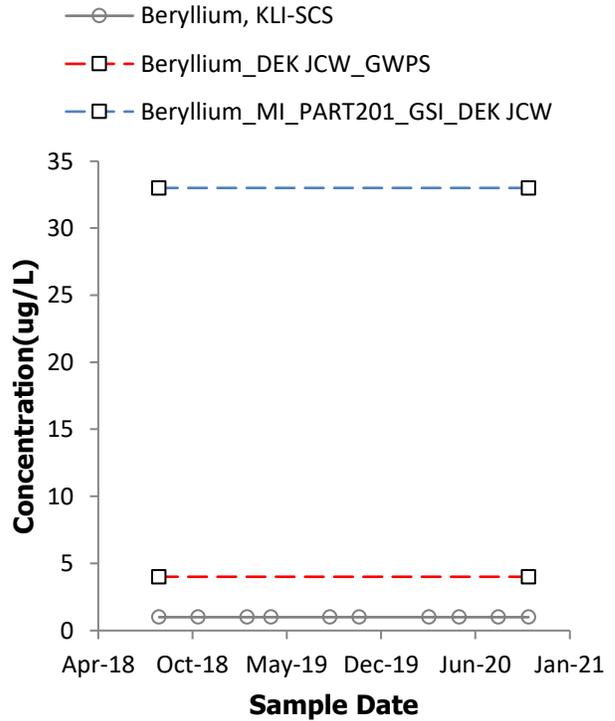
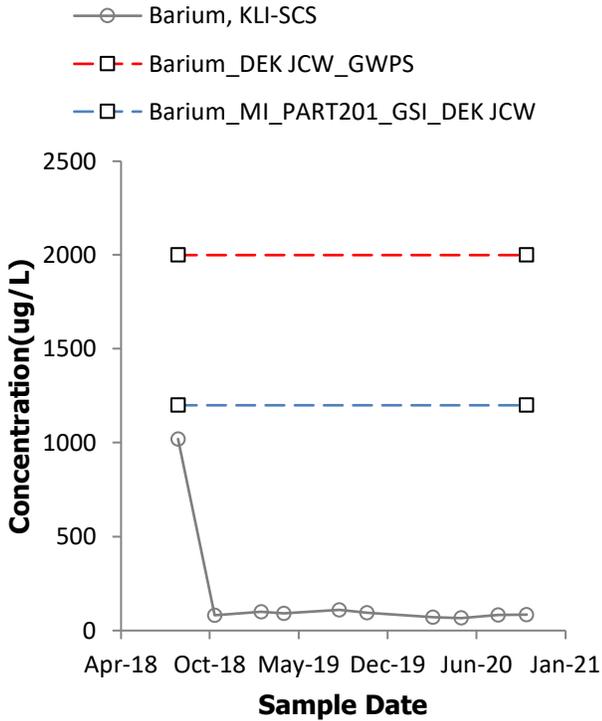
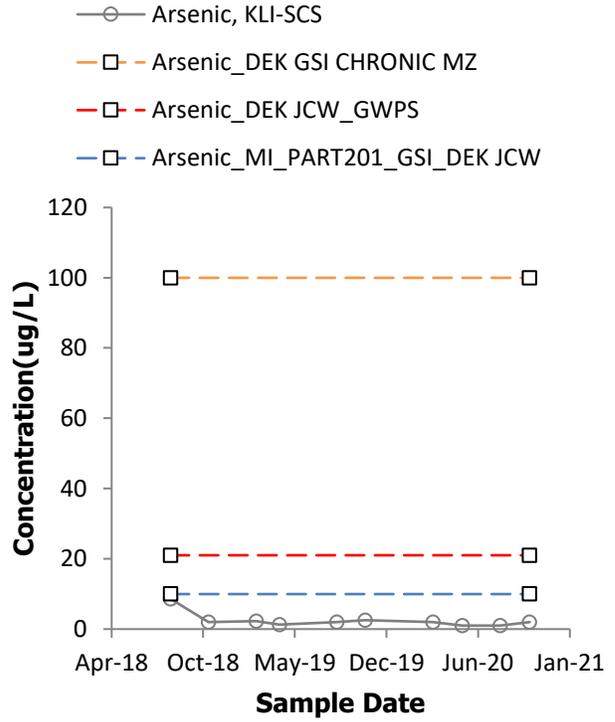
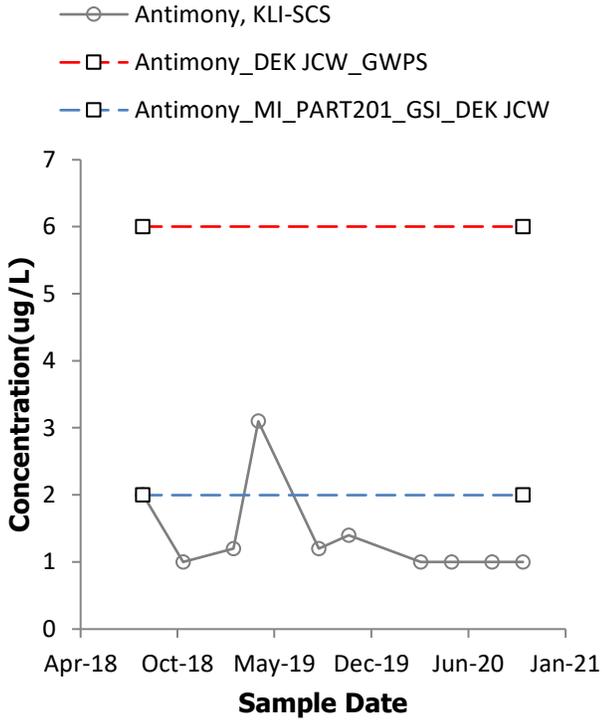
cc: Mr. Gary Schwerin, EGLE Saginaw Bay District Office
Ms. Lori Babcock, EGLE Saginaw Bay District Office
Mr. Caleb Batts, Consumers Energy
Ms. Darby Litz, TRC

