

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

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Environmental Services



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.

DE Karn Semiannual Progress Report Ms. Lori Babcock January 29, 2021



Principal Engineer Landfill Operations Compliance Phone: (517) 788-2982 Email: <u>harold.registerjr@cmsenergy.com</u>

Enclosures

- 1. <u>May 2020 Detection Monitoring Data Summary, Consumers Energy, DE Karn Site, Lined</u> <u>Impoundment CCR Unit</u> (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

Attachments:

acob Krenz

Staff Geologist

Table 1Summary of Groundwater Elevation DataTable 2Summary of Field Parameter ResultsTable 3Summary of Groundwater Sampling Results (Analytical)Table 4Comparison 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.



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 1Summary of Groundwater Elevation DataDE Karn – RCRA CCR Monitoring ProgramEssexville, Michigan

	тос		Screen Interval	March	n 9, 2020	May 11, 2020		
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	
				(ft BTOC)	(ft)	(ft BTOC)	(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 Por	nd							
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 Por	nd & Karn Lined Im	poundment	••					
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 Exte	nt	•	• • • • •					
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	
		undment (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-19 MW-20	631.44	Sand	582.3 to 579.3	51.11	580.33	50.35	581.09	
MW-20 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-01 OW-02	598.01	Fly Ash	579.4 to 576.4	14.08	583.93	14.55	583.46	
OW-02 OW-03	598.01	Fly Ash and Sand	573.6 to 568.6	15.46	583.93	14.55	582.92	
OW-03 OW-04	590.21	Sand and Bottom/Fly Ash	579.1 to 574.1	8.40	581.81	7.77	582.44	
OW-04 OW-05	593.53	Sand and Boltom/Fly ASI	576.9 to 571.9	11.50	582.03	11.10	582.43	
OW-05 OW-06				20.20	583.80	20.45	583.31	
	603.76	NR	580.9 to 575.9					
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	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity		
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)		
Karn Lined Impoundm	Karn Lined Impoundment								
DEK-MW-15003	3/11/2020	0.25	-72.4	7.8	471	15.1	1.2		
DER-10100-15005	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		
NLI-505	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		
000-10	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		
000-11	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		
000-12	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 - Nephelmetric 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^	Back	ground			downg	radient	-	
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	SÜ	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

					Sample Location:	OW	/-11	KLI	-SCS
					Sample Date:	3/11/2020	5/14/2020	3/11/2020	5/13/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^		Supple	emental	
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.

^ - 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.

 $\ensuremath{\textbf{BOLD}}$ 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





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LEGEND

- 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
- SLURRY WALL (APPROXIMATE)



EXTENT OF GEOSYNTHETICS (KARN LINED IMPOUNDMENT)

<u>NOTES</u>

- 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).
- 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.



1 " = 1,000 '

1:12,000

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

2,000

TITLE:

KARN AND WEADOCK COMPLEX AREA

DRAWN BY:	S. MAJOR	PROJ NO.:		367388-001
CHECKED BY:	J. KRENZ			
APPROVED BY:	D. LITZ		FIGURE 2	
DATE:	JULY 2020			



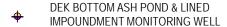
1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com

FILE NO

367388-001-005.mxd



LEGEND

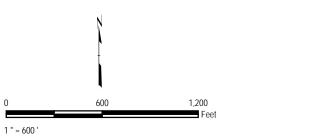


- DEK BOTTOM ASH POND MONITORING WELL
- ✤ DEK LINED IMPOUNDMENT MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- ✤ MONITORING WELL (STATIC ONLY)
- SURFACE WATER GAUGING STATION
- +- NATURE AND EXTENT WELL
- SLURRY WALL (APPROXIMATE)
- EXTENT OF GEOSYNTHETICS (KARN LINED IMPOUNDMENT) GROUNDWATER ELEVATION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

(NM) NOT MEASURED

<u>NOTES</u>

- 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.



1:7,200 PROJECT:

<u>MW-16</u>

CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN

SHALLOW GROUNDWATER CONTOUR MAP MAY 11, 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	367388.0001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ	FIGURE 3	
DATE:	JULY 2020		
		•	



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

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-12

- OW-10 OW-11
- 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.</p>
- 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	5/14/2020		
OW-11	5/14/2020		
OW-12	5/14/2020	Sulfate	Field duplicate analysis exceeds acceptance criteria (<30% RPD); indicates potential uncertainty in sulfate re However, results were consistent with historical results; therefore, data usability is not affected.
KLI-SCS	5/14/2020		
DUP-01	5/14/2020		
OW-10	5/14/2020	Chromium	Field duplicate analysis exceeds acceptance criteria (<30% RPD); indicates potential uncertainty in chromium
DUP-01	5/14/2020	Chioman	results. However, results were consistent with historical results; therefore, data usability is not affected.
OW-10	5/14/2020		Field duplicate applysic exceeds acceptance criteria (20% PDD); indicates potential uncertainty in conner results
KLI-SCS	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.
DUP-01	5/14/2020		

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

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		

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

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.

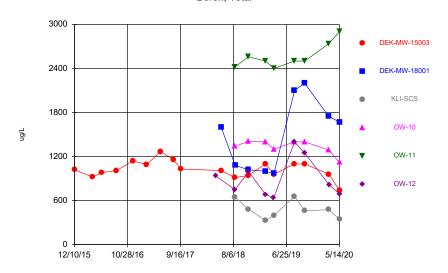
- MS and MSD analyses were performed on sample DEK-MW-18001 for metals, anions, and alkalinity. The recoveries were within the acceptance limits. RPDs were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since 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.</p>
- Carrier recoveries, where applicable, were within 40-110%.

Attachment B Time Series Plots

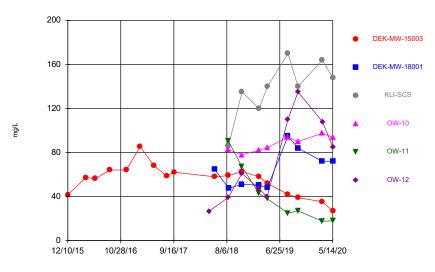


Sanitas[™] v.9.6.26 Sanitas software licensed to Consumers Energy. UG

Boron, Total



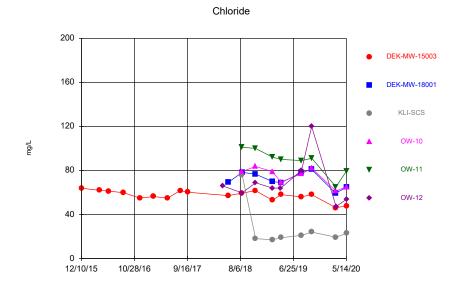
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Calcium, Total

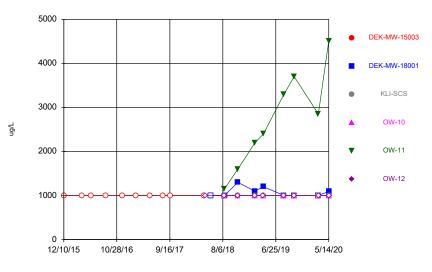
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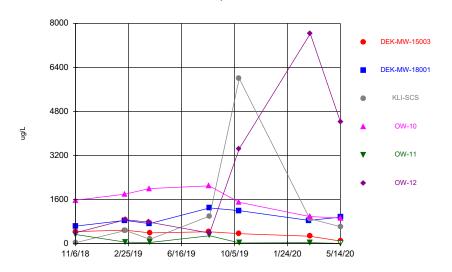


Time Series Analysis Run 7/9/2020 10:21 AM Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev Sanitas[™] v.9.6.26 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.

Fluoride

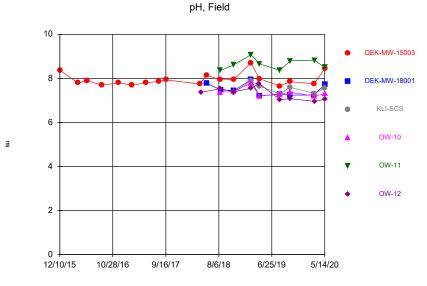


Time Series Analysis Run 7/9/2020 10:21 AM Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev Sanitas[™] v.9.6.26 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



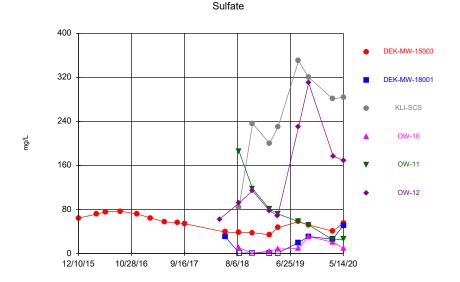
Iron, Total

Time Series Analysis Run 7/9/2020 10:21 AM Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev Sanitas™ v.9.6.26 Sanitas software licensed to Consumers Energy. UG



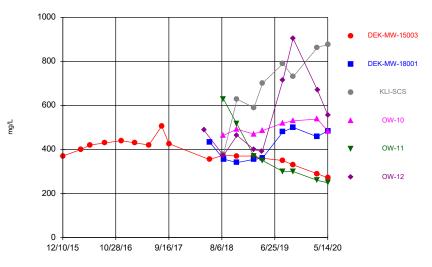
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Sanitas¹⁸ v.9.6.26 Sanitas software licensed to Consumers Energy. UG Hollow symbols indicate censored values.



Time Series Analysis Run 7/9/2020 10:21 AM Client: Consumers Energy Data: DEK_CCR_Sanitas_20.06.18.rev Sanitas[™] v.9.6.26 Sanitas software licensed to Consumers Energy. UG

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: <u>Harold.RegisterJR@cmsenergy.com</u>

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 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 EGLEapproved 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

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

тос			Screen Interval	Augus	st 3, 2020	October 5, 2020		
Well Location	Elevation (ft)	Geologic Unit of Screen Interval	Elevation (ft)	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	
				(ft BTOC)	(ft)	(ft BTOC)	(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 Pon								
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 Pon								
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 Exter		· · · ·	• •		4		L.	
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 Lev	el							
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	Oxidation Reduction Potential	рН	Specific Conductivity	Temperature	Turbidity
		(mg/L)	(mV)	(SU)	(umhos/cm)	(°C)	(NTU)
Karn Lined Impound	dment						
DEK-MW-15003	8/3/2020	0.26	-127.1	7.9	438	17.6	0.7
DEK-10100-15005	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
DEK-10001	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
KLI-SUS	10/8/2020	5.60	2.2	7.6	1,283	17.8	80
014/ 40	8/4/2020	0.84	60.1	7.2	640	12.1	5.9
OW-10	10/8/2020	1.44	-117.5	7.4	948	12.9	6.7
014/ 44	8/4/2020	0.81	81.8	9.1	339	13.3	4.7
OW-11	10/8/2020	1.50	-125.1	9.4	486	12.5	2.0
011/ 40	8/3/2020	0.82	-87.1	7.1	751	20.6	5.1
OW-12	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 - Nephelmetric 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-M	W-15003	DEK-MV	V-18001	OM	/-10	OV	V-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^	Back	ground			Downg	radient		-
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 [⊑]	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 [⊵]	6.5 - 9.0	7.9	8.5	7.5	7.6	7.2	7.4	7.1	7.3
MI Part 115 Parameters	;												1
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:	OM	/-11	KLI-
					Sample Date:	8/4/2020	10/8/2020	8/5/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non- Residential*	MI GSI^		Supple	emental
Appendix III								
Boron	ug/L	NC	500	500	4,000	2,800	3,040	423
Calcium	mg/L	NC	NC	NC	500 ^{EE}	13.7	21.3	156
Chloride	mg/L	250**	250 ^E	250 ^E	50	76	75.7	22.6
Fluoride	ug/L	4,000	NC	NC	NC	4,790	5,160	< 1,000
Sulfate	mg/L	250**	250 [⊑]	250 ^E	500 ^{EE}	24.3	25.9	316
Total Dissolved Solids	mg/L	500**	500 [⊨]	500 [⊑]	500	271	238	965
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
MI Part 115 Parameters								
Iron	ug/L	300**	300 ^E	300 ^E	500,000 ^{EE}	54	57	3,380

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.

_I-	SCS
	10/8/2020
	346
	164
	25.4
	< 1,000
	303
	810
	7.6
	1,400

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	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

Data is in

(X) ug/L

() mg/L

unless otherwise stated

or

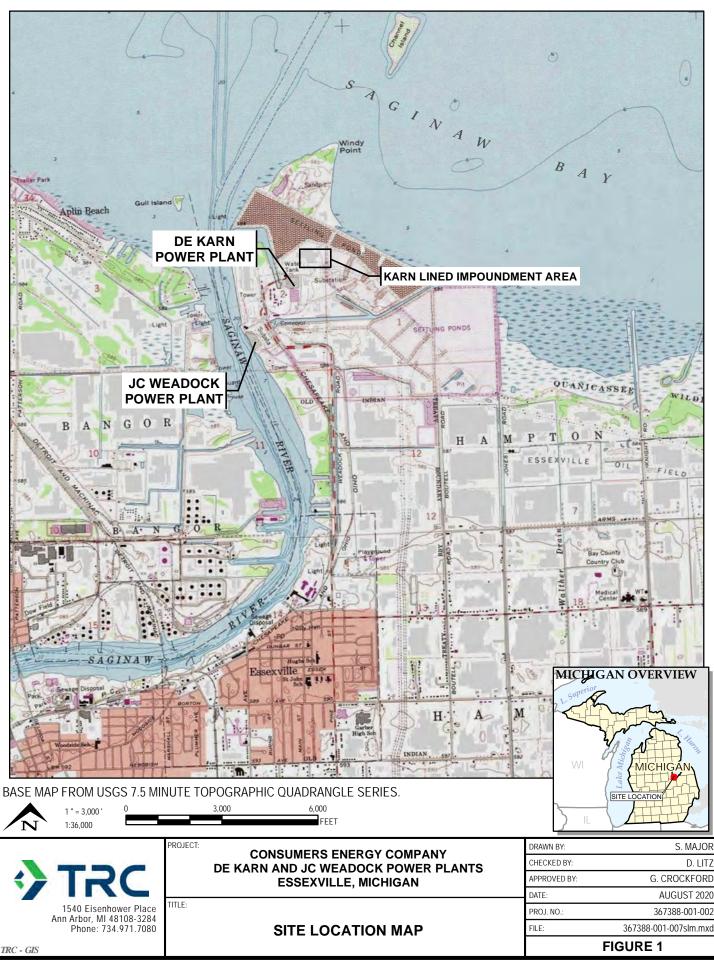
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY SUMMARY OF STATISTICAL EXCEEDANCES

Facility: Karn Lined Impoundment – WDS# 392503

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2020 (bold >201)		
I		No	Excee	edances	1	1	

Figures





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LEGEND

- 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
- SLURRY WALL (APPROXIMATE)



LINED IMPOUNDMENT (COVENANT BOUNDARY)

<u>NOTES</u>

- 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).
- 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.



1 " = 1,000 '

1:12,000

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

2,000

TITLE:

KARN AND WEADOCK COMPLEX AREA

DRAWN BY:	S. MAJOR	PROJ NO.:	367388-001
CHECKED BY:	J. KRENZ		
APPROVED BY:	D. LITZ	FIGURE	2
DATE:	JANUARY 2021		



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

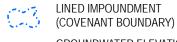
367388-001-005.mxd



LEGEND



- 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)

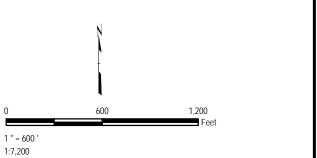


GROUNDWATER ELEVATION CONTOUR (1' INTERVAL, DASHED WHERE INFERRED)

(580.50) GROUNDWATER ELEVATION (FEET)

NOTES

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



ROJECT

CONSUMERS ENERGY COMPANY DE KARN POWER PLANT ESSEXVILLE, MICHIGAN

SHALLOW GROUNDWATER CONTOUR MAP **OCTOBER 5, 2020**

S. MAJOR	PROJ NO.:	367388.0001
J. KRENZ		
D. LITZ	FIGURE	3
JANUARY 2021		
	J. KRENZ D. LITZ	J. KRENZ D. LITZ FIGURE 3



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

367388-001-012 m

Attachment A Field Notes





PROJECT NAME:	CEC Karn BAP/LI: 2020 GW Complliance
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 то 8-5-2020
PURPOSE OF FIELDWORK:	Appendix III and IV CCR sampling
	laka Kranz/Katu Paminga
WORK PERFORMED BY:	Jake Krenz/Katy Reminga

SIGNED They 8-18-20 DATE

Katy Reminga CHEOKED BY 11/05/2020 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: J.Krenz	TIME LEFT: 1800

			WEATHER	
EMPERATURE: 75	5 °F	WIND:	10-15 MPH	VISIBILITY: Rin AM/ chear for
		WO	RK / SAMPLING PE	RFORMED
Sitewide w	ater les	rels		
Collected (2	C.		Carl Dok March
NCK - MW	- 15002	NEW .	DEK-MU	0W-12,
DEP 100	- 1300 5	INER-	1100 150031	owsit
Children - Contractor				
		i		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
very hard Robin mid morning	waited it out for 15mm

	COMMUNICATION				
NAME	REPRESENTING	SUBJECT / COMMENTS			
2. Butts Consumers		Arsenic specifichion cooler shipment			
D. L.YE	TRC	site wedates			

WASTE MATRIX		
VVASTE MATRIA	QUANTITY	COMMENTS
arge water	SNM	purgred to ground.

D B-18-20 Katy Reminga D DATE CHECKED BY SIGNED

11/05/2020

DATE



GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE: 8-4-20	TIME ARRIVED:0700
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR: J. Krene	TIME LEFT: 1600

			W	EATHE	R	
	70 °F	WIND:	0-5	MPH	VISIBILITY:	Chear
		wo	RK / SAM	PLING F	PERFORMED	
Sampled	wells :	00-11	D, OW	-11 .	DE14-MW-15004	, DEK-MW-15006,
•			1-	,		, <u>op</u> , , , , ,

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
insite meter not functioning	sent Katy to poick
connectly	up resided meters in harshy

COMMUNICATION			
REPRESENTING	SUBJECT / COMMENTS		
TRC	site updates		

And the second	INVEST	IGATION DERIVED WA	STE SUMMARY	
WASTE MATRIX	QUANTITY	3	COMMENTS	
page moster	Dum	purged	to grownel	
And ?	they	8-18-20	Katy Reminga	11/05/2020
BIGNED	0	DATE	CHECKED BY	DATE



GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE:	8-5-2020	TIME ARRIVED:0700
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR:	J. Krenz	TIME LEFT: 1600

		WEAT	HER		
TEMPERATURE:75	°F WIN	D: 0-5 MPI	<u>+</u>	VISIBILITY:	chear
		WORK / SAMPLIN		ED	
Collected	KLI-SCS	sam, Ohe	and	Equipment	Black
				t P	
				and the second	

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN	
NA	N/A	

COMMUNICATION			
NAME REPRESENTING		SUBJECT / COMMENTS	
D.L.HZ	TRC	site updates	

INVESTIGATION DERIVED WASTE SUMMARY									
WASTE MATRIX	QUANTITY	COMMENTS							
purse nater	DNM	purged to KLI							

I Ming B-18-20 Katy Reminga DATE CHECKED BY SIGNED

11/05/2020

DATE

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CAL.

RANGE

TIME



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Karn LF: 2020 GW Compliance	MODEL: insity some TROLL of P	SAMPLER: JK/KR
PROJECT NO .:	367388.0000.0000 Phase 3 Task 1	SERIAL #: TRC A2	DATE: 8-3-20

PH CALIBRATION CHECK

рН 7 (LOT #): 060930 (EXP. DATE): Mr/22	pH 4/10 (LOT #): C & 473 (EXP. DATE): Mar/22	CAL. RANGE	ТІМЕ
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		1219
7.00 17.00	4.00 14.00		
1	1		
1	1		
1	1		

ORP CALIBRATION CHECK

CAL. READING (LOT #): 19£100 362 (EXP. DATE): 2/2021	n: 19E100 362			
POST-CAL. READING / STANDARD				
270 1270	24.0		1224	
1				
1				
1				

TURBIDITY CALIBRATION CHECK CALIBRATION READING (NTU) (LOT #): 47102 (LOT #): CAL. TIME (EXP. DATE): Ju(/18 RANGE (EXP. DATE): POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD 1 10.0 10.1 1 1 1 1 1 1 1

NOTES

PROBLEMS ENCOUNTERED	

POST-CAL.	READING / STANDARD		1000				
141	3/1413	23,9		,206			
	1						
	1						
	1						
	D.O. CA	LIBRATION CHE	СК				
CAL	READING	TEMPERATURE		1			
POST-CAL. RE	ADING /SATURATED AI	("CELSIUS)	CAL. RANGE	TIME			
7.68	17.68	23.1		1227			
	1						
	1						
	1						
		COMMENTS					
	AL SOLUTION	STANDARD SOLUTION (S)					
(LOT #): (EXP. DATE):		LIST LOT NUMBERS AND EXPIRATION DATE UNDER CALIBRATION CHECK					
CALIBRAT	ED PARAMETERS	CALIBRATION RANGES (1)					
	pH	pH: +/- 0.2 S.	U.				
	COND	COND: +/- 1% OF	CAL STAN	DARD			
	ORP	ORP: +/- 25 mV	,				
	D.O.	D.O.: VARIES					
	TURB	TURB: +/- 5% Of	CAL STAN	DARD			

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

TEMPERATURE

(*CELSIUS)

CAL. READING

(LOT #): OGC673

(EXP. DATE): Mus /21

Katu Paminaa 1110510000

CORRECTIVE ACTIONS

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

flow 8-18-2020 DATE SIGNE

Katy Reminga 11/05/2020 CHECKED BY DATE

STRC WATER QUALITY METER CALIBRATION LOG PROJECT NAME CEC Karn BAP/LI: 2020 GW Compliance DSS MODEL: Pr 1 SAMPLER: JK/KR PROJECT NO .: 367388.0001.0000 Phase 3 Task 1 SERIAL #: TRC A2 DATE: S 3 2020 PH CALIBRATION CHECK SPECIFIC CONDUCTIVITY CALIBRATION CHECK pH 7 pH 4 / 10 CAL. READING TEMPERATURE (LOT #): 0G1/181 (LOT #): 06A042 (LOT #): 9G12652 CAL. CAL TIME TIME (EXP. DATE): DEC 20 (EXP. DATE): Tan (EXP. DATE): Jan 122 RANGE 27 RANGE ("CELSIUS) POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD 3 RANGE 11413 WITHIN X :27him 1 41 6 3 Δ epm WITHIN WITHIN 1 1 WITHIN 1 1 WITHIN WITHIN 1 WITHIN 1 ORP CALIBRATION CHECK D.O. CALIBRATION CHECK CAL. READING TEMPERATURE CAL. READING TEMPERATURE 14100796 (LOT #): 1941007910 CAL. CAL. ("CELSIUS) TIME TIME (EXP. DATE): State RANGE RANGE 27/2024 ("CELSIUS) POST-CAL. READING / STANDARD POST-CAL. READING /SATURATED AIR 34.8 134.8 0C RANGE : 42 pm 22 7 3 7 J:Ooph N WITHIN 1 1 WITHIN 1 RANGE TURBIDITY CALIBRATION CHECK COMMENTS CALIBRATION READING (NTU) AUTOCAL SOLUTION STANDARD SOLUTION (S) (LOT #): (LOT #): CAL (LOT #): LIST LOT NUMBERS AND EXPIRATION DATES TIME EXP. DATE): (EXP. DATE): RANGE (EXP. DATE): UNDER CALIBRATION CHECK POST-CAL. READING / STANDARD POST-CAL. READING / STANDARD CALIBRATED PARAMETERS CALIBRATION RANGES (1) RANGE 90110.0 Л 1 Car O 2:23 pH pH: +/- 0.2 S.U. 1 1 COND COND: +/- 1% OF CAL. STANDARD WITHIN 1 1 ORP +/- 25 mV ORP: WITHIN 1 1 D.O. VARIES DO: NOTES TURB TURB: +/- 5% OF CAL. STANDARD (1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER PROBLEMS ENCOUNTERED CORRECTIVE ACTIONS 8/3/2020 8-18-20 CHECKED BY

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WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Karn BAP/LI: 2020 GV	V Compllia	nce	MODE	Fro DSS	SAMPLER:	JKIKR		
PROJECT NO.:	367388.0001.0000 Phase 3	3 Task 1		SERIA	L#: TRC A2	DATE: 84	-20 (514)	
PH	CALIBRATION CHECK				SPECIFIC COND	UCTIVITY CALIB	RATION C	HECK	
PH 7 (LOT #): UGA BII (EXP. DATE): JAN 22 POST-CAL. READING/STANDARD	PH 4 / 10 (LOT #): OG CY 73 (EXP. DATE): MAK 12 POST-CAL. READING / STANDARD	CAL. RANGE	TIME		CAL. READING (LOT #): 9GLUS2 (EXP. DATE): DEC 20 POST-CAL. READING / STANDARD	TEMPERATURE ("CELSIUS)	CAL. RANGE	ТІМЕ	
7.0 170	4.0 14.0		8:18	am.	6.082 / 1-11			8:020	
781	1				1				
1	1			1	1				
1 -	1				1				
ORP	CALIBRATION CHECK				D.O. CA	LIBRATION CHE	ск		
CAL. READING (LOT #): 19 H1 00 79 4 (EXP. DATE): 0 27 (24	TEMPERATURE ("CELSIUS)	CAL. RANGE	TIME		CAL. READING	TEMPERATURE	CAL. RANGE	TIME	
POST-CAL. READING / STANDARD	1 94	CT WITHIN	1.00		POST-CAL. READING /SATURATED A		WITHIN	0.00	
242.3 1 240.3	17.9"		8:22	am	8.16/8.2	17.40		8:20	
						-	RANGE		
							RANGE		
/		RANGE			1				
	ITY CALIBRATION CHEC	K	-	1	AUTOCAL SOLUTION		SOLUTION	(8)	
(LOT #): (EXP. DATE):	Constant and Solution		TIME		(LOT #): (EXP. DATE):	STANDARD SOLUTION (S)			
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD	Sugar in	here		CALIBRATED PARAMETERS	CALIBRATION RANGES (1)			
- 0.01 / 0.0	9.951 10.0		8:05	am	🗆 рН	pH: +/- 0.2 S.	U.		
1	1				COND	COND: +/- 1% O	F CAL. STAN	NDARD	
1	7 1				ORP	ORP: +/- 25 m\	,		
1	1 30				D.O.	D.O.: VARIES			
	NOTES					TURB: +/- 5% O	F CAL. STAN	NDARD	
						(1)			
	15 11 5 - 54 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5					THE MODEL OF THE			
						-	no octore		
P	ROBLEMS ENCOUNTERED	panenna ar			CORRECT	IVE ACTIONS			
				-					
				1					

Katy Reminga 8/4/2020 SIGNED BATE

1 8-13-20 DATE CHECKED BY



SAMPLE ID: $b \notin k - M = 15003$ WELL DIAMETER: 2^{u} 4" 6" OTHER WELL MATERIAL: 2^{v} PVC SS IRON GALVANIZED STEEL OTHER SAMPLE TYPE: 2^{o} GW WW SW DI LEACHATE OTHER PURGING TIME: $1, 1, 45$ DATE: $3 - 3 - 2020$ SAMPLE TIME: 1323 DATE: $3 - 3 - 2020$ PURGE PUMP PERISTALTIC PUMP PH: $2, 3^{e^{-5}}$ SU CONDUCTIVITY: $437, 5^{e^{-5}}$ un METHOD: BAILER BAILER (DISPOSABLE) ORP: $-12, 7, 1$ mV DO: $0, 26$ mg/L DEPTH TO WATER: $10, 02$ T/PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM $3, 7, 43$ T/PVC GALLONS TEMPERATURE: $17, 57$ °C OTHER: VOLUME: NA UITERS GALLONS COLOR: 1000 R. 1000 R. VOLUME REMOVED: 3.5 UITERS GALLONS COLOR: 1000 R. 1000 R. VOLUME: NA UITERS GALLONS COLOR: 1000 R. 1000 R. VOLUME REMOVED: 3.5 UITERS GALLONS COLOR: <t< th=""><th>PROJEC</th><th>T NAME:</th><th>CEC</th><th>Karn BAP/LI:</th><th>2020 GW C</th><th>1</th><th>PREPARED</th><th></th><th>CHE</th><th>CKED</th></t<>	PROJEC	T NAME:	CEC	Karn BAP/LI:	2020 GW C	1	PREPARED		CHE	CKED	
SAMPLE ID: $D \notin V \sim 15003$ WELL DIAMETER: 2° 4" 6" 0 OTHER WELL MATERIAL: 2° PVC SS IRON GALVANIZED STEEL OTHER SAMPLE TYPE: 2° GW WW SW SW DI ILEACHATE OTHER PURGING TIME: 1323 DATE $3 - 3 - 2020$ SAMPLE TIME: 1323 DATE $3 - 3 - 2020$ PURGE PUMP PERISTALTIC PUMP PH: 7.3° SU CONDUCTIVITY: 437.5 un DEPTH TO WATER: 10.01 T/ PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM $2.7.48$ T/ PVC ØNOR: -127.1 mV DO: $0.2.6$ mg/L DEPTH TO BOTTOM $2.7.48$ T/ PVC ØNOR: -127.1 mV DO: $0.2.6$ mg/L DEPTH TO BOTTOM $2.7.48$ T/ PVC ØNOR: -127.1 mV DO: $0.2.6$ mg/L VOLUME: NA ILTERS GALLONS COLOR: $-12.7.7$ °C OTHER: $-2.7.6$ ODOR: -0.76 °C VOLUME: NA ILTERS GALLONS COLOR: -12.6 M/A FILTRATE (0.45 um) YES MOO VOLUME: NA ILTERS GALLONS COLOR: $-1.60.7$ M/A FILTRATE COLOR: M/A <td colspan<="" th=""><th>PROJEC</th><th>TNUMBE</th><th>R: 3673</th><th>88.0001.0000</th><th>Phase 3 Ta B</th><th>r: GD</th><th>R DATE</th><th>-3-20 BY:</th><th>KR</th><th>DATE11/05/2</th></td>	<th>PROJEC</th> <th>TNUMBE</th> <th>R: 3673</th> <th>88.0001.0000</th> <th>Phase 3 Ta B</th> <th>r: GD</th> <th>R DATE</th> <th>-3-20 BY:</th> <th>KR</th> <th>DATE11/05/2</th>	PROJEC	TNUMBE	R: 3673	88.0001.0000	Phase 3 Ta B	r: GD	R DATE	-3-20 BY:	KR	DATE11/05/2
WELL MATERIAL: \bigcirc PVC SS IRON GALVANIZED STEEL OTHER SAMPLE TYPE: \bigcirc GW WW SW DI LEACHATE OTHER PURGING TIME: $1,245$ DATE: $3-3-2020$ SAMPLE TIME: 1323 DATE: $3-3-3-2020$ PURGE \bigcirc PUMP PERISTALTIC PUMP PH: 7.3^25 SU CONDUCTIVITY: 437.5 un DEPTH TO WATER: 16.0^21 T/ PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM 37.48 T/ PVC 17.97 0.65 NTU DEPTH TO BOTTOM 37.48 T/ PVC $17.97^{\circ}c$ OTHER: $0.75^{\circ}c$ OTHER VOLUME: NA IITERS GALLONS TEMPERATURE: $17.57^{\circ}c$ OTHER: $0.00^{\circ}c$ $0.0^{\circ}c$ $0.00^{\circ}c$ $0.00^{\circ}c$ $0.00^{\circ}c$ $0.00^{\circ}c$ <td< td=""><td>SAMPLE</td><td>ID: DE</td><td>K-MW</td><td>- 15003</td><td>WELL DIA</td><td>METER:</td><td>☑ 2" 🗌 4" [</td><td>] 6" 🗌 ОТН</td><td>11-</td><td></td></td<>	SAMPLE	ID: DE	K-MW	- 15003	WELL DIA	METER:	☑ 2" 🗌 4" [] 6" 🗌 ОТН	11-		
SAMPLE TYPE: \bigcirc GW \bigcirc WW SW \bigcirc DI \bigcirc LEACHATE \bigcirc OTHER PURGING TIME: 1,245 DATE: ϑ -32020 SAMPLE TIME: 1,323 DATE: ϑ -3 PURGE PUMP PERISTALTIC PUMP PH: 7.15 SU CONDUCTIVITY: 437.5 un METHOD: BAILER BAILER (DISPOSABLE) ORP: -127.1 mV DO: 0.126 mg/L DEPTH TO WATER: 16.01 T/ PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM 27.98 T/ PVC MODERATE VE VIRBIDITY: 0.65 NTU DEPTH TO BOTTOM 27.98 T/ PVC MODERATE ODOR: 0.07 OTHER: 0.07	WELL MAT	ERIAL:	PVC	ss 🗆							
PURGE PUMP PERISTALTIC PUMP PH: 7.85 SU CONDUCTIVITY: 4323 DATE 3-3- PURGE PUMP PERISTALTIC PUMP PH: 7.85 SU CONDUCTIVITY: 4323 un DEPTH TOWATER: BAILER BAILER BAILER (DISPOSABLE) ORP: -127.1 mV DO: 0.236 mg/L DEPTH TO WATER: 16.01 T/ PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM 27.98 T/ PVC MODERATE VOLUME: NA LITERS GALLONS TURBIDITY: 0.65 NTU VOLUME REMOVED: 3.5 LITERS GALLONS COLOR: 17.97 C OTHER: -2.26 VOLUME REMOVED: 3.5 LITERS GALLONS COLOR: 17.97 C OTHER: -0.00 -17.97 C OTHER: -2.26 -0.00 -10.08 MODERATE VERY QC SAMPLE: MA FILTRATE ODOR: N/A DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: COMMULE IEVEL	SAMPLE T	YPE:	🖸 GW	the dealer of the second se							
PURGE PUMP PERISTALTIC PUMP PH: $?.?S$ SU CONDUCTIVITY: 437.5 un METHOD: BAILER BAILER (DISPOSABLE) ORP: 127.1 mV DO: $0.2.26$ mg/L DEPTH TO WATER: 16.01 T/ PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM 27.48 T/ PVC MODERATE INONE SLIGHT MODERATE VEL DEPTH TO BOTTOM 27.48 T/ PVC MODERATE COLOS: 0.65 NTU DEPTH TO BOTTOM 27.92 LITERS GALLONS TEMPERATURE: 17.57 $0.07.61$	PUR	GING	TIME: 1	245 0	ATE: 2-3-20	20	SAMPLE	TIME: 132	3	DATE 2-3-20	
METHOD: BAILER BAILER BAILER (DISPOSABLE) ORP: $-127,1$ mV DO: $0.2.6$ mg/L DEPTH TO WATER: 10.01 T/ PVC TURBIDITY: 0.65 NTU MODERATE VEL DEPTH TO BOTTOM 27.48 T/ PVC Ø NONE SLIGHT MODERATE VEL VOLUME: NA LITERS GALLONS TEMPERATURE: 17.57 °C OTHER: $$ VOLUME REMOVED: 3.5 2 LITERS GALLONS COLOR: 12.65 MNO COLOR: $Clear$ ODOR: $Aone$ FILTRATE (0.45 um) YES Ø NO VOLUME REMOVED: 3.5 2 LITERS GALLONS COLOR: 17.97 °C OTHER: $$ COLOR: $Clear$ ODOR: $Aone$ FILTRATE (0.45 um) YES Ø NO TURBIDITY MODERATE VERY QC SAMPLE: MS/MSD DUP- $$ DISPOSAL METHOD[2] GROUND DRUM OTHER COMMENTS: $$ $0.7.51$ 398.1 $$ $($			PUMP	PERISTALTIC	PUMP	PH:	7.85				
DEPTH TO WATER: 16.01 T/PVC TURBIDITY: 0.65 NTU DEPTH TO BOTTOM $2.7.48$ T/PVC Ø NONE SLIGHT MODERATE VE NELL VOLUME: NA LITERS GALLONS TEMPERATURE: 17.57 °C OTHER: \sim VOLUME REMOVED: 3.5 LITERS GALLONS COLOR: 17.57 °C OTHER: \sim VOLUME REMOVED: 3.5 LITERS GALLONS COLOR: 17.57 °C OTHER: \sim COLOR: 2.5 LITERS GALLONS COLOR: 17.57 °C OTHER: \sim COLOR: $2.6ex$ ODOR: $Aone$ FILTRATE (0.45 um) YES Ø NO TURBIDITY MODERATE VERY QC SAMPLE: MS/MSD DUP- ODUP- DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: CUMULA (KILUMIN) (WATER CUMULA 1248 100 6.30 384.6 -54.8 1.12 6.377 21.30 16.79 INTI/ 1253 100 <t< td=""><td>METHOD</td><td>); 🛛</td><td>BAILER</td><td>BAILER (DISP</td><td>OSABLE)</td><td>a serie constant</td><td></td><td></td><td>A CONTRACTOR OF A CONTRACTOR O</td><td>second in the second discount of the second size of the second seco</td></t<>	METHOD); 🛛	BAILER	BAILER (DISP	OSABLE)	a serie constant			A CONTRACTOR OF A CONTRACTOR O	second in the second discount of the second size of the second seco	
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: $17.57 ^{\circ}$ C OTHER: \sim VOLUME REMOVED: 3.5 \Box LITERS GALLONS COLOR: $17.57 ^{\circ}$ C OTHER: \sim VOLUME REMOVED: 3.5 \Box LITERS GALLONS COLOR: $17.57 ^{\circ}$ C OTHER: \sim COLOR: $LITERS$ GALLONS COLOR: $17.57 ^{\circ}$ C OTHER: \sim COLOR: $LITERS$ GALLONS COLOR: $17.57 ^{\circ}$ C OTHER: \sim COLOR: $LITERS$ ODOR: $Aone$ FILTRATE (0.45 um) YES YES NO COLOR: $LIPERY$ ODOR: $Aone$ FILTRATE COLOR: N/A FILTRATE ODOR: N/A DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: OMENTS: UNICA TIME PURGE PH CONDUCTIVITY ORP D.0. TURBIDITY TEMPERATURE WATER CUMULA 1248 (00 6.30 384.6 -54.8 $1.12.6.37$ 21.30 16.79 <td< td=""><td>DEPTH TO</td><td>WATER:</td><td>16.01</td><td>_ T/ PVC</td><td></td><td>TUF</td><td></td><td></td><td></td><td></td></td<>	DEPTH TO	WATER:	16.01	_ T/ PVC		TUF					
WELL VOLUME: NA LITERS GALLONS TEMPERATURE: 17.57° C OTHER: $-$ VOLUME REMOVED: 3.5° LITERS GALLONS COLOR: $Clear$ ODOR: $Aone$ COLOR: $Clear$ ODOR: $Aone$ FILTRATE (0.45 um) YES NO TURBIDITY FILTRATE COLOR: N/A FILTRATE ODOR: N/A QCOLOR: $Clear$ ODOR: $Aone$ GALLONS FILTRATE (0.45 um) YES Yes NO QCOLOR: $Clear$ ODOR: $Aone$ FILTRATE COLOR: N/A FILTRATE ODOR: N/A QL NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP-	DEPTH TC	BOTTON	27.48	T/ PVC					MODERATE		
VOLUME REMOVED: 3.5 \Box LITERS \Box GALLONS COLOR: $Clear$ ODOR: $none$ COLOR: $Clear$ ODOR: $Aone$ FILTRATE (0.45 um) YES \square NO TURBIDITY INTURBIDITY FILTRATE COLOR: N/A FILTRATE ODOR: N/A INTURBIDITY MODERATE $VERY$ QC SAMPLE: MS/MSD \Box DUP- DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: CUMULA TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE WATER LEVEL (FEET) CUMULA 1243 100 6.30 384.6 -54.8 1.12 6.377 21.30 16.79 INITI/ 1253 100 7.51 318.1 -113.4 0.54 2.41 13.50 11.24 $.5$ 1258 100 7.81 412.4 -130.5 0.32 2.48 17.47 17.62 1.0 1303 100 7.81 412.4 -130.5 0.32				and the second sec	GALLONS	TEM	PERATURE:	7.57 °C (OTHER:	~	
COLOR: \underline{Clexr} ODOR: $\underline{\Lambdaone}$ FILTRATE (0.45 um) YES $\underline{\boxtimes}$ NO TURBIDITY $\underline{\square}$ NONE SLIGHT MODERATE VERY FILTRATE COLOR: \underline{NA} FILTRATE ODOR: \underline{NA} $\underline{\square}$ NONE SLIGHT MODERATE VERY GC SAMPLE: MS/MSD DUP- DISPOSAL METHOD[2] GROUND DRUM OTHER COMMENTS: COMMENTS: TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE WATER LEVEL CUMULA PURGE VG (GALO 1248 VOO 6.30 384, 6 -54.8 1,12 6.37 21.30 16.79 INITIA 1253 IVO 7.51 348.1 -113.4 0.54 2.41 18.50 17.24 .5 1258 IOO 7.81 412.9 -130.5 0.32 2.48 17.97 17.62 1.0 1303 IOO 7.81 412.9 -130.5 0.23 1.82 17.90 1.5 1303 IOO 7.86 416.9 <td>OLUME F</td> <td></td> <td></td> <td></td> <td>GALLONS</td> <td></td> <td></td> <td></td> <td></td> <td>none</td>	OLUME F				GALLONS					none	
ALMONE SLIGHT MODERATE VERY ALMONE COLOR NOT MATE COOR NOT DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: COMMENTS: TIME PURGE RATE PH CONDUCTIVITY ORP D.O. TURBIDITY TEMPERATURE WATER LEVEL CUMULA PURGE VC (FEET) 1248 VOO 6.80 384.6 -54.8 1.12 6.37 21.30 16.79 INITI/ 1253 1253 100 7.51 318.1 -113.4 0.54 2.41 18.50 11.29 .5 1253 100 7.81 412.4 -130.5 0.32 2.48 17.97 17.62 1.0 1303 100 7.81 412.4 -130.5 0.32 2.48 17.90 17.98 2.0 1303 100 7.86 416.4 -135.1 0.29 1.82 17.90 17.98 2.0 1303 100 7.86 416.4 -135.1 0.29 1.82 17.90 17.98 2.0 <td>COLOR:</td> <td>_ C</td> <td>lear</td> <td> 00</td> <td>DOR: None</td> <td> FILT</td> <td>RATE (0.45 um)</td> <td>YES [</td> <td>NO NO</td> <td></td>	COLOR:	_ C	lear	00	DOR: None	FILT	RATE (0.45 um)	YES [NO NO		
Δ NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DUP- DISPOSAL METHOD GROUND DRUM OTHER COMMENTS: TIME PURGE RATE (ML/MIN) PH (SU) CONDUCTIVITY (umhos/cm) ORP (mV) D.O. (mg/L) TURBIDITY (NTU) TEMPERATURE (°C) WATER LEVEL (FEET) CUMULA PURGE VG (GAL O 1248 100 0.80 384.6 -54.8 1.12 6.37 21.30 16.79 INITI/ 1253 1253 100 7.51 318.1 -113.4 0.54 2.41 18.50 17.29 .5 1258 100 7.81 412.9 -130.5 0.32 2.48 17.97 17.62 1.0 1303 100 7.81 412.9 -130.5 0.32 2.48 17.90 1.48 2.0 1303 100 7.86 416.9 -135.1 0.29 1.82 17.90 17.48 2.0						FILTE	ATE COLOR:	NA	FILTRATE OD	DOR: NA	
TIMEPURGE RATE (ML/MIN)PH (SU)CONDUCTIVITY (umhos/cm)ORP (mV)D.O. (mg/L)TURBIDITY (NTU)TEMPERATURE (°C)WATER LEVEL (°C)CUMULA PURGE VG (GALO (GALO $ 248$ (00 6.30 384.6 -54.8 1.12 6.37 21.30 16.79 INITIA INITIA 1253 100 7.51 348.1 -113.4 0.59 2.41 18.50 11.29 $.5$ 1258 100 7.14 407.9 -131.4 0.473 2.81 17.97 17.62 1.0 1303 100 7.81 412.9 -130.5 0.32 2.48 17.97 17.40 1.5 1308 100 7.86 4116.9 -135.1 0.28 1.82 17.90 11.98 2.0	-					QC :	SAMPLE: 🗌 MS				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	JISPOSAL	METHOD	GROU			CON	IMENTS:				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		RATE					and a second sec		LEVEL	PURGE VOLUME	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							1				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$											
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$								18.50	11.29	.5	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$							4101	17,97	17,62	1.0	
1313 100 7.81 496.2 -129.2 0.21 102 11.10 11.10 4.0								17.97	17.90	1.5	
1313 (00 7 8/ 4/6) -109 0 00/ 100		100						17,90	17.98	2.0	
	313	100				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	318	100	7.85			0.25	1.05				
323 100 7.35 437.5 -127.1 0.26 0.65 17.57 18.05 3.5	323	100	7.85	437.5	-127,1	0,26	0.65				
									and the second data of an property second		