Attachment A: Water Quality Data and Trends
Attachment B: Leak Detection Survey
Attachment C: Visual Determination of Primary Liner Damage

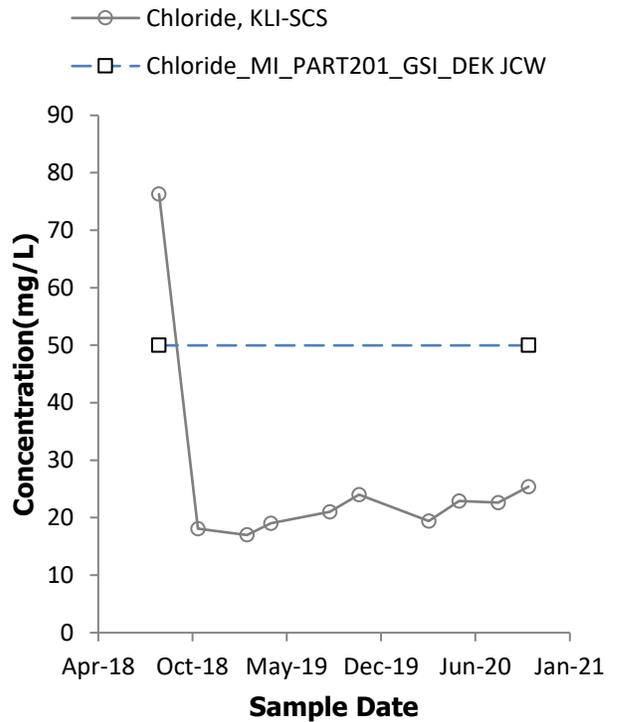
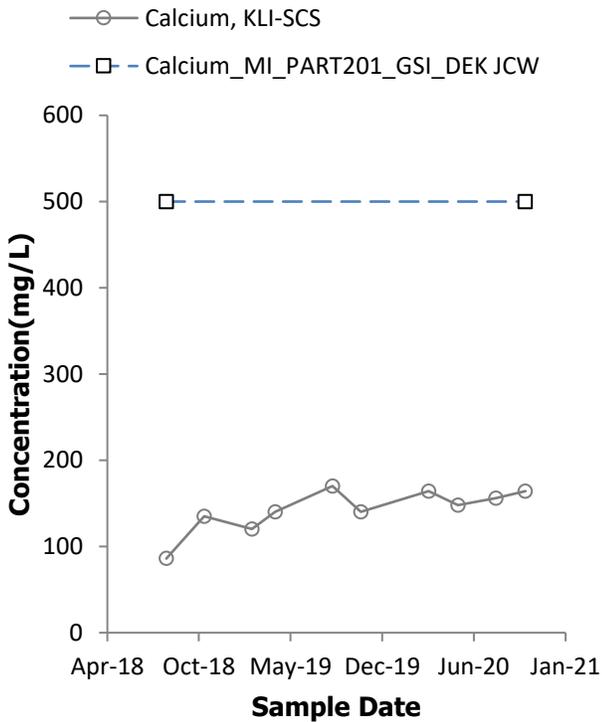
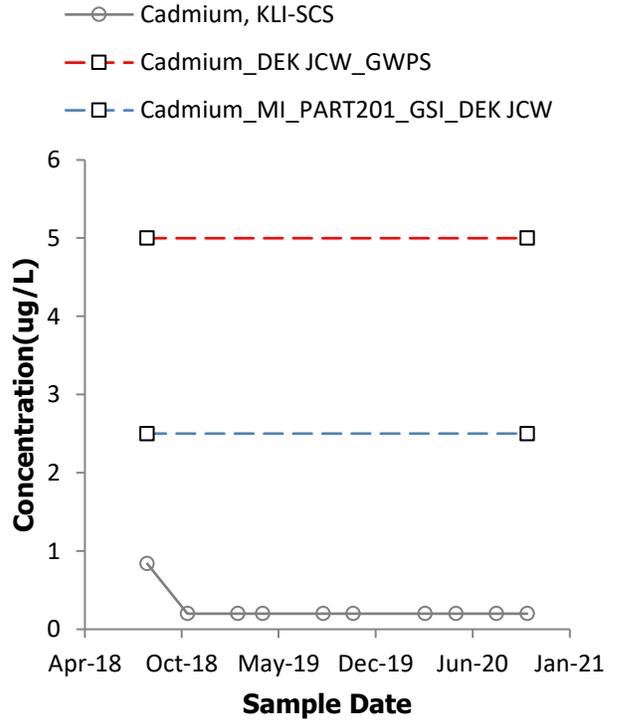
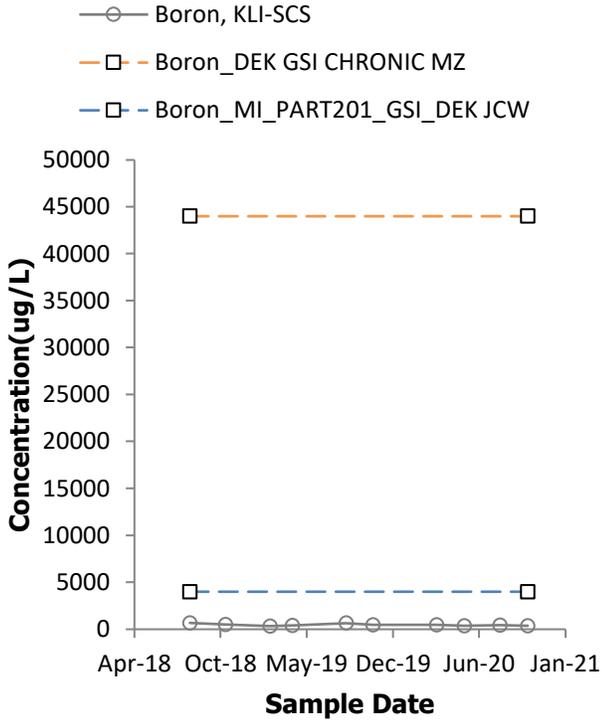
ATTACHMENT A