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: COND.: +/- 3 % ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10 % or </= 10

pH: +/- 0.1

TEMP .: +/- 0.5°C

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BOTTLES	ATIVE CODES A	DES A - NONE B - HNO3 C - H2SO						D - NaOH E - HCL F -							
NUMBER	SIZE	TYPE	PRESERVATIVE		FIL	TER	ED	NUMBER	SIZE	TYPE	PRESERVATIVE	-	-	ERE	ED
1	250mL	Plastic	A		Y		N						Y		N
1	ISML	Plastic	A		Y	۲ġ	N						Y	E	N
1	125 ML	Plastic	B		Y	X	N						Y	6	N
2	boml	VOA	A		Y	Ø	N						Y	6	N
					Y		N						Y		N
HIPPING	METHOD:	Fede	CX DATI	E SH	IPP	ED:		8-5-2	020	AIRBILL	NUMBER:	-			-
COC NUME	BER:		SIGN	IATU	RE		A	e 7	inc	DATE SI	GNED: 8	-15	2-1	20	



					EPARED	and the second s			CKED
TNUMBE	R: 36738	38.0001.0000 F	hase 3 Ta BY		DATE	3-20 BY:	K	R	DATE11/05/2
ID: DEI	K-MW	- 13001	WELL DIA	METER: 🗹	2" 🗌 4" 🗌	6" 🗌 OT	HER		
TERIAL:	PVC	ss 🗆		LVANIZED	TEEL	п от	HER		
TYPE:	☑ GW		SW 🗆 DI		LEACHATE	то 🗌	HER		
GING	TIME: 13	55 D/	ATE: 8-3-20) S	AMPLE	TIME: 14	16	D	ATE: 8-3-20
	PUMP	PERISTALTIC	PUMP	PH:	7.48 5		JCTIVI	TY: 800	6.6 umhos/cm
D: 🗆	BAILER	BAILER (DISPO	DSABLE)	ORP:	-70.1 n	nV DO:	O,	/4 mg	g/L
O WATER:	8.01	T/ PVC		TURBI	DITY: O.S.	NTU	a) — "featlainin		
O BOTTON	19.66	_ T/ PVC		NO 🛛	NE 🗆 SL	ібнт 🗆	MO	DERATE	VERY
LUME:	NA		GALLONS	TEMPE	RATURE: 14	1.20 00	OTH		
REMOVED	4.0		GALLONS	COLO	e: Clear		ODO	DR:	none
_21-	ear	00	OR: none	FILTRA	TE (0.45 um)	I YES	Ø	NO	
	TUR	RBIDITY		FILTRA		NA	FILT	RATE OD	OR: NA
				QC SA	MPLE: 🗹 MS	S/MSD		DUP-	
L METHOD	GROU	ND DRUM		COMM	ENTS:				
PURGE RATE (ML/MIN)	PH (SU)			D.O.			URE	WATER LEVEL	CUMULATIVE PURGE VOLUME (GAL OR L)
							2		INITIAL
									1.0
									2.0
									3,0
200	7,48	006.6	- 10,1	0.14	0151	14.20)	8.18	4.0
0.1	COND.: +/-	3 % ORP:	+/- 10 mV D		TURB: +/-	10 % or	=</td <td></td> <td>TEMP.: +/- 0.5°C</td>		TEMP.: +/- 0.5°C
SIZE	TYPE	PRESERVATIN	E FILTERE		R SIZE	TYPE	PR	ESERVAT	IVE FILTERED
125mL	Plastic	в		N			-		
and the second sec		the second secon					in Reservation	1. 1965 (F. 1967 - 1966 - 1966 - 1966 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 -	
and a channel with the party of the second second		A		N					
IN LONG LA	UUTI	FT I	- 90	1.1					
	TERIAL: TYPE: CGING D: D: O WATER: O BOTTOM LUME: REMOVED (1) PURGE RATE (ML/MIN) J.OO J.OO J.OO J.OO J.OO RESCOND CO J.OO J.	TERIAL: □ PVC TYPE: □ GW CGING TIME: [3] COMP □ □ BAILER 0 WATER: 3.01 0 0 BOTTOM [4].66 LUME: NA REMOVED: 4.0	TYPE: \Box GW WW \Box IGING TIME: $3 \leq 5$ D/ Image: PUMP PERISTALTIC D/ D: BAILER BAILER BAILER (DISPO O WATER: $3 \cdot 0 = 1$ T/ PVC O WATER: $3 \cdot 0 = 1$ T/ PVC O BOTTOM 14.66 T/ PVC LUME: NA UITERS REMOVED 4.0 \Box LITERS REMOVED 4.0 \Box LITERS REMOVED 4.0 \Box UITERS REMOVED 4.0 \Box UITERS REMOVED 4.0 \Box UITERS REMOVED $GROUND$ $DRUM$ PURGE PH CONDUCTIVITY (ML/MIN) (SU) (umhos/cm) 200 7.42 749.8 201.7 200 7.48 306.6 6 DIE PRESERVATIVE CODES	TERIAL: \square PVC \square SS \square IRON \square GAN TYPE: \square GW \square WW \square SW \square DI IGING TIME: $3 \leq S$ \square DATE: $8 - 3 - 2a$ Image: \square PUMP PERISTALTIC PUMP \square D: \square BAILER BAILER (DISPOSABLE) \square WATER: $3 - 2a$ \square WATER: $3 - 01$ \top PVC \square DUMP \square DITERS \square GALLONS \square WHE: NA \square UITERS \square GALLONS \square REMOVED: $4 - 0$ \square UITERS \square GALLONS \square REMOVED: $4 - 0$ \square UITERS \square GALLONS \square REMOVED: $4 - 0$ \square UITERS \square GALLONS \square SLIGHT MODERATE \square VERY \square URBIDITY \square SLIGHT MODERATE \square VERY \square MODERATE \square VERY \square METHOD \square GROUND \square DRUM \square OTHER \square PURGE \square PH $CONDUCTIVITY$ \bigcirc GR \square METHOD \square GROUND \square DRUM \square OTHER \square	TERIAL: \bigcirc PVC SS IRON GALVANIZED S TYPE: \bigcirc GW WW SW DI \bigcirc GING TIME: $3 \subseteq S$ DATE: $3 - 2 \cup$ S. GING TIME: $3 \subseteq S$ DATE: $3 - 2 \cup$ S. \bigcirc PUMP PERISTALTIC PUMP PH: \bigcirc \bigcirc S. \bigcirc WATER: \bigcirc \bigcirc \bigcirc T/ PVC TURBIN \bigcirc \bigcirc \bigcirc WATER: \bigcirc \bigcirc \bigcirc \bigcirc T/ PVC \bigcirc \bigcirc \bigcirc \bigcirc WATER: \bigcirc OWATER: \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc OWATER: \land \land \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc OBOT: \land \land \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \square UME: \land \land \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc	TERIAL: \bigcirc PVC \bigcirc SS \bigcirc IRON \bigcirc GAUVANIZED STEEL TYPE: \bigcirc GW \bigcirc WW SW \bigcirc DI \bigcirc LEACHATE ISGING TIME: \bigcirc GW \bigcirc WW SW \bigcirc DI \bigcirc LEACHATE ISGING TIME: \bigcirc GW \bigcirc WW SW \bigcirc DI \bigcirc LEACHATE ISGING TIME: \bigcirc GW \bigcirc WW SW \bigcirc DI \bigcirc LEACHATE ISGING TIME: \bigcirc GW PHERISTALTIC PUMP PH: $?$.4'8 S OWATER: $?$.0.1 T /PVC \bigcirc MATER: $?$.0.1 T URBIDITY: $?$.0.1 T URBIDITY: $?$.0.2 OBOTTOM A \Box LITERS GALLONS COLOR: C / $?$.0.4 $?$.0.5 LUME: NA \Box LITERS GALLONS COLOR: C / $?$.0.4 $?$.0.5 $?$.0.0 SLIGHT MODERATE \lor VERY QC SAMPLE: $?$.0.5 $?$.0.5 $?$.0.0 $?$.0.4 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1 $?$.0.1	TERIAL: \bigcirc PVC SS IRON GALVANIZED STEEL \bigcirc OT TYPE: \bigcirc GW WW SW DI \bigcirc LEACHATE OT IGING TIME: $13 \leq \leq$ DATE: $8-3 \cdot 20$ SAMPLE TIME: 14 C BAILER BAILER (DISPOSABLE) ORP: -70.1 mV DO: OWATER: 8.01 T/ PVC TURBIDITY: 0.52 NTU OBOTTOM 14.66 T/ PVC SI NONE SLIGHT mV DO: OBOTTOM 14.66 T/ PVC SI NONE SLIGHT \bigcirc CLeas FILTRATE (0.45 um) YES LUME: NA UITERS GALLONS COLOR: $U2 = 4$ SLIGHT MODERATE VERY GL SAMPLE: MA URBIDITY IITRBIDITY FILTRATE (0.45 um) YES MALENDIG GONDUCTIVITY ORP D.0. TURBIDITY TEMPERAT SLIGHT MODERATE VERY D.0. TURBIDITY TEMPERAT MALENDIG GONDUCTIVITY ORP D.0.	TERIAL: PVC SS I RON GALVANIZED STEEL OTHER TYPE: GW WW SW DI LEACHATE OTHER GING TIME: 135 S DATE: 8-3-20 SAMPLE TIME: 14/6 GING TIME: 135 S DATE: 8-3-20 SAMPLE TIME: 14/6 GING TIME: 135 S DATE: 8-3-20 SAMPLE TIME: 14/6 GUNDUCTIVI PH: 7.43 SU CONDUCTIVI ORP: -70.1 mV ODO: 0.2 0 WATER: 3.01 TPVC TURBIDITY: 0.5 TURBIDITY TURBIDITY TURBIDITY FILTRATE COLOR: N/A FILTRATE OX SMSMSD D. LMETHOD GROUND D DRUM OTHER COMMENTS: CMMENTS FILTRATE COLOR: N/A FILTRATE OA LMETHOD2 GROUND D DRUM OTHER	TERIAL: PVC SS IRON GALVANIZED STEEL OTHER TYPE: GW WW SW DI LEACHATE OTHER GING TIME: 13.5 S DATE: 8.3-2.0 SAMPLE TIME: 14/16 D GING TIME: 13.5 S DATE: 8.3-2.0 SAMPLE TIME: 14/16 D GING TIME: BAILER BAILER (DISPOSABLE) ORP72.1 mV DO: 0.1/1 moderate 0 WATER: 8.01 T/ PVC TURBIDITY: 0.5.2 NTU 0 BAILER BAILER (DISPOSABLE) ORP72.1 mV DO: 0.1/14 moderate UME: NA UTERS GALLONS TEMPERATURE: 14.20 C OTHER - REMOVED: 4.0 UTERS GALLONS COLOR: UA FILTRATE COLOR: UA



PROJEC	T NAME:	CEC	Karn BAP/LI: 2	020 GW C	PR	EPARED		CHE	CKED
PROJEC	TNUMBE	R: 36738	38.0001.0000 P	hase 3 Ta BY		DATE: 8~	3-20 BY: K	R	DATE:11/05/2
SAMPLE	ID: DEI	K-mw	- 15002	WELL DIA	METER: 🕖	2" 🗌 4" 🗌	6" 🗌 OTHER		
WELL MA	TERIAL:	PVC	ss 🗆		LVANIZED S	STEEL	OTHER		
SAMPLE	TYPE:	☑ GW		SW 🗆 DI		LEACHATE			
PUR	GING	TIME: 1	156 DA	ATE: 8-3-20	S	AMPLE	TIME: 1538	3 0	DATE: 8 - 7-20
PURGE		PUMP	PERISTALTIC	PUMP	PH:	7.52 s		ITY: 128	0.6 umhos/cm
METHO	D:	BAILER	BAILER (DISPO	DSABLE)	ORP:	-77.9 m	nV DO: 0	<u>,14</u> m	g/L
DEPTH T	O WATER:	2.88	T/ PVC		TURBI	DITY: 0.78	NTU		
DEPTH T	О ВОТТОМ	15.69	_ T/ PVC			NE 🗌 SL	іднт 🗆 мо	DERATE	
WELL VO	LUME:	NA		GALLONS	TEMPE	RATURE: 15	<u>, 02</u> °C ΟΤ	HER: _	
VOLUME	REMOVED	8		GALLONS	COLO	R: clear	OD	OR: _	noue
COLOR:	_ <u>e</u> 1	ear	OD	OR: nome	FILTRA	TE (0.45 um)	🗆 YES 🛛 🔀	NO	
		TUR	BIDITY		FILTRA	TE COLOR:	NA FIL	TRATE OD	OR: NA
NONE	🗆 SL	ібнт 🗆	MODERATE		QC SA	MPLE: MS	S/MSD	DUP-	
DISPOSA	L METHOD	GROU	ND 🗌 DRUM		COMM	IENTS:			
TIME	PURGE RATE	РН	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	LEVEL (FEET)	PURGE VOLUME (GAL OR L)
1458	200	7.34	1521.2	-52.9	0.81	4,27	18.94	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	14 30,3	~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
	200	7.51	1318.8	- 77.6	0.15	2.27	15,28	6,10	6
1528	200	7.52	12977	-76.7	0.14	2.01	15.19	6.10	7
	-00	h	1 2 2		+		·····		
1528	200	7,52	1280,6	- 77.9	0.14	0.78	15.02	6,10	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

BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NC	NE		в-	HNO3 (C - H2SO4	D - NaOł	H E - HCL	F		_
NUMBER	SIZE	TYPE	PRESERVATI	VE I	FILT	ERE	D	NUMBER	SIZE	TYPE	PRESERVATIVE	FI	TER	ED
i	250ml	Plastic	A		Y	X	N] N
(125~6	plastre	A		Y	Ø	N			-] N
1	125ml	Plastic	ß		Y	X	N				1] N
					Y		N						1] N
		1 1 90 (1 + + + + + + + + + + + + + + + + + +			Y		N] N
SHIPPING	METHOD:	Feel	ex D/	ATE SH	IPPE	ED:		8-5-20	<u>ບ</u>	AIRBILL			_	-
COC NUM	BER:		SI	GNATU	RE:		1	he	They	DATE SIG	GNED: 8	-13	-2	0

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WATER SAMPLE LOG

PROJEC	T NAME:	CEC	Karn BAP/LI: 2	020 GW C	PF	REPARED		CHEC	CKED
PROJEC	TNUMBE	R: 3673	88.0001.0000 F	hase 3 Ta BY	B/KF	DATE: 8-	1-20 BY: K	R	DATE:11/05/2
SAMPLE	ID: DE	K- MU	- 15005	WELL DIA	METER: 🖸	2" 🗌 4" 🗌	6" 🗌 OTHER		
WELL MA	TERIAL:	PVC	🗆 ss 🗖		LVANIZED	STEEL	OTHER		
SAMPLE	TYPE:	🛛 GW		SW 🗆 DI		LEACHATE	OTHER		MULE 10 20 11 10 10 10 10 10 10 10 10 10 10 10 10
PUR	GING	TIME: }	600 DA	ATE: 8-3-20	0 5	SAMPLE	TIME: 1617	D	ATE: 2.3-20
PURGE		PUMP	PERISTALTIC	PUMP	PH:	7.76 s		ITY: 32	8.7 umhos/cm
METHO		BAILER	BAILER (DISPO	SABLE)	ORP:	-114,0 m	NV DO: 0	18 m	g/L
	O WATER:		_ T/ PVC		TURB	IDITY: 1.73	NTU		
DEPTH T	О ВОТТОМ	22.30) T/ PVC		M NC	DNE 🗌 SL	ібнт 🗆 мо	DERATE	
WELL VO		NA		GALLONS	TEMP	ERATURE: 1	5.37 °C OTH	HER: _	
VOLUME	REMOVED	3		GALLONS	COLC	R: chear		DR: _	none
COLOR:	C	eur	OD	OR: AOne	FILTR	ATE (0.45 um)	YES 🔀	NO	
		TUP	RBIDITY		FILTRA	TE COLOR:	NA FIL	TRATE OD	OR: NA
MONE		бнт 🛛	MODERATE		QC S	Ample: 🗌 Ms	MSD 🛃	DUP-	21
DISPOSA	L METHOD	GROU		OTHER	COM	MENTS: FB-	ol collecte	d	
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)
1602	200	7.15	766.8	-112.3	0.66	0,94	17.48	7.00	INITIAL
1607	200	7.71	816.8	119.9	0.22	1.27	15.24	7.00	1
1612	200	7.74	832.3	- 115,9	0,17	1.23	15.04	7.00	2
1617	200	7.76	828.7	-114.0	0.18	1.72	15,37	6.45	3
				· · · · · · · · · · · · · · · · · · ·					
		n (an an an an an Anna an Anna an Anna an			
							er wa w		
					1				

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

COND.: +/- 3 % ORP: +/- 10 mV D.O.: +/- 0.3 TURB: +/- 10 % or </= 10

TEMP .: +/- 0.5°C

BOTTLES	S FILLED	PRESERV	ATIVE CODES A	- NC	ONE	5	В-	HNO3	C - H2SO4	D - NaOH	E - HCL	F۰	_		
NUMBER	SIZE	TYPE	PRESERVATIVE		FILT	TERE	ED	NUMBER	SIZE	TYPE	PRESERVATIVE	F	ILT	ERE	D
3	125mL	Plastk	ß		Y	M	N						Y		N
3	125m2	plastic	A		Y		N			e menerentet (countries) ar a lart			Y		N
2	250mu	Plastic	A		Y	Ø	N						Y		N
					Y		N						Y		N
					Y		N						Y		N
SHIPPING	METHOD:	Feel	ex DATE	SH	IPP	ED:		8-5-	2020	AIRBILL N	iumber: 🥌				_
COC NUME	BER:		SIGN	ATU	RE	:	4	he /	and	DATE SIG	SNED: 8	-1	3~	2	2

REVISED 04/2019

pH: +/- 0.1

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>TRC

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WATER SAMPLE LOG

PROJEC	T NAME:	CEC I	Karn BAP/LI: 2	020 GW C	PF	REPARED		CHEC	KED
PROJEC	T NUMBE	R: 36738	8.0001.0000 F	hase 3 Ta By	: JK/KR	DATE 8/3	3/20 BY: 3	FIK.	DATE: 8-18-2
SAMPLE	ID:	OW-	-12	WELL DIA		2" 🗌 4" 🗌	6" 🗌 OTHER		
WELL MA		PVC				STEEL	OTHER		an an an an an a such a such a such a such a such a such a
SAMPLE 1	YPE:	⊡ GW		SW 🗆 DI		LEACHATE	OTHER		
PUR	GING	TIME:	DATE PIL DA	ATES/3/20	20 5	SAMPLE	TIME: 5:20	an D	ATE: 8/3/20
PURGE	J	PUMP	PERISTALTIC	PUMP	PH:	7.09 5			umhos/cn
METHO	D: 🗆	BAILER	BAILER (DISPO	OSABLE)	ORP:	-87.1 m	N DO: 7=	the KK mg	N. 0. 87.
DEPTH T	WATER:	And A	T/ PVC 17	0	TURB	IDITY: 5.00	NTU		0.00
DEPTH TO	о воттом	all the	TI PVC 23	3.45	- DXNC	NE SLI	іднт 🗌 мо	DERATE	
WELL VOL	UME:	NA		GALLONS	TEMP	ERATURE: 2	<u>0.6</u> ℃ от	HER:	
VOLUME	REMOVED		☑ LITERS	GALLONG	COLO	R: <u>Clea</u>	r od	OR:	none
COLOR:	Ore	ringe	OD	OR: NONE	FILTR	ATE (0.45 um)	⊡ YES 🗖	NO	
-			BIDITY	N/ at	FILTRA	TE COLOR:	FIL	TRATE ODC	DR:
			MODERATE	X VERY	QC SA	AMPLE: 🗌 MS	/MSD	DUP-	
DISPOSA	LMETHOD	GROU	ND 🗌 DRUM		COMM	MENTS:			
TIME	PURGE RATE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER LEVEL	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(Vm)	(mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
1-33	200	nin 1:03	COAR 7	80 -47.7	1.50	109.0	14.7	17.0	INITIAL
1:38		7.02	771	-64.4	1.46	64.6	14.7	17.0	11
4:43		7.02	784	-71.7	1.23	98.7	16.9	17.0	ZL
4:48		7.05	780	-81.3	1.13	158.0	16.7	17.0	31
1:53		7.06	772	-83.4	1.03	30.9	14.5	17.0	41
1:58		7.07	764	-83,5	1.00	64.2	14.4	17.0	SL
5:030	h	7.08	762	-85.5	1.00	31.4	14.4	17.0	lec
5:08		7.08	756	-86.7	0.91	9.98	14.5	17.0	76
5:13		7.09	755	-86.9	0.85	9.30	16.6	17.0	81
5:18		7.09	751	- 87.1	0.82	5.08	16.4	17.0	91
NC	TE: STABI	LIZATION 1	EST IS COMPL		SUCCESSIN	E READINGS 4	RE WITHIN THE		G LIMITS.
pH: +/-		COND.: +/-			0.0.: +/- 0.3				TEMP.: +/- 0.5°C
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaOH	E . HC	L F
					5 11105	0 - 112004	DEMACH	L - 110	· · · · · · · · · · · · · · · · · · ·

BOTTLE	S FILLED	PRESERV	ATIVE CODES A-	NONE	В	- HNO3	C - H2SO4	D - NaOł	E - HC	LF			_
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTER	ED	NUMBER	SIZE	TYPE	PRESERVATI	VE I	FILT	ERE	D
1	250	P	noned	OY X	N						Y		N
1	250	P	gang B)	o y 🖎	N						Y		N
1	125	P	(A)	D Y 🕅	N						Y		N
2	60	YOA	(A)	o y Ø	N						Y		N
			0	□ Y ⊠	N						Y		N
SHIPPING	METHOD:	Fede	X DATE	SHIPPED:	-	8-5-2	0	AIRBILL		_			-
COC NUM	BER:		SIGN/	ATURE:	1	KR		DATE SIG	BNED: 8/0	5/20	20)	

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>TRC

WATER SAMPLE LOG

	T NAME:	CEC	Karn BAP/LI: 20	020 GW C	PF	REPARED		CHEC	KED
PROJEC	T NUMBE	R: 36738	38.0001.0000 P	hase 3 Ta BY:	JK/KR		-4-20 BY:	JK	DATE 8 -18-24
SAMPLE	ID: OV	1-10		WELL DIA		2" 🗌 4" 🗌	6" 🗌 OTHER		
WELL MA	TERIAL:	PVC	🗆 SS 🔲		LVANIZED	STEEL	OTHER		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -
SAMPLE 1	TYPE:	🖸 GW		SW 🗆 DI		LEACHATE	OTHER		n na mar na hannan na h-saolar polar kanna i kalan saya sa
PUR	GING	TIME: 8	: 46am DA	ATE: 8 14/2	.020 \$	SAMPLE	TIME: 9:410	in DA	ATE: 8/4/202
PURGE		PUMP	PERISTALTIC I			7.15 5		/ITY: 64	0 umhos/cm
METHO	D: 🗆	BAILER	BAILER (DISPO	SABLE)	ORP:	60.1 n	N DO: 0.4	34 mg	/L
DEPTH T	O WATER:	5.95	T/ PVC		TURB	BIDITY: 5.8			
DEPTH T	о воттом	17.95	T/ PVC			DNE X SL	іднт 🗆 ма	DERATE	
WELL VOI	LUME:	NA		GALLONS	TEMP	ERATURE: 12		HER:	
VOLUME	REMOVED	111		GALLONS	COLC	DR: Clear	00	OR:	none
COLOR:	_U	car	OD	OR: non	E FILTR	ATE (0.45 um)	🗆 YES 🙀	NO	
		TUF	RBIDITY		FILTRA	ATE COLOR:	FIL	TRATE ODC	DR:
	SLI	IGHT	MODERATE		QC S	AMPLE: 🔲 MS	MSD D	DUP- 0	2
DISPOSA	LMETHOD	GROU			COM	MENTS:	,		
DISPOSA	PURGE RATE	PH		ORP	D.O.	TURBIDITY	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME
TIME	PURGE RATE (ML/MIN)		CONDUCTIVITY		I	I Vene	(°C)		CUMULATIVE
тіме 8: 4(204	PURGE RATE (ML/MIN) 200 mL	PH (SU)	CONDUCTIVITY	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	(°C) 12.62	LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
	PURGE RATE (ML/MIN) 200 mL	рн (SU) (с.85 (с.86	conductivity (umhos/cm) ·7#45	ORP (mV) 163.0 147.2	D.O. (mg/L) (.90	turbidity (NTU) 48. 8	(°C)	LEVEL (FEET) 5.95	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL
тіме 8:4600 3:560	PURGE RATE (ML/MIN) 200 pL	РН (SU) (6.85 (4.96 (е.98	CONDUCTIVITY (umhos/cm) 77745 688 657	ORP (mV) 163.0 147.2 109.1	D.O. (mg/L) 1.90 1.73 1.19	TURBIDITY (NTU) 48.8 12.0	(°C) 12.6 12.5 12.4	LEVEL (FEET) 5.95 5.95 5.95 5.94	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL L 2 L
тіме 8:46аа 3:56аа 9:56аа 9:66аа	PURGE RATE (ML/MIN) 200 mL	РН (SU) (6.85 (6.86 (6.96) (6.98 (7.02	CONDUCTIVITY (umhos/cm) 777495 688 657 652	ORP (mV) 163.0 147.2 169.1 82.5	D.O. (mg/L) 1.90 1.73 1.19 1.07	TURBIDITY (NTU) 48.8 12.0 49.2 40.0	(°C) 12.6 12.5 12.4 12.4	LEVEL (FEET) 5.95 5.95 5.95 5.94 5.95	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL I L 2 L 3 L
тіме 8:4600 3:5600 9:5600 9:6101 9:060	PURGE RATE (ML/MIN) 200 mL 1 N M	PH (SU) (0.85 (0.96 (0.98 7.02 7.00	CONDUCTIVITY (umhos/cm) 777495 688 657 657 652 647	ORP (mV) 163.0 147.2 109.1 82.5 42.0	D.O. (mg/L) 1.90 1.73 1.19 1.07 0.98	TURBIDITY (NTU) 48. 8 12.0 49.2 40.0 31.2	(°C) 12.6 12.5 12.4 12.4 12.4 12.2	LEVEL (FEET) 5.95 5.95 5.95 5.94 5.95 5.95	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL I L 2 L 3 L 4 L
TIME B: 4600 3:51000 3:51000 9:0100 9:0100 1:0100 1:01000	PURGE RATE (ML/MIN) 200 mL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	рн (SU) (6.85 (6.86 (6.96 (6.98 (6.98 7.02 7.06 7.06 7.08	CONDUCTIVITY (umhos/cm) 77745 688 657 652 647 647 647	ORP (mV) 163.0 147.2 109.1 82.5 42.0 10.1	D.O. (mg/L) 1.90 1.73 1.19 1.07 0.98 0.94	TURBIDITY (NTU) 48.8 12.0 49.2 40.0 31.2 25.0	(°C) 12.6 12.5 12.4 12.4 12.2 12.3	LEVEL (FEET) 5.95 5.95 5.95 5.94 5.95 5.95 5.95	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL I L 2 L 3 L 4 L 5 L
TIME 3:51 am 3:51 am 3:51 am 9:01 am 9:01 am 1:11 am	PURGE RATE (ML/MIN) 200 mL 1 M M	PH (SU) (6.85 (6.96 (6.98 (6.98 7.02 7.06 7.06 7.08 7.11	CONDUCTIVITY (umhos/cm) 7 # 45 638 657 652 647 647 647 647 647	ORP (mV) 163.0 147.2 109.1 82.5 42.0 10.1 -18,6	D.O. (mg/L) 1.90 1.73 1.19 1.07 0.98 0.94 0.90	TURBIDITY (NTU) 48.8 12.0 49.2 40.0 31.2 25.0 17.4	(°C) 12.6 12.5 12.4 12.4 12.2 12.3 12.3	LEVEL (FEET) 5.95 5.95 5.94 5.95 5.95 5.95 5.95 5.94	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL I L 2 L 3 L 4 L 5 L 6 L
тіме 8: Цеан Э:51 ан 3:56 ан	PURGE RATE (ML/MIN) 200 mL N M	рн (SU) (6.85 (6.86 (6.96 (6.98 (6.98 7.02 7.06 7.06 7.08	CONDUCTIVITY (umhos/cm) 7 # 45 638 657 652 647 647 647 647 647	ORP (mV) 163.0 147.2 109.1 82.5 42.0 10.1	D.O. (mg/L) 1.90 1.73 1.19 1.07 0.98 0.94	TURBIDITY (NTU) 48.8 12.0 49.2 40.0 31.2 25.0	(°C) 12.6 12.5 12.4 12.4 12.2 12.3	LEVEL (FEET) 5.95 5.95 5.95 5.94 5.95 5.95 5.95	CUMULATIVE PURGE VOLUME (GAL OR L) INITIAL I L 2 L 3 L 4 L 5 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

BOTTLE	S FILLED	PRESERV	ATIVE CODES A	- NONE	В-	HNO3	C - H2SO4	D - NaOł	H E - HCL	F
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTER	ED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
2	250	P	(A)	DYD	N					
2	250	P	B		N					
2	125	P	\mathbf{k}		N					DX D N
4	60	VOA	R		N					
			•		N					
SHIPPING	METHOD:	Fed	ex Date	SHIPPED:		8-5-2	0	AIRBILL	NUMBER:	
COC NUM	BER:		SIGN	ATURE:	1	KR	1996 - 1997 - 19	DATE SIG	GNED: 8/05/	2020

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WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW Co	PREI	PARED	on the second	СН	ECKED
PROJECT NUMBER:	367388.0001.0000 Phase 3 Tas BY:	JK/KR	DATE: 8-4-20	BY:	312	DATE:8-21-20

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATUR (°C)	(FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
9: 3ka	e	7.15	641	-56.0	0.86	7.05	12.3	annus	9510 L
9:41a	m		-000 0000	-60.1	0.84	5.88	12.1 1	handless	9510 L 9511 L
a)									
au									
					. b 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
1						ner men en e			
						and the second of the second second			
		*			-			····	
	9 95 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 1	e (1999) (1997) (1977) (1977) (1977) (1979)	e and in the second		· · · · · · · · · · · · · · · · · · ·				
									an ann i sciarta a suaran an insta
	1 								and and a static state of the
						n a dan an a			Reading a set of the second set of the second second set of the second second second second second second second
				e and e a second second		1			
	• · · · · · · · · · · · · · ·								
					1				
	n h		- 11 - 11 - 12 - 12 - 12 - 12 - 12 - 12						
						• • • • • • • • • • • • • • • • • • •		-	
							Anno 4 of the base of the second second is a second s	and the second discovery discovery discovery discovery discovery discovery discovery discovery discovery discov	· · · · · · · · · · · · · · · · · · ·
						-			
						and the second system			
_			()))))))))))))))))))))))))))))))))))))	n an		and the state of the			1
						en en en el composition par una composition de la composition de la composition de la composition de la composi			an barren yan da san san san da anan san ali sa saka anan
				and the second second second					

SIGNATURE: Katy Reminga

DATE SIGNED: 8/04/2020

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WATER SAMPLE LOG

-11 PVC □ SS GW □ WW ME: 1440	□ IRON □ G □ SW □ D □ DATE: 8-4-2 LTIC PUMP		2" 🗌 4" 🗌	6" □ OTHER □ OTHER □ OTHER	<i>R</i>	DATE11/05/2
PVC SS GW WW ME: 1440 MP PERISTAN	□ IRON □ G □ SW □ D □ DATE: 8-4-2 LTIC PUMP		STEEL			
GW WW ME: 1440 MP PERISTAN	□ SW □ D DATE: 8-4-2 LTIC PUMP	ו 🗆 פי צ	LEACHATE			and a second
ME: 1440 MP PERISTAI ILER BAILER (I	DATE: 8-4-2	0 5		OTHER		
MP PERISTA						**************************************
ILER BAILER (I			DAIVIPLE	TIME: 152	7 04	ATE: 8-4-20
	NODOCADIE	PH:	and some the state of the state		ITY: 33	2,7 umhos/cm
1.15 T/ PVC	JISPUSABLE)	ORP:		deserved i weeks in the second	<u>.81</u> mg	/L
- 117			IDITY: 4,7			
5.43 T/ PVC		NO NO		2 0	DERATE	
						one
	UDUR: More					
						R: <u>Aone</u>
					DUP	
		D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE PURGE VOLUME
	cm) (mV)	(mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
	8 101.0	1.87	97.2	15.6	21.87	INITIAL
.15 346.6		1.25	163	14.5	22.21	.5
.11 341.6		1.00	191	13.9	22.58	1.0
	1 90.5	0,94	128	13.7	22.80	1.5
09 339,1	89.9	0,91	82.2			
		the second se	Ux. a	13.6	22.87	2,0
.09 338.	88.2	0,43	39.3	13.6	22.87 22.46	2,0
,12 338.0		0.93	and a more in the second state of the second s	A REAL PROPERTY OF A DESCRIPTION OF A DE		2.5
in the later of the second sec	\$ 85.2		39,3	13.3	22.96	
,12 338.0	8 85.2 84.1	0,90	39,3 14,6	13,3 13,4	22.96 22.97	2.5 3.0
	Iter Image: Construction TURBIDITY Image: Construction Image: Constructing <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td>	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $

CN 2 60ml WA ASML Plastic A X Y D N VOA YOml E ١ Feder SHIPPING METHOD: DATE SHIPPED: 8-4-2020 AIRBILL NUMBER: 8-18-20 COC NUMBER: SIGNATURE: DATE SIGNED:



PROJEC	T NAME:	CEC	Karn BAP/LI: 2	020 GW C	PF	REPARED		CHE	CKED
PROJEC	TNUMBE	R: 36738	38.0001.0000 F	hase 3 Ta By	(IR)KF	DATE:8-4	1-20 BY:	KR	DATE:11/05/20
SAMPLE	ID: DE	K-MW	- 15004	WELL DIA	METER: 🖸	2" 🗌 4" 🗌	6" 🗌 OT	HER	
WELL MA	TERIAL:	PVC	ss 🗆		LVANIZED	STEEL	П от	HER	· · · · · · · · · · · · · · · · · · ·
SAMPLE	TYPE:	☑ GW		SW 🗆 DI		LEACHATE	🗆 от	HER	
PUR	GING	TIME: 10	033 DA	ATE: 8-4-20		SAMPLE	TIME: 11	۲ ۲ (۲	DATE: 8-4-20
PURGE		PUMP	PERISTALTIC	PUMP	PH:	7,44 5	SU CONDU	CTIVITY: 61	umhos/cm
METHO	D:	BAILER	BAILER (DISPO	SABLE)	ORP:	-113.6 1	nV DO:	0.75 m	ig/L
DEPTH T	O WATER:	27.15	T/ PVC		TURB	IDITY: 1,33	NTU		
DEPTH T	О ВОТТОМ	47.76	T/ PVC		NC NC		ібнт 🗆	MODERATE	
WELL VO	LUME:	NA		GALLONS	TEMP	ERATURE:	6.2 °C	OTHER:	
VOLUME	REMOVED	8		GALLONS	COLC	R: Clew		ODOR:	nome
COLOR:		clear	OD	OR: none	FILTR	ATE (0.45 um)	YES	DE NO	
		TUF	RBIDITY		FILTRA	TE COLOR:	NA	FILTRATE OD	OR: NA
M NONE	🗆 SL	IGHT	MODERATE		QC S	AMPLE: 🔲 MS	S/MSD		
DISPOSA	LMETHOD	GROU			COMM	MENTS:			
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATI	JRE WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1035	200	7.39	663	38.1	1.45	20.7	16.9	27.34	
1040	200	7.43	641	-58.6	1.10	6.80	16.2	27.34	
1045	200	7.45	634	-96.1	0.29	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	27.14	and the second
100	200	7.44	636	-110.1	0.78	20.2	16.1	27,74	
1105	200	7.44	676	- 110.9	0.17	3.87	16.2	27,34	1 6
1110	200	7,44	631	-111.8	0,76	1,62	16.3		
1115	200	7.44	637	- 113.6	0.75	633	16.2	27.34	

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	S FILLED	PRESERV	ATIVE CODES A	- NC	ONE		В-	HNO3	C - H2SO4	D - NaOl	H E - HCL	F-			_
NUMBER	SIZE	TYPE	PRESERVATIVE		FILT	ERE	D	NUMBER	SIZE	TYPE	PRESERVATIVE	F	ILT	ERE	D
1	2 Some	Photic	А		Y	Ø	N						Y		N
1	125-1	Plustic	А		Y	8	N						Y		N
1	125ML	Plustic	β		Y	54	N				and the second se		Y		N
					Y		N						Y		N
					Y		N			14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			Y		N
SHIPPING	METHOD:	Fede	ZX DATE	SH	IPP	ED:		8-5-20	120	AIRBILL	NUMBER:				-
	BER:		SIGN	ATU	RE		1	Jul	K	DATE SI	GNED: 8-	18	1-0	20)

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WATER SAMPLE LOG

TROOL	CT NAME:	CEC	Karn BAP/LI: 2	020 GW C	PF	REPARED		CHEC	CKED
PROJEC	CT NUMBE	R: 3673	88.0001.0000 F	Phase 3 Ta BY	JKKR	DATE:	4-20 BY: K	R	DATE:11/05/2
SAMPLE	ID: DE	K-MW	-15006	WELL DIA	METER: 🕢	2" 🗌 4" 🗌	6" 🗌 OTHER		
WELL MA	TERIAL:	PVC	ss 🗆		LVANIZED	STEEL	OTHER		
SAMPLE	TYPE:	GW		SW 🗆 DI		LEACHATE	OTHER	10 - 	
PUF	RGING	TIME: 1	142 04	ATE: 8-4-20) 5	SAMPLE	TIME: 1219	D	ATE: 8-4-20
PURGE METHO		PUMP	PERISTALTIC		and the second second			/ITY: 8	31 umhos/cm g/L
DEPTH T		6.23			TURB	IDITY: 1:18	NTU		
DEPTH T	OBOTTON	1 21.50	T/ PVC		NO NO		іднт 🗆 мо	DERATE	
WELL VO	LUME:	NA		GALLONS	TEMPE	ERATURE:	14.3 °C OT	HER: _	
VOLUME	REMOVED			GALLONS	COLO	R: <u>Chen</u>	(OD	OR:	none
COLOR:		chear	OD	OR:	FILTRA	ATE (0.45 um)	🛛 YES 🗌	NO	
			RBIDITY MODERATE				the second s	TRATE OD	OR: <u>none</u>
DISPOSA		GROU					<u> </u>		
		1			COMM	IENTS:		WATER	CUMULATIVE
DISPOSA		РН	ND DRUM		D.O.	IENTS: TURBIDITY	TEMPERATURE	WATER	CUMULATIVE PURGE VOLUME (GAL OR L)
	PURGE RATE	РН	CONDUCTIVITY	ORP	COMM	IENTS: TURBIDITY (NTU)	TEMPERATURE (°C)	WATER	
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	IENTS: TURBIDITY	TEMPERATURE (°C) 14.6	WATER LEVEL (FEET) 6,38	PURGE VOLUME (GAL OR L)
тіме]/44 1/49	PURGE RATE (ML/MIN)	рн (su) 7.76	CONDUCTIVITY (umhos/cm) 多りえ	ORP (mV) 33.5	COMN D.O. (mg/L)	1ENTS: TURBIDITY (NTU) 7.39 6.76	TEMPERATURE (°C) 14.6 14.6	WATER LEVEL (FEET) G.38 G.38	PURGE VOLUME (GAL OR L) INITIAL
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TIME }/144 1/49 1/54 1/59	METHOD PURGE RATE (ML/MIN) 400 400 400	рн (su) 7.76 7.82 1.82	CONDUCTIVITY (umhos/cm) 892 881 873 871 871 873	ORP (mV) 38,5 11.7 ~36.4 ~83.8 ~103.1	COMM D.O. (mg/L) 1,21 0,91 0,91 0,82 0.78 0,74	IENTS: TURBIDITY (NTU) 7.39 6.76 4.46 2.52	TEMPERATURE (°C) 14.6 14.6	WATER LEVEL (FEET) 6.38 6.38 6.38 6.38	PURGE VOLUME (GAL OR L) INITIAL 2 4 6
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BOTTLE	S FILLED	PRESERV	ATIVE CODES A	- NO	ONE	1	B	HNO3	C - H2SO4	D - NaOH	E - HCL	F-	£1	T/	1
NUMBER	SIZE	TYPE	PRESERVATIVE		FIL	TERE	ED	NUMBER	SIZE	TYPE	PRESERVATIVE	F	ILTE	RE	D
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1	STOML	4	A		Y	X	N	1	ASML	Phashe	Ν		Y	X	N
1	125mL		A		Y	×	N	2	60mL	VOR	A		Y	X	N
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1	V	V	ß	Q	Y		N	1	YOML	¢	L	5	Y		N
SHIPPING	METHOD:	Fed	ex DATI	E SH	IPP	ED:		8-5-	2020	AIRBILL N	IUMBER: <			-	-
	BER:	-	SIGN	IATU	RE	:	7	Ine	The	DATE SIG	INED: 8-	12.	21)	

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PAGE 18 OF 22



WATER SAMPLE LOG

PROJEC	T NAME:	CEC	Karn BAP/LI: 20	20 GW C	PRE	PARED		CHEC	KED
PROJEC	T NUMBE	R: 36738	38.0001.0000 Ph	ase 3 Ta BY:	JK/KR	DATE:8/	5/207 BY: 5	51C	DATE: 8-18-20
SAMPLE	ID: /	LI -SC	-5	WELL DIAN	IETER: 🗹	2" 🗌 4" 🗌	6" 🗌 OTHEF	२	
VELL MA		PVC			VANIZED S	TEEL		2	
AMPLE T	YPE:	☑ GW		SW 🗆 DI	<u> </u>	EACHATE		२	
PUR	GING	TIME: 2	: SOpm DAT	TE: 8/5/20	20 SA	MPLE	TIME: 2:50	om DA	TE: 8/5/20
PURGE METHO	n .	PUMP BAILER	PERISTALTIC P BAILER (DISPOS		and the second second second second			VITY: 101	2 umhos/cm
DEPTH TO	WATER:		T/ PVC			ITY: 2.50	an an owner with the second		en (marcado a contra consta) - a de a se
DEPTH TO	BOTTOM	1	T/ PVC			E NO SL		ODERATE	U VERY
VELL VOL	UME:	NA	D DITERS [GALLONS	TEMPER	ATURE: 0	1.1 °C 0.	THER:	
OLUME	REMOVED):	U LITERS	GALLONS	COLOR				none
COLOR:			ODC)R:		E (0.45 um)		NO	
/	111	TUR	BIDITY			E COLOR:		LTRATE ODO	R:
			MODERATE	VERY				DUP-	
DISPOSAL	METHOD	GROU		OTHER	СОММЕ	NTS:			
TIME	PURGE RATE	РН	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE PURGE VOLUME
	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	(FEET)	(GAL OR L)
:: 50 pr	•	<i>t</i> .32	. 1012	47.7	Q.18	2.50	21.1		INITIAL
NO pH: +/- BOTTLES	0.1	COND.: +/-	TEST IS COMPLE 3 % ORP: + ATIVE CODES A	/- 10 mV D.C		READINGS A TURB: +/- C - H2SO4		= 10 1	EMP.: +/- 0.5°C
UMBER	SIZE	TYPE	PRESERVATIVE					E - HCL RESERVATIN	
	250ml	plantic	A	YXI	_				
1	125mL	Induc	0.						
1			B						
2	12526	U I	A						
2	60mh	VOVA	A						
	METHOD	5.1				0.0			
	METHOD:	Fede		E SHIPPED: -	8-5-20		AIRBILL NUM		
DC NUME	BER:		SIGN	NATURE:	_KK	2	DATE SIGNE	ED: 8/0)5/2020

PROJE	CT NAME	CEC	C Karn BAP/LI:	2020 GW C	F	REPARED		CHE	CKED
PROJE	CT NUME	BER: 367	388.0001.0000	Phase 3 Ta B	: JK/	R) DATE	5 20 BY: 3		DATE: 8-18-3
SAMPL	EID: 6	B-07)	WELL DIA	METER: [2" [4" [0100
	ATERIAL:	PVC						The second second	
SAMPLE	TYPE:	🖸 GW		SW 🗆 DI] LEACHATE			and a state of the
PU	RGING	TIME:	D	ATE:	1	SAMPLE	TIME: 2:41	0.00	DATE: 815/2
PURC		PUMP	PERISTALTIC	PUMP	PH:		SU CONDUCTIV		01210
METH	1	BAILER	BAILER (DISPO	SABLE)	ORP		mV DO:		umhos/ci
	TO WATER		_ T/ Pye		TUR	BIDITY:	NTU		312
	ТО ВОТТО	м	TI PVC			ONE St	нент 🗆 мо	DERATE	U VERY
VELL VO		NA		GALLONS	TEMF	PERATURE:	°C OT	HER:	
	REMOVE	D:	U LITERS	GALLONS	COLO	DR:		OR:	
COLOR:	/-			OR:	_ FILTR	ATE (0.45 um)	TYES D	NO	
			RBIDITY	and the second		ATE COLOR	FIL	TRATE OD	QR:
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JISPUS/	-	GROU		OTHER	COM	MENTS:			
TIME	PURGE RATE	РН	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE
_	(ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	LEVEL (FEET)	PURGE VOLUME (GAL OR L)
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				510	<u> </u>		an a		
			e e construction de la construcción						
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NC pH: +/-	TE: STABI	LIZATION T	EST IS COMPLE		CCESSIV				and the second second
-						TURB: +/- *	10 % or = *</td <td>т 0</td> <td>EMP.: +/- 0.5°C</td>	т 0	EMP.: +/- 0.5°C
OTTLES	FILLED I	PRESERVA	TIVE CODES A	NONE	- HNO3	C - H2SO4			

	METHOD:	Fed		_	-		N	8-5-0	020				Y		N
					Y		N						Y		N
······	V	C			Y	DX.							Y		N
		B			Y	Ø	N						Y		1
	125mL	NT O			Y	Ø	N						Y		1
NUMBER	SIZE	TYPE	PRESERVATIVE	F	FILT	ERE	D	NUMBER	SIZE	TYPE	PRESERVATIVE	F	FILT	ER	EC
BOTTLES			ATIVE CODES A-	_	NE		B	- HNO3	C - H2SO4	D - NaO	H E - HCL	F -			_

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Line Date surpre. Interstructed Altracted Alt	Karn Bottom Ash	- buod -	2020 Q3			70-088/						BING		s	SI	SEND REPORT TO: CDBatts
Rel SAMPLE SAMPLE DESCRIPTION/LOCATION DEFTH $# 0F$ 7	SAMPLING TEAM:				DATE SHIPPED: 8-4-20	SITI	E SKETCHEL CIRCLE) ATTACHED? ONE: NO	l Metals	suc					P I	HD Register, TRC HONE:
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	CO)	35 WEST		nt – 2020 Q3	INGTEAM: Katy Remir + Jake Krenz	SAMPLE TIME	V	(1	2: 50 pm		-06 8/5/2020 2: 4/2 pm	1			(URE)	7	URE)		
	ters Ene	1		Ipoundme	ite k	SAMPLE DATE				-0481512020		5/5/2020				3Y: (SIGNA)	and a	3Y: (SIGNA)	EX	
	Consum		SAMPLING SITE:	Karn Lined Impoundment - 2020 Q3	FAMPLING TEAM: KOLY REMINGOR F Jake Krenz	CE CONTROL #	20-0889-01	-02	03	-048	-05	-06	¥ -01			RELINQUISHED BY: (SIGNATURE)	fre	RELINQUISHED BY: (SIGNATURE)	Fedex	

PAGE 1 OF 26

	C
	6

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:		TO 10/12/20
in the	2	SA20 sampling event
PURPOSE OF FIELDWORK:		
		San and the second
	Kat	y Reminga/Javier Jasso
WORK PERFORMED BY:		
0	a lx	1000
NED 10110	DATE	CHECKED BY

>TRC

GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE: 10 5 /00	TIME ARRIVED: Oloc
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR: JJ ASI.	TIME LEFT: 1630

		WEATHER		
TEMPERATURE: 38 °F	WIND: 10	MPH	VISIBILITY: (a.d.	
	WORK / S	AMPLING PERFO	DRMED	
water lu				

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN	
1222		
VIOV		

	COMN	UNICATION
NAME	REPRESENTING	SUBJECT / COMMENTS

QUANTITY	COMMENTS
111	
	Λ
1.1.	$ \cap \cap $
0/10/00	Jul 1/m 10-2
	QUANTITY V 0/10/20

1

l Juny 10-27-20 V DATE CHECKED BY

REVISED 04/2019

PAGE 3 OF 26

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GENERAL NOTES

PROJECT NAME:	CEC Kam BAP/LI: 2020 GW C	DATE: 10/ 6/20	TIME ARRIVED: 6000
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR: ASS-	TIME LEFT: 1630

			WEATHER	
TEMPERATURE:	50 °F	WIND: 15	MPH	VISIBILITY: Clard
		WORK / S	AMPLING PERFO	RMED NEK D
wells SI	Amplod:	KFW-NW	- 16001, ms	Imsid infate MU 15003
HER. MW.	15003, m	w +1, Dup.	Hol, mwa	HINSD HAFE MU 15003 03, MW-06 MW-08
mar lle	mstms	D		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN	
non		

COMMUNICATION			
NAME	REPRESENTING	SUBJECT / COMMENTS	

INVESTIGATION DERIVED WASTE SUMMARY			
WASTE MATRIX	QUANTITY	COMMENTS	-

DATE

-5

SIGNED

10-27-20 DATE Jh СНЕСКЕР ВУ l

REVISED 04/2019

10/10/20 DA

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GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE: 10/7	120	TIME ARRIVED: OLOC
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR:	JASTO	TIME LEFT: 1 4 4

		WEATHER	1 0
TEMPERATURE: 59 °F	WIND: 15	MPH	VISIBILITY: Clarge Kan
		MPLING PER	
MW-10, MW	12,14,1	B-HO2,	EBtod DEKMW-15001
\$ E'KMW 15006	DEK-MU	- 15004,	EBtol DEKMW-15001 EBtol

Shipping SAmples

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
· N ()	
AUV	
1100	

	COMMUNICATION				
NAME	REPRESENTING	SUBJECT / COMMENTS			
		\ \			

T			
WASTE MATRIX	QUANTITY	COMMENTS	

) (6/6/2C DATE SIGNED

My 10-27-20 DATE CHECKED BY



GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE: 10 8	20	TIME ARRIVED 6610
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR:	ASSU	TIME LEFT: 14 26

WEATHER
TEMPERATURE: 45°F WIND: 10 MPH VISIBILITY Cleudy
WORK / SAMPLING PERFORMED
MW- 22, OW- 10, Dyp # 01, OW-12, EBOI, FBOI MLI-SCS
MLI-SCS
Shipping Samples
Shipping

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN	

COMMUNICATION				
NAME	REPRESENTING	SUBJECT / COMMENTS		
	-			

WASTE MATRIX	QUANTITY	COMMENTS
WASTEWATRIA		OOMINE ITO
\wedge		1
	n/10bc	hal the 10-
	11010-	A pay 100

DATE

20 CHECKED BY DATE 0

PAGE 6 OF 26

*) T	RC
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GENERAL NOTES

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW C	DATE:	0	121	Sc	TIME ARRIVED: OTC
PROJECT NUMBER:	367388.0001.0000 Pha	AUTHOR	2:	61	ASSE	TIME LEFT: 1520

					WEATHER	
TEMPERATURE:	40	°F	WIND:	15	MPH	VISIBILITY: Clevely
			WC	RK / SA	MPLING PERF	ORMED
LH-101	, mi	up v-1	ms d B, ms	tws.	D, LUK ISD, MU	54 F,B*01, 2-B#01 5-19 Dup#03, TB#03

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
11010	

	COMMUNICATION								
NAME	REPRESENTING	SUBJECT / COMMENTS							

	INVESTIGATION DERIVED WASTE SUMMARY								
WASTE MATRIX	QUANTITY	COMMENTS							
		<u></u>							
		100 million (1990)							

DATE

10/10/2 SIGNED

My 20 CHECKED BY DATE

PROJECT NAME:	CEC Karn BAP/LI: 2020 GW		
PROJECT NO	367388.0001.0000 Phase 3	SAMPLER NAME:	Katy Reminga/Javier Jasso
WATER I EVEL MEAS	UREMENTS COLLECTED WITH:		
	RON DIPPER-T		TRC A2
NAME AND MODEL OF I		SERIAL NUMBER	
PRODUCT LEVEL ME	ASUREMENTS COLLECTED WIT	н:	
	NA		NA
NAME AND MODEL OF I	NSTRUMENT	SERIAL NUMBER	(IF APPLICABLE)
DEPTH TO BOTTOM	OF WELL MEASUREMENTS COL	LECTED WITH:	
HEF	RON DIPPER-T		TRC A2
NAME AND MODEL OF I	NSTRUMENT	SERIAL NUMBER	(IF APPLICABLE)
PURGING METHOD			
PERISTALTIC P	UMP/SUBMERSIBLE PUMP		TRC A2
NAME AND MODEL OF F	PUMP OR TYPE OF BAILER	SERIAL NUMBER	(IF APPLICABLE)
SAMPLING METHOD			
PERISTALTIC P	PUMP/SUMERSIBLE PUMP		TRC A2
NAME AND MODEL OF F	PUMP OR TYPE OF BAILER	SERIAL NUMBER	(IF APPLICABLE)
GEOTECH	DISPOSABLE FILTER		0.45 MICRON
NAME AND MODEL OF F	FILTERATION DEVICE	FILTER TYPE AND	D SIZE
DEDICA	TED POLY TUBING	J LOW-	FLOW SAMPLING EVENT
TUBING TYPE			
PURGE WATER DISPO	OSAL METHOD		
GROUND		D POLYTANK	
DECONTAMINATION	AND FIELD BLANK WATER SOU	RCE	
-	ORE BOUGHT		ABORATORY PROVIDED
OTABLE WATER SOUR	RCE	DI WATER SOURC	DE

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WATER QUALITY METER CALIBRATION LOG

388.0001.0000 Phase 3 IBRATION CHECK рН 4 / 10 т #): 9 (G.) 70) Р. DATE): 10/2 (CAL		MODEL: D.S.S. P. 10 SERIAL # TRC A2	DATE: 10/0	120	
рН 4/10 Г. #):963702 Р. DATE): 10/21	and the second se		SPECIFIC COND	1		
рН 4/10 Г. #):963702 Р. DATE): 10/21	and the second se		SPELIEIL LUNI	UCTIVITY CALIBI		HECK
ST-CAL READING / STANDARD	RANGE	TIME	CAL. READING (LOT #)G(04 331 (EXP. DATE): 4/)/ POST-CAL READING / STANDARD	("CELSIUS)	CAL. RANGE	TIME
ter 14a	RANGE	0530	14/3 1/4/3	NA	RANGE	USA
1	RANGE		1		RANGE	
1			1		WITHIN RANGE	
/			1			
LIBRATION CHECK			D.O. CAI	IBRATION CHEC		
TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	CAL READING	(*CELSIUS)	CAL. RANGE	TIME
220		052	607 18.03	25.4	- WITHIN PANGE	05
	U WITHIN		1	0,00	WITHIN	-
	U WITHIN				WITHIN	
	WITHIN				RANGE	
	RANGE			COMMENTS	RANGE	
				-	SOLUTION (51
LOT #): 149319 (LOT #): EXP. DATE): ///) ((EXP. DATE):		TIME	(LOT #):			,
P. DATE):	RANGE	TIME	(EXP. DATE):			
OST-CAL READING / STANDARD	-		CALIBRATED PARAMETERS	CALIBRATIC	N RANGES (1	
/	RANGE	UNK	D pH	pH: +/- 0.2 S.U	J.	
1			COND	COND: +/- 1% OF	CAL STAN	DARD
1			C ORP	ORP: +/- 25 mV		
/			D.O.	D.O.: VARIES		
NOTES			J TURB	TURB: +/- 5% OF	CAL STAN	DARD
LEMS ENCOUNTERED			CORRECT	IVE ACTIONS		
	/ / / LIBRATION CHECK TEMPERATURE ("CELSIUS) 23.() CALIBRATION CHEC DING (NTU) T#): DING (NTU) T#): DING (NTU) T#): DING (NTU) T#): NOTES	/ WITHIN / WITHIN / WITHIN / WITHIN RANGE / / WITHIN RANGE CAL. 23.0 WITHIN WITHIN RANGE 23.0 WITHIN WITHIN RANGE DING (NTU) CAL. T#): CAL. P. DATE): CAL. NOTES WITHIN	/ □ WITHIN / □ WITHIN RANGE / □ / □ WITHIN RANGE / □ / □ WITHIN RANGE IIME / □ WITHIN RANGE CAL. TIME 0 WITHIN BANGE □ WITHIN RANGE □ WITHIN CAL. RANGE CAL. RANGE □ WITHIN CAL. RANGE U WITHIN / □ WITHIN / □ WITHIN / □ WITHIN / □ WITHIN / □	/ RANGE (°CELSIUS) CAL. RANGE TIME D3.0 RANGE RANGE IME 0 WITHIN RANGE IME 0 WITHIN RANGE IME 0 RANGE 0 WITHIN RANGE I 0 WITHIN RANGE I 0 WITHIN RANGE I 0 WITHIN RANGE I 0 RANGE 1 RANGE	/ □ WITHEN RANGE / □ WITHEN RANGE / □ WITHEN RANGE / □ WITHEN RANGE (°CELSIUS) CAL RANGE TIME / □ WITHEN RANGE D.O. CALIBRATION CHECK 0 WITHEN RANGE TIME 0.0 / □ WITHEN RANGE 0.0 0 WITHEN RANGE TIME 0.0 0 WITHEN RANGE 0.0 0.0 0 WITHEN RANGE 1 0.0 0 WITHEN RANGE 1 0.0 0 WITHEN RANGE CALIBRATION CHECK 0.0 0.0 0.0 0.0 0.0 0.0 0 WITHEN RANGE TIME 0.0 0.0 0.0 1 WITHEN RANGE TIME 0.0 0.0 0.0 0.0 1 WITHEN RANGE TIME 0.0 0.0 0.0 0.0 0.0 1 WITHEN RANGE TIME TIME 0.0 0.0 0.0 0.0 0.	/ RANGE / RAN

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WATER QUALITY METER CALIBRATION LOG

	367388.0001.0000 Phase 3	Task 1		SERIAL #: TRC A2	DATE 107	1.	
PH C				SERIAL #; TRC A2	DATE OIL	130	
	ALIBRATION CHECK			SPECIFIC CONDU	CTIVITY CALIBR	RATION C	HECK
000 20	PH 4/10 LOT #: 96 370 7 EXP. DATE: 10/21 POST-CAL READING / STANDARD	CAL. RANGE	TIME	CAL READING ILOT ALG 33 (EXP. DATE): 11/20/ POST-CAL READING / STANDARD	TEMPERATURE	CAL. RANGE	TIME
7001700	4001400		0531	1413 1 1413	NA		USE
1	1			1			
/	1			1			
1	1			1			
ORP	CALIBRATION CHECK			D.O. CAL	BRATION CHEC		
CAL. READING LOT #: KD 100679 EXP. DATE: 04/24 POST-CAL READING / STANDARD	TEMPERATURE ("CELSIUS)	CAL. RANGE	TIME	CAL READING	TEMPERATURE	CAL RANGE	TIME
220 1220	23.0	WITHIN RANGE	053	019 1819	240		053
1			001	8.19 8.19		U WITHIN	
1		U WITHIN		,	1	RANGE	
1						RANGE	
TURRIDI		RANGE		1			
CALIBRATION R	TY CALIBRATION CHEC			AUTOCAL SOLUTION	COMMENTS		
LOT #: A9317	(LOT #): (EXP. DATE):	CAL. RANGE	TIME	(LOT #): (EXP. DATE):	STANDARD	ND EXPIRATI	ON DATE
POST-CAL READING / STANDARD	POST-CAL READING / STANDARD			CALIBRATED PARAMETERS		ON RANGES (
010	1		053	рн	pH: +/- 0.2 S.U		
200/200	1	WITHIN				CAL. STAN	
1	1	RANGE	0				DARD
1	1	RANGE			ORP: +/- 25 mV		
1	1	RANGE		D.O.	D.O.: VARIES		
	NOTES			TURB	TURB: +/- 5% OF	CAL. STAN	DARD
					(1) CALIBRATION RAN	GES ARE SR	
					THE MODEL OF THE V	WATER QUAL	TY METE
PB	OBLEMS ENCOUNTERED						
	and a state of the state			CORRECTI	VE ACTIONS		
SIGNED 10	111/20	DATE		CHECKED BY	Ky	10-:	27-3 DATE

PAGE 10 OF 26



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WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC Kam BAP/LI: 2020 GV	N Complian	ice	MODEL PRODSS	SAMPLER:	KR, JJ	_
PROJECT NO .:	367388.0001.0000 Phase 3	3 Task 1		SERIAL #: TRC A2	DATE: 10	8/20	
PH	CALIBRATION CHECK			SPECIFIC COND	UCTIVITY CALIB	RATION C	HECK
(LOT \$66304 (EXP. DATE): 763 POST-CAL READING / STANDARD	pH 4 / 10 (LOT #): 96) 70) (EXP. DATE): 6/2) POST-CAL READING (STANDARD	CAL. RANGE	TIME	CAL. READING	("CELSIUS)	CAL RANGE	TIME
700 1700	400 1400	RANGE	052	1413 /1413	AU	WITHIN	OS
1	1			1			
1	1			1			
1	1			1			
	CALIBRATION CHECK			D.O. CA	LIBRATION CHE	СК	
CAL READING (LOT #): (GIOO U 99 (EXP. DATE): 4/24 POST-CAL READING / STANDARD	(*CELSIUS)	CAL. RANGE	TIME	CAL. READING	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
270 1230	22.0	WITHIN RANGE		8.351835	23.0		057
1	001		0.00	1	00.0		
1				1			
1		WITHIN RANGE		/		WITHIN RANGE	
TURBID	ITY CALIBRATION CHE				COMMENTS	RANGE	
CALIBRATION	READING (NTU)		1000	AUTOCAL SOLUTION	STANDARD	SOLUTION (S)
(LOT #): A93 (7 (EXP. DATE): (1/)- ((LOT #): (EXP. DATE):	CAL. RANGE	TIME	(LOT #): (EXP. DATE):	LIST LOT NUMBERS A UNDER CALIE	AND EXPIRATION CHEC	
POST-CAL READING / STANDARD	POST-CAL, READING / STANDARD		_	CALIBRATED PARAMETERS	CALIBRATI	ON RANGES (1)).
010	1		052	рн	pH: +/- 0.2 S.	U.	
200120	1		052	COND	COND: +/- 1% O	F CAL STAN	DARD
1	1			C ORP	ORP: +/- 25 mV	1	
1	1			D.O.	D.O.: VARIES		
	NOTES			TURB	TURB: +/- 5% Of	CAL STAN	DARD
					(1) CALIBRATION RAN THE MODEL OF THE V	IGES ARE SPE	CIFIC TO
Р	ROBLEMS ENCOUNTERED			CORRECT	TVE ACTIONS		
	a/14/20	DATE		снескерву	2 Ju	y 11	0-2 1 DATE

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WATER QUALITY METER CALIBRATION LOG

PROJECT NO.:	CEC Kam BAP/LI: 2020 GV 367388.0001.0000 Phase 3			ERIAL #: TRC A2	DATE: 1012	IX			
PROJECT NO.	367388,0001,0000 Phase 3	TASK I			1 101-				
PH	CALIBRATION CHECK			SPECIFIC CONDU	-	-	HECK		
PH 7 (LOT #): OGG 30G (EXP. DATE): 7/2 2 POST-CAL READING (STANDARD	PH 4/10 (LOT #): 96) 70 3 (EXP. DATE): 10/21 POST-CAL READING / STANDARD	CAL. RANGE	TIME	CAL. READING (LOT #): 96K331 (EXP. DATE): 11/100 POST-CAL READING / STANDARD	("CELSIUS)	CAL. RANGE	TIME		
700 1700	How I da		0757	14/3 /14/3	Nt	RANGE	07)		
100 100	1		010		/0 /		010		
1	/			/					
1	1			1					
ORF	CALIBRATION CHECK	104102	1	D.O. CAL	IBRATION CHE	-			
CAL READING (LOT #): 19100079 (EXP. DATE): 4/24 POST-CAL READING / STANDARD	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME	CAL. READING	TEMPERATURE	CAL. RANGE	TIME		
223 1223	16.0		ANX	8.3514.31	16.0	WITHIN	0201		
1	10-0	U WITHIN	00	0.1.	10	WITHIN RANGE	0.0.		
1				1					
1		RANGE		,		RANGE			
/		RANGE		/	COMMENTS	RANGE			
	DITY CALIBRATION CHEC	JK I	0	AUTOCAL SOLUTION	STANDARD SOLUTION (S)				
CALIBRATION READING (NTU) LOT #): (LOT #): EXP. DATE): ///// (EXP. DATE):		CAL. RANGE	TIME	(LOT #): (EXP. DATE):	LIST LOT NUMBERS A UNDER CALIE	ND EXPIRAT	ON DATE		
POST-CAL READING / STANDARD			1	CALIBRATED PARAMETERS	CALIBRATIC	ON RANGES)		
0 10	1	WITHIN BANGE	(1))	🗆 рН	pH: +/- 0.2 S.I	U.			
200 / 200	1		0714	COND	COND: +/- 1% OF	CAL. STAN	DARD		
1	1			ORP	ORP: +/- 25 mV				
1	1			D.O.	D.O.: VARIES				
	NOTES	- I I I I I I I I I I I I I I I I I I I	1	TURB	TURB: +/- 5% OF	CAL STAN	DARD		
					⁽¹⁾ CALIBRATION RAN THE MODEL OF THE V				
	PROBLEMS ENCOUNTERED			CORRECTIN	E ACTIONS				
SIGNED	10/10/2	DATE		снескору	My	10	-27- DATE		