Water Quality Data

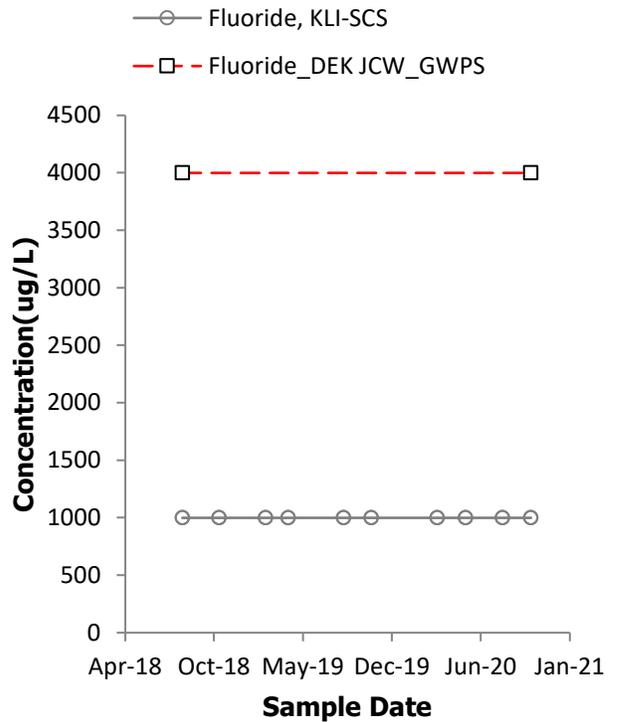
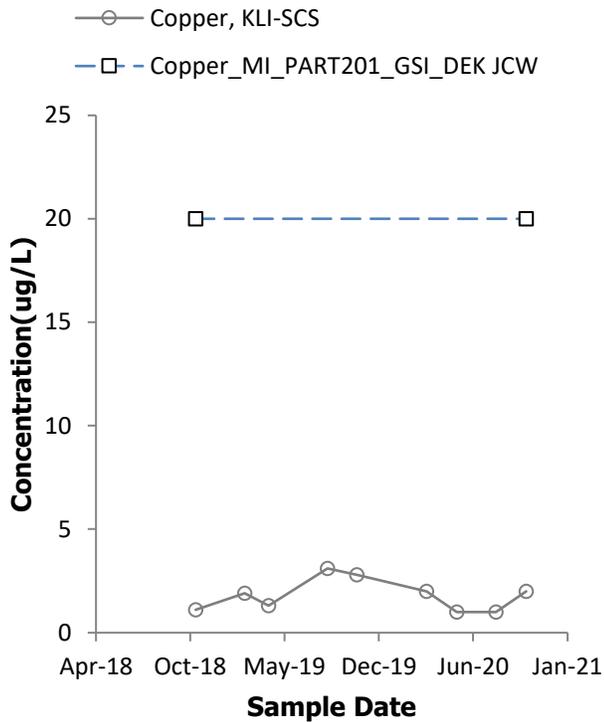
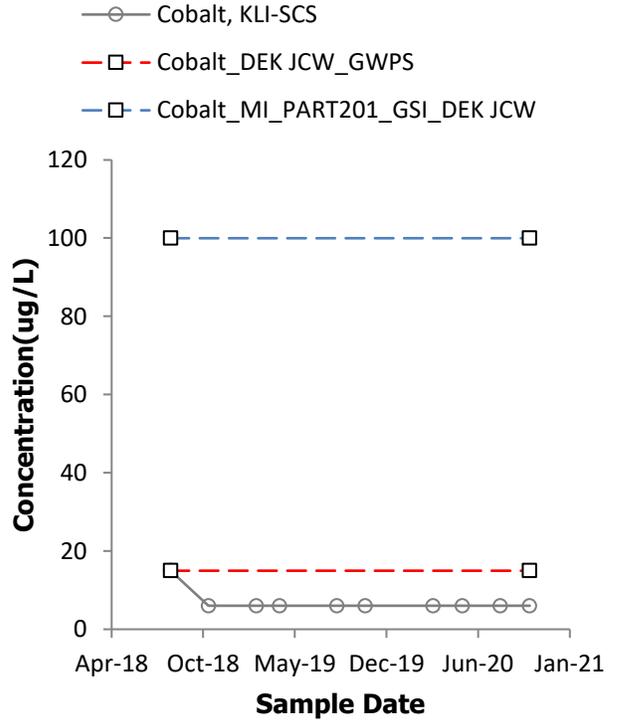
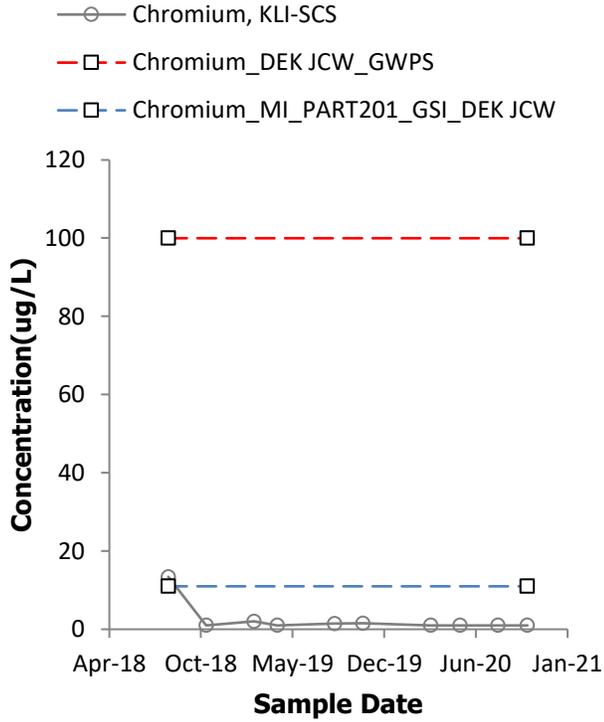
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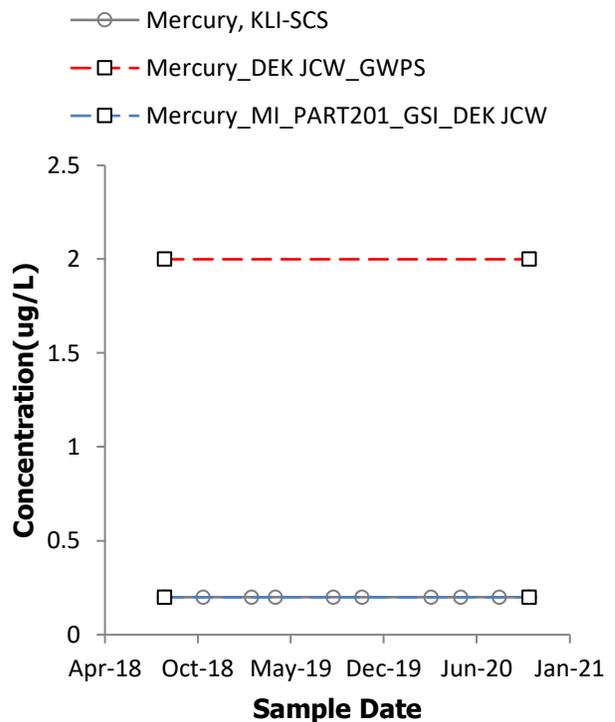
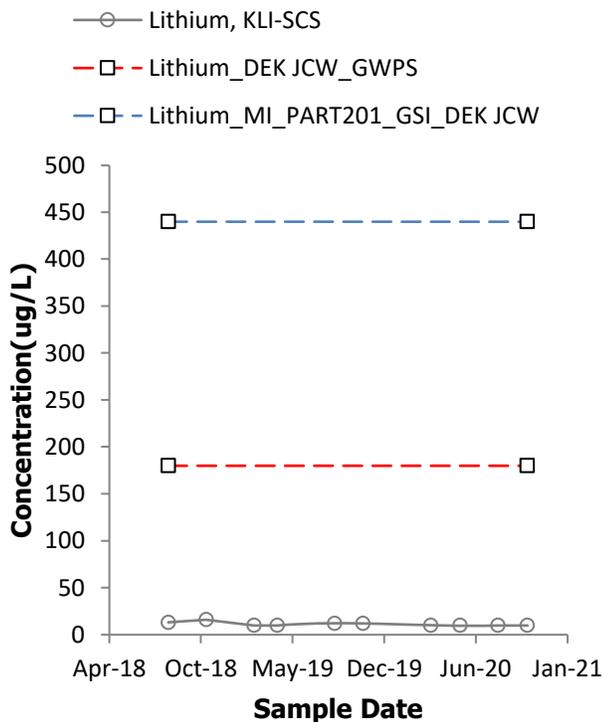