1	1121			~	i iken	14	-	ANTE L	E LOG				
PROJECT	NAME:	DE K	ARN/JCWEADOO	KL	AND			PRE	PARED		-	CHECK	KED
PROJECT	NUMBER	R: 36738	88.0000.0000 PH	ASE	3 Т.	BY		IJ	DATE 6	LO DBY	3	sk	DATE: 10/27
SAMPLE	D:KL	T	SES	W	ELL	DIAI	MET		2" 4"	6" OT	HER		
WELL MAT	ERIAL:	PVC		RON		GA	LVA	NIZED ST	EEL		HER		
SAMPLE T	YPE:	GW	ww s	W		DI			EACHATE		HER		
PURC	GING	TIME:	DAT	E:				SA	MPLE	TIME	-	DA	TER 8/2
PURGE METHOD		PUMP BAILER	PERISTALTIC PU	MP				PH:	22	SU CONDU		TY: 128	3 umhos/c
DEPTH TO	WATER:		T/ PVC		_			TURBID	151		2.0		
DEPTH TO	BOTTOM	1	TI PVC	-		-			E SL		MOD	ERATE	VERY
WELL VOL	UME:	AI/A		GA	LLC	NS		TEMPER		6 °C	OTH	ER:	
VOLUME E	REMOVED		LITERS] GA	LLC	NS		COLOR:		de	ODO	R: Y	2016
COLOR:			ODO	R:			_	FILTRAT	E (0.45 um)	YES	B	NO	
1		TUP	RBIDITY					FILTRATI	E COLOR:		FILT	RATE ODOF	2:
NONE	SL		MODERATE		VE	RY		QC SAN		S/MSD		DUP-	
DISPOSAL	METHOD	GROU] OT	HEF	२		COMME	NTS				
TIME	PURGE RATE	PH	CONDUCTIVITY		RP	1		D.O.	TURBIDITY	TEMPERATU	JRE	A REAL PROPERTY OF	CUMULATIVE PURGE VOLUM
	(ML/MIN)	(SU)	(umhos/cm)	(Г	nV)	L. G. H.	(mg/L)	(NTU)	(°°)	15.2	(FEET)	(GAL OR L)
							-				-		INTTAL
							-						
							-						
					_		-			2	_		
						_	-						
				_			_						
							_						
							-						
													-
				-									
PH: +/-		COND.: +/-	TEST IS COMPLE						TURB: +/-		'HE F(LIMITS: EMP.: +/- 0.5°
BOTTLES	FILLED	PRESERV	ATIVE CODES A	- NO	NE		В-	HNO3	C - H2SO4	D - NaOł	н	E - HCL	F.
NUMBER	SIZE	TYPE	PRESERVATIVE	F	ILT	ERE	D	NUMBER	R SIZE	TYPE	PRE	SERVATIV	
	40 mL	VOA	E	1	Y		N	1	JEEML	PLASTIC		A	
	40 mL	VOA	E		Y	1	N				1		
				10		-							

C 6 8 8

YVN Y N Y N 125 mL VOA А 2 YVN PLASTIC A 125 mL 1 YVN в YON 125 mL PLASTIC Feder DATE SHIPPED: 10-8-20 SHIPPING METHOD: AIRBILL NUMBER: N/A 10/10/20 SIGNATURE: DATE SIGNED COC NUMBER: N/A

PROJEC	T NAME:	DE K	ARN/JCWEADO	CK LANE	PR	EPARED		CHEC	CKED
PROJEC	T NUMBER	: 36738	88.0000.0000 PH	ASE 3 T/ BY:	JJ	DATE: 10	8/20 BY:	5K	DATE 10/277
SAMPLE	ID: F.T	3.0		WELL DIAN		2 4"	6" 🗖 OTHE	R No	4
WELL MA		PVC			VANIZED S	STEEL		R	
SAMPLE 1	TYPE:	1.ew	ww s	SW DI		LEACHATE	OTHE	R	and stored concernent
PUR	GING	TIME:	DAT	E:	S	AMPLE	TIME: 181		ATE: 6/8/2
PURGE	D Z	PUMP	PERISTALTIC PU	AMP		IA			
DEPTH T	O WATER	DALEIN	T/ PVQ	17	TURBI	the second descent and the local data	1 NTU		,
DEPTH T	O BOTTOM.		T/ PVC	1	J NO			ODERATE	VERY
WELL VOI	UME:	N/A	LITERS	GALLONS	TEMPE		1A °C C	THER:	
VOLUME	REMOVED:		LITERS	GALLONS	COLO	R: (let	C		102
COLOR:			ODO	R:	FILTRA	TE (0.45 um)	YES [A-NO-	
		TUR	RBIDITY		FILTRA	TE COLOR:	F	ILTRATE OD	DR
NONE] MODERATE	VERY	QC SA	MPLE: MS	MSD [DUP-	
DISPOSA	L METHOD:	GROL	JND DRUM	OTHER	COMN	IENTS:			
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATUR	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
		(00)	(and a string of		(((-/		INITIAL
								-	
				-					1
				_					
		-							

BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F-PRESERVATIVE FILTERED NUMBER SIZE PRESERVATIVE FILTERED NUMBER SIZE TYPE TYPE YON VOA Е 125 mL PLASTIC С YVN 40 mL YVN 40 mL VOA Е Y N YVN YON 125 mL VOA А YVN 125 mL PLASTIC A Y N 125 mL PLASTIC в YVN YON 10/8/20 SHIPPING METHOD Feber DATE SHIPPED: AIRBILL NUMBER: N/A SIGNATURE: DATE SIGNED: COC NUMBER: 10-27-20 N/A

PROJECT	NAME.	DE KA	RN/JCWEAI	000	K LAN	d	-	PREF	ARED			CHEC	KED
PROJECT	NUMBER	R: 36738	8.0000.0000	PHA	SE 3 1	BY	443	IJ		Lelz BY	0	ik	DATE 10-27-
SAMPLE	D:E	B= O	(Ne.	WELL	DIAN	IET	ER: 🗸 2"			HER		
WELL MAT	ERIAL	PVC	ss [ON [GAL	VA	NIZED STE	EL	от	HER		
SAMPLE T	YPE	GW		SV	V	DI		LE	ACHATE	ОТ	HER		
PURC	GING	TIME	0	DATE				SAM	APLE	TIME: 12	IC) D.	ATE:10/8/2-
PURGE METHOD		PUMP BAILER	PERISTALTIC	PUN	1P				N	SU CONDU)11_ umhos/c J/L
DEPTH TO	WATER:	4	T/ AVC	\wedge				TURBIDIT	Y: N	1 NTU			
DEPTH TO	BOTTOM		T/ PVC					ANONE	SL		MO	DERATE	VERY
WELL VOL	UME:	NA	LITERS	1	GALL	ONS		TEMPERA		A °C	OTH	IER:	
VOLUME F	REMOVED		LITERS	D	GALL	ONS		COLOR:	- Clu	24	ODO	DR:	horo
COLOR:	· ·		C	DOR				FILTRATE	(0.45 um)	YES		NO	
		TUR	BIDITY					FILTRATE	COLOR:		FILT	RATE OD	DR:
NONE	SL	IGHT	MODERATE			ERY		QC SAMP	LE: MS	S/MSD		DUP-	
DISPOSAL	METHOD	GROUI		A 🗌	OTHE	R		COMMEN	TS				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVIT	Y	ORP (mV)	1		D.O. 1 mg/L)	URBIDITY (NTU)	TEMPERATI	URE	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUM (GAL OR L)
								3.7					INITIAL
-								-				12.1	31+
					1								- 1-
													-1-/
					1-	1						191	1
			-	17	-		1	1			-		1
				-	-	7	-				-		
						-	-						
		-		1							-		
NС pH: +/-		COND.: +/-	TEST IS COMI 10 % ORI		E WHE				EADINGS A TURB: +/-		HE F		5 LIMITS: TEMP.: +/- 0.5°
BOTTLES			ATIVE CODES		-		-	HNO3	C - H2SO4	D - NaOł	-	E - HC	
NUMBER	SIZE	TYPE	PRESERVA	TIVE		TERE	-	NUMBER	SIZE	TYPE	PR	ESERVATI	VE FILTERED
	<u>40 ml</u>	VOA	E		Y		-		-125 mL	PLASTIC		-6-	
-	- 40 mL	VOA	E		Y	-	N	2	14	PI		B	OY CH
	125 mL	VOA	A		Y		N						
1	125 mL	PLASTIC	А		Y	1	N		_				Y
1	125 mL	PLASTIC	В		Y		N						
	METHOD:	Feder	x c	DATE	SHIPP	ED:		10-8	-20	AIRBILL	NUM	BER: N/	4
SHIPPING N			~										

REVISED 04/2019

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PROJECT	NAME:	DE KA	RN/JCWE	ADOC	KLA	ANC		PR	EP.	ARED		(CHECK	ED	
PROJECT	NUMBER	R: 36738	8.0000.000	D PHA	SE	3 T. BY	¢	JJ		DATE	WY BY	JK	0	ATE 10	1/2
SAMPLE	10:6U	1-12		1	WE		ME] 2"	4"]6" 🗌 OT	HER		-	-
WELL MAT	ERIAL.	K PVC	SS	IR	ON	G	ALVA	NIZED	STEE	EL	ОТ	HER			
SAMPLE T	YPE:	GW	WW	S	N				LEA	CHATE	ОТ	HER			
PUR	GING	TIME: 11	03	DATE	la l	8/2	<i>.</i>	S	AM	IPLE	TIME 114	4	DAT	E io le	1
PURGE METHOD		PUMP	PERISTALT	IC PUI				PH:	7.	Te			64		mha
DEPTH TO	WATER:	1200	T/ PVC			_		TURBI	-		NTU	1.0			
DEPTH TO	BOTTOM	NM	T/ PVC		-			DINO	NE		СНТ	MODER	ATE	V	ER
WELL VOL	UME:	N/A	LITERS] GA	LLONS		TEMPE	RAT		e-3 °c	OTHER:			
VOLUME	REMOVED	9	✓ LITERS] GA	LLONS		COLOR	R:	(10	W	ODOR:	n	onc	2
COLOR:	B	nowr		ODOR	- 10	ny	2	FILTRA	TE ((0.45 um)	YES	NO			
			BIDITY					FILTRA	TEC	OLOR:		FILTRAT	E ODOR		
NONE			MODERATE		8	VERY		QC SA		_	/MSD	DUP		_	_
DISPUSAL		GROU			JOT	HER	-	COMM	IENT	rs:			_	_	_
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIV (umhos/cm			RP 1V)		D.O. (mg/L)	π	(NTU)	TEMPERATI	JRE LE	EET)	CUMUL URGE V (GAL 0	OL
1103	24	7.54	1041		-10	3.5	7	75	10	00	160	17	as	INIT	-
1108		730	865		-9	1.7	1.	60	10	75.00	156	17	13	1	t
1113		7.30	6 Le 1	-	9	7.6	1.	49	1	1.39	157		13	0	0
1118		7.30	857	-	-9	9. Í	1.	40	14	e.82	158		B		0
1123		7.29	854		- 98	3.5	1.	39	10	1	lleu	17	13	4	
1128		7.30	854	-	10	6.1	1.	34		5.23	1 Cel	17	13	5.	8
1133		7.31	647	-	10	0.3	1.	.33	1.	38	16.7	17	13	6	-
1138		7.31	844	-	10	07	1	32	0	049	16.3	17.	13	3	ò
1143		7.31	643	-	100).7	1	.32	C	2.51	14.3	17	,13	É	2
1148		7.31	843	-	10	0.6	1.	32	C	41	14.3	17	13	9	
	0.1	COND.: +/-	TEST IS CON 10 % OF ATIVE CODE	RP: +/-	10 9	% 1	0.0.:		%		RE WITHIN T 10 % or D - NaOI	= 5</td <td></td> <td>MP. +/</td> <td>_</td>		MP. +/	_
NUMBER	SIZE	TYPE	PRESERV	ATIVE	F	ILTER	D	NUMBE	ER	SIZE	TYPE	PRESE	RVATIVE	-	-
	40 mL	VOA	E		1	Y	N	1		Jerm	PLASTIC	1	9	Y	1.0
	40 mL	VOA	E			YV	N	2		IL	PI		3	D Y	+-
2	125 mL	VOA	А			Y	N				-1-1			Y	
Î	125 mL	PLASTIC	А			YV	N							Y	E
1	125 mL	PLASTIC	В			Y	N							Y	C
SHIPPING	METHOD:	Fede	K	DATE	SHI	PPED		10/8	310	20	AIRBILL	NUMBER	N/A		
COC NUME				SIGN	ATUR	RE:	-	1	í		DATE SI		111	101	
		N/A					-	0					101	(4)	1

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>TRC WATER SAMPLE LOG PROJECT NAME. DE KARN/JCWEADOCK LAND PREPARED CHECKED PROJECT NUMBER: 367388.0000.0000 PHASE 3 T/BY JJ DATE NO/27/2 DATE (GIU) BY JK WELL DIAMETER: 2" 4" 6" OTHER SAMPLE ID: / 42-10 IRON GALVANIZED STEEL WELL MATERIAL OTHER R PVC **SS** SAMPLE TYPE: GW NWW SW DI LEACHATE OTHER DATE: 10 8 PURGING TIME OF 59 DATE USIDU SAMPLE TIME 1004 7.30 PURGE PUMP PERISTALTIC PUMP PH: SU CONDUCTIVITY 948 umbos/cm METHOD ORP 117. 5 mV DO: 1.44 BAILER mg/L DEPTH TO WATER: 6-33 T/ PVC TURBIDITY: LO.LEL NTU NONE DEPTH TO BOTTOM. Nm T/ PVC SLIGHT MODERATE VERY LITERS GALLONS 12.4 WELL VOLUME: N/A TEMPERATURE °C OTHER VOLUME REMOVED: ✓ LITERS GALLONS 611 COLOR: 100 ODOR: non CLey COLOR: FILTRATE (0.45 um) YES 1 NO ODOR: MORE TURBIDITY FILTRATE COLOR FILTRATE ODOR DUP- 401 NONE SLIGHT MODERATE VERY QC SAMPLE: MS/MSD DISPOSAL METHOD: GROUND DRUM OTHER COMMENTS PURGE WATER CUMULATIVE TIME PH CONDUCTIVITY ORP DO. TURBIDITY TEMPERATURE RATE PURGE VOLUME I EVEL (ML/MIN) (SU) (umhos/cm) (mV) (mg/L) (NTU) (°C) (FEET) (GAL OR L) 0894 7.31 597 3.3 18.50 11.6 INITIAL 100 6.33 10.0 7.27 0404 1005 -26.6 12.4 730 2.11 17.89 1 999 0909 - 55.0 12.5 745 7.30 1.72 18.72 1 988 - 80.0 0914 7.32 1.60 19.76 12.1 7.50 1.1 0919 966 7.36 -1021 1.54 19.10 12.1 775 0924 957 - 110.0 3 7 154 10.00 7.55 12.6 2.i 953 -115.0 929 38 49 10.0 3 12.6 7.60 -117.0 1.44 9.85 6934 38 951 7.65 3.0 62-7 6939 950 -1169 1.44 740 U 34 13.7 162 0944 7.38 949 70 -117. 44 41 411 NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS: pH: +/- 0.1 COND .: +/- 10 % ORP: +/- 10 % DO: +/- 10 % TURB: +/- 10 % or </= 5 TEMP +/- 0.5°C BOTTLES FILLED PRESERVATIVE CODES A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCL F PRESERVATIVE FILTERED SIZE NUMBER SIZE TYPE NUMBER TYPE PRESERVATIVE FILTERED VOA 40 mL E YON 325mL PLASTIC P YVN Э YVN VOA F R 40 mL 2 IL Y N PI 125 mL VOA A Y VN 2 Y N PLASTIC Y VN A 125 ml UY UN 2 Y VN 125 mL PLASTIC В Y N Feder SHIPPING METHOD DATE SHIPPED 10/8/20 AIRBILL NUMBER: N/A 10/20 COC NUMBER: SIGNATURE. DATE SIGNED: N/A **REVISED 04/2019**

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WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

TRC PROJECT NAME: CEC Karn BAP/LI: 2020 GW Co PREPARED CHECKED DATE: 10/27/20 KR, JJ DATEIGIUIX BY: JK PROJECT NUMBER: 367388.0001.0000 Phase 3 Tas BY:

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 VOLUM (GAL OR L)
0949	14	738	948	-117.6	1.44	7,25	12-9	765	5
0954		7.38	949	-1174	1.44	6.76	12.8	765	5.1
0959		7.30	940	-117.5	1.43	6.70	129	765	6
1004		7.38	946	-117.5	1.44	6.65		765	6.5
							1		
-									
			1	17 1				17.6	
-		-				-			

REVISED 04/2019

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WATER SAMPLE LOG

PROJEC	T NAME:	DE K	ARN/JCWEADO	CK LAND	PF	REPARED		CHEC	CKED
PROJEC	T NUMBER	3673	38.0000.0000 PH	ASE 3 TABY:	IJ	DATE (0	(ul) BY: t	5K	DATE: 10/27/2
SAMPLE	ID: F-6	SAC	55	WELL DIAM] 2" [] 4" []] 6" 🗌 OTHER		
WELL MA	TERIAL:	PVC	SS IF		VANIZED	STEEL	OTHER		
SAMPLE	TYPE:	√ GW	ww s	SW DI		LEACHATE	OTHER		
PUR	GING	TIME:	DAT	E:	5	SAMPLE	TIME: 1351	D	ATE 1017 DO
PURGE		PUMP	PERISTALTIC PL	JMP	PH: ORP:	41.4		TY: NI	
DEPTH T	O WATER:		T/ PVC	N	TURB	4 1 8	NTU		
DEPTH T	O BOTTOM:	1	T/ PVC	11			GHT МО	DERATE	VERY
WELL VO	LUME:	N/A		GALLONS	TEMPE		M °C OT	HER:	
VOLUME	REMOVED:	/ \	UTERS	GALLONS	COLO	R: Cle	OD	OR:	non
COLOR:			ОДО	R:	_ FILTRA	ATE (0.45 um)	YES	NO	
	SLIC		RBIDITY] MODERATE	VERY			/MSD	DUP-	DR:
DISPOSA	L METHOD:	GROU		OTHER	COMM	MENTS:			
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 VOLUM (GAL OR L)
									INITIAL
								6	
							1		
	1								

pH: +/- 0.1 COND.: +/- 10 % ORP: +/- 10 % D.O.: +/- 10 % TURB: +/- 10 % or </= 5 TEMP.: +/- 0.5°C

BOTTLE	S FILLED	PRESERV	ATIVE CODE	S A-	NON	E	Β-	HNO3	C - H2SO4	D - NaOł	H E - HCL	F	
NUMBER	SIZE	TYPE	PRESERV	ATIVE	FIL	TERE	D	NUMBER	SIZE	TYPE	PRESERVATIVE	FILT	ERED
-	40 mL	VOA	E		Υ		N		_125 ml	PLASTIC	С	Y	√ N
	40 mL	VOA	E		Y	1	N	-				Y	
	125 mL	VOA	A		Y	1	N		-			Y	
1	125 mL	PLASTIC	А		Y	1	N					Y	
1	125 mL	PLASTIC	В		Y	1	N					Y	
SHIPPING	METHOD:	Fele	X	DATE	SHIPF	ED:		10-3-	20	AIRBILL	NUMBER: N/A	-	
COC NUME	BER:	N/A		SIGNA	TURE	:	_	0		DATE SI	GNED: 16/10	100	

586-524-4092

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PROJECT	T NAME:	CECH	Karn LF: 2020	GW Comp		PR	EPARED			CHEC	KED
PROJECT	T NUMBE	R: 36738	8.0000.0000 P	3 T1 BY	KB) 11 1	K DATE:10	8 201 BY:	E.	sk	DATE: 10/27/20
SAMPLE	ID: 0	W-11		WELL DIA	_	_	2" 4" 0		HER		
WELL MAT		PVC	SS D			_			HER		
SAMPLE T	YPE:	GW		SW 🗆 DI			LEACHATE		HER		
PUR	GING	TIME: 12	: 27 pm DA	TE: 10/8/20	20	5	AMPLE	TIME: 17	38	DA	ATE: 10/8/20
PURGE METHOD		PUMP	PERISTALTIC I BAILER (DISPO	PUMP	F	PH:	-100 1	13	CTIVIT	TY: 480	6.3 umhos/cm
DEPTH TO	WATER:	HODRA	T/ PVC 22		-		DITY: 2.0			ing	
DEPTH TO	BOTTOM	and the second second	T/ PVC	e id	_	A NO	the second second		MOD	ERATE	VERY
WELL VOL	UME:	NA	LITERS	GALLONS	Т	EMPE		2.5 °C	отн		
	REMOVED		☑ LITERS	GALLONS		COLO	R: Chen	5	ODO	R:	none
COLOR:		grang		OR: Nome	_ F	ILTRA	TE (0.45 um)	YES		NO	
			BIDITY						-	RATE ODO	DR:
		-			-		MPLE: MS	MSD		DUP-	
	PURGE	120.000					IENTS.		-	MATER	
TIME	RATE (ML/MIN)	PH (SU)	CONDUCTIVITY	ORP		0.	TURBIDITY	TEMPERATU	JRE	WATER LEVEL	CUMULATIVE PURGE VOLUME
12:27pm	. 1		(umhos/cm)	(mV) 112.5	(mg		(NTU)	(°C) 14.0		(FEET)	(GAL OR L) INITIAL
12:320		9.23		81.0	1.1		over	13.1	L	22.33	
12:37		9.20	425	64.5	1.2	18	703	13.1		22.33	
12:4201		9.18	425.	56.2	1.1		70.4	13.2		22.30	21
1:47 YN		9.19	426	53.8		Or	25.0	13.4			31
2:52 m		9.19	426	50.5	1.0		51.5	13.4		22.31	41
12:57pm		9.20	42.5	46.6	1.0		0.68	13.4	1	2.32	le L
1:02pm		9.21	425	45.8	1.0		- 26	12 9		22.32	FL
1.07 pm		9.17	0423		0.9		68.12	12 (22.32	82
: @12 pr		9.40	494.1	- 61.7	1.90		64.98	12.0	5 7	7 72	92
			TEST IS COMPL		-			RE WITHIN T	HE FO	OLLOWING	
pH: +/-		COND .: +/-									TEMP .: +/- 0.5°C
BOTTLES	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - H	NO3	C - H2SO4	D - NaOH	1	E - HCI	L F-
NUMBER	SIZE	TYPE	PRESERVATIN	E FILTERE	DN	UMB	ER SIZE	TYPE	PRE	SERVATIN	
2	125	G	A	VX	N					-	
1	125	P	A	D Y X	N						
1	250	P	A	D Y X	N						
1	125	P	B	D Y X	N						
2	IL	P	B	D Y R	N						
SHIPPING I	METHOD:	Feder	C DA	TE SHIPPED:	10	-8-	-20	AIRBILL N	NUMB	ER:	
COC NUME	BER:	_	SIC	SNATURE:	he	e	the	DATE SIG	SNED	1	0-27-20
					11		8			-	

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>TRC

WATER SAMPLE LOG (CONTINUED FROM PREVIOUS PAGE)

PROJECT NAME:	CEC Karn LF: 2020 GW Compl		PREPARED			CHECKED
PROJECT NUMBER:	367388.0000.0000 P3 T1	BY:	KR JJ JK DATE: 10/8/202	BY:	JK	DATE: 10/27/20

TIME	PURGE	PH	CONDUCTIVITY	ORP	D.O.	TURBIDITY	TEMPERATURE	WATER	CUMULATIVE
	RATE (ML/MIN)	(SU)	(umhos/cm)	(mV)	(mg/L)	(NTU)	(°C)	LEVEL (FEET)	PURGE VOLUMI (GAL OR L)
1:17pm		9.40	487.7	-100.9	1.60	69.96		22.32	
: 23 pm		9.39	487.9	-108.8	1.54	46.72		22.32	
: 28 pm		9.38	484.8	-117.7	1. cel	4.69		22.32	12L
1:33pm		9.38		-120.6	1.51	2.66	12.6	22.32	13 L
:38pm		9.38	486.3	-125.1	1.50	2.00	12.5	2.32	14L
			-						
							· ·		
						-			
						4			
			6						
_	-				4	X			
-									1-

SIGNATURE:

I hay

DATE SIGNED:

10/27120

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PROJEC	T NAME:	CEC K	arn BAP/LI: 20	020 GW C	PR	EPARED		С	HECK	ED
PROJEC	TNUMBER	R: 36738	8.0001.0000 P	hase 3 Ta BY:	KR, JJ	DATE	BY:	JK	0	DATE: 10/27/2
SAMPLE	ID:DEK	·mu-	18001	WELL DIAN		2" 🗌 4" 🗌	6" 🗌 OT	HER		
WELL MA	TERIAL:	PVC	ss 🗆		VANIZED	STEEL	ОТ	HER		
SAMPLE T	YPE:	GW		SW 🗆 DI		LEACHATE	ОТ	HER		
PUR	GING	TIME:	oto DA	TE: 16/10/20	S	AMPLE	TIME: 67	から	DAT	E: 16/6/2
PURGE METHO	-		PERISTALTIC F			1116	U CONDU	CTIVITY: _	S 12 mg/L	bumhos/c
DEPTH T	O WATER:	825	T/ PVC		TURBI	DITY: 1.3 1	NTU			
DEPTH T	O BOTTOM	Nim	T/ PVC		NO NO		GHT 🗌	MODERA	TE	VERY
WELL VOI	UME:	NA	LITERS	GALLONS	TEMPE		3.6 °C	OTHER:		
VOLUME	REMOVED	45	LITERS	GALLONS	COLO	R: _ Clu	21	ODOR:		
COLOR:	(lear	OD	OR: none	FILTRA	TE (0.45 um)	YES	-NO		
_	1.0		BIDITY		FILTRA	TE COLOR:		FILTRAT	EODOR	
			MODERATE	VERY	QC SA	MPLE: MS	/MSD	DUP		
DISPOSA	L METHOD	GROUN		OTHER	COMM	ENTS:				
TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERAT (°C)	LE	TER VEL F	CUMULATIVE PURGE VOLUM (GAL OR L)
dato	100	400	895	-659	6-70	33.95	13.2	8)	-	INITIAL
HOUT		7.51	850	-151.6	2.00	4.70	13.1		30	5
der		7.55	820	-142.0	1.70	050	13,1	83		1
DOTT		7.55	621	-141.0	145	1.00	13.1	6	30	1.F
0700		7.56	818	-141.7	1.000	1.27	13.1	83.	0	2
0705	1	7.56	BIT	-141.5	1.54	127	13.0	0.3		2.5
0710	1	7.56	814	-142.5	1.54	1.26	13.1	8.3	_	3
0715	1	7.56	813	-141.9	1.53	1.31	13.0	8.	-	7.5
6730		357	613	-141.3	153	135	13.0	8.3		4
onr		7.57	413	-141.8	1.53	1.31	13.0	83		4,5
	DTE: STAB	LIZATION	TEST IS COMPL	ETE WHEN 3 S				THE FOLL	WING	
pH: +/-			3 % ORP:							
BOTTLE	S FILLED	PRESERV	ATIVE CODES	A - NONE	B - HNO3	C - H2SO4	D - NaO	H E	- HCL	F
NUMBER		TYPE	PRESERVATI		-	-	TYPE	PRESER		1
6	13 Tmi	C)45	A	DYB	N				-	
3	121	DI	A	DYD	N					
3	125	pl	B	DYD	N					
í	ASO	PI	A	DYG	N					
2	1000	DI	B	DYD	N					
	METHOD:	Fed		TE SHIPPED:	10-1	8-20	AIRBILL	NUMBER:	Λ)A-
on in Pingo	METHOD.	- rea	A SIC						1.t.	

WATER SAMPLE LOG

PROJECT	NAME:	CECH	Karn BAP/LI: 20	020 GW C	P	REPARED		CHEC	KED
PROJECT	NUMBE	R: 36738	8.0001.0000 P	hase 3 Ta	BY: KR.J.	DATE: 10	ILOX BY:	JK	DATE: 10/27/2
SAMPLE	ID: DE	K-mu	15003	WELL D		2" 4"	6" OTHER		
WELL MAT	ERIAL:	PVC	SS 🗆		GALVANIZED	STEEL	OTHER		
SAMPLE T	YPE:	GW		SW 🗌		LEACHATE	OTHER		
PUR	GING	TIME: O	915 DA	TE: 10/10	X	SAMPLE	TIME: 093		ATEICLESC
PURGE METHOD		PUMP	PERISTALTIC F		PH: ORP:	11/20		11TY: 40	Cumhos/c
DEPTH TO	WATER:	1600		,		BIDITY: 0,2	9 NTU		
DEPTH TO	BOTTOM	NM	T/ PVC		JEN.		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DERATE	VERY
WELL VOL	UME:	NA	LITERS	GALLO	NS TEMP	ERATURE: 1	27°C OT	HER:	
VOLUME	REMOVED	1.5	☑ LITERS	GALLON	NS COLO	DR: CQC		OR:	hor
COLOR:	_C	ler	OD	ORDON	FILTR	ATE (0.45 um)	I YES	NO	
DANONE	SL		BIDITY MODERATE					DUP-	DR:
DISPOSAL	METHOD	GROU		OTHER	COM	MENTS:			
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 VOLUM (GAL OR L)
OPIT	100	836	217	-90.1	9.00	2.00	12.2	14.08	INITIAL
2690		8.94	411	-1480	225	0.50	(77)	1685	Ĩ.
0935		854	404	-148		025	12.7	1700	
0930		8.54	400	-1480		025	12.7	1710	1, 1
			1			32		12.00	7
		1	19		3	ES .	0		25
		13-	9	19.2		1			N
						1			
				-		1	-		
	1			1					
NC	TE STAR	IZATION	TEST IS COMPL		3 SUCCESSI	E READINGS	ARE WITHIN THE	FOLLOWING	C LIMITS:
pH: +/-		COND .: +/-			D.O.: +/- 0.3				TEMP.: +/- 0.5°C
			ATIVE CODES		B - HNO3	C - H2SO4		E - HC	
BOTTLE				L	2	0 112004	Denaon	LINU	
BOTTLES		TYPE	PRESERVATIN	VE FILTE	RED NUME	ER SIZE	TYPE PF	RESERVATI	
BOTTLES NUMBER	SIZE	TYPE CAS				SER SIZE	TYPE PF	RESERVATI	

DY ON OY ON 200 A PI ()1 PI B DYDN Y N B OY EN 1000 PI 2 10-8-20 Feelex DATE SHIPPED: AIRBILL NUMBER: N SHIPPING METHOD: NN SIGNATURE: DATE SIGNED: olidis COC NUMBER: 0

Page 23 of 26 **CHAIN OF CUSTODY**

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Consumers Energy

SAMPLING SITE: Karn Lined Impoundment – 2020 Q4					PROJECT NUMBER:		ANALYSIS REQUESTED							Page 1 of 1		
Kar	n Lined	Impoundm	ent – 2020 Q	4	2	:0-1110										SEND REPORT TO: CDBatts
SAM	PLING TE	AM:			DATE SHIPPED:	SIT		D ATTACHED?	als							HD Register, TRC
							CIRCLE	E ONE: NO	Fotal Metals	Anions	s	Alkalinity				PHONE:
CO	CE NTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOO	CATION	DEPTH (ft)	# OF CONTAINERS	Tot	Ani	TDS	Alk				REMARKS
20	-1110-01	10/8/2	1004	GW	OW-10			5	x	x	x	x				1
	-02	(181)	1338	GW	OW-11			5	x	x	х	x				
	-03	plelac	1148	GW	OW-12			5	x	x	x	x				
	-04	14/8/2	1305	GW	KLI-SCS			5	x	x	x	x				
	-05	10/8/2		GW	DUP- O (5	x	х	x	x				
		10/8/2	1216	W	EB- O (2	x	x						
	-07	iolens	1215	W	FB- G Ì	_		2	x	x						
					-											
17																
REL	INOUTSHE	D BY: (SIGN	ATURE)		IME: PA INE	EIVED BY		13-20 12: AL	45 A	eč.	D	on		OMMEN		3-3.0°C 5484
REL	INQUISHE	D BY: (SIGN	ATURE)	DATE/T		EIVED BY	: (SIGNATUR	RE)								5484 CUSTOMER
-				-		20-1	1110 Page 19	of 19			-				-	

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North Canton, OH 44720

Chain of Custody Record



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Phone: 330-497-9396 Fax: 330-497-0772	Sampler			Lab PM	W			Carrier Tracking No(s)	ing No(s).	COC No: 240-176446 1	
Client Information (Sub Contract Lab)				Broo	Brooks, Kris M			State of Ocion		240-120440.1	
Client Contact: Shinning/Receiving	Phone:			Kris.	E-mail: Kris.Brooks@Eurofinset.com	Eurofinset	com	Michigan		Page 1 of 1	
Company Company					Accreditatio	ns Required	Accreditations Required (See note):			Job # 240-138056-1	
I estAmerica Laboratories, inc. Address	Due Date Requested:	d:					Analysi	Analysis Reginested		Preservation Codes:	:se
13715 Rider Trail North,	TAT Requested (davs):	vs):				E			-	A - HCL B - NAOH	M - Hexane N - None
city Earth City							-			Acid	O - AsNaO2 P - Na204S
State, Zip: MO, 63045											Q - Na2SO3 R - Na2S2O3
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	#Od									G - Amchfor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahydrate
Email	# OM				(oN	-	-				V - MCAA W - pH 4-5
Project Name Karn/Weadock CCR Groundwater Monitoring	Project # 24024154				10 59						Z - other (specify)
Site	SSOW#				N) as					of co	
	Common Data	Sample Time	Sample Type (C=comp, G=crah)	Matrix (w=water, S=solid, O=wastefoll,	Perform M/2M	2_903.0/PrecSep_0				Total Number Poecial T	Special Instructions/Note:
Sample Identification - Client ID (Lab ID)		X	00	ion Code.	X						V
OW-10 (240-138056-1)	10/8/20	10:04		Water		×				2 TVA protocol - Ra 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-11 (240-138056-2)	10/8/20	13:38 Fostern		Water		××				2 TVA protocol - Ra 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-12 (240-138056-3)	10/8/20	11:48 Fastern		Water		××				2 TVA protocol - Ra	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
DUP-01 (240-138056-4)	10/8/20	Eastern		Water		××				2 TVA protocol - Re 5.0 pCi/L	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
EB-01 (240-138056-5)	10/8/20	12:10 Eastern		Water		×				2 TVA protocol - Ra 5.0 pCi/L	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
					-						
Note Since laboratory accreditations are subject to change. Eurofins 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 near the since upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently near the since upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently near the since upon out subcontract laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica restrictions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica accention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.	stAmerica places the owners ts/matrix being analyzed, the current to date, return the sign	ip of method, a samples must be chain of Cus	analyte & accree be shipped back stody attesting t	ditation compl to the Eurofi o said compli	ance upon o is TestAmer ance to Eur	ut subcontra ica laborator ofins TestAn	act laboratories y or other instru-	This sample shipmen uctions will be provided	Lis forwarded under Any changes to ac	chain-of-custody. If the labo creditation status should be l	ratory does not currently prought to Eurofins
Possible Hazard Identification					Sam	Ple Dispo	le Disposal (A fee Return To Client	may be assessed if san	if samples are By Lab	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Return To Client Disposal By Lab Acchive For Mon	1 month) Months
Uncommitted Deliverable Requested: I, II, III, IV, Other (specify)	Primary Delive	rable Rank:	2		Spec	cial Instrue	ctions/QC R	Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Date:			Time.			Met	Method of Shipment.		
Reinquished by (Date/Time	8101 0		Surger		Received by		FED EX	Date/Time.		Company
	Date/Time:			Company		Received by	NN	2	Date/Time (0 (13/20 20	2263 0207	1
LEULA	DataTima			Company	Ī	Received by		>	Date/Time.		Company

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Ver: 01/16/2019

Cooler Temperature(s) °C and Other Remarks.

Company

Date/Time

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12/16/2020

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Custody Seal No.

Page 25 of 26 **CHAIN OF CUSTODY**

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Consumers Energy

SAMI	LING SIT	E:			PROJECT NUMBER:	0 1100	1100				ANAL		Page 1 of 1			
Karı	Bottom	Ash Pond	& LI - 2020	Q4	2	0-1109										SEND REPORT TO: CDBatts
SAMI	LING TEA	AM:			DATE SHIPPED:	SI		DATTACHED?	als							HD Register, TRC
T	rc				1.0.0		CIRCLE ONE: YES NO			suc		Alkalinity				PHONE:
CON	CE TROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOC	ATION	DEPTH (ft)	# OF CONTAINERS	Total Metals	Anions	TDS	Alka				REMARKS
20-	1109-01	10/6/2	on	GW	DEK-MW-15003			5	x	x	x	x				1
	-02	11 11	6755	GW	DEK-MW-18001			5	x	x	x	x				
	-03	1 2)	2725	GW	DEK-MW-18001 MS			4	x	x		x				1
N	-04	1110	0725	GW	DEK-MW-18001 MSD			4	x	x		x				
					i e l'estrette l'est											1
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		200 000 100 20 20					Luis Columba									
RELI	Al	D BY: (SIGNA	ATURE)	DATE/T	IME: RECE 7-2020/0743	IVED BY	/: (SIGNATUR A-	E)		7.1°			C	OMMEN	TS	
REL	QUISHEI	D BY: (SIGN/	ATURE)	DATE/T	IME: RECE	EIVED OY	: (SIGNATUR	E)		9 01	540					
											OI	RIGINA	L TO LA	в со	PY TO	CUSTOMER

Eurofins TestAmerica, Canton 4101 Shuffel Street NW

Chain of Custody Record



lient Information (Sub Contract Lab)	Sampler.			Lab PM Brooks	Lab PM: Brooks, Kris M				Carrier Tra	Carrier Tracking No(s).		COC No. 240-126446.1	
lient Contact	Phone:			E-Mail Kris.B	E-Mait Kris.Brooks@Eurofinset.com	Eurofir	iset.com		State of Origin Michigan	gin:		Page 1 of 1	
niipping/receiving ompany					Accreditations Required (See note)	ons Regi	uired (See	note).				Job # 240-138055-1	
esuhinenua Lauoulatoris, mus. dafessi adates	Due Date Requested: 11/9/2020	÷						ualys	Analysis Requested			Preservation Codes	les: M Hornoo
or to reven main work, and the first state. Zip tate. Zip	TAT Requested (days)	ys):				-						B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4	N - Nexand N - None O - Asna02 P - Na2045 Q - Na2203
	# 0d											F - MeOH G - Amchior H - Accordio Acid	R - Na2S203 S - H2S04 T - TSD Indershufrate
14-298-8566(Tel) 314-298-8757(Fax) mail	#OM				(0								U - Acetone V - MCAA
roject Name Cam/Meadock CCR Groundwater Monitoring	Project #: 24024154				es ot N					_			W - pH 4-5 Z - other (specify)
	SSOW#				Y) as		595			-		of Cother:	
	Samule Date	Sample Time	Sample Type (C=comp, G=drab)	Matrix (w=water, S=solid, O=wasteroli, BTETrenue A=Arr	Perform MS/M	903.0/PrecSep_6	Ra226Ra228_GF					Total Number Special L	Special Instructions/Note:
Sample Identification - Client ID (Lab ID)		X		Preservation Code:	X	-							V
DEK-MW-15003 (240-138055-1)	10/6/20	09:30 Fastern		Water		×	×					2 TVA protocol - Ra 5.0 pCi/L	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L
DEK-MMM-18001 (240-138055-2)	10/6/20	07:35		Water		×	×					2 5 0 nC//l	TVA protocol - Ra-226+228 action limit at
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 miniminan accreditation in the State of Origin listed above for analysistests/matrix being analyzed, the samples tho the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention in the State of Origin listed above for analysistests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.	tAmerica places the ownersh /matrix being analyzed, the s rrent to date, return the signe	up of method a amples must b d Chain of Cus	malyte & accre e shipped bac tody attesting	ditation complied to said complied	ance upon o is TestAmer cance to Eur	ut subci ica laboi ofins Tei	ontract lab atory or of stAmerica.	bratories.	This sample shipme ctions will be provide	nt is forward	ed under chi ges to accre	ain-of-custody. If the labo	oratory does not currently brought to Eurofins
Possible Hazard Identification					San	Defe Di	sposal (Afeer	nay be assessed if san	d if samp	les are re	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	1 month) Months
Unconfirmed Deliverable Requested: I, II, IV, Other (specify)	Primary Deliveral	ole Rank:	2		Spe	cial Ins	al Instructions/QC	/QC Re	Special Instructions/QC Requirements:	nà ran		D TANK	
Empty Kit Relinquished by:		Date:			Time:				Me	Method of Shipment	ment.		
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Reinquished by FED EX	0			Company		packing ph	Mas	2	~	Dat 10	Date/Time 10/13/1020	10 022	ETA SIL
Relinquished by:	Date/Time:			Company		Refeived by	d by:			Ca	Date/ Lime.		company
Custody Seals Intact: Custody Seal No.:						Cooler 1	emperatur	e(s) ^a C ar	Cooler Temperature(s) ^a C and Other Remarks.				

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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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 20-0888

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

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area 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 accredidation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.

CASE NARRATIVE

I. Sample Receipt

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

II. <u>Methodology</u>

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

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

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

DEFINITIONS / QUALIFIERS

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

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

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



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

<u>Sample #</u>	Field Sample ID	<u>Matrix</u>	Sample Date	<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



Sample Site:	DEKarn Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-0888
Field Sample ID:	DEK-MW-15003	Collect Date:	08/03/2020
Lab Sample ID:	20-0888-01	Collect Time:	01:23 PM
Matrix:	Groundwater		

Mercury by EPA 7470A, T	otal, 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: CC	R Rule Appendix III-IV To	tal 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		ua/l	1	08/27/2020	AB20-0813-05

Calcium	31400	ug/L	1000	00/13/2020	AB20-0013-03
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 CCF	R Rule Analyte List, CI, F,	SO4, Aqu	eous	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 U	Jnits	RL	Analysis Date	Tracking #
Total Dissolved Solids	291	m	ng/L	10	08/06/2020	AB20-0806-07
	<u>20</u>	-0888 Page 5 of	13			



Sample Site:DEKarn Bottom Ash Pond & Lined ImpoundmentLaboratory Project:20-0888Field Sample ID:DEK-MW-15003Collect Date:08/03/2020Lab Sample ID:20-0888-01Collect Time:01:23 PMMatrix:GroundwaterCollect Time:01:23 PM

Alkalinity by SM 2320B			Aliquot: 2	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



Sample Site:	DEKarn Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-0888
Field Sample ID:	DEK-MW-18001	Collect Date:	08/03/2020
Lab Sample ID:	20-0888-02	Collect Time:	02:16 PM
Matrix:	Groundwater		

Mercury by EPA 7470A, T	otal, 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: CC	R Rule Appendix III-IV Tot	tal 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, CI, F, S	SO4, Aqu	eous	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 25	40C			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

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Sample Site:DEKarn Bottom Ash Pond & Lined ImpoundmentLaboratory Project:20-0888Field Sample ID:DEK-MW-18001Collect Date:08/03/2020Lab Sample ID:20-0888-02Collect Time:02:16 PMMatrix:GroundwaterCollect 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	



Sample Site:	DEKarn Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-0888
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	08/03/2020
Lab Sample ID:	20-0888-03	Collect Time:	02:16 PM
Matrix:	Groundwater		

Mercury by EPA 7470A, Total, Aqueous				Aliquot: 2	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

vietals by EPA 6020B: CCF	letals 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	AB20-0813-0
Boron	96		%	20	08/13/2020	AB20-0813-0
Cadmium	99.0		%	0.2	08/27/2020	AB20-0813-0
Calcium	120		%	1000	08/13/2020	AB20-0813-0
Chromium	91		%	1	08/27/2020	AB20-0813-0
Cobalt	90		%	6	08/27/2020	AB20-0813-0
Copper	90		%	1	08/27/2020	AB20-0813-0
Iron	92		%	20	08/27/2020	AB20-0813-0
Lead	96		%	1	08/27/2020	AB20-0813-0
Lithium	101		%	10	08/27/2020	AB20-0813-0
Magnesium	107		%	1000	08/13/2020	AB20-0813-0
Manganese	91		%	5	08/27/2020	AB20-0813-0
Molybdenum	101		%	5	08/27/2020	AB20-0813-0
Nickel	90		%	2	08/27/2020	AB20-0813-0
Potassium	107		%	100	08/13/2020	AB20-0813-0
Selenium	89		%	1	08/27/2020	AB20-0813-0
Silver	97.4		%	0.2	08/27/2020	AB20-0813-0
Sodium	112		%	1000	08/13/2020	AB20-0813-0
Thallium	97		%	2	08/27/2020	AB20-0813-0
Vanadium	94		%	2	08/27/2020	AB20-0813-0
Zinc	90		%	30	08/27/2020	AB20-0813-0
Anions by EPA 300.0 CCR	Rule Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	20-0888-03-C02-A01	Analyst: DMV
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking

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: 2	20-0888-03-C03-A01	Analyst: DLS

Antaning by on Lozob			Aliquoti	10 0000 00 000 AU	Analyst. DEO
Parameter(s)	Result	Flag Units	RL	Analysis Date	Tracking #
Alkalinity total	92	%	10000	08/11/2020	AB20-0810-09
	20	-0888 Page 9 of 13			

20-0888 Page 9 of 13



Sample Site:	DEKarn Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-0888
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	08/03/2020
Lab Sample ID:	20-0888-04	Collect Time:	02:16 PM
Matrix:	Groundwater		

Mercury by EPA 7470A, Total, Aqueous					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

etals by EPA 6020B: CCR	Rule Appendix III-IV To	tai Metais Expand	Aliquot:	Aliquot: 20-0888-04-C01-A02	
rameter(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	AB20-0813-0
Beryllium	100	%	1	08/27/2020	AB20-0813-0
Boron	123	%	20	08/13/2020	AB20-0813-0
Cadmium	100	%	0.2	08/27/2020	AB20-0813-0
Calcium	119	%	1000	08/13/2020	AB20-0813-0
Chromium	91	%	1	08/27/2020	AB20-0813-0
Cobalt	90	%	6	08/27/2020	AB20-0813-0
Copper	90	%	1	08/27/2020	AB20-0813-0
Iron	90	%	20	08/27/2020	AB20-0813-0
Lead	96	%	1	08/27/2020	AB20-0813-0
Lithium	101	%	10	08/27/2020	AB20-0813-0
Magnesium	110	%	1000	08/13/2020	AB20-0813-0
Manganese	91	%	5	08/27/2020	AB20-0813-0
Molybdenum	103	%	5	08/27/2020	AB20-0813-0
Nickel	90	%	2	08/27/2020	AB20-0813-0
Potassium	111	%	100	08/13/2020	AB20-0813-0
Selenium	89	%	1	08/27/2020	AB20-0813-0
Silver	99.1	%	0.2	08/27/2020	AB20-0813-0
Sodium	114	%	1000	08/13/2020	AB20-0813-0
Thallium	96	%	2	08/27/2020	AB20-0813-0
Vanadium	94	%	2	08/27/2020	AB20-0813-0
Zinc	91	%	30	08/27/2020	AB20-0813-0

Amons by Li A 300.0 CON Nule Analyte List, Ci, I, 304, Aqueous		Allquot. 20-0000-04-002-A01		Analyst. Divivv		
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 20-0	% 888 Page 10 of 13	10000	08/11/2020	AB20-0810-09



Data Qualifiers

Exception Summary

No exceptions occured.

CONSUMERS ENERGY

Chemistry Department

PROC CHEM-1.2.01

General Standard Operating Procedure

PAGE 1 OF 2 **REVISION 3** ATTACHMENT A

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Inspection By:		
n Ach Pond		
	21	
rier.		
USP	S	Airborne
Shipping Form	Attached: Yes	No
oping containers receive	ed.	
Custom Case	Enve	elope/Mailer
of the shipment contai	ner.	
		Leaking
f several sample contai	ners.	_
Samples Received	I on Ice: Yes X	No
41		
er of sample containers	received.	
Other	Broken	Leaking
		-
		-
	USP: Shipping Form oping containers receive Custom Case Other of the shipment contai Dented ers were opened before Sealed osed with the shipment. Air Data Sheet f several sample contain Samples Received	Shipping Form Attached: Yes oping containers received. Custom Case Other of the shipment container. Dented of the shipment container. Dented sealedX osed with the shipment. Air Data Sheet other f several sample containers. Samples Received on Ice: Yes

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

Consumers Energy

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

SAMPLING SIT	E:			PROJECT NUMBER:			ANALYSIS REQUESTED				Page 1 of 1			
Karn Bottom	a Ash Pond	& LI - 2020	Q3	20-0888								SEND REPORT TO: CDBatts		
AMPLING TEA	AM:	_		DATE SHIPPED:	SITE SKETCHED ATTACHED?			als			lais		HD Register, TRC	
71	RC			8-4-20	CIRCLE ONE: YES NO		al Me	Total Metals Anions TDS Alkalinity					PHONE:	
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LO	OCATION	DEPTH (ft)	# OF CONTAINERS	Tot	Ani	TDS	Alk			REMARKS
20-0888-01	8-3-20	1323	GW	DEK-MW-15003		1.2	5	x	x	x	x			
-02	8-3-20	1416	GW	DEK-MW-18001			5	x	x	x	x			1.50
-03	8-3-20	1416	GW	DEK-MW-18001 MS			4	x	х		x			
-04	8-3-20	1416	GW	DEK-MW-18001 MSD)		4	x	х		x			
	-													
						1.								
														-
													-	
						1								
							1		-	-				
ELINQUISHE	 D BY: (SIGNA	TURE)	DATE/T	IME: RE	ECEIVED BY:	(SIGNATUR) E)				1	CO	MMENTS	3
A	e que	ing	8-1	4-20/1700	Fede	X								
ELINQUISHE	D BY: (SIGNA	TURE)	DATE/T	IME: RE	ECEIVED BY:	(SIGNATUR	E)							
Fe.	dEx		q	5-5-2020 (130	CHSI	epsta	nsen			OI	RIGINAL	TO LAB	COP	Y 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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 20-0889

phone 517-788-1251

fax 517-788-2533

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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

DEFINITIONS / QUALIFIERS

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

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

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



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

Sample #	Field Sample ID	<u>Matrix</u>	Sample Date	Site
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



Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: OW-10 Collect Date: 08/04/2020 Lab Sample ID: 20-0889-01 Collect Time: 09:41 AM Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous				Aliquot: 2	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	R Rule Appendix III-IV To	tal 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, CI, F,	SO4, Aque	eous	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
	<u>20</u>	-0889 Page 5	5 of 21			



Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:OW-10Collect Date:08/04/2020Lab Sample ID:20-0889-01Collect Time:09:41 AMMatrix:GroundwaterCollect Date: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



Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: OW-11 Collect Date: 08/04/2020 Lab Sample ID: 20-0889-02 Collect Time: 03:27 PM Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous				Aliquot: 2	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, CI, F,	SO4, Aqu	eous	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 20	-0889 Page 7	mg/L 7 of 21	10	08/06/2020	AB20-0806-07



Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:OW-11Collect Date:08/04/2020Lab Sample ID:20-0889-02Collect Time:03:27 PMMatrix:GroundwaterCollect Date:Collect Time:

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



Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:OW-12Collect Date:08/03/2020Lab Sample ID:20-0889-03Collect Time:05:20 PMMatrix:GroundwaterGroundwaterGroundwaterGroundwater

Mercury by EPA 7470A, Tota	I, 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 F	Rule Appendix III-IV Tot	tal Metals Expand	Aliquot	20-0880-03-001-002	Analyst: SI K

Metals by EPA 6020B: CCF	R Rule Appendix III-IV To	tal Metals Ex	pand Aliquot:	20-0889-03-C01-A02	Analyst: SLK
Parameter(s)	Result	Flag Ur	nits 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 CCF	R Rule Analyte List, CI, F, S	SO4, Aqu	eous	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
	<u>20</u>	-0889 Page 9 of 21			



Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:OW-12Collect Date:08/03/2020Lab Sample ID:20-0889-03Collect Time:05:20 PMMatrix:GroundwaterCollect Date:05:20 PM

Alkalinity by SM 2320B			Aliquot: 2	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



Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: KLI-SCS Collect Date: 08/05/2020 Lab Sample ID: 20-0889-04 Collect Time: 02:50 PM Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueous	6			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

Metals by EPA 6020B: CCR	Rule Appendix III-IV To	tal 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	AB20-0813-0
Lithium	10		ug/L	10	08/27/2020	AB20-0813-0
Magnesium	47400		ug/L	1000	08/13/2020	AB20-0813-0
Manganese	162		ug/L	5	08/27/2020	AB20-0813-0
Molybdenum	13		ug/L	5	08/27/2020	AB20-0813-0
Nickel	4		ug/L	2	08/27/2020	AB20-0813-0
Potassium	5510		ug/L	100	08/13/2020	AB20-0813-0
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-0
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-0
Sodium	40600		ug/L	1000	08/13/2020	AB20-0813-0
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-0
Vanadium	3		ug/L	2	08/27/2020	AB20-0813-0
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-0
Anions by EPA 300.0 CCR	Rule Analyte List, CI, F,	SO4, Aqu	eous	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

Total Dissolved Solids	965	_	mg/L	10	08/06/2020	AB20-0806-07
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids by SM 2540C				Aliquot:	20-0889-04-C03-A01	Analyst: CLH
Sulfate	316000		ug/L	1000	08/14/2020	AB20-0813-02

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Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:KLI-SCSCollect Date:08/05/2020Lab Sample ID:20-0889-04Collect Time:02:50 PMMatrix:GroundwaterCollect Time:02:50 PM

Alkalinity by SM 2320B			Aliquot: 2	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



Sulfate

Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: DUP-02 Collect Date: 08/04/2020 Lab Sample ID: 20-0889-05 Collect Time: 12:00 AM Matrix: Groundwater

Mercury by EPA 7470A, Total, Aqueou	IS			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

Metals by EPA 6020B: CCR	R Rule Appendix III-IV To	tal 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, CI, F,	SO4, Aqu	eous	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

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

ug/L

1000

08/14/2020

AB20-0813-02

43700

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Sample Site:DEKarn Lined ImpoundmentLaboratory Project:20-0889Field Sample ID:DUP-02Collect Date:08/04/2020Lab Sample ID:20-0889-05Collect Time:12:00 AMMatrix:GroundwaterCollect Time:12:00 AM

Alkalinity by SM 2320B			Aliquot:	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



Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: EB-02 Collect Date: 08/05/2020 Lab Sample ID: 20-0889-06 Collect Time: 02:46 PM Matrix: Water

Mercury by EPA 7470A, Tot	al, Aqueous			Aliquot:	Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03
Marala Las EDA 0000D 00D			-			

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

Metals by EPA 6020B: CCI	R Rule Appendix III-IV I d	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	AB20-0813-0
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	AB20-0813-0
Boron	ND		ug/L	20	08/13/2020	AB20-0813-0
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-0
Calcium	ND		ug/L	1000	08/13/2020	AB20-0813-0
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-0
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-0
Copper	ND		ug/L	1	08/27/2020	AB20-0813-0
Iron	ND		ug/L	20	08/27/2020	AB20-0813-0
Lead	ND		ug/L	1	08/27/2020	AB20-0813-0
Lithium	ND		ug/L	10	08/27/2020	AB20-0813-0
Magnesium	ND		ug/L	1000	08/13/2020	AB20-0813-0
Manganese	ND		ug/L	5	08/27/2020	AB20-0813-0
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-0
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-0
Potassium	ND		ug/L	100	08/13/2020	AB20-0813-0
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-0
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-0
Sodium	ND		ug/L	1000	08/13/2020	AB20-0813-0
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-0
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-0
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-0

Anions by EPA 300.0 CCI	R 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



Sample Site: **DEKarn Lined Impoundment** Laboratory Project: 20-0889 Field Sample ID: FB-02 Collect Date: 08/04/2020 Lab Sample ID: 20-0889-07 Collect Time: 03:27 PM Matrix: Water

Mercury by EPA 7470A, T	otal, Aqueous			Aliquot:	Analyst: TMR	
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Mercury	ND		ug/L	0.2	08/12/2020	AB20-0812-03
Matala by EDA COODS CO		tal Matala				

Metals by EPA 6020B: CCI	R Rule Appendix III-IV 10	tai metais	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	AB20-0813-0	
Arsenic	ND		ug/L	1	08/27/2020	AB20-0813-05	
Barium	ND		ug/L	5	08/27/2020	AB20-0813-0	
Beryllium	ND		ug/L	1	08/27/2020	AB20-0813-05	
Boron	ND		ug/L	20	08/13/2020	AB20-0813-0	
Cadmium	ND		ug/L	0.2	08/27/2020	AB20-0813-05	
Calcium	ND		ug/L	1000	08/13/2020	AB20-0813-0	
Chromium	ND		ug/L	1	08/27/2020	AB20-0813-0	
Cobalt	ND		ug/L	6	08/27/2020	AB20-0813-0	
Copper	ND		ug/L	1	08/27/2020	AB20-0813-0	
Iron	ND		ug/L	20	08/27/2020	AB20-0813-0	
Lead	ND		ug/L	1	08/27/2020	AB20-0813-0	
Lithium	ND		ug/L	10	08/27/2020	AB20-0813-0	
Magnesium	ND		ug/L	1000	08/13/2020	AB20-0813-0	
Manganese	ND		ug/L	5	08/27/2020	AB20-0813-0	
Molybdenum	ND		ug/L	5	08/27/2020	AB20-0813-0	
Nickel	ND		ug/L	2	08/27/2020	AB20-0813-0	
Potassium	ND		ug/L	100	08/13/2020	AB20-0813-0	
Selenium	ND		ug/L	1	08/27/2020	AB20-0813-0	
Silver	ND		ug/L	0.2	08/27/2020	AB20-0813-0	
Sodium	ND		ug/L	1000	08/13/2020	AB20-0813-0	
Thallium	ND		ug/L	2	08/27/2020	AB20-0813-0	
Vanadium	ND		ug/L	2	08/27/2020	AB20-0813-0	
Zinc	ND		ug/L	30	08/27/2020	AB20-0813-0	

Anions by EPA 300.0 CCI	R Rule Analyte List, Cl, F, S	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



Data Qualifiers

Exception Summary

No exceptions occured.

Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number:20-0889	1		
Inspection Date: 9.5.20		dmw	
Sample Origin/Project Name: Kam			
Shipment Delivered By: Enter the type of ship	oment carrier.		
Pony FedEx	UPS US	PS Airb	orne
Other/Hand Carry (whom) Tracking Number: 3954 6729 כל	823 Shipping For	m Attached: Yes	No
Shipping Containers: Enter the type and num	ber of shipping containers rece	ived.	
Cooler X Cardboard Box	Custom Case	Envelope	Mailer
Loose/Unpackaged Containers			
Condition of Shipment: Enter the as-received			
			.f.a
Damaged Shipment Observed: None _ Other			cing
Shipment Security: Enter if any of the shippin	g containers were opened befo	re receipt.	
	the second s		
Shipping Containers Received: Opene	d Sealed		
Enclosed Documents: Enter the type of docum	ents enclosed with the shipme	nt.	
CoC Work Request	Air Data Sheet	Other	
Temperature of Containers: Measure the temp	perature of several sample con	ainers	
As-Received Temperature Range 2.1-	11 CAC		
		ved on Ice: Yes X N	0
M&TE # and Expiration 015402	6.4.21		
Number and Type of Containers: Enter the to	otal number of sample contained	ers received.	
Container Type Water S	Soil Other	Broken	Leaking
VOA (40mL or 60mL) 8			
Quart/Liter (g/p)			-
9-oz (amber glass jar)			
2-oz (amber glass)	-		-
125 mL (plastic) 10			
24 mL vial (glass)			-
500 mL (plastic)		التشار الم	
Other 250 ml 4			-

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Consumers Energy

SAMPLING SIT	E:			PROJECT NUMBER:						ANAL	YSIS RE	QUESTEI)	Page 1 of 1
		ent – 2020 Q3		20	-0889		100							SEND REPORT TO: CDBatts
AMPLING TE	AM: TRC	- Katy Jake Kr	334	DATE SHIPPED:	SITE	SKETCHEL CIRCLE	ONE	tals			~			HD Register, TRC
Ren	ninga +	Jake Kr	ene	8/4/2020		YES	NO	Total Metals	Anions		Alkalinity			PHONE:
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCA	ATION	DEPTH (ft)	# OF CONTAINERS	Tot	Ani	TDS	Alk			REMARKS
20-0889-01	8/4/2020	\$9:41 an	GW	OW-10		17:95	5	x	x	x	x			
-02	8/4/2020	i527	GW	OW-11			5	x	x	х	x			
-03	8/3/2020	5:20pm	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			
	8/4/2020		W	EB-02			2	x	x			_		
· -07	8/4/2020	1527	W	FB- OZ			2	x	x					
_						_		-				_		
												-		
							1							
FUNCTION	D BY: (SIGNA	TURE	DATE/T	IME RECE	IVED BY: (S	SIGNATUR	E)						MMENTS	
	- Ja			1-20/1700	Fede		~,						VIIVILLI VI O	
	D BY: (SIGNA	TURE)	DATE/T		IVED BY: (S									
te	1 Ex		8	5-2020 1130		9 Page 19 0				OI	RIGINAL	TO LAB	COPY	Y TO CUSTOMER

CONSUMERS ENERGY Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

Project Log-In Number:	20-08	89			
Inspection Date:					
Sample Origin/Project Name:					
				-	
Shipment Delivered By: Ente					
			USPS	Airt	orne
Other/Hand Carry (wh			a		
Tracking Number: <u></u>	155230	180100	Shipping Form Att	ached: Yes 🗡	No
Shipping Containers: Enter th	ne type and i	number of shipp	oing containers received.		
$\operatorname{Cooler}(1)$	Cardboard B	ox	Custom Case	Envelop	e/Mailer
Loose/Unpackaged Co	ntainers		Other		
Condition of Shipment: Enter	the as-recei	ived condition of	of the shipment container.		
			Dented		king
Other				-	0
Shipment Security: Enter if an	ny of the shi	pping container			
Shipping Containers R	eceived: Oj	pened	Sealed		
Enclosed Documents: Enter th	ne type of do	ocuments enclos	sed with the shipment.		
CoC Wor	k Request		Air Data Sheet	Other	
Temperature of Containers: N					
As-Received Temperat	ture Range	3-3.1%	Samples Received on	Ice: Yes V N	lo
		1.			
M&TE # and Expiration	on 015 70	2111-4-21			
Number and Type of Contain	ers: Enter t	he total number	of sample containers rec	eived.	
Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)	_2	_			_
Quart/Liter (g/p)		-			
9-oz (amber glass jar)		_		_	
2-oz (amber glass)		-			
125 mL (plastic)	Ч	_			
24 mL vial (glass)		-			-
500 mL (plastic)		-			
Other 250 mL HDPE	<u> </u>	-			

CHAIN OF CUSTODY

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

Consumers Energy

TE:			PROJECT NUMBER:				ANAI	YSIS RE	QUESTE	D	Page 1 of 1		
202024	2001010-012			20-08	89								SEND REPORT TO: CDBatts
EAM: Kat	y Remi	nga	DATE SHIPPED:				tals			~			HD Register, TRC
take l	crenz				YES	NO	al Me	ions	s	alinit			PHONE:
SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATIO		N DEPTH N (ft)	# OF CONTAINERS	Tot	An	E	Alk			REMARKS
1		GW	OW-10		-	5	x	x	x	x	-		
2 —	(GW	OW-11			55		-x-	x	x		-	-
3		G₩	OW-12		-	5	x	x	-x-	x	_		
48/5/2020	2:50 pm	GW	KLI-SCS			5	x	x	x	x			
		GW	DUP-			5	x	x	x	x			
68/5/2020	2:46pm	W	EB- 02			2	x	x					
	-	w	FB-			2	x	x					
					-						-		
-						-						-	
1							-	-			-	-	
-					-		-				-	-	
		DATE/T	IME: -20/1600	10.000		E)	COMMENTS				5 1-3-3.19 017.14		
	TURE)											#015902	
	EAM: Kat Jake J SAMPLE DATE 12 13 148/5/2020 15 168/5/2020 17 168/5/2020 17 168/5/2020 17 168/5/2020 17	I Impoundment - 2020 Q: EAM: KATY REMI JAKE KTEMZ SAMPLE SAMPLE TIME 1 2 	Impoundment - 2020 Q3 EAM: KATY Reminga Jake Kremz Jake Kremz AMPLE SAMPLE DATE TIME MATRIX GW 92 - GW GW 93 GW 94 SIS/2020 95 GW 96 S/S/2020 97 - 98 S/2/2020 99 GW 90 GW 91 GW 92 - 93 GW 94 S/S/2020 94 S/S/2020 94 GW 95 - 96 S/S/2020 97 - 98 S/S/2020 99 - 90 - 91 - 92 - 93 - 94 - 95 - 96 S/S/2020 97 <	Impoundment - 2020 Q3 EAM: KAHY Remingq DATE SHIPPED: JAKE SAMPLE SAMPLE SAMPLE DATE TIME MATRIX SAMPLE DESCRIPTION M GW OW-10 OW Q2 GW OW-10 OW Q3 GW OW-12 OW Q4 SIS/2020 Z: 50 pm GW KLI-SCS J5 GW DUP- OV OV J6 S/S/2020 Z: 4/Le pm W EB- 0/2 J7 W FB- OV OV J0 DATE DATE/TIME: $2-5-20/1600$ ED BY: (SIGNATURE) DATE/TIME: $2-5-20/1600$	A Impoundment - 2020 Q3 20-08 EAM: Katy Reminga Date shipped: Jake SAMPLE SAMPLE SAMPLE Jake Krenz Date shipped: Interview Jake SAMPLE SAMPLE SAMPLE SAMPLE Jake SAMPLE SAMPLE Matrix SAMPLE description / Location Jake GW OW-10 OW OW-10 Q2 GW OW-11 OW OW Q3 GW OW-12 OW OW Q48/5/2020 Z: SOpm GW KLI-SCS SS G8 GW DUP- OW OUP- G8/5/2020 Z: 4/Lepm W EB- 02 P FE W FB- FE Fe Material GU Date/TIME: Receivee Fe Material Date/TIME: Receivee Fe ED BY: (SIGNATURE) Date/TIME: Receivee Fe Ed EX S-4: 2020 OMS CX	Impoundment - 2020 Q3 20-0889 EAM: KATY Reminga Date shipped: SITE SKETCHEL JAKE SAMPLE SAMPLE SAMPLE SAMPLE DEPTH SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE DEPTH DEPTH SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE DEPTH DEPTH 1 GW OW-10 0 0 0 0 2 GW OW-10 0 0 0 0 2 GW OW-10 0 0 0 0 2 GW OW-11 0 0 0 0 2 GW OW-12 0 0 0 0 48/5/2020 2: 50 pm GW KLI-SCS 0 0 0 5 GW DUP- 0 0 0 0 0 0 68/5/2020 2: 4/Lepm W EB- 0.2 0 Felex Felex 0 Felex 0 0 0 0 0 <	20-0889 Impoundment - 2020 Q3 EAM: Katy Remingation SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEFT # OF SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEFT # OF SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEFT # OF SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEFT # OF SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEFT # OF Question GW OW-10 S S S S Question GW OW-11 S S S S Question GW OW-12 S S S S Sample Question GW PUP- S S S G8 S/2020 2: 4/2 (pm) W EB- 02 Question S IDATETIME: RECEIVED BY: (SIGNATURE) Fubox	20-0889 Impoundment - 2020 Q3 EAM: Katy Reminger SITE SKETCHED ATTACHED? SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION Date TIME SAMPLE SAMPLE DESCRIPTION / LOCATION Date GW OW-10 S a GW OW-11 S QW OW-12 GW OW-12 S GW OW-12 S GW OW-12 GW OW-12 S GW OW-12 S GW DUP- S GW FB- DATE/TIME: <	20-0889 Support of the second se	I Impoundment - 2020 Q3 20-0889 Impoundment - 2020 Q3 EAM: Katy Renningen Jake Krenz Date shipped: SITE SKETCHED ATTACHED? CIRCLE ONE: Impoundment - 2020 Q3 SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION Impoundment - 2020 Q3 SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION Impoundment - 2020 Q3 Impoundment - 2020 Q3 Sample SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION Impoundment - 2020 Q3 Impoundment - 2020 Q3 OW OW-10 S X X Impoundment - 2020 Q3 OW - 000-10 S X X X Impoundment - 2020 Q3 OW - 000-10 S X X X Impoundment - 2020 Q3 OW - 000-11 S X X X Impoundment - 2020 Z: SO pm GW KLI-SCS S X X Impoundment - 2020 Z: SO pm GW DUP- S X X Impoundment - 2020 Z: SO pm GW DUP- S X X Impoundment - 2020 Z: SO pm W FB- Q X X	20-0889 Impoundment - 2020 Q3 EAM: KALY Reminged SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO SAMPLE DATE SAMPLE SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION SAMPLE DATE SAMPLE SAMPLE DESCRIPTION / LOCATION DEPTH CONTAINERS SUBJECTION / LOCATION DATE TIME SAMPLE DESCRIPTION / LOCATION DEPTH CONTAINERS SUBJECTION / LOCATION DATE TIME SAMPLE DESCRIPTION / LOCATION DEPTH CONTAINERS SUBJECTION AMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEPTH CONTAINERS SUBJECTION DATE TIME SAMPLE ONE: SAMPLE SAMPLE DEPTH ON OW-12 GW OW-11 S X X X X SAMPLE ONE: X X X X A OW OW-12 S X X X X A OW OUP- S X X X X S GE OZ Z X X A W FB- Z X X <	20-0889 Inpoundment - 2020 Q3 EAM: Katy Renninga Date shipped: SITE SKETCHED ATTACHED? VES NO SAMPLE SAMPLE SAMPLE DESCRIPTION / LOCATION DEPTH # 0 SAMPLE SAMPLE DESCRIPTION / LOCATION DEPTH # 0 SAMPLE SAMPLE DESCRIPTION / LOCATION DEPTH # 0 SET SKETCHED ATTACHED? DATE TIME SAMPLE DESCRIPTION / LOCATION DEPTH # 0 DATE TIME A X X X X X QUE QUE OUTO A W OW-10 S X X X X QUE CO QUE QUE OUTO A W OW-12 S X X X X GW DUP S X X X X GW DUP S X X X CO GW DUP S X X X CO <t< td=""><td>Impoundment - 2020 Q3 Information of the set of the se</td></t<>	Impoundment - 2020 Q3 Information of the set of the se



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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 20-1109

phone 517-788-1251

fax 517-788-2533

TRC Environmental, Inc. conducted groundwater monitoring at the DEKarn Bottom Ash Pond and Lined Impoundment Wells area 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 accredidation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.

CASE NARRATIVE

I. Sample Receipt

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

II. <u>Methodology</u>

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

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

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

DEFINITIONS / QUALIFIERS

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

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

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



Customer Name:Karn/Weadock ComplexWork Order ID:Q4-2020 DEK RCRA Bottom Ash Pond & Lined ImpoundmentDate Received:10/9/2020Chemistry Project:20-1109

<u>Sample #</u>	Field Sample ID	Matrix	Sample Date	<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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-1109
Field Sample ID:	DEK-MW-15003	Collect Date:	10/06/2020
Lab Sample ID:	20-1109-01	Collect Time:	09:30 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	otal 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, A	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	e Analyte List, CI, F,	SO4, Aqu	eous	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 2	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



Sample Site:DEK Bottom Ash Pond & Lined ImpoundmentLaboratory Project:20-1109Field Sample ID:DEK-MW-15003Collect Date:10/06/2020Lab Sample ID:20-1109-01Collect Time:09:30 AMMatrix:GroundwaterCollect Time:09:30 AM

Alkalinity by SM 2320B			Aliquot:	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

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Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-1109
Field Sample ID:	DEK-MW-18001	Collect Date:	10/06/2020
Lab Sample ID:	20-1109-02	Collect Time:	07:25 AM
Matrix:	Groundwater		

Parameter(s)	Result	Flag	Units	RL		
A			Unito	IVE.	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	6			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	e List, Cl, F,	SO4, Aqu	eous	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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-1109
Field Sample ID:	DEK-MW-18001	Collect Date:	10/06/2020
Lab Sample ID:	20-1109-02	Collect Time:	07:25 AM
Matrix:	Groundwater		

Alkalinity by SM 2320B			Aliquot:	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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-1109
Field Sample ID:	DEK-MW-18001 MS	Collect Date:	10/06/2020
Lab Sample ID:	20-1109-03	Collect Time:	07:25 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Ru	le Appendix III-IV To	otal 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, A	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	e Analyte List, Cl, F,	SO4, Aqu	eous	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



Sample Site:	DEK Bottom Ash Pond & Lined Impoundment	Laboratory Project:	20-1109
Field Sample ID:	DEK-MW-18001 MSD	Collect Date:	10/06/2020
Lab Sample ID:	20-1109-04	Collect Time:	07:25 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule	e Appendix III-IV To	otal 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, A	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, CI, F,	SO4, Aqu	eous	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 occured.