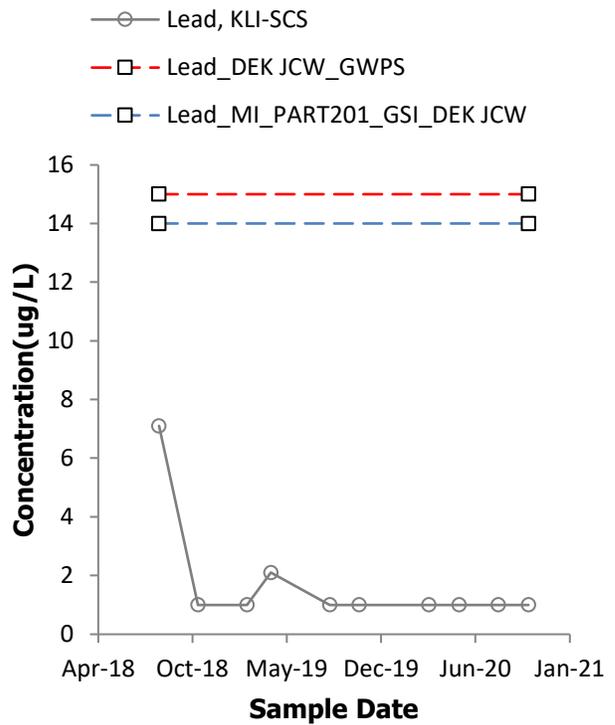
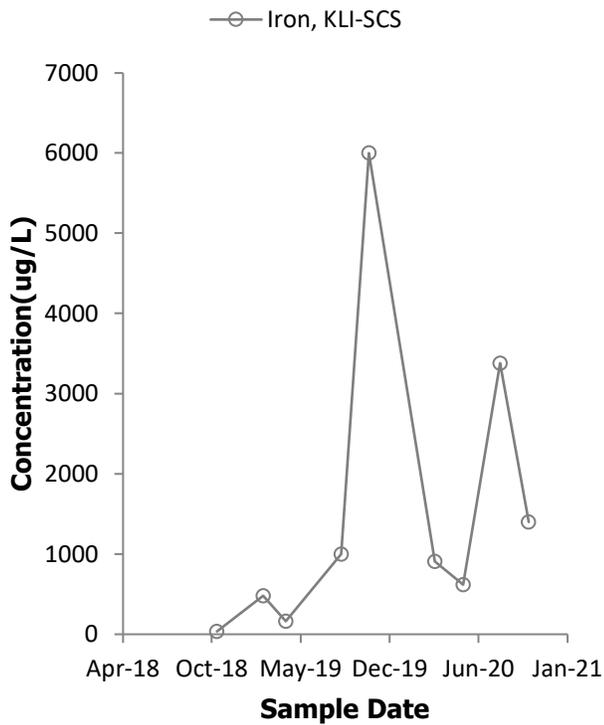
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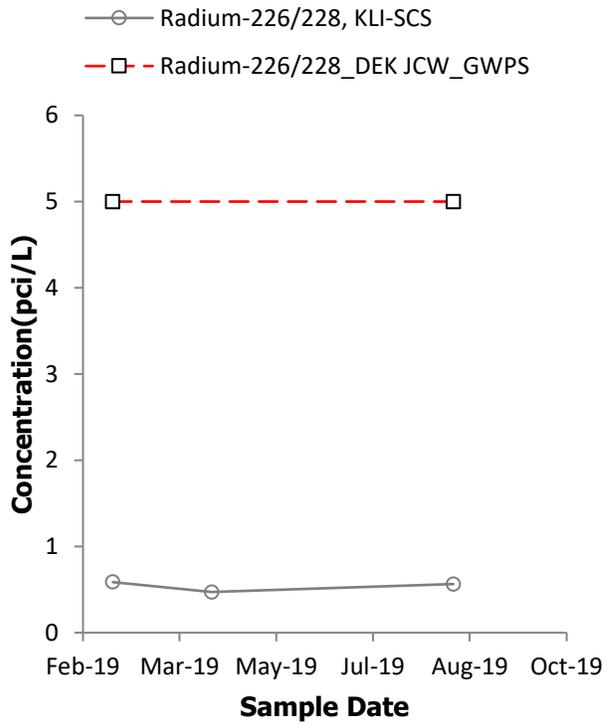
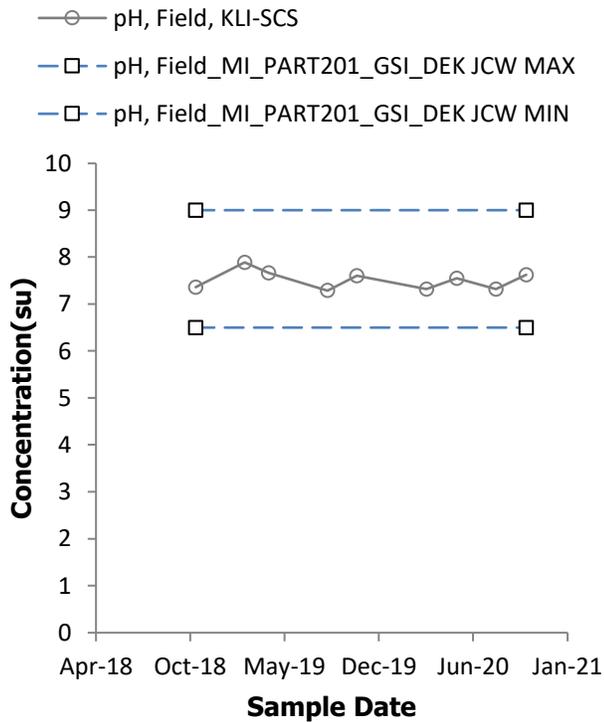
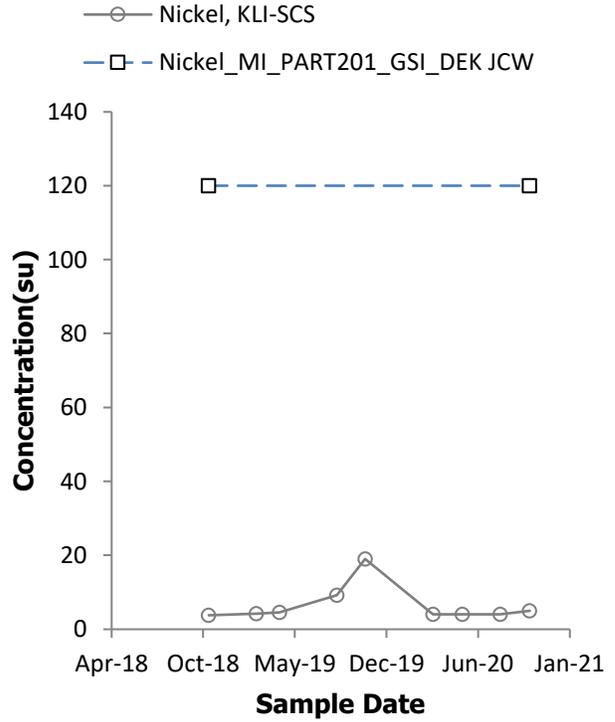
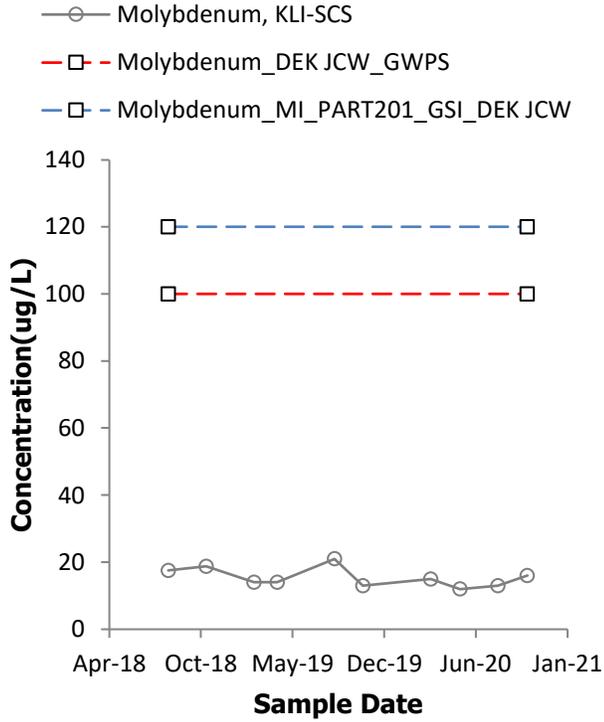