CONSUMERS ENERGY Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

	2-1109		1.4	10071	des	
Inspection Date: 10-07-24	020	Inspection I	By: del	1001.	10 0	
Sample Origin/Project Name	KAKN BO	STIDM FISH	FOND	411-	2020 4	
Project Log-In Number: Inspection Date: Sample Origin/Project Name Shipment Delivered By: Ente	er the type of shipm	ent carrier.				
Pony I Other/Hand Carry (wh	FedEx	UPS	USPS	Airb	orne	
Other/Hand Carry (wh	hom) JAKE 1	KRENZ	-		-	
Tracking Number:		Shippi	ng Form Attach	ed: Yes	No	
Shipping Containers: Enter t	and the second se		rs received.			
Cooler	Custom (Custom Case Envelope/Mailer				
Loose/Unpackaged Containers		Other	Other			
Condition of Shipment: Ente	r the as-received co	ndition of the shipmer	nt container.			
Damaged Shipment O	Damaged Shipment Observed: None		Dented		Leaking	
Other						
Enclosed Documents: Enter t CoC Wo	rk Request	Air Data S	Sheet	Other	-	
Temperature of Containers: I As-Received Tempera M&TE # and Expiration	ture Range 5.1°c	Samples 1	Received on Ice	:: Yes 🗹 N	0	
As-Received Tempera M&TE # and Expiration	nture Range <u>5.1°c</u> on_015402	5 Samples 06/04/202	Received on Ice		0	
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u>	nture Range <u>5.1°c</u> on_015402	Samples of Sample co	Received on Ice ontainers receive		0 Leaking	
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60mL)	nture Range 5.1° on 015402 ners: Enter the total	Samples of Sample co	Received on Ice ontainers receive	ed.		
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60mL) Quart/Liter (g/p)	nture Range 5.1° on 015402 ners: Enter the total	Samples of Sample co	Received on Ice ontainers receive	ed.		
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar)	nture Range 5.1° on 015402 ners: Enter the total	Samples of Sample co	Received on Ice ontainers receive	ed.		
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60mL) Quart/Liter (g/p)	nture Range 5.1° on 015402 ners: Enter the total	Samples of Sample co	Received on Ice ontainers receive	ed.		
As-Received Tempera M&TE # and Expiration Number and Type of Contain <u>Container Type</u> VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass)	thure Range 5.1° on 015402 hers: Enter the total <u>Water</u> Soi	Samples of Sample co	Received on Ice ontainers receive	ed.		
M&TE # and Expiration Number and Type of Contain Container Type VOA (40mL or 60mL) Quart/Liter (g/p) 9-oz (amber glass jar) 2-oz (amber glass) 125 mL (plastic)	thure Range 5.1° on 015402 hers: Enter the total <u>Water</u> Soi	Samples of Sample co	Received on Ice ontainers receive	ed.		

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Consumers Energy

SAMPLING SITE:			PROJECT NUMBER: 20-1109				ANALYSIS REQUESTED				Page 1 of 1					
Karn Bottom Ash Pond & LI - 2020 Q4				& LI - 2020	Q4	20-1109			tals						SEND REPORT TO: CDBatts	
SAMPLING TEAM:			DATE SHIPPED:	SI	SITE SKETCHED ATTACHED?					-			HD Register, TRC			
7	c					11. 37.90		CIRCLE ONE: YES NO		Fotal Metals	Anions	~	Alkalinity			PHONE:
CON	CE FROL #	SA E	MPLE ATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOO	SAMPLE DESCRIPTION / LOCATION		# OF CONTAINERS	Tota	Ani	Anio TDS				REMARKS
20-	109-01	0	ble	on	GW	DEK-MW-15003	DEK-MW-15003		5	x	х	x	x			A Design of the second
	-02	11	11	6752	GW	DEK-MW-18001			5	x	x	x	x			
	-03	1)	М	0725	GW	DEK-MW-18001 MS			4	x	x		x			
1	-04	1	11	0725	GW	DEK-MW-18001 MSD			4	x	x		x			
		-				A Contraction of the										
1																
6																
				-						1						
		1														
RELINQUISHED BY: (SIGNATURE) DATE/T		IME: 7-2020/0743	1			1.1.1	COMMENTS 5.1°C				5					
RELINQUISHED BY: (SIGNATURE) DATE/TI			IME: REC	EIVED	?: (SIGNATUR	E)		59 01	0 1-2		L TO LAB	COPY	Y TO CUSTOMER			
-					-		20-	1109 Page 13	of 13	-						



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

135 W. Trail St.

Jackson, MI 49201

Chemistry Project: 20-1110

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

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

CASE NARRATIVE

I. Sample Receipt

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

II. Methodology

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

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

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

DEFINITIONS / QUALIFIERS

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

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

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



Customer Name:Karn/Weadock ComplexWork Order ID:Q4-2020 DEK RCRA Lined Impoundment WellsDate Received:10/11/2020Chemistry Project:20-1110

<u>Sample #</u>	Field Sample ID	<u>Matrix</u>	Sample Date	<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



Analyst: SLK

Aliquot: 20-1110-01-C01-A01

Sample Site: **DEK Lined Impoundment** Laboratory Project: 20-1110 Field Sample ID: OW-10 Collect Date: 10/08/2020 Lab Sample ID: 20-1110-01 Collect Time: 10:04 AM Matrix: Groundwater

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, Tota	I, 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 R	ule Analyte List, Cl, F,	SO4, Aqu	eous	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



Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:OW-10Collect Date:10/08/2020Lab Sample ID:20-1110-01Collect Time:10:04 AMMatrix:GroundwaterCollect Time:10:04 AM

Alkalinity by SM 2320B	Aliquot:	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



Total Dissolved Solids

Analyst: SLK

Aliquot: 20-1110-02-C01-A01

Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:OW-11Collect Date:10/08/2020Lab Sample ID:20-1110-02Collect Time:01:38 PMMatrix:GroundwaterCollect 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	e Analyte List, Cl, F,	SO4, Aqu	eous	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 2	2540C			Aliquot:	20-1110-02-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissaluad Calida	000		····· //	10	40/40/0000	1000 4040 40

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mg/L

10

10/13/2020

AB20-1013-12



Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:OW-11Collect Date:10/08/2020Lab Sample ID:20-1110-02Collect Time:01:38 PMMatrix:GroundwaterCollect Time:01:38 PM

Alkalinity by SM 2320B	Aliquot: 2	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



Total Dissolved Solids

Analyst: SLK

Aliquot: 20-1110-03-C01-A01

Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:OW-12Collect Date:10/08/2020Lab Sample ID:20-1110-03Collect Time:11:48 AMMatrix:GroundwaterCollect 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, Ac	lueous			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 A	Analyte List, CI, F,	SO4, Aqu	eous	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 254	40C			Aliquot:	20-1110-03-C03-A01	Analyst: SLK
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #

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mg/L

10

10/13/2020

AB20-1013-12



Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:OW-12Collect Date:10/08/2020Lab Sample ID:20-1110-03Collect Time:11:48 AMMatrix:GroundwaterCollect Time:11:48 AM

Alkalinity by SM 2320B	Aliquot: 2	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



Analyst: SLK

Aliquot: 20-1110-04-C01-A01

Sample Site: **DEK Lined Impoundment** Laboratory Project: 20-1110 Field Sample ID: KLI-SCS Collect Date: 10/08/2020 Lab Sample ID: 20-1110-04 Collect Time: 01:05 PM Matrix: Groundwater

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

					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, Aque	ous			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 Ana	lyte List, CI, F,	SO4, Aqu	eous	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	



Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:KLI-SCSCollect Date:10/08/2020Lab Sample ID:20-1110-04Collect Time:01:05 PMMatrix:GroundwaterCollect Time:01:05 PM

Alkalinity by SM 2320B	Aliquot:	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



Analyst: SLK

Aliquot: 20-1110-05-C01-A01

Sample Site: **DEK Lined Impoundment** Laboratory Project: 20-1110 Field Sample ID: DUP-01 Collect Date: 10/08/2020 Lab Sample ID: 20-1110-05 Collect Time: 12:00 AM Matrix: Groundwater

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, Ac	lueous			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 A	Analyte List, CI, F,	SO4, Aqu	eous	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 254	40C			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



Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:DUP-01Collect Date:10/08/2020Lab Sample ID:20-1110-05Collect Time:12:00 AMMatrix:GroundwaterCollect Date: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



Fluoride

Sulfate

Analyst: SLK

Aliquot: 20-1110-06-C01-A01

Sample Site:DEK Lined ImpoundmentLaboratory Project:20-1110Field Sample ID:EB-01Collect Date:10/08/2020Lab Sample ID:20-1110-06Collect Time:12:10 PMMatrix:WaterCollect 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 CC	CR Rule Analyte List, CI, F, S	SO4, Aqu	eous	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

ug/L

ug/L

1000

1000

10/13/2020

10/13/2020

AB20-1013-09

AB20-1013-09

ND

ND



20-1110

Sample Site: **DEK Lined Impoundment** Laboratory Project: Field Sample ID: FB-01 Collect Date: 10/08/2020 Lab Sample ID: 20-1110-07 Collect Time: 12:15 PM Matrix: Water

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

Metals by EPA 6020B: CCR Ru	ule Appendix III-IV To	otal 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 Ru	e Analyte List, Cl, F,	SO4, Aqu	eous	Aliquot:	20-1110-07-C02-A01	Analyst: DMW
Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #

		, i				
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

No exceptions occured.

Chemistry Department

General Standard Operating Procedure

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

TITLE: SAMPLE LOG-IN - SHIPMENT INSPECTION FORM

2 44247	1011
nspection Date: 10-01-2040	Inspection By:
Inspection Date: 10-07-2020 Sample Origin/Project Name: KARN LINE	D IMPOUNDMENT - 2020 QU
Shipment Delivered By: Enter the type of shipment of	
Pony FedEx U	JPS USPS Airborne
Other/Hand Carry (whom)	
Tracking Number: 3976 3811 4077	Shipping Form Attached: Yes No
Shipping Containers: Enter the type and number of s	shipping containers received.
Cooler Cardboard Box	Custom Case Envelope/Mailer
	Other
Condition of Shipment: Enter the as-received condit	
Damaged Shipment Observed: None	Dented Leaking
Other	
CoC Work Request	Air Data Sheet Other
Cemperature of Containers: Measure the temperature	e of several sample containers.
Cemperature of Containers: Measure the temperature As-Received Temperature Range <u>1-8-3-0</u>	The of several sample containers. Samples Received on Ice: Yes $$ No $(-2)^2 - 20^2 l$
Cemperature of Containers: Measure the temperature As-Received Temperature Range 1.8 - 3.0 M&TE # and Expiration	The of several sample containers. Samples Received on Ice: Yes $$ No $(-2)^2 - 20^2 l$
Comperature of Containers: Measure the temperature As-Received Temperature Range 1.8-3.0 M&TE # and Expiration 215484 Number and Type of Containers: Enter the total nur Container Type Water VOA (40mL or 60nL) 10	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Cemperature of Containers: Measure the temperature As-Received Temperature Range As-Received Temperature Range M&TE # and Expiration ØM&TE # and Expiration ØM <te #="" and="" expiration<="" td=""> ØM<te #="" and="" expiration<="" td=""> ØM<</te></te>	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature Ass-Received Temperature Range 1.8-3.0 M&TE # and Expiration M&TE # and Expiration Image: Solic Containers: Enter the total num Container Type Water VOA (40mL or Son)L) Image: Container glass jar) 9-oz (amber glass jar) Image: Container glass jar)	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature Ass-Received Temperature Range 1.8 - 3.0 M&TE # and Expiration 215484 Number and Type of Containers: Enter the total num Container Type Water VOA (40mL or 60nL) 10 Quart/Liter (g/p) 10 9-oz (amber glass) 10	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature As-Received Temperature Range M&TE # and Expiration ØM&TE # and Expiration ØM ØM <t< td=""><td>The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.</td></t<>	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature Ass-Received Temperature Range 1.8 - 3.0 M&TE # and Expiration 215484 Number and Type of Containers: Enter the total num Container Type Water VOA (40mL or 60nL) 10 Quart/Liter (g/p) 10 9-oz (amber glass jar) 12 125 mL (plastic) 14 24 mL vial (glass) 10	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature Ass-Received Temperature Range 1.8 - 3.0 M&TE # and Expiration 215484 Number and Type of Containers: Enter the total num Container Type Water Soil VOA (40mL or 60mL) 10 Quart/Liter (g/p)	The of several sample containers. Samples Received on Ice: Yes \checkmark No 10-01-2021 mber of sample containers received.
Comperature of Containers: Measure the temperature Ass-Received Temperature Range 1.8 - 3.0 M&TE # and Expiration 215484 Number and Type of Containers: Enter the total num Container Type Water VOA (40mL or 60nL) 10 Quart/Liter (g/p) 10 9-oz (amber glass jar) 12 125 mL (plastic) 14 24 mL vial (glass) 10	re of several sample containers. Samples Received on Ice: Yes No

CHAIN OF CUSTODY

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

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

Consumers Energy

SAMPLING SIT	E:			PROJECT NUMBER:						ANAL	YSIS REC	UESTED	Page 1 of 1
arn Lined I	mpoundm	ent – 2020 Q	4	20	0-1110								SEND REPORT T CDBatts
AMPLING TEA	AM:			DATE SHIPPED:	SIT	TE SKETCHEI CIRCLE YES	O ATTACHED? ONE: NO	Total Metals	suc		Alkalinity		<u>HD Register, TRC</u> PHONE:
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOC	ATION	DEPTH (ft)	# OF CONTAINERS	Tota	Anions	TDS	Alka		REMARKS
20-1110-01	10/13/2	1004	GW	OW-10			5	x	x	x	x		
-02	10/8/2	1338	GW	OW-11			5	x	x	х	x	-	
-03	plebc	1148	GW	OW-12			5	x	x	x	x		
-04	148/2	1305	GW	KLI-SCS			5	x	x	x	x		
-05	10/8/2		GW	DUP- O (5	x	x	x	x		
-06	10/8/2	1210	W	EB-OI			2	x	x				
·-07	iolens	1215	W	FB- G ĺ			2	x	x				
							-						
RELINGUISHE	D BY: (SIGNA	TURE)		IME: RECE RECE L'LC	EIVED BY		A. 10 12	45 A	eč.	D	on	COMMENT JCG	1.8-3.0°C 015484
RELINQUISHEI	D BY: (SIGNA	TURE)	DATE/T	IME: RÉCI	EIVED BY	: (SIGNATUR	E)				N		015484 PY TO CUSTOMER
			-		<u>20-1</u>	110 Page 19	of 19	-			In on the	TO LIE CO.	TTTTO COOTOMER

🔅 eurofins

Environment Testing America

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

Brooks

Authorized for release by: 12/16/2020 11:33:48 AM

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

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.

Visit us at: www.eurofinsus.com/Env

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Definitions/Glossary

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

3

Qualifiers

Rad ~ -1:£:

Rad		
Qualifier	Qualifier Description	4
U	Result is less than the sample detection limit.	
Glossary		5
Abbreviation	These commonly used abbreviations may or may not be present in this report.	6
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	
%R	Percent Recovery	
CFL	Contains Free Liquid	
CFU	Colony Forming Unit	0
CNF	Contains No Free Liquid	0
DER	Duplicate Error Ratio (normalized absolute difference)	
Dil Fac	Dilution Factor	9
DL	Detection Limit (DoD/DOE)	
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC	Decision Level Concentration (Radiochemistry)	
EDL	Estimated Detection Limit (Dioxin)	
LOD	Limit of Detection (DoD/DOE)	
LOQ	Limit of Quantitation (DoD/DOE)	
MCL	EPA recommended "Maximum Contaminant Level"	
MDA	Minimum Detectable Activity (Radiochemistry)	
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
MPN	Most Probable Number	
MQL	Method Quantitation Limit	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
NEG	Negative / Absent	
POS	Positive / Present	
PQL	Practical Quantitation Limit	
PRES	Presumptive	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	
TEQ	Toxicity Equivalent Quotient (Dioxin)	
TNTC	Too Numerous To Count	

Job ID: 240-138055-1

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

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

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

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		

Eurofins TestAmerica, Canton

Client Sample Results

Lab Sample ID: 240-138055-1 Matrix: Water

Client Sample ID: DEK-MW-15003 Date Collected: 10/06/20 09:30 Date Received: 10/10/20 09:50

Method: 903.0 -	Radium-226	(GFPC)								
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2 σ+/-)	(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)								
		(/	Count	Total						
			Uncert.	Uncert.						

Analyte	Result	Qualifier	(2σ+/-)	(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

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

5

Client Sample Results

Lab Sample ID: 240-138055-2 Matrix: Water

Date Collected: 10/06/20 07:35 Date Received: 10/10/20 09:50

Client Sample ID: DEK-MW-18001

Radium-226 0.129 U 0.259 0.260 1.00 0.473 pCi/L 10/27/20 12/15/20 20:24 Carrier % Yield Qualifier Limits Prepared Analyzed Z Ba Carrier 56.6 40 - 110 Count Total Uncert. Uncert. Discussion				Count Uncert.	Total Uncert.						
Carrier% Yield 56.6QualifierLimits 40 - 110PreparedAnalyzed 10/27/20 12:49ZMethod: 904.0 - Radium-228 (GFPC)CountCountTotal Uncert.Uncert.	Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Ba Carrier 56.6 40 - 110 10/27/20 12:49 12/15/20 20:24 Method: 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert.	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
Method: 904.0 - Radium-228 (GFPC) Count Total Uncert. Uncert.	Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Count Total Uncert. Uncert.	Ba Carrier	56.6		40 - 110					10/27/20 12:49	12/15/20 20:24	1
Uncert. Uncert.	Method: 904.0 -	Radium-228	(GFPC)								
				Count	Total						
Analyte Result Qualifier (2σ+/-) (2σ+/-) RL MDC Unit Prepared Analyzed D				Uncert.	Uncert.						
		Descult	Qualifian	(2 - + /)	(20+/)	DI	MDC	Unit	Bronarod	Analyzod	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	
Г	_										

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

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

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Tracer/Carrier Summary

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR DEK Bottom Ash Pond Job ID: 240-138055-1

Prep Type: Total/NA

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

_				Percent Yield (Acceptance Limits)	
		Ва			
Lab Sample ID	Client Sample ID	(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			
LCSD 160-486962/2-A	Lab Control Sample Dup	51.3			
MB 160-486962/23-A	Method Blank	66.0			
Tracer/Carrier Legend	I				8
Ba = Ba Carrier					Ī
Method: 904.0 - R	adium-228 (GFPC)				
Matrix: Water	. ,			Prep Type: Total/NA	
-				Percent Yield (Acceptance Limits)	
		Ва	Y		
Lab Sample ID	Client Sample ID	(40-110)	(40-110)		
240-138055-1	DEK-MW-15003	80.9	109		
240-138055-2	DEK-MW-18001	90.0	108		

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			

Lab Control Sample

88.8

Y = Y Carrier

LCS 160-488922/1-A

QC Sample Results

Job ID: 240-138055-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water											Prep Type	: Tot	al/NA
Analysis Batch:	: 491763										Prep Batc		
				Count	Total								
		MB	МВ	Uncert.	Uncert.								
Analyte	Re	esult	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC	Unit		Prepared	Analyzed	I	Dil Fac
Radium-226	-0.0	4795	U	0.260	0.260	1.00	0.536	pCi/L	10	/27/20 12:49	12/15/20 20:	40	1
		ΜВ	МВ										
Carrier	%	Yield	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	-486	962/1-A					Cli	ent Sa	ample ID:	Lab Contro	ol Sa	ample
Matrix: Water											Prep Type		
Analysis Batch:	: 491775										Prep Batc		
•	- The second sec					Total					•		
			Spike	LCS	LCS	Uncert.					%Rec.		
Analyte			Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits		
Radium-226				10.19		1.38	1.00	0.375	pCi/L	90	75 - 125		
	LCS LCS	s											
Carrier %	%Yield Qua	alifier	Limits										
Ba Carrier	73.6		40 - 110	-									
	73.6 LCSD 16		40 - 110	-		Total		Client S	ample		Control Sa Prep Type Prep Batc	: Tot	al/NA
Ba Carrier Lab Sample ID: Matrix: Water	73.6 LCSD 16		40 - 110 6962/2-A		ICSD	Total		Client S	ample		Prep Type Prep Batc	: Tot	al/NA 86962
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch:	73.6 LCSD 16		40 - 110 6962/2-A Spike		LCSD Qual	Uncert.					Prep Type Prep Batc %Rec.	: Tot h: 48	al/NA 86962 RER
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte	73.6 LCSD 16		40 - 110 6962/2-A	LCSD <u>Result</u> 9.807			<u>RL</u> 1.00	MDC	Unit		Prep Type Prep Batc %Rec. Limits	: Tot	al/NA 86962 RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226	73.6 LCSD 16 : 491775	5 0-4 8	40 - 110 6962/2-A Spike Added	Result		Uncert. (2σ+/-)	RL		Unit	%Rec	Prep Type Prep Batc %Rec. Limits	: Tot h: 48 RER	al/NA
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226	73.6 LCSD 16 : 491775 	50-48 SD	40 - 110 6962/2-A Spike Added 11.3	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Type Prep Batc %Rec. Limits	: Tot h: 48 RER	al/NA 86962 RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier	73.6 LCSD 16 : 491775 LCSD LCS &Yield Qua	50-48 SD	40 - 110 6962/2-A Spike Added 11.3 Limits	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Type Prep Batc %Rec. Limits	: Tot h: 48 RER	al/NA 86962 RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226	73.6 LCSD 16 : 491775 	50-48 SD	40 - 110 6962/2-A Spike Added 11.3	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Type Prep Batc %Rec. Limits	: Tot h: 48 RER	al/NA 86962 RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier % Ba Carrier	73.6 LCSD 16 : 491775 LCSD LC: %Yield Qua 51.3	50-48 SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110	Result 9.807		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Type Prep Batc %Rec. Limits	: Tot h: 48 RER	al/NA 86962 RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Ba Carrier Method: 904.0	73.6 LCSD 16 : 491775 LCSD LC3 &Yield Qua 51.3	SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 86	Prep Type Prep Batc %Rec. Limits 75 - 125	: Tot h: 48 RER 0.13	RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Ba Carrier Method: 904.0 Lab Sample ID:	73.6 LCSD 16 : 491775 LCSD LC3 &Yield Qua 51.3	SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 86 ient Samp	Prep Type Prep Batc %Rec. Limits 75-125	: Tot h: 48 RER 0.13	RER Limit
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Method: 904.0 Lab Sample ID: Matrix: Water	73.6 LCSD 16 : 491775 LCSD LC3 &Yield Qua 51.3 - Radiu MB 160-4	SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 86 ient Samp	Prep Type Prep Batc %Rec. Limits 75-125	rod I	RER Limit Blank
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Ba Carrier Method: 904.0 Lab Sample ID:	73.6 LCSD 16 : 491775 LCSD LC3 &Yield Qua 51.3 - Radiu MB 160-4	SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 86 ient Samp	Prep Type Prep Batc %Rec. Limits 75-125	rod I	RER Limit Blank
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Method: 904.0 Lab Sample ID: Matrix: Water	73.6 LCSD 16 : 491775 LCSD LC3 &Yield Qua 51.3 - Radiu MB 160-4	SD alifier	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC 22/21-A	Result 9.807	Qual	Uncert. (2σ+/-)	RL	MDC	Unit pCi/L	<u>%Rec</u> 86 ient Samp	Prep Type Prep Batc %Rec. Limits 75-125	rod I	RER Limit Blank
Ba Carrier Lab Sample ID: Matrix: Water Analysis Batch: Analyte Radium-226 Carrier Method: 904.0 Lab Sample ID: Matrix: Water	73.6 LCSD 16 : 491775 (491775 (491775) LCSD LC: (491775) LCSD LC: (491775) (491169) : 491169	50-48 SD alifier 4889 MB	40 - 110 6962/2-A Spike Added 11.3 Limits 40 - 110 228 (GFPC 22/21-A	Result 9.807	Qual	Uncert. (2σ+/-)	RL	<u>MDC</u> 0.494	Unit pCi/L	<u>%Rec</u> 86 ient Samp	Prep Type Prep Batc %Rec. Limits 75-125	: Tot h: 48 RER 0.13	RER Limit Blank

	МВ	МВ				
Carrier	%Yield	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

Eurofins TestAmerica, Canton

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)

Analysis B	atch: 4911	72									Prep Ba	tch: 48	88922
			Online	1.00	LCS	Total Uncert.					%Rec.		
Ameliate			Spike Added	Result			RL	MDC	11	%Rec	%Rec.		
Analyte Radium-228				8.844	Quai	(2σ+/-) 1.11				87	75 - 125		
Radium-220			10.1	0.044		1.11	1.00	0.514	pCI/L	07	75-125		
	LCS	LCS											
Carrier	%Yield	Qualifier	Limits										
Ba Carrier	88.8		40 - 110										
Y Carrier	93.8		40 - 110										
Lab Sample		D 160-4889	22/2-A					Client S	ample	ID: Lab	Control S		
Lab Sample Matrix: Wat	ter		22/2-A				•	Client S	ample	ID: Lab	Prep Typ	be: Tot	tal/NA
Lab Sample Matrix: Wat	ter		22/2-A				(Client S	ample	ID: Lab		be: Tot	tal/NA
Lab Sample Matrix: Wat	ter			1.005	1000	Total		Client S	ample	ID: Lab	Prep Typ Prep Ba	be: Tot	tal/NA 88922
Lab Sample Matrix: Wat Analysis B	ter		Spike		LCSD	Uncert.			·		Prep Typ Prep Bar %Rec.	be: Tot tch: 48	tal/NA 88922 RER
Lab Sample Matrix: Wat Analysis B Analyte	ter		Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48	tal/NA 88922 RER Limit
Lab Sample Matrix: Wat Analysis B Analyte	ter		Spike			Uncert.			Unit		Prep Typ Prep Bar %Rec.	be: Tot tch: 48	tal/NA 88922 RER Limit
Lab Sample Matrix: Wat Analysis B Analyte	ter atch: 4911 		Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48	tal/NA 88922 RER Limit
Lab Sample Matrix: Wat Analysis B Analyte Radium-228	ter atch: 4911 	72	Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48	tal/NA 88922 RER Limit
Lab Sample Matrix: Wat Analysis B Analyte Radium-228 Carrier Ba Carrier	ter atch: 4911 	172	Spike Added 10.1	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48	tal/NA

Eurofins TestAmerica, Canton

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		1
LCSD 160-488922/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0		

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

Client Sample ID: DEK-MW-15003 Date Collected: 10/06/20 09:30 Date Received: 10/10/20 09:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	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 Date Collected: 10/06/20 07:35 Date Received: 10/10/20 09:50

	Batch	Batch		Dilution	Batch	Prepared		
Ргер Туре	Туре	Method	Run	Factor	Number	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

Job ID: 240-138055-1

Lab Sample ID: 240-138055-1 Matrix: Water

Lab Sample ID: 240-138055-2

Matrix: Water

Eurofins TestAmerica, Canton

Accreditation/Certification Summary

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

Job ID: 240-138055-1

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Laboratory:	Eurofins	TestAmerica, St. Louis	
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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 4101 Shuffel Street NW North Canton, OH 44720 Phone: 330-497-9396 Fax: 330-497-0772	U	Chain of Custody Record	f Cust	ody R	ecord	4,6155		×	🔅 eurofins	Environment Testing America
Client Information	Sampler	54D	ASE	Brool	Lab PM: Brooks, Kris M		Carrier Tracking No(s):	?(S	COC No: 240-75415-29053.1	33.1
Client Contact Jacob Krenz	734 204	m	31C	E-Mail Kris.I	E-Mait: Kris.Brooks@Eurofinset.com	inset.com			Page: Page 1 of 1	
Company: TRC Environmental Corporation.						Analysis Requested	equested		Job #:	
Address: 1540 Eisenhower Place	Due Date Requested:	ed:			1/10					les:
City. Ann Arbor	TAT Requested (days):	ays):			Big					M - Hexane N - None O - AsNaO2
State, Zp: Mi, 48108-7080					17.2				D - Nitric Acid E - NaHSO4	P - Na204S Q - Na2S03
Phone: 734-971-7080(Tei) 734-971-9022(Fax)	PO#: 135139				(0					R - Na2S203 S - H2S04 T - TSP Dodecabydrate
Email: JKrenz@trccompanies.com	:# OM								1 - Ice J - DI Water	U - Acetone V - MCAA
Project Name: Karn/Weadock CCR DEK Bottom Ash Pond & I	Project #: 24024154				EPC es or				K - EDTA L - EDA	W - pH 4-5 Z - other (specify)
Site:	SSOW#				528 CI				of con	
		Sample		-	eld Filtered M/SM mohe 3.0, Ra226Ra 3.0 - Standard				tel Number	
Sample Identification	Sample Date	Time	G=grab) BT=Tissue, A-A Preservation Code:	-		a set to the set				Special Instructions/Note:
DEK-MW-15003	tolote	520	3	Water						
DEK-MW-18001	11 12	1735		Water	1111					
DEK-ME 14:001 MS JUNSI	11 11	-400	00	Water	5					
							+			
				240-13	240-138055 Chain of Custody	f Custody				
				T	+	+				
Possible Hazard Identification					Sample Di	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	e assessed if samp	les are reta	nined longer than 1	month)
Ne Skin Irritant	Poison B Duknown		Radiological		Retu	Return To Client	Disposal By Lab	Ar	Archive For	Months
Deliverable Requested: 1, 11, 11, 11, V. Other (specify)					special Ins	tructions/UC Required	. 1			
		Date:			Time:		Method of Shipment:	oment:		
	10/8/DE	0)	31-0	Company	Received by:	A	Dat	Date/Time: い)	1210 0-	Euline FINI
Relinquisted by	5	24 69	200	Company Guile 1 C		amy a	200	Date/Time:	1-20 950	Comparty
Reinquistred by:	Date/Time:		0	Company		1 py: 0	Dai	Date/Time:		Company
Custody Seals Intact: Custody Seal No.: A Yes A No					Coaler T	Cooler Temperature(s) °C and Other Remarks	r Remarks:			
-					14	11 12 13	9 10	7 8	5 6	Ver 01/16/2019

Canton Facility Client TRC Environmental Site Name	
lient INI. ENVIRONMENTO Site Name	Cooler unpacked by:
poler Received on 10-10-20 Opened on 10-10-20	Varmy Rage
edEx: 1 st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier	Other O O
teceipt After-hours: Drop-off Date/Time Storage Location	
Packing material used: Bubble Wrap Foam Plastic Bag None Other COOLANT: Wet Ice Blue Ice Dry Ice Water None Cooler temperature upon receipt □ See Multiple Cooler IR GUN# IR-11 (CF +0.9 °C) Observed Cooler Temp. °C Corrected Cooler IR GUN #IR-12 (CF +0.5 °C) Observed Cooler Temp. °C Corrected Cooler . Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity . . . Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? . . . Were tamper/custody seals intact and uncompromised? . . . Did custody papers accompany the sample(s)? Were the custody papers relinquished & signed in the appropriate place? . . . Was/were the person(s) who collected the samples clearly identified on the COC? . . . Did all bottle labels (ID/Date/Time) be reconciled with the COC? . . . Sufficient quantity received to perform indicated analyses? . . . Are these work share samples and all listed on the COC? Were all preserved sample(s) at the correct pH upon receipt? <th>r Temp. °C er Temp. °C es No No NA es No No NA es No es No</th>	r Temp. °C er Temp. °C es No No NA es No No NA es No es No
 Was a LL Hg or Me Hg trip blank present?Y 	
	Voice Mail Other
ontacted PM Date by via Verbal	Voice Mail Other
ontacted PM Date by via Verbal	Voice Mail Other
ontacted PM Date by via Verbal oncerning	Voice Mail Other
Contacted PM Date by via Verbal Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page	Samples provessed by:
Contacted PM Date by via Verbal	Samples provessed by:
Date by via Verbal oncerning B. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Missing Sample - DEK - HW 18001	Samples professed by: m.S.+m3D
ontacted PM Date by via Verbal oncerning B. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Missing Sample - DEK - HW B. SAMPLE CONDITION were received after the recommended homogeneous provide the second provided after the recommended homogeneous provided after the recommended after the recommended homo	Sample provessed by: M.S. + M.S. D Iding time had expired.
ontacted PM Date by via Verbal oncerning	Sample provessed by MS + M3 D Iding time had expired. ed in a broken container.
ontacted PM Date by via Verbal oncerning	Sample provessed by MS + M3 D Iding time had expired. ed in a broken container.
Contacted PM Date by via Verbal Concerning	Sample provessed by MS + M3 D Iding time had expired. ed in a broken container.
Date by via Verbal concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Missing Sample - DEK - HW 9. SAMPLE CONDITION ample(s) Were received after the recommended ho ample(s) were received after the recommended ho ample(s) Were received with bubble >6 mr 0. SAMPLE PRESERVATION	Sample provessed by MS+M3D Iding time had expired. red in a broken container. n in diameter. (Notify PM)
Contacted PM Date by via Verbal Concerning	Sample provessed by MS + M3 D Iding time had expired. ed in a broken container.

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
A Client Box Other	IR-10 IR-11	4.6	5.5	(Wet Ice) Blue Ice Dry Ice
TA Client Box Other	IR-10 HR-TT	0.3	1.2	Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11	0.5	1.0	Water None Wet Ice Blue Ice Dry Ice
	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
rA Client Box Other	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
rA Client Box Other	IR-10 IR-11			Water None Wet ice Blue ice Dry ice
IA Client Box Other	IR-10 IR-11			Water None Water Blue Ice Dry Ice
A Client Box Other		Contraction of the later is the second second second	and the state of the	Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
IA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
IA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11		and the state of the second	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11	A CONTRACTOR OF		Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11	Carrier and the second second second		Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11		Constitution of the second	Water None Wet Ice Blue Ice Dry Ice
IA Client Box Other	IR-10 IR-11		the second state of the second	Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11	- The second second		Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
and the second	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11		anna i an citate a constate	Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11			Water None Wet Ice Blue Ice Dry Ice
TA Client Box Other	IR-10 IR-11			Water None
TA Client Box Other		and the second	and the second strain of the second	Wet ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wetice Blueice Drylce Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11	and Conference Contraction and a second		Wet Ice Blue Ice Dry Ice

WI-NC-099 Cooler Receipt Form Page 2 - Multiple Coolers

Eurofins TestAmerica, Canton 4101 Shuffel Street NW

Chain of Custody Record



Client Information (Sub Contract Lab)	Sampler			Lab PM Brook: E-Mail	Lab PM: Brooks, Kris M E-Mail		Carrier Tracking No(s) State of Origin:	ting No(s).	COC No. 240-126446.1 Page:	
tient Contact Shipping/Receiving	Phone.			Kris.B	Kris.Brooks@Eurofinset.com	ofinset.com			Page 1 of 1	
ompany estAmerica Laboratories. Inc.				4	ccreditations F	Accreditations Required (See note)	note).		Job # 240-138055-1	
(ddress. 13715 Birler Trail North	Due Date Requested: 11/9/2020	÷				A	Analysis Requested		Preservation Codes:	des: M - Hexane
tar Torvicer I fair Young Sign State, Zp Mo 6 Sold S	TAT Requested (days):	ys):							B - NACH B - Acetate C - Zn Acetate D - Nitric Acid E - Natro	N - None 0 - AsNaO2 P - Na2045 Q - Na2203 B - Na2203
mo, ocorro Phone 314-208-8757(Fax) 314-208-8757(Fax)	# Od					15			G - Amchlor H - Ascorbic Acid	
	# 0M				(0)	inget Li				
Project Name. Karrn/Weadock CCR Groundwater Monitoring	Project # 24024154				ea ot l	sT bisb				Z - other (specify)
Site:	#MOSS				A) asi				of co	
	Samnia Data	Sample Time	Sample Type (C=comp, G=drab)	Matrix (wewater, S=solid. O=wasteroli, attricente AttAir)	Perform M/SM mrofned Perform MS/M -geScep_	.04.0/PrecSep_ 0_8226Я8226Я			Total Number Special	Special Instructions/Note:
Sample Identification - Client ID (Lab ID)		X	Preserva		X					X
DEK-MW-15003 (240-138055-1)	10/6/20	09:30 Eastern		Water	×	××			2 TVA protocol - R	TVA protocol - Ra-226+228 action limit at 5.0 pC//L.
DEK-MW-18001 (240-138055-2)	10/6/20	07.35 Eastern		Water	×	× ×			2 TVA protocol - R 5.0 pCi/L	TVA protocol - Ra-226+228 action limit at 5.0 pC//L
Note: Since laboratory accreditations are subject to change. Eurofins TestAmerica places the ownership of maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samp TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Ch	IstAmerica places the ownersh ts/matrix being analyzed, the s urrent to date, return the signer	ip of method & amples must t	I accre inalyte & accre ie shipped bac stody attesting	method, analyte & accreditation compliance upon out subcontract lab les must be shipped back to the Eurofins TestAmerica laboratory or or ain of Custody attesting to said complicance to Eurofins TestAmerica	TestAmerica la tota tota la to	ubcontract labo aboratory or oth TestAmerica	method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently les 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 ain of Custody attesting to said complicance to Eurofins TestAmerica.	Lis forwarded under Any changes to ac	chain-of-custody. If the lab creditation status should be	oratory does not cu brought to Eurofins
Possible Hazard Identification					Sample	le Disposal (A I Return To Client	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	if samples are	retained longer than ☐ Archive For	1 month) Months
Uncontitmed Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverabl	able Rank: 2	2		Special	Instructions	Requirem			
Empty Kit Relinguished by:		Date:			Time:		Meth	Method of Shipment.		
Reinquished by:	Date/Time	101	3	Company	Rece	Received by	FED EX	Date/Time:		Company
Relinquished by EED FX				Company	X	A Day	in	Date/Time 10 113 ho 20	1260 020	Company ETA SIL
Relinquished by	Date/Time:			Company	Partie	teceived by:		Date/Time.		Company

Custody Seal No.

Ver: 01/16/2019

Cooler Temperature(s) ^aC and Other Remarks.

13 14

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Login Number: 138055 List Number: 2 Creat

List Number: 2			List Creation: 10/14/20 01:09 PM
Creator: Mazariegos, Leonel A			
Question	Answer	Comment	
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td> <td></td>	True		
The cooler's custody seal, if present, is intact.	True		
Sample custody seals, if present, are intact.	True		
The cooler or samples do not appear to have been compromised or tampered with.	True		
Samples were received on ice.	N/A		
Cooler Temperature is acceptable.	True		
Cooler Temperature is recorded.	True		
COC is present.	True		
COC is filled out in ink and legible.	True		
COC is filled out with all pertinent information.	True		
Is the Field Sampler's name present on COC?	True		
There are no discrepancies between the containers received and the COC.	True		
Samples are received within Holding Time (excluding tests with immediate HTs)	True		

HTs)	mao
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	True
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

Job Number: 240-138055-1

List Source: Eurofins TestAmerica, St. Louis

🔅 eurofins

Environment Testing America

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

lis Brooks

Authorized for release by: 12/16/2020 11:36:30 AM

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

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.

Visit us at: www.eurofinsus.com/Env

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The

Expert

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Definitions/Glossary

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

3

Qualifiers

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I LUM	a	а	ĸ

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

Glossary

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

Job ID: 240-138056-1

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

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

5 6 7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asse
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	

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

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

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

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

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2 σ+/-)	(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: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Lab Sample ID: 240-138056-2 Matrix: Water

Client Sample ID: OW-11 Date Collected: 10/08/20 13:38 Date Received: 10/10/20 09:50

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(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)								
Method: 904.0 -	Radium-228	(GFPC)	Count	Total						
Method: 904.0 -	Radium-228	(GFPC)	Count Uncert.	Total Uncert.						
		(GFPC) Qualifier			RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Method: 904.0 - Analyte Radium-228		Qualifier	Uncert.	Uncert.	RL	MDC 0.469		Prepared	Analyzed 12/08/20 12:45	Dil Fac

Ba Carrier 86.4 40 - 110 11/12/20 06:43 12/08/20 12:45 105 40 - 110 11/12/20 06:43 12/08/20 12:45 Y Carrier Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

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

5 7

1

1

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

Job ID: 240-138056-1

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

5

7

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

Method: 903.0 -	Radium-226	(GFPC)	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(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)								
		(-)	Count	Total						
			Uncert.	Uncert.						

Analyte	Result	Qualifier	(2σ+/-)	(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

			Count	Total							
			Uncert.	Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(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: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Lab Sample ID: 240-138056-4 Matrix: Water

Client Sample ID: DUP-01 Date Collected: 10/08/20 00:00 Date Received: 10/10/20 09:50

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

Carrier	%Yield Qualif	er 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

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

5

6 7

Client: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Karn Lined Impoundment Job ID: 240-138056-1

Lab Sample ID: 240-138056-5

Client Sample ID: EB-01 Date Collected: 10/08/20 12:10 Date Received: 10/10/20 09:50

Method: 903.0		(0110)	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2 σ+/-)	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

			Count Uncert.	Total Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	(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 -		(GFPC)	Count	Total					12 10 20 20:20	·	Ì
-		(GFPC)		Total					12 10 20 20:20	·	ì
-	- Radium-228	(GFPC) Qualifier		Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
Method: 904.0 -	- Radium-228	Qualifier	Count Uncert.	Uncert.	RL 1.00	MDC 0.489				Dil Fac	1
Method: 904.0 -	- Radium-228 Result 0.306	Qualifier	Count Uncert. (2σ+/-)	Uncert. (2σ+/-)				Prepared	Analyzed	Dil Fac 1 Dil Fac	
Method: 904.0 - Analyte Radium-228	- Radium-228 Result 0.306	Qualifier	Count Uncert. (2σ+/-) 0.302	Uncert. (2σ+/-)				Prepared 11/12/20 06:43	Analyzed 12/08/20 12:45	1	

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

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

Matrix: Water

Tracer/Carrier Summary

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

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

			Percent Yield (Acceptance Limits)	
		Ва		- 5
Lab Sample ID	Client Sample ID	(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		9
LCSD 160-486962/2-A	Lab Control Sample Dup	51.3		
MB 160-486962/23-A	Method Blank	66.0		
	_			
Tracer/Carrier Legend	d in the second s			

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

				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

Prep Type: Total/NA

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)

Radium-226 -0.04795 U 0.260 0.260 1.00 0.536 pC//L 10/27/20 12:49 12/15/20 20:40 Carrier MB MB MB Carrier Prepared Analyzed Dil Fi Bit Carrier Stried Qualifier Limits 40-110 Total Prepared Analyzed Dil Fi Bit Carrier Spike LCS 160-486962/1-A Client Sample ID: LCS 160-486962/1-A Client Sample ID: Lab Control Sample Prep Type: Total/N Prep Satch: 48696 Prep Type: Total/N	Lab Sample		60-4869	62/23-A						Client Samp	ole ID: Metho	
Count Radium-228 Total Uncert. (20+7) NL (20+7) NL (20+											Prep Type: T	otal/N/
MB MB MB Uncert. (20+i) RL (20+i) MDC (20+i)	Analysis Ba	tch: 4917	763								Prep Batch:	48696
Analyte Result Qualifier (2σ+/.) RL MDC Unit Prepared Analyzed Dil Fa Carrier Wield Qualifier Limits 0.04795 U 0.060 0.060 0.0536 pC/L 10/21/20 12.49 12/15/20 20.40 Dil Fa Carrier Wield Qualifier Limits Prepared Analyzed Dil Fa 3a Carrier 66.0 40.110 Total Prepared Analyzed Dil Fa Lab Sample ID: LCS 160-486962/1-A Kath:: Ketr Norert. Client Sample ID: Lab Control Sample Prep Type: Total/N Prep Batch: 48690 Analyte Added Result Qualifier Limits %Rec. Limits %Rec. Limits Prep Type: Total/N Prep Ty					Count	Total						
Radium-226 -0.04795 0 0.260 0.260 1.00 0.536 pC/L 1027/2012/249 12/15/20 20.40 Carrier %Yield Qualifier Limits Propared Analyzed Dil Fi Ba Carrier 66.0 40.110 Propared Analyzed Dil Fi Lab Sample ID: LCS 160-486962/1-A Spike LCS LCS Total Prep Batch: 48690 Analysis Batch: 491775 Spike LCS LCS Total Uncert. MDC Unit %Rec. Analysis Batch: 491775 Added RL MDC Unit %Rec. %Rec. Analysis Batch: 491775 Added Result Qualifier Limits Result Qualifier MDC Unit %Rec. %Rec. Carrier %Weid Qualifier Limits Result Qualifier Result Qualifier Limits Result Qualifier					Uncert.	Uncert.						
MB MB Carrier % Yield Qualifier Limits Prepared Analyzed Dif R Sa Carrier % Yield Qualifier 40.110 1027/2012/49 12/15/20 20.40 Dif R Lab Sample ID: LCS 160-486962/1-A Matrix: Water Client Sample ID: Lab Control Sample Prep Type: TotalN Prep Type: TotalN Prep Batch: 48696 Analyzed				· · · · · · · · · · · · · · · · · · ·	(2σ+/-)	(2 σ +/-)	RL				-	Dil Fa
Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fill Ba Carrier 66.0	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	
Ba Carrier 66.0 40.110 10/27/20 12:49 12/15/20 20:40 Lab Sample ID: LCS 160-486962/1-A Matrix: Water Analysis Batch: 491775 Client Sample ID: Lab Control Sample Prep Type: Total/N Prep Batch: 48690 Analyte Radium-226 Spike LCS LCS LCS LCS LCS LCS LCS IIIIIts Uncert. Added Nucert. Result Qual Nucert. (20+4) MDC Unit 1.38 %Rec. IIIIIts %Rec. IIIIIts Sa Carrier %Vield Qualifier 73.6 Limits 40.110 Client Sample ID: Lab Control Sample Du 0.375 pC/L %Rec. 80 IIIIIIts Analyte Radium-226 LCS LCS LCS LCSD Limits 40.110 Client Sample ID: Lab Control Sample Du 0.375 pC/L %Rec. 80 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			MB	МВ								
Lab Sample ID: LCS 160-486962/1-A Matrix: Water Analysis Batch: 491775 Client Sample ID: Lab Control Sample Prep Type: Total/N Prep Batch: 48696 Analysis Batch: 491775 Total Uncert. 200 0.375 pG/L WBC Unit 90 %Rec. Limits 90 Limits 90 Analyte Radium-226 CS LCS LCS LCS Carrier Limits 40 - 110 Limits 40 - 110 Client Sample ID: Lab Control Sample Du 0.375 pG/L %Rec. 90 Limits 75 - 125 Lab Sample ID: LCSD 160-486962/2-A Matrix: Water Analysis Batch: 491775 Limits 40 - 110 Client Sample ID: Lab Control Sample Du Nerep Type: Total/N Prep Batch: 48696 Carrier Spike Matrix: Water Analysis Batch: 491775 Added 11.3 LCSD LCSD 100 erret. 9.007 Total Uncert. 40 - 110 MDC Unit 9.807 %Rec. 86 RER Limits 75 - 125 RER Limits 75 - 125 Carrier %Yield Qualifier 51.3 Limits 40 - 110 Limits 40 - 110 Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892 Carrier MB MB Matrix: Water Analyte MB MB MB M	Carrier		%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Matrix: Water Analysis Batch: 491775Prep Type: Total/N Prep Batch: 46696Analyte Radium-226Spike Added 11.3LCS LCS 10.19LCS 1.38Uncert. (20+/)RL MDC (20+/)MDC Wit WRec 0.375 pC/L%Rec. Limits 90Limits 75.125Carrier Sa Carrier%Yield 73.6Qualifier 40.110Limits 40.110Client Sample ID: Lab Control Sample Du Uncert. Result Qual 1.48Client Sample ID: Lab Control Sample Du Prep Batch: 48696Analyte Radium-226Added 11.3Result Qual 9.807Uncert. 1.48MDC 1.48MDC 0.494Witer WRec. Prep Batch: 48696Analyte Radium-226Added 11.3Limits 9.807Control 1.48MDC 1.00Witer WRec. Rec LCSDKec. Kec. Rec Limits 86Result 75.125Limits 0.13Sa Carrier Sa CarrierMDC 904.0Client Sample ID: Lab Control Sample Du WRec. 86Limits 75.125Nece. 0.13Rec WRec. WRec. Rec Limits 1.48NBC 1.00Witer WRec. WRec. WRec.Rec Limits 86Nece. 75.125Rec 0.13Carrier Analysis Batch: 491169Limits Uncert. Uncert. Uncert. Count 0.258Count 0.258Total 1.00NDC 0.457Unit Prepared Total/NPrepared Analyzed 11/12/2006/3Analyzed 12/08/2012/49Dil Fa 12/08/2012/49Mis Mis Ba Carrier 39.6Mis Mis 40.110Limits 0.258NDC 0.258NDC 0.457Unit PC/L <t< td=""><td>Ba Carrier</td><td></td><td>66.0</td><td></td><td>40 - 110</td><td></td><td></td><td></td><td></td><td>10/27/20 12:49</td><td>12/15/20 20:40</td><td></td></t<>	Ba Carrier		66.0		40 - 110					10/27/20 12:49	12/15/20 20:40	
Matrix: Water Analysis Batch: 491775 Analysis Batch: 491775 Analyte An			400 400	00014					01			.
Analysis Batch: 491775 Prep Batch: 48696 Analyte Spike LCS LCS Uncert. MDC Unit %Rec. Limits			160-486	962/1-A					Cli	ent Sample ID:		
TotalAnalyteAddedLCSLCSLCSUncert. (2\extrine)MDCUnit%Rec.LimitsRadium-22611.310.191.381.000.375 $pCiL$ $\frac{90}{90}$ 75.125 -75.125 LCSLCSLCSLCSLCSLCSLCSLCSLCSLCSMDCUnit%Rec.Limits $3a$ Carrier $\frac{\% Vield}{73.6}$ QualifierLimits 40.110 40.110 1.38 1.00 0.375 $pCiL$ $\frac{\% Rec}{90}$ TotalLab Sample ID: LCSD 160-486962/2-A Matrix: WaterMatrix: WaterPrep Type: Total/N Prep Batch: 48696Prep Type: Total/N Prep Batch: 48696Prep Type: Total/N Prep Batch: 48696Analyte Tadium-226Added 11.3Result 40.110Qual (2\end{tabular})Client Sample ID: Lab Control Sample Du Matrix: WaterCarrier Sa Carrier%Weid %Weid Qualifier 0.02189Limits 40.110Count (2\end{tabular})Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892Carrier Matrix: WaterMB MB MB Matrix: WaterMB MB MB MBMB Uncert. (2\end{tabular})Count (2\end{tabular})Total Mc McMDC Matrix: MB MBMB MB MB MB MB MB Matrix: Matrix: MB MBMB MB MB MB Matrix: Matrix: MB MB MB Matrix: MB MB Matrix: MB MB MB Matrix: Matrix: MB MB MB Matrix: Matrix: MB MB MB Matrix: Matrix: MB MB Mat			775									
AnalyteSpike AddedLCS ResultLCS QualUncert. (20+/-)RL (20+/-)MDC RL (20+/-)Unit MCC%Rec. Limits 90Limits 75.125CarrierLCS % VieldQualifier 40-110Limits 40-110Limits 40-110Client Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696Lab Sample ID: LCSD 160-486962/2-A Matrix: Water Analysis Batch: 491775Spike Added 11.3LCSD Result QualClient Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696Analyte Radium-226Added 11.3Result 40-110Qual 1.48(20+/-) 1.48RL 1.00MDC 0.494Unit pCi/L%Rec. %Rec. RE Limits 86RER Limits 0.13LCSD LCSD Carrier 3a CarrierSpike 40-110LCSD 40-110Client Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696LCSD LCSD Carrier 3a CarrierMB 160-488922/21-A 40-110Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892Lab Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169Count Uncert. (20+/-) 0.258Total Uncert. (20+/-)Matrix: Water Analysis Batch: 491169MB MB MB MB MB BacarrierMB MB MB MB MB MB MB MB MB MB MB MB MB MB BacarrierCount MB <b< td=""><td>Analysis Ba</td><td>ucn: 491/</td><td>10</td><td></td><td></td><td></td><td>Total</td><td></td><td></td><td></td><td>Frep Batch:</td><td>40030</td></b<>	Analysis Ba	ucn: 491/	10				Total				Frep Batch:	40030
Analyte Added Result Qual (2σ+/-) RL MDC Unit %Rec Limits Radium-226 LCS LCS LCS LCS LCS LCS Added 10.19 1.38 1.00 0.375 pC//L 90 75.125 - Carrier %Yeid Qualifier Limits 40-110 LCS LCS Client Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696 Matrix: Water Analysis Batch: 491775 Added Result Qual (2σ+/-) RL MDC Unit %Rec. RER Limits Analyte Added 11.3 9.807 1.48 1.00 0.494 pC//L 86 75.125 0.13 Carrier %Yeid Qualifier Limits 40.110 40.110 1.48 1.00 0.494 pC//L 86 75.125 0.13 Clethod: 904.0 - Radium-228 (GFPC) Lab Sample ID: MB 160-488922/21-A Count Total Uncert. Uncert. Qualifier 2///////////// Prep Type: Total/N Prep Type: Total/N Prep Type: Total/N Prep Type: Total/N <				Snika	1.06	105					%Rec	
Radium-226 11.3 10.19 1.38 1.00 0.375 pC//L 90 75-125 LCS LCSD Limits RER Linits	Δnalvte			•				PI	MDC	Linit %Rec		
$\begin{array}{c} LCS \ LCS \\ Carrier \\ Ba \ Carrier \\ Ba \ Carrier \\ T3.6 \\ \hline 73.6 \\ \hline 73.6 \\ \hline 10 \\ \hline 11.3 \\ \hline 11.48 \\ \hline 10 \\ \hline 11.48 \\ \hline 10 \\ \hline 11.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 1.48 \\ \hline 10 \\ \hline 10 \\ \hline 1.48 \\ \hline 10 \\ \hline 11.0 \\ \hline 10 \\ \hline 11.12 \\ \hline 10 \\ \hline 11.12 \\ \hline 10 \\ \hline 11.12 \\ \hline 10 \\ \hline 11 \\ \hline 11.12 \\ \hline 10 \\ \hline 11 \\ \hline 11 \\ \hline 11 \\ \hline 11 \\ 12 \\ 12$						<u> </u>	<u> </u>					
Carrier % Yield Qualifier Limits 3a Carrier 73.6 Qualifier Limits 40-110 Client Sample ID: LCSD 160-486962/2-A Client Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696 Analyte Added Result Qual Qual Qual Prep Type: Total/N Prep Batch: 48696 Analyte Added Result Qual Qual Qual Qual Qual Qual Qual Result MDC Unit % Rec. RER Limits 3a Carrier 5/1.3 Limits 40-110 11.48 1.00 0.494 pCi/L % Rec. RER Limits 3a Carrier % Yield Qualifier Limits 40-110 1.48 1.00 0.494 pCi/L % Rec. RER Lim Ba Carrier % Yield Qualifier Limits 40-110 1.48 1.00 0.494 pCi/L % Rec. RER Lim Rethod: 904.0 - Radium-228 GFPC) Count Total Uncert. Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892					10.10				0.070	- 3.12 00		
$ \frac{Ba \ Carrier}{2} \overline{73.6} \overline{40.110} $ $ \frac{A0.110}{40.110} $ $ Lab \ Sample \ ID: \ LCSD \ 160-486962/2-A \ Matrix: Water \ Analysis \ Batch: 491775 \ \hline Matrix: Water \ Analysis \ Batch: 491775 \ \hline Matrix: Water \ Analysis \ Batch: 491775 \ \hline Matrix: Water \ Analysis \ Batch: 491775 \ \hline Matrix: Client \ Sample \ ID: \ Lab \ Client \ Sample \ ID: \ Matrix: 48696 \ \ Mec. \ Result \ Qual \ 1.3 \ 9.807 \ \hline Matrix: (2\sigma+i) \ 1.48 \ 1.00 \ \hline 0.494 \ \ DCI \ \ MBC \ Unit \ 86 \ \ Client \ Sample \ ID: \ Mec. \ Result \ MBC \ \ Matrix: \ Water \ \ \ Matrix: \ \ \ Matrix: \ \ Matrix: \ \ \ Matrix: \ \ \ Matrix: \ \ \ \ \ Matrix: \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	_											
Lab Sample ID: LCSD 160-486962/2-A Matrix: Water Analysis Batch: 491775Client Sample ID: Lab Control Sample Du Prep Type: Total/N Prep Batch: 48696Analyte Radium-226Spike Added 111.3LCSD 9.807LCSD 11.48MDC 1.48MDC 0.494Unit pCi/L%Rec 86RER Limits RER Limits Total 0.494Limits pCi/L%Rec 86%Rec 75.125RER 0.13LCSD Ba CarrierLCSD 51.3 LCSD 40.110 Limits 40.110 Limits 40.110 Client Sample ID: Method Blan Prep Type: Total/N NPrep Batch: 48892Lab Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169Count Uncert. $(2\sigma + r)$ Total Uncert. $(2\sigma + r)$ Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892Analyte Radium-228MB 0.0258 Count 0.258 Total 0.258 MDC 0.457 Unit 0.457 Prepared $11/12/20.06:43$ Analyzed $12/08/20.12:49$ Dil Fa $12/08/20.12:49$			Qualifier		_							
Matrix: Water Analysis Batch: 491775Prep Type: Total/N Prep Batch: 48696Analyte Analyte adium-226Spike Added 11.3LCSD 9.807LCSD 1.48Uncert. ($2\sigma+l-$)RL MDC 1.48MDC 0.494Unit pCi/L%Rec. %Rec. 86Rec Limits 0.13Limits 0.13LCSD LCSD CarrierLCSD 31.3 Limits 40-110Limits 40-110Limits 40-110Client Sample ID: NE 160-488922/21-A Natrix: Water Analysis Batch: 491169Count VolationTotal Uncert. Unce	Ba Carrier	73.6		40 - 110								
$\frac{\text{Analyte}}{\text{Radium-226}} - \frac{\text{Added}}{11.3} + \frac{\text{LCSD}}{9.807} + \frac{\text{LCSD}}{1.48} + \frac{\text{Qual}}{1.00} + \frac{(2\sigma+/-)}{1.48} + \frac{\text{RL}}{1.00} + \frac{\text{MDC}}{0.494} + \frac{\text{WRec}}{\text{pCi/L}} + \frac{\text{WRec}}{86} + \frac{\text{Limits}}{75.125} + \frac{\text{RER}}{0.13} + \frac{\text{Limits}}{1.00} + \frac{\text{Limits}}{1.00} + \frac{\text{MDC}}{1.00} + \frac{\text{WRec}}{1.00} + \frac{100}{10} + 10$	Analysis Ba	atch: 4917	775									
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							Total					
Radium-226 11.3 9.807 1.48 1.00 0.494 pCi/L 86 75 - 125 0.13 Carrier % Yield Qualifier Limits 40 - 110 Client Sample Differ				Spike	LCSD	LCSD					%Rec.	
$\begin{array}{c} \underline{Carrier} & \underline{\%Yield} & \underline{Qualifier} & \underline{Limits} \\ \underline{3a \ Carrier} & \underline{51.3} & \underline{Qualifier} & \underline{Limits} \\ \underline{40 - 110} \end{array}$ $\begin{array}{c} \hline \\ \hline $	Analvte			•			Uncert.	RL	MDC	Unit %Rec		RE
$\frac{Carrier}{3a \ Carrier} \qquad \frac{\% Yield}{51.3} \qquad \frac{Qualifier}{40.110} \qquad \frac{Limits}{40.110}$ $lethod: 904.0 - Radium-228 (GFPC)$ Lab Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169 Count Total Uncert. Uncert. Analyte $\frac{MB}{2} \qquad \frac{MB}{U} \qquad \frac{MB}{Uncert.} \qquad \frac{Count}{Uncert.} \qquad \frac{Total}{Uncert.}$ Result $\frac{Qualifier}{0.02189} \qquad \frac{(2\sigma r/r)}{U} \qquad \frac{(2\sigma r/r)}{0.258} \qquad \frac{RL}{0.0258} \qquad \frac{MDC}{0.457} \qquad \frac{Unit}{pCi/L} \qquad \frac{Prepared}{11/12/20 \ 06:43} \qquad \frac{Analyzed}{12/08/20 \ 12:49} \qquad \frac{Dil Fa}{11/12/20 \ 06:43} \qquad \frac{Dil Fa}{12/08/20 \ 12:49}$	-			Added	Result		Uncert. (2σ+/-)				Limits RE	RE R Lim
Ba Carrier 51.3 40.110 Iethod: 904.0 - Radium-228 (GFPC)Client Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169Matrix: Water Analysis Batch: 491169Count Uncert. Uncert. Uncert. Uncert. Uncert. $(2\sigma+/-)$ Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892Analyte Radium-228MB 0.02189MB UQualifier U $(2\sigma+/-)$ 0.258RL 0.258MDC 0.457Unit pCi/LPrepared 11/12/20 06:43Analyzed 12/08/20 12:49Dil Fa Dil Fa Dil Fa Dil Fa Dil Fa Dil Fa Dil FaBa Carrier $\%$ Yield 93.6Qualifier ULimits 40-110Limits 40-110Prepared 11/12/20 06:43Analyzed 12/08/20 12:49Dil Fa Dil Fa <br< td=""><td>-</td><td></td><td></td><td>Added</td><td>Result</td><td></td><td>Uncert. (2σ+/-)</td><td></td><td></td><td></td><td>Limits RE</td><td>RE <u>Lim</u></td></br<>	-			Added	Result		Uncert. (2σ+/-)				Limits RE	RE <u>Lim</u>
Iethod: 904.0 - Radium-228 (GFPC)Lab Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169Client Sample ID: Method Blan Prep Type: Total/N Prep Batch: 48892Matrix: Water Analysis Batch: 491169Count Uncert. 	Radium-226			Added 11.3	Result		Uncert. (2σ+/-)				Limits RE	RE R Lim
Lab Sample ID: MB 160-488922/21-A Matrix: Water Analysis Batch: 491169Client Sample ID: Method Blam Prep Type: Total/N Prep Batch: 48892Matrix: Water Analysis Batch: 491169Count Uncert. Uncert. Uncert. Uncert. 	Radium-226 Carrier	%Yield	Qualifier	Added 11.3 Limits	Result		Uncert. (2σ+/-)				Limits RE	RE R Lim
Matrix: Water Analysis Batch: 491169Prep Type: Total/N Prep Batch: 48892Matrix: Water Analysis Batch: 491169Count Uncert.Total Uncert.MBMBUncert.Uncert.Analyte Radium-228Result 0.02189Qualifier U $(2\sigma+/-)$ 0.258RL 0.258MDC 1.00Unit 0.457Prepared pCi/LAnalyzed 11/12/20 06:43Dil FaMBMB MBMB 	Radium-226 Carrier Ba Carrier	% Yield 51.3	Qualifier	Added 11.3 Limits 40 - 110	Result 9.807		Uncert. (2σ+/-)				Limits RE	RE R Lim
Analysis Batch: 491169Prep Batch: 48892Analysis Batch: 491169CountTotalMBMBUncert.Uncert.AnalyteResultQualifier $(2\sigma+/-)$ RLMDCUnitPreparedAnalyzedDil FaAnalyteMBU0.2580.2581.000.457 pCi/L $11/12/20 06:43$ AnalyzedDil FaRadium-228MBMBMB 1.00 0.457 pCi/L $11/12/20 06:43$ Analyzed $11/12/20 06:43$ $12/08/20 12:49$ Carrier%YieldQualifierLimits $40 - 110$ $11/12/20 06:43$ $12/08/20 12:49$ $11/12/20 06:43$ $12/08/20 12:49$	Radium-226 Carrier Ba Carrier Iethod: 90	%Yield 51.3 94.0 - Ra	Qualifier	Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)			pCi/L 86	Limits RE 75 - 125 0.1	RE R <u></u> Lim
Count Total MB MB Uncert. Uncert. Analyte Result Qualifier (2σ+/-) RL MDC Unit Prepared Analyzed Dil Fa Radium-228 0.02189 U 0.258 0.258 1.00 0.457 PCi/L 11/12/20 06:43 Analyzed Dil Fa MB MB MB Limits 40 - 110 40 - 110 Prepared Analyzed Dil Fa	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample	%Yield 51.3 94.0 - Ra 9 ID: MB 1	Qualifier	Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)			pCi/L 86	Limits 75-125 0.1	RE R <u></u> Lim 3
MB MB Uncert. Uncert. Analyte Result Qualifier (2σ+/-) RL MDC Unit Prepared Analyzed Dil Fa Radium-228 0.02189 U 0.258 0.258 1.00 0.457 pCi/L 11/12/20 06:43 Analyzed Dil Fa MB MB MB Example Limits Example Prepared Analyzed Dil Fa Carrier %Yield Qualifier Limits 40 - 110 Fa The pared Analyzed Dil Fa	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier dium-2 60-4889	Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807		Uncert. (2σ+/-)			pCi/L 86	Limits 75-125 Ole ID: Metho Prep Type: T	RE R 3 Lim 3 d Blan fotal/N
Analyte Result Qualifier (2σ+/-) (2σ+/-) RL MDC Unit Prepared Analyzed Dil Fa 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 Dil Fa MB MB MB Carrier %Yield Qualifier Limits 40 - 110 Prepared Analyzed Dil Fa	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier dium-2 60-4889	Added 11.3 Limits 40 - 110 228 (GFPC	Result 9.807	Qual	Uncert. (2σ+/-)			pCi/L 86	Limits 75-125 Ole ID: Metho Prep Type: T	RE R 3 Lim 3 d Blan fotal/N
MB MB Carrier %Yield Qualifier Limits Ba Carrier 93.6 40 - 110 11/12/20 06:43 11/12/20 06:43 11/12/20 06:43	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier adium-2 60-4889	<u>Added</u> 11.3 <u>Limits</u> 40 - 110 228 (GFPC	Result 9.807	Qual	Uncert. (2σ+/-)			pCi/L 86	Limits 75-125 Ole ID: Metho Prep Type: T	RE R 3 Lim 3 d Blan fotal/N
MBMBCarrier% YieldQualifierLimitsBa Carrier93.640 - 11011/12/20 06:4312/08/20 12:49	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate Analysis Ba	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier adium-2 60-4889 169 MB	<u>Added</u> 11.3 <u>Limits</u> 40 - 110 228 (GFPC 22/21-A	Result 9.807	Qual Total Uncert.	Uncert. (2σ+/-) 1.48	1.00	0.494	pCi/L 86	Limits 75-125 Ole ID: Metho Prep Type: T Prep Batch:	RE R 3 d Blan otal/N 48892
Carrier%Yield 93.6QualifierLimits 40 - 110PreparedAnalyzed 11/12/20 06:43Dil Fa	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate Analysis Ba	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier dium-2 60-4889 169 MB Result	Added 11.3 <u>Limits</u> 40 - 110 228 (GFPC 22/21-A MB Qualifier	Result 9.807 Count Uncert. (2σ+/-)	Qual Total Uncert. (2σ+/-)	Uncert. (2σ+/-) 1.48	1.00	0.494 Unit	pCi/L 86	Limits 75-125 0.1 Die ID: Metho Prep Type: T Prep Batch: Analyzed	RE R J d Blan otal/N. 48892 Dil Fa
Ba Carrier 93.6 40 - 110 11/12/20 06:43 12/08/20 12:49	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate Analysis Ba	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier adium-2 60-4889 169 MB Result 0.02189	<u>Added</u> 11.3 <u>Limits</u> 40 - 110 228 (GFPC 22/21-A MB Qualifier U	Result 9.807 Count Uncert. (2σ+/-)	Qual Total Uncert. (2σ+/-)	Uncert. (2σ+/-) 1.48	1.00	0.494 Unit	pCi/L 86	Limits 75-125 0.1 Die ID: Metho Prep Type: T Prep Batch: Analyzed	RE R J d Blan otal/N. 48892 Dil Fa
	Radium-226 Carrier Ba Carrier Iethod: 90 Lab Sample Matrix: Wate Analysis Ba Analyte Radium-228	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier	<u>Added</u> 11.3 <u>Limits</u> 40 - 110 228 (GFPC 22/21-A MB Qualifier U MB	Result 9.807 Count Uncert. (2σ+/-) 0.258	Qual Total Uncert. (2σ+/-)	Uncert. (2σ+/-) 1.48	1.00	0.494 Unit	pCi/L 86 Client Samp	Limits 75-125 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	RE R d Blan otal/N 48892 _ Dil Fa
	Lab Sample Matrix: Wate Analysis Ba Analyte Radium-228 Carrier	%Yield 51.3 94.0 - Ra 9 ID: MB 1 er	Qualifier	<u>Added</u> 11.3 <u>Limits</u> 40 - 110 228 (GFPC 22/21-A MB Qualifier U MB	Result 9.807 Count Uncert. (2σ+/-) 0.258 Limits	Qual Total Uncert. (2σ+/-)	Uncert. (2σ+/-) 1.48	1.00	0.494 Unit	pCi/L 86 Client Samp	Limits 75-125 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	RE R 3 <u>Lim</u> d Blan

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)

Analysis Ba	atch: 4911	72									Prep Ba	tch: 48	88922
			Online	1.00	1.00	Total					0/ D = =		
A mali da			Spike	LCS		Uncert.		MDO	11		%Rec.		
Analyte			Added	Result	Quai	<u>(2σ+/-)</u>		MDC		%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										
	93.8		40 - 110										
Y Carrier	35.0												
		160-4880	22/2-1					Client S	amplo	ID: Lab	Control	ample	
Lab Sample	e ID: LCSI	D 160-4889)22/2-A				(Client S	ample	ID: Lab	Control S		
Lab Sample Matrix: Wat	e ID: LCSI ter		22/2-A				(Client S	ample	ID: Lab	Prep Typ	e: Tot	al/NA
Lab Sample Matrix: Wat	e ID: LCSI ter		022/2-A			Total	(Client S	ample	ID: Lab		e: Tot	al/NA
Lab Sample Matrix: Wat	e ID: LCSI ter			LCSD	LCSD	Total Uncert.	(Client S	ample	ID: Lab	Prep Typ	e: Tot	al/NA
Lab Sample Matrix: Wat Analysis Ba	e ID: LCSI ter		22/2-A Spike Added	LCSD Result		Uncert.	RL	Client S	Ì	ID: Lab	Prep Typ Prep Ba	e: Tot	al/NA 88922
Lab Sample Matrix: Wat Analysis Ba Analyte	e ID: LCSI ter		Spike						Unit		Prep Typ Prep Bar %Rec.	be: Tot tch: 48	al/NA 88922 RER
Lab Sample Matrix: Wat Analysis Ba Analyte	e ID: LCSI ter atch: 4911	72	Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48 <u>RER</u>	RER Limit
Lab Sample Matrix: Wat Analysis Ba Analyte Radium-228	e ID: LCSI ter atch: 4911	172	Spike Added 10.1	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48 <u>RER</u>	RER Limit
Y Carrier Lab Sample Matrix: Wat Analysis Ba Analyte Radium-228 Carrier Ba Carrier	e ID: LCSI ter atch: 4911	72	Spike Added	Result		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Prep Typ Prep Bar %Rec. Limits	e: Tot tch: 48 <u>RER</u>	RER Limit

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 422056 2	014/ 44		\A/=t==	D=== 0 == 0	

		i iep iype	matrix	Methou	
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	

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

Matrix: Water

Matrix: Water

Matrix: Water

Lab Sample ID: 240-138056-1

Lab Sample ID: 240-138056-2

Lab Sample ID: 240-138056-3

2 3 4 5 6 7 8 9

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

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	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

Bate	ch	Batch		Dilution	Batch	Prepared		
Ргер Туре Тур	e	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Fotal/NA Prep	р	PrecSep STD			486962	10/27/20 12:49	AVB	TAL SL
Fotal/NA Ana	alysis	903.0		1	491775	12/15/20 20:25	SCB	TAL SL
Total/NA Prep	р	PrecSep_0			488922	11/12/20 06:43	AVB	TAL SL
Fotal/NA Ana	alysis	904.0		1	491172	12/08/20 12:45	FLC	TAL SL
Fotal/NA Ana	alysis	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

	Batch	Batch		Dilution	Batch	Prepared		
Ргер Туре	Туре	Method	Run	Factor	Number	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

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Туре	Туре	Method	Run	Factor	Number	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: TRC Environmental Corporation. Project/Site: Karn/Weadock CCR Karn Lined Impoundment

Job ID: 240-138056-1

Matrix: Water

Lab Sample ID: 240-138056-5

Client Sample ID: EB-01 Date Collected: 10/08/20 12:10 Date Received: 10/10/20 09:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	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

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

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
lowa	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

North Canton, OH 44720 Phone: 330-497-9396 Fax: 330-497-0772			220		Cilam of Custody Mecola 0-3,	2114		America
Client Information	Sampler	D	HSSC	Broc	Lab PM: Brooks, Kris M	Carrier Tracking No(s)	ing No(s);	COC No: 240-75416-29054.1
Client Contact: Jacob Krenz	Phone: 704	m	316	E-Ma Kris.	E-Mail: Kris.Brooks@Eurofinset.com	iet.com		Page 1 of 1
Company: TRC Environmental Corporation.						Analysis Requested		Job #:
Address: 1540 Eisenhower Place	Due Date Requested:	ted:			Real Providence			ő
City. Ann Arbor	TAT Requested (days):	ays):			CORTAN D			
State, Zp: MI, 48108-7080					100			D - Nitric Acid P - Na204S E - NaHSO4 Q - Na2SO3
Phone: 734-971-7080(Tel) 734-971-9022(Fax)	PO#: 135139				(0			D
Email: JKrenz@trccompanies.com	#OM							1 - Ice J - DI Water
Project Name: Karn/Weadock CCR Karn Lined Impoundment Site:	Project #. 24024154 SSOW#				GFPC (Yes or			K - EDTA L - EDA Other:
					87265 OSW/			
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, 5=solid, O=westeroll, BT=Tissue, AmAtr)	Field Filtere Perform MS 903.0, Ra226F 904.0 - Standa			Total Number Special Instructions/Note:
	X	X	Preserva	Preservation Code:	Ž			X
OW-10	00/8/01	loot	0	Water	うちょう			
OW-11	1/2/1	1355	0	Water	エイショ			
OW-12	1016 Ju	3611	0	Water	+++			
DUP-01	10/8/2	1	C	Water	アナシシ			
EB-01	10/5/2	130	U	Water	+2 52			
				Water				
						240-138056 Chain of Custody	of Custody	
ant	Poison B		Radiological		Sample Dispu	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Return To Client Disposal By Lab Archive For Mont	samples are re Lab	etained longer than 1 month) Archive For Months
Deliverable Requested: I, III, III, IV, Other (specify)					Special Instruc	Special Instructions/QC Requirements:		
Empty Kit Relinquished by:		Date:			Time:		Method of Shipment	
Relinquished by	10/9/bu	660	5	Company	Received by		Date/Time:	9/20 0735 Company
Relinquished by:	6	20 06	632	Company	FINI REPORT	men have	Date/Time	20 950 COMPANY
	Date/Time:			Company	Received by	0	Date/Time:	Company
Custody Seals Intact: Custody Seal No.:					Cooler Temp	Cooler Temperature(s) "C and Other Remarks.		