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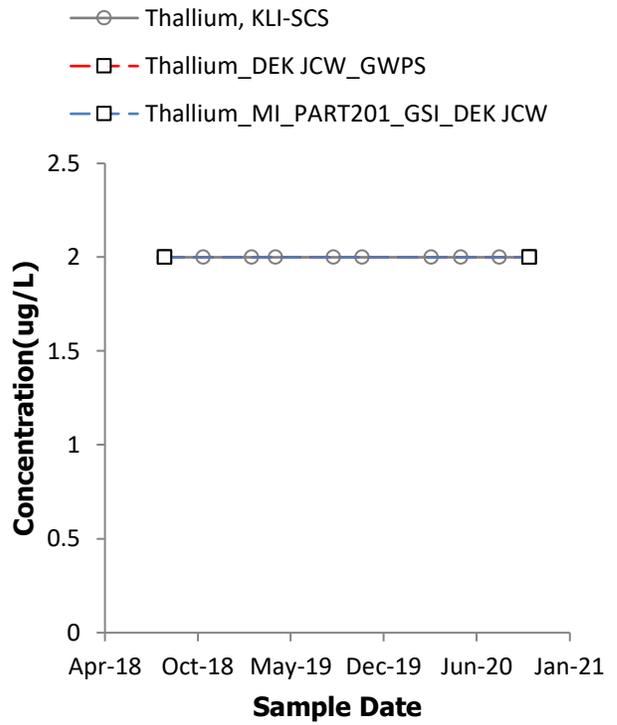
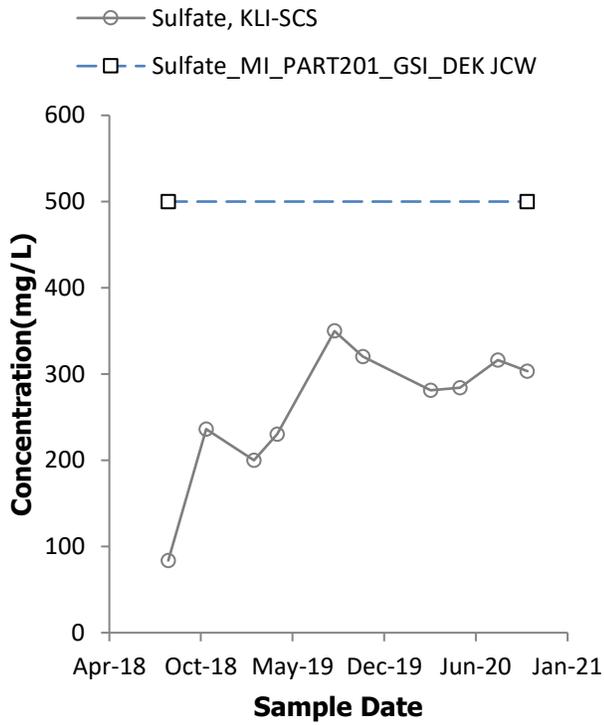
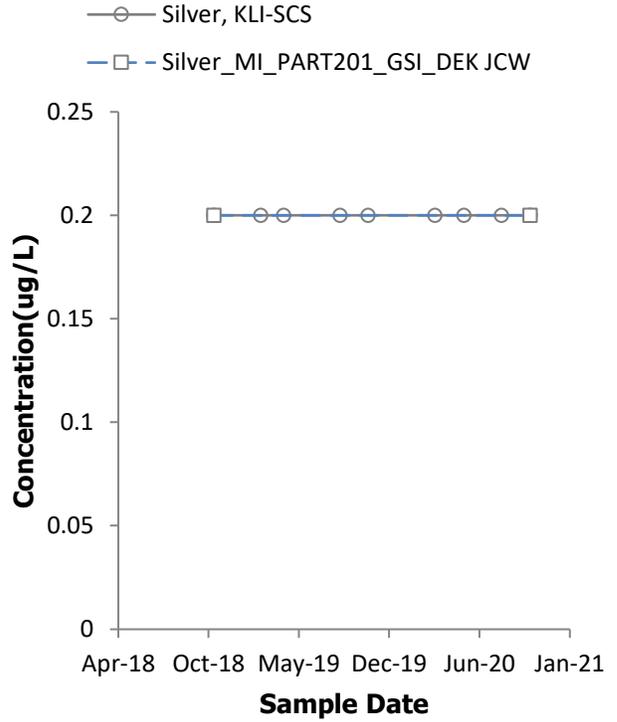
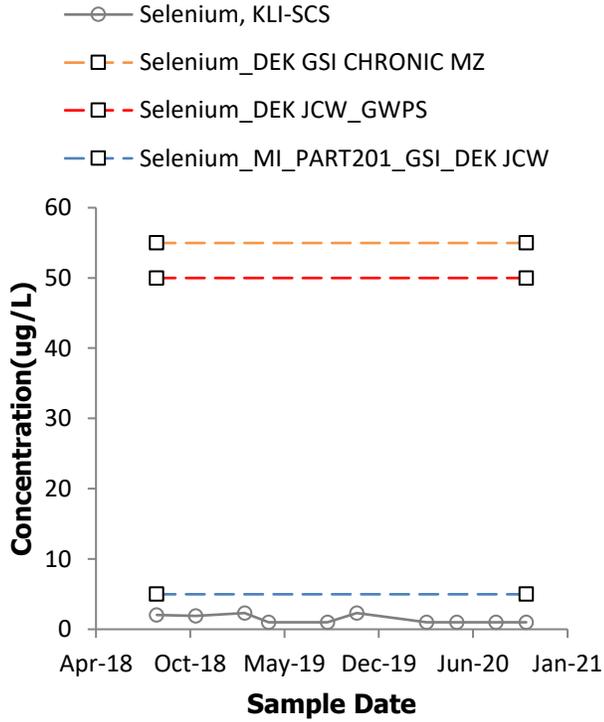
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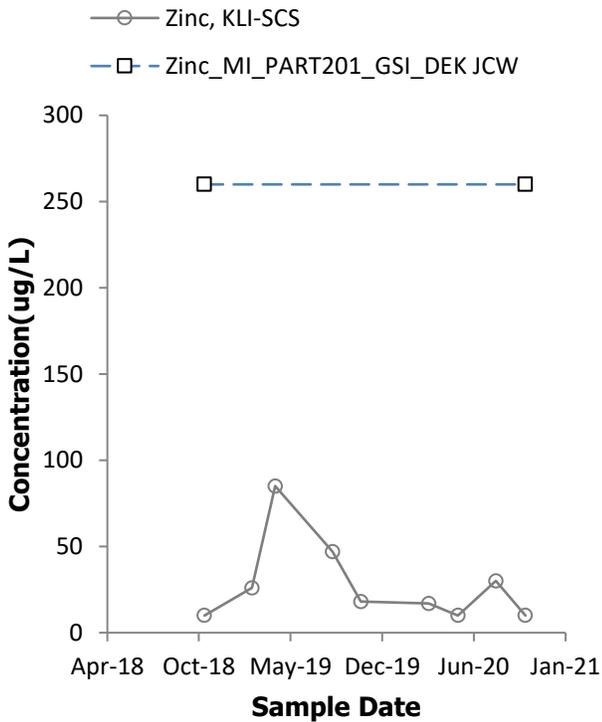