Client TRC Environmental Site Name	
inem IN Erior of Incritic intervalle	Cooler unpacked by:
Cooler Received on 10-10-20 Opened on 10-10-20	Jamy logge
	Other Other
Receipt After-hours: Drop-off Date/TimeStorage Location	
 Packing material used: Subble Wrap Foam Clastic Bag None Other COOLANT: Wet Ice Blue Ice Dry Ice Water None Cooler temperature upon receipt See Multiple Cooler Form IR GUN# IR-11 (CF +0.9 °C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler T IR GUN #IR-12 (CF +0.5°C) Observed Cooler Temp. °C Corrected Cooler Temp. °C Corrected Cooler T # 0.5 (Shippers' packing slip attached to the cooler(s)? Was/were the person(s) who collected the samples clearly identified on the COC? Was/were the person(s) who collected the samples clearly identified on the COC? Was/were the person(s) who collected the samples clearly identified on the COC? Could all bottle labels (ID/Date/Time) be reconciled with the COC? For each sample, does the COC specify preservatives (Y)), # of containers (Y) and sat 10. Were correct bottle(s) used for the test(s) indicated? Sufficient q	emp. °C emp. °C No NA No No No No <
And the second	
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes	
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes 7. Was a LL Hg or Me Hg trip blank present? Yes	N
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes	N
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes 7. Was a LL Hg or Me Hg trip blank present? Yes Contacted PM Date by via Verbal Vo	N
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes 17. Was a LL Hg or Me Hg trip blank present? Yes Contacted PM Date by via Verbal Vo Concerning	bice Mail Other
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES □ additional next page 9. SAMPLE CONDITION	Samples processed by:
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES □ additional next page 9. SAMPLE CONDITION ample(s)were received after the recommended holding	Samples processed by:
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES □ additional next page 9. SAMPLE CONDITION ample(s)were received after the recommended holdin ample(s)were received after the recommended holdin ample(s)were received after the recommended holdin ample(s)	Samples processed by:
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIESadditional next page 9. SAMPLE CONDITION Sample(s)were received after the recommended holding mample(s)were received after the recommended holding mample(s)were received with bubble >6 mm in trip Blank Lot #Yes Yes Yes Yes Yes Yes Yes Yes	Samples processed by:
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIESadditional next page 9. SAMPLE CONDITION Sample(s)were received after the recommended holding manple(s)were received after the recommended holding were received with bubble >6 mm ir 0. SAMPLE PRESERVATION	Samples processed by: ng time had expired. in a broken container. diameter. (Notify PM)
6. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #Yes 7. Was a LL Hg or Me Hg trip blank present?Yes Contacted PMDatebyvia Verbal Vo Concerning 8. CHAIN OF CUSTODY & SAMPLE DISCREPANCIESadditional next page 9. SAMPLE CONDITION Cample(s)were received after the recommended holding Cample(s)were received after the recommended holding Cample(s)were received with bubble >6 mm ir 0. SAMPLE PRESERVATION	Samples processed by:

WI-NC-099

Login # : 13896

1

Cooler Description	fins TestAmerica (IR Gun #	Observed	Corrected	Coolant
(Circle)	(Circle)	Temp °C	Temp °C	(Circle)
A Client Box Other	IR-10 IR-11	4.6	5.5	Wet Ice) Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-TT	0.3	1.2	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
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IA Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ico Water None
A Client Box Other	IR-10 IR-11			Wet ice Blue ice Dry ice Water None
A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
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A Client Box Other	IR-10 IR-11			Wet Ice Blue Ice Dry Ice Water None
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IA Client Box Other	IR-10 IR-11	an and the part of the second second second	and the second	Wet Ice Blue Ice Dry Ice Water None

W1-NC-099 Cooler Receipt Form Page 2 - Multiple Coolers

10/10/2020

Login Container Summary Report

240-138056

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container Preservative pH Temp Added (mls) Lot #	
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	1
EB-01	240-138056-B-5	Plastic 1 liter - Nitric Acid	<2	-

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North Canton, OH 44720 Phone: 330-

Chain of Custody Record



. eurofins

Climet Information (Sub Contract ab)	Sampler			Lab PM Brooks	Lab PM: Brooks, Kris M			Carrier Tracking No(s)	(s)oN bi	240-126446.1	
	Phone:			E-Mail: Kris.B	Brooks@	E-Mail: Kris.Brooks@Eurofinset.com	com	State of Origin Michigan		Page 1 of 1	
Shipping/Keceiving Company					Accreditatio	Accreditations Required (See note)	1 (See note):			Job #	
TestAmerica Laboratories, Inc.	4									240-138056-1 Preservation Codes:	odes:
Address: 13715 Birler Trail North	Due Date Kequested: 11/9/2020						Analysis	Analysis Requested	1	A - HCL	M - Hexane
List 15 model 1 demonstrate	TAT Requested (days):	ys):								B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4	N - None 0 - AsNaO2 P - Na2O4S 0 - Na2SO3
	#04					-				F - MeOH G - Amchfor H - Ascorbic Acid	R - Na25203 S - H2SO4 T - TSP Dodecahvdrate
314-298-8506(1ei) 314-298-6/5/(Fax) Email	#OM				(0)					_	
Project Name Karn/Weadock CCR Groundwater Monitoring	Project #; 24024154				ea or l						z - other (specify)
Site	\$SOW#				N) as					of co	
	Samole Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, S=solid, O=wastefoll, BT=Tissue, A=Air)	Field Filtered M/2M m/2M	903.0/PrecSep_				Total Number So C C C C C C	Special Instructions/Note:
Sample Identification - Citeric ID (Lab 12)	X	X	Preserva		X						V
OW-10 (240-138056-1)	10/8/20	10:04 Fastern		Water		××				2 TVA protocol - F 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-11 (240-138056-2)	10/8/20	13:38 Factern		Water		××				2 TVA protocol - F 5.0 pCi/L.	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
OW-12 (240-138056-3)	10/8/20	11:48 Eastern		Water		××				2 TVA protocol - F 5.0 pCi/L	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L
DUP-01 (240-138056-4)	10/8/20	Eastern		Water		××				2 5.0 pCi/L	TVA protocol - Ka-226+228 action limit at 5.0 pCi/L
EB-01 (240-138056-5)	10/8/20	12:10 Eastern		Water		×				2 TVA protocol - F	TVA protocol - Ra-226+228 action limit at 5.0 pCi/L.
Note Since laboratory accreditations are subject to change. Eurofins TestAmenta places the ownership of maintain accreditation in the State of Origin listed above for analysis/liests/matrix being analyzed, the sampl TestAmentica attention immediately. If all requested accreditations are current to date. return the signed Ch	stAmerica places the ownersh ts/matrix being analyzed, the r urrent to date, return the sign	ip of method, samples must l	analyte & accre be shipped bac stody attesting	method, analyte & accreditation compliance upon out subcontract lab tes must be shipped back to the Eurofins TestAmerica laboratory or or ain of Custody attesting to said complicance to Eurofins TestAmerica	ance upon (is TestAmer ance to Eur	out subcontrical aboratorical aboratorical aboratori	act laboratories. 1 ry or other instruct nerica.	his sample shipment	s forwarded undi Any changes to a	method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently les 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 ain of Custody attesting to said complicance to Eurofins TestAmerica.	boratory does not currently ie brought to Eurofins
Possible Hazard Identification					San	Die Disp	le Disposal (A fee m Return To Client	ay be assessed if sam	fsamples ar /Lab	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Return To Client Disposal By Lab Achive For Mon	n 1 month) Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverabl	rable Rank:	2		Spe	cial Instru	Special Instructions/QC Requirements				
Empty Kit Relinquished by:		Date:			Time.			Metho	Method of Shipment		-
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Inquished by

Custody Seal No.

FED EX

late/Time

Cooler Temperature(s) °C and Other Remarks

befved by

Company

Date/Time:

Company

Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Sample containers have legible labels.

Sample collection date/times are provided.

Appropriate sample containers are used.

Containers are not broken or leaking.

Sample bottles are completely filled. Sample Preservation Verified.

Multiphasic samples are not present.

Residual Chlorine Checked.

Samples do not require splitting or compositing.

Samples are received within Holding Time (excluding tests with immediate

There is sufficient vol. for all requested analyses, incl. any requested

Containers requiring zero headspace have no headspace or bubble is

Login Number: 138056 List Number: 2

HTs)

MS/MSDs

<6mm (1/4").

List Source: Eurofins TestAmerica, St. Louis

List Number: 2			List Creation: 10/14/20 12:18 PM	
Creator: Mazariegos, Leonel A				
Question	Answer	Comment		
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td> <td></td> <td></td>	True			
The cooler's custody seal, if present, is intact.	True			
Sample custody seals, if present, are intact.	True			
The cooler or samples do not appear to have been compromised or tampered with.	True			
Samples were received on ice.	N/A			
Cooler Temperature is acceptable.	True			
Cooler Temperature is recorded.	True			
COC is present.	True			
COC is filled out in ink and legible.	True			
COC is filled out with all pertinent information.	True			
Is the Field Sampler's name present on COC?	True			4
There are no discrepancies between the containers received and the COC.	True			

True

True

True

True

True True

True

True

True

True

True

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

Analyte GroupMethodAnions (Fluoride, Chloride, Sulfate)EPA 300.0Total Dissolved Solids (TDS)SM 2540CTotal MetalsSW-846 6020B/ 7470AAlkalinitySM 2320B

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

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.

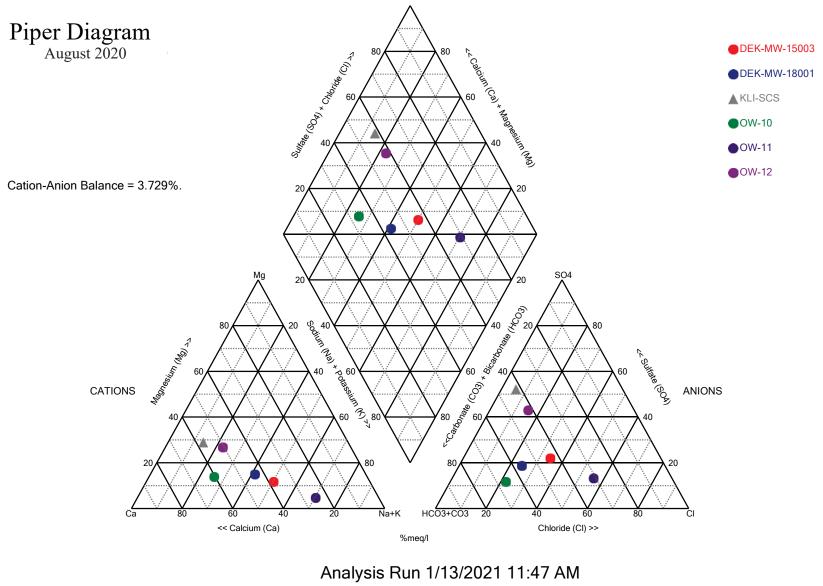
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were DUP-01 and OW-10; RPDs between the parent and duplicate sample were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- Carrier recoveries, 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	Parium corrier recovering holes accortance limit ((400)). Non detect recults are notentially biased law			
OW-11	10/8/2020	Raululli 220	Barium carrier recoveries below acceptance limit (<40%). Non-detect results are potentially biased			

Attachment D ASD Supporting Information

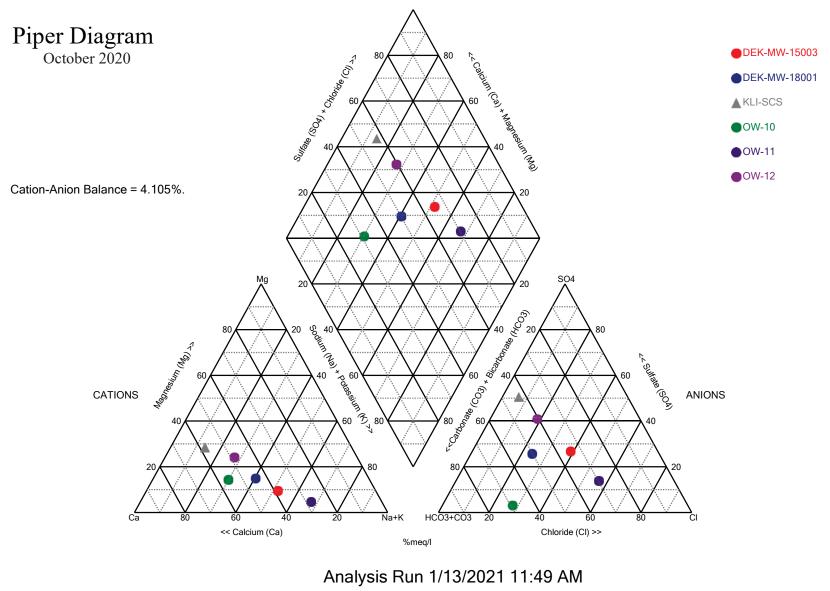




Piper Diagram

Analysis Run 1/13/2021 11:49 AM

Totals (ppm)	Na	K	Ca	Mq	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

Analysis Run 1/13/2021 11:50 AM

Totals (ppm)	Na	K	Ca	Mq	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

Consumers Energy Parnall Office Building /Jackson 1945 W Parnall Road, Jackson MI

Environmental Services



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: <u>harold.registerjr@cmsenergy.com</u>

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

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Environmental Services



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 reginal 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

- 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.

" Preliminary Written Assessment Karn Lined Impoundment" Mr. Phil Roycraft January 22, 2021 Page 4



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.

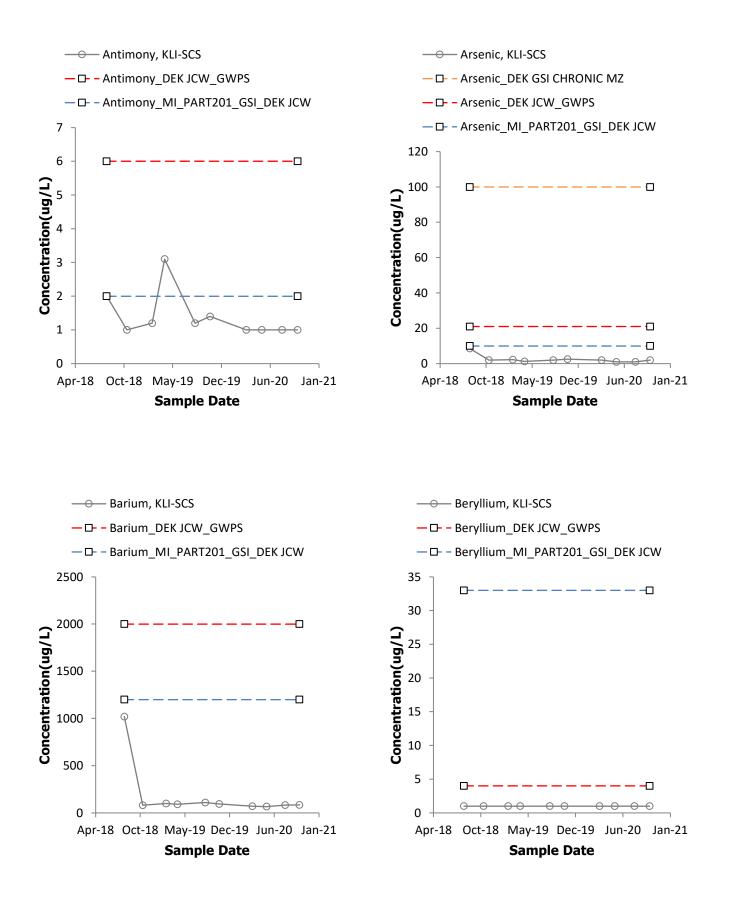
Sincerely,

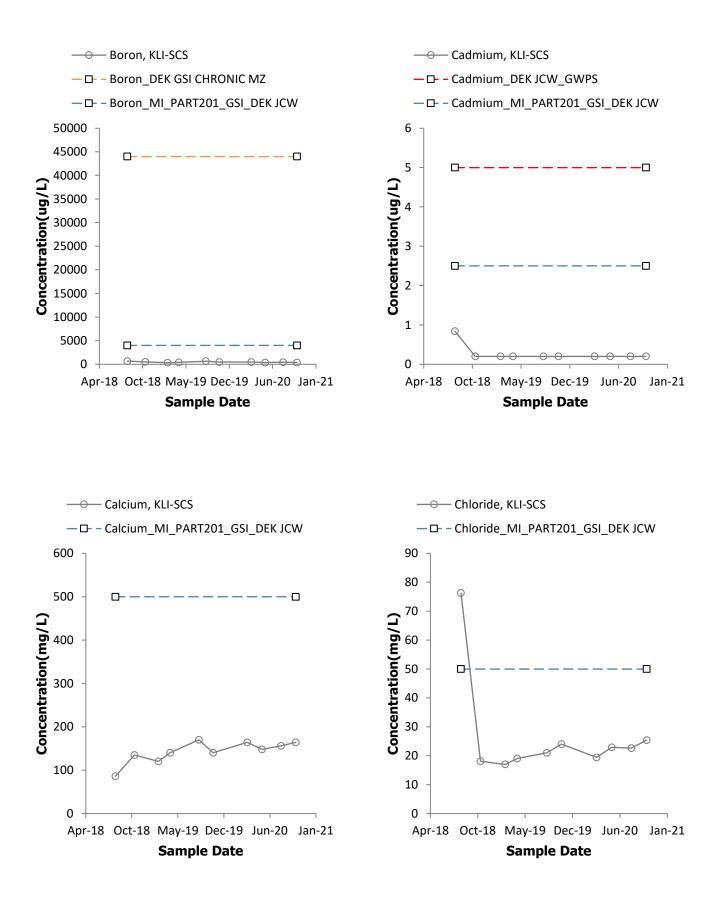
Harold D. Register, Jr., P.E. Principal Engineer Landfill Operations Compliance Phone: (517) 788-2982 Email: harold.registerjr@cmsenergy.com

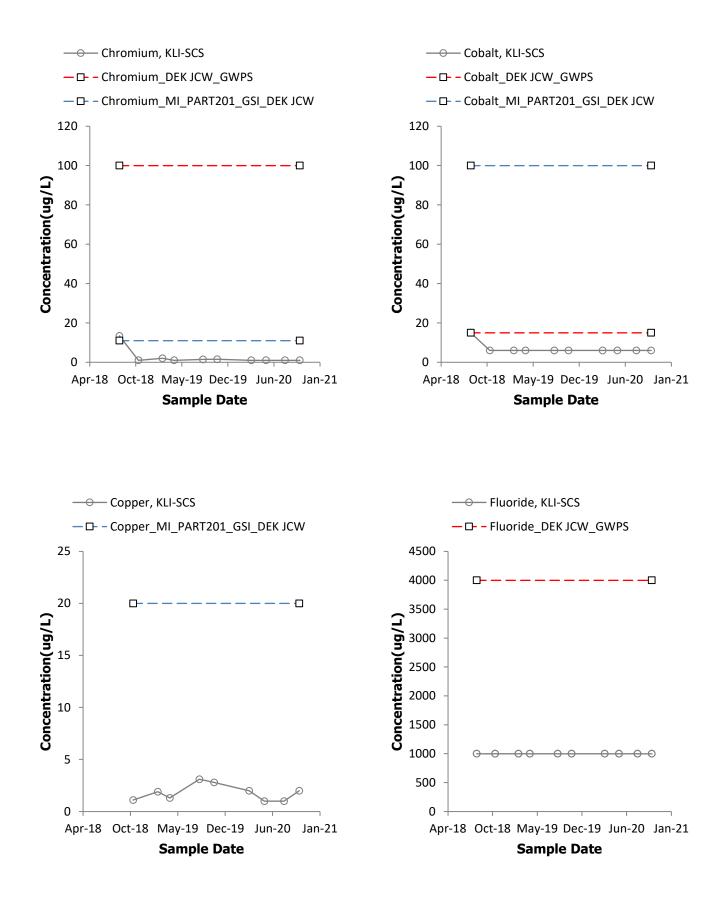
cc: Mr. Gary Schwerin, EGLE Saginaw Bay District Office Ms. Lori Babcock, EGLE Saginaw Bay District Office Mr. Caleb Batts, Consumers Energy Ms. Darby Litz, TRC

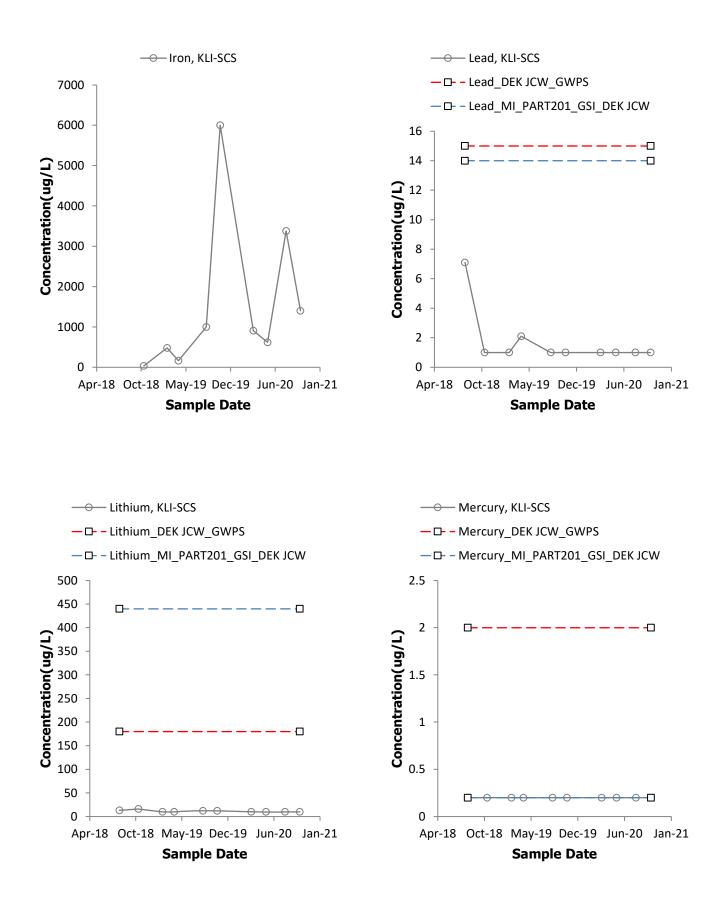
Attachment A: Water Quality Data and Trends Attachment B: Leak Detection Survey Attachment C: Visual Determination of Primary Liner Damage ATTACHMENT A

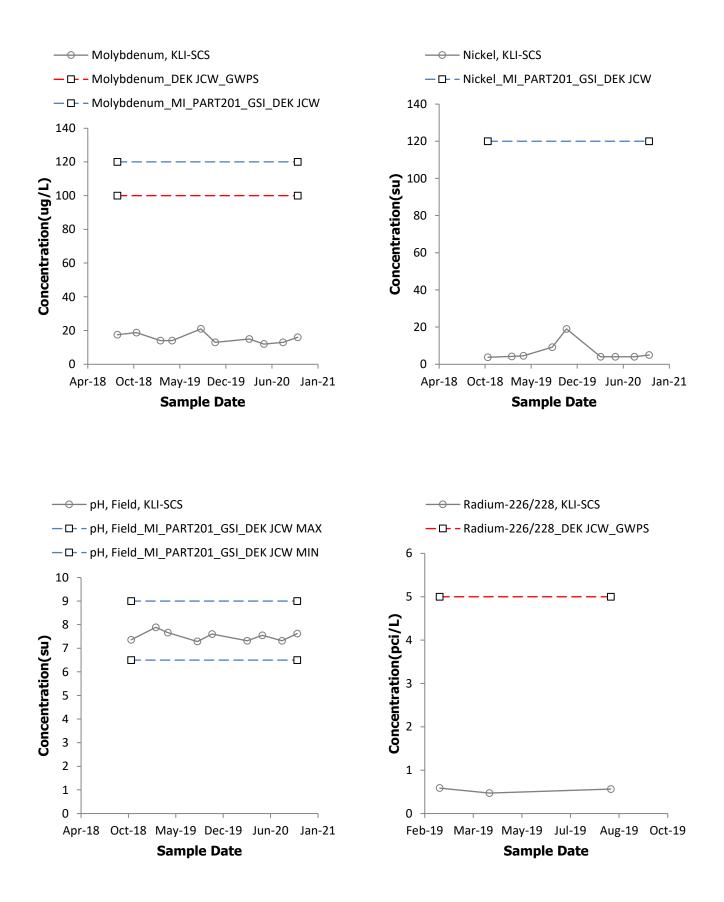
Water Quality Data

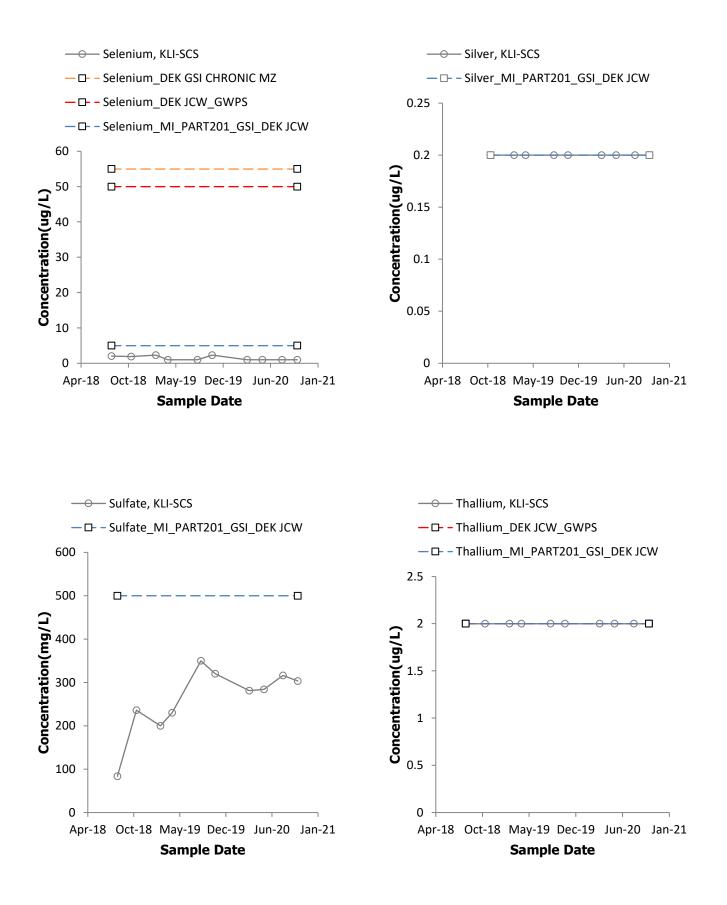


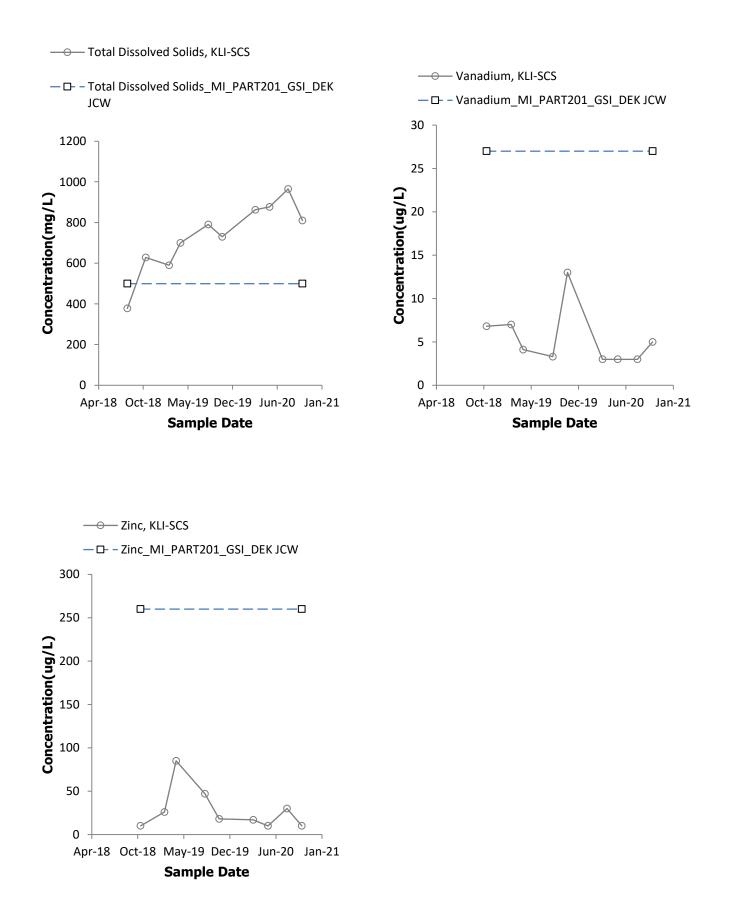












ATTACHMENT B

Liner Leak Detection Survey Results



January 15, 2021

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

Email: <u>caleb.batts@cmsenergy.com</u>

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. <u>Survey</u>

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. <u>General</u>

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

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

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

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

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

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

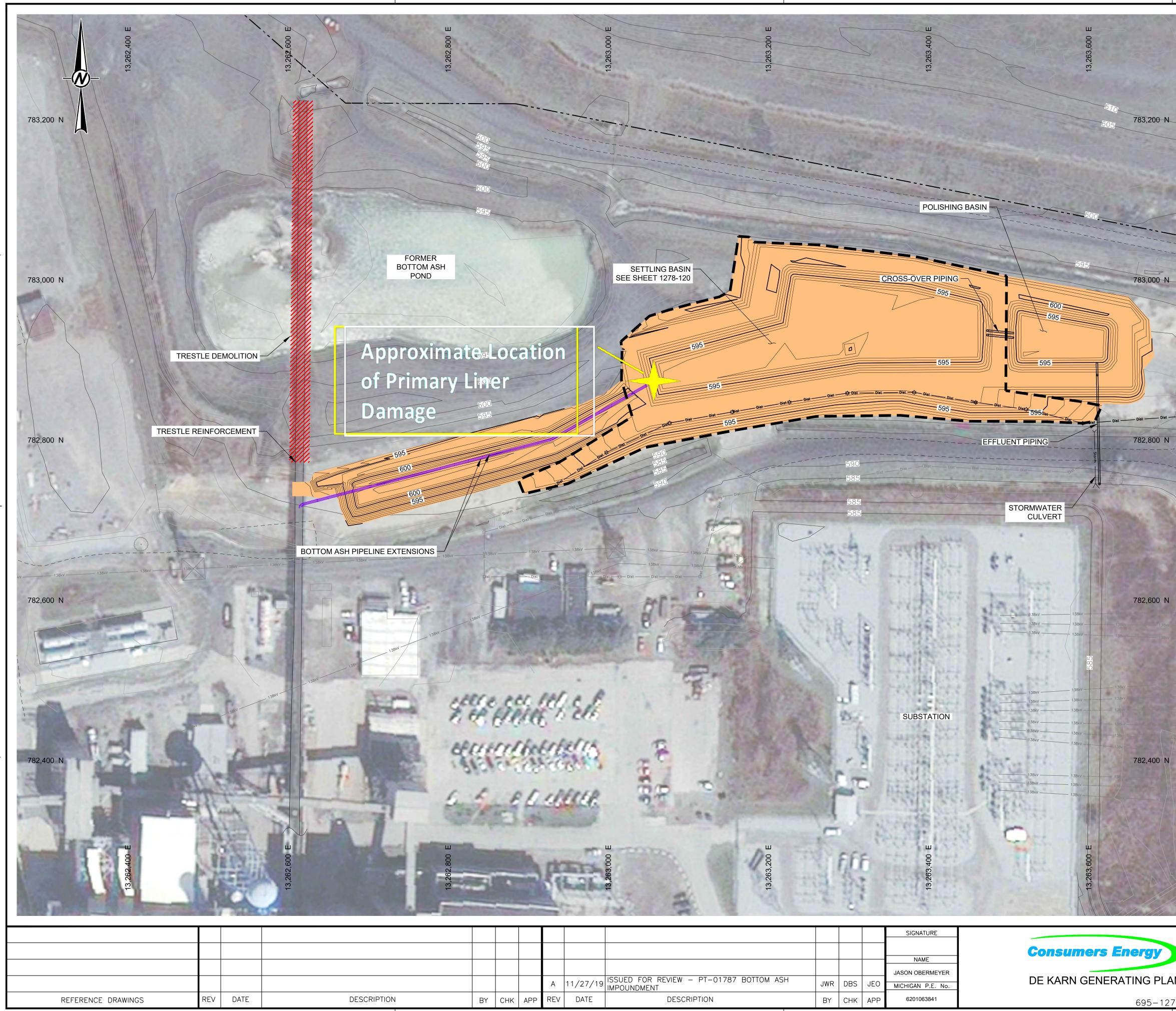
Respectfully,

John Ortiz Senior Project Manager



ATTACHMENT C

Visual Confirmation of Primary Liner Damage



В

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А

						SIGNATURE		
						NAME		Consumers End
A	11/27/19	ISSUED FOR REVIEW - PT-01787 BOTTOM ASI IMPOUNDMENT	H JWR	DBS	JEO	JASON OBERMEYER MICHIGAN P.E. No.		DE KARN GENERATI
REV	DATE	DESCRIPTION	BY	Снк	APP	6201063841		
	В						С	

LEGEND 6240	EXISTING GROUND TOPOGRAPHY
6240	AS-BUILT GRADES (TOP OF EMBANKMENT FILL)
	CERTIFIED FOOTPRINT
	GRADING EXTENTS
Storm Storm	NEW CULVERT
	NEW HDPE PIPE
	NEW BOTTOM ASH PIPELINE
¢	NEW LIGHT POLE (LOCATIONS APPROXIMATE)
Dist Dist	NEW OVERHEAD DISTRIBUTION LINE
	EXISTING BUILDING
	EXISTING TOWER STRUCTURE
	EXISTING ASH TRESTLE
	SOLID WASTE BOUNDARY
·//////	ASH TRESTLE DEMOLITION
Storm Storm	EXISTING CULVERT
Dist Dist	EXISTING OVERHEAD DISTRIBUTION LINE
	EXISTING EDGE OF GRAVEL ROAD
SW	EXISTING OVERHEAD SHIELD WIRE
138kV	EXISTING OVERHEAD 138KV WIRE
345kV	EXISTING OVERHEAD 345KV WIRE
\odot	EXISTING TREE
¢	EXISTING LIGHT POLE

REFERENCE(S)

- 1. AERIAL IMAGE: © CNES 2016, DISTRIBUTION AIRBUS DS GEO SA/AIRBUS DS GEO INC. 2. HORIZONTAL COORDINATE SYSTEM: MICHIGAN STATE PLANE, SOUTH ZONE, NORTH AMERICAN DATUM 1983 (1994 ADJUSTMENT), INTERNATIONAL SURVEY FOOT.
- 3. VERTICAL BASIS OF ELEVATION: NORTH AMERICAN VERTICAL DATUM 1988. 4. EXISTING SITE TOPOGRAPHY PROVIDED IN APRIL 2016 BY ENGINEERING & ENVIRONMENTAL SOLUTIONS, L.L.C. AUGMENTED WITH DESIGN GRADES FOR PROCESS WATER MODIFICATIONS IMPLEMENTED IN FALL 2017.

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4

N.T.S.

KEY MAP



1'' = 60' FEET

y	
PL/	ANT

KARN	BOTTOM ASH IMPOUNDMENT	
	PROJECT OVERVIEW	

PI ANT				units #	£1 & 2
	SCALE	AS SHOWN	DRAWING NO.	SHEET	REV.
-1278-119-REV-A.dwg	JOB	PT-01787	695-1278	119	А

D



Figure 1 - Visual Identification of Primary Liner Damage – Shovel on the Right for Scale



Figure 2 - Temporary AquaBlok Backfill and Steel Plate Placement