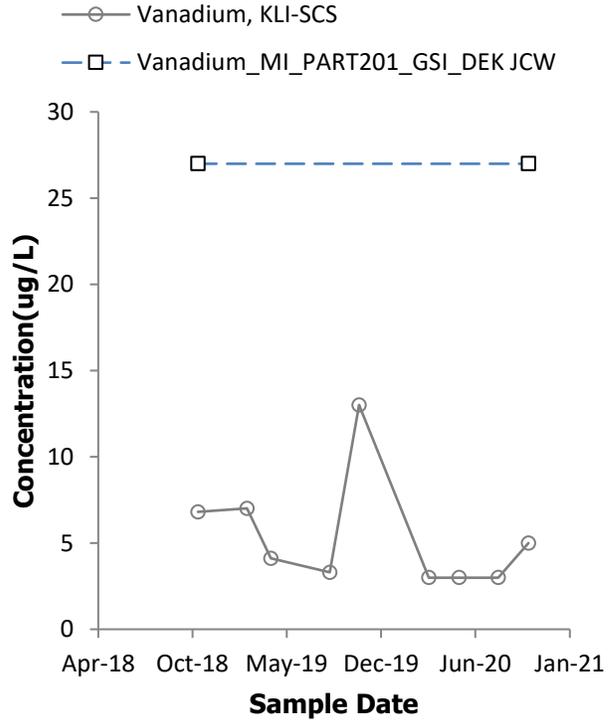
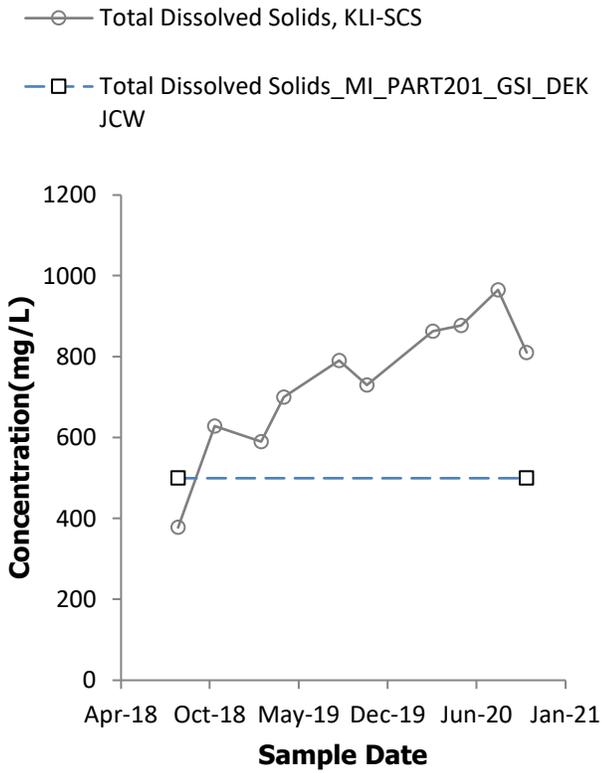
Water Quality Time Series



Water Quality Time Series



Water Quality Time Series



ATTACHMENT B

Liner Leak Detection Survey Results



OVER 25 YEARS

LEAK LOCATION SERVICES, INC.

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. Deep Water Survey

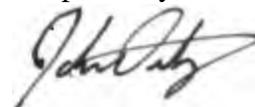
A towed probe survey may also be used to locate leaks in geomembranes that are covered with more than 30 inches of water and for testing side slopes covered with water. The sensor is towed down the side-slope across the short dimension of the basin and then back up the opposite side-slope along the established 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 C

Visual Confirmation of Primary Liner Damage



Figure 1 - Visual Identification of Primary Liner Damage – Shovel on the Right for Scale



Figure 2 - Temporary AquaBlok Backfill and Steel Plate Placement