

3399 Veterans Drive, Traverse City, Michigan 49684

QUARTERLY PROJECT UPDATE REPORT 4th QUARTER 2019

HARLTAND 36 GAS PLANT PORTION OF E¹/₂ of NW ¹/₄ of SECTION 36, T03N-R06E, HARTLAND TWP, LIVINGSTON COUNTY, MICHIGAN

LAMBDA ENERGY RESOURCES, LLC 1510 THOMAS ROAD KALKASKA, MICHIGAN 49646

> May 5, 2020 ECT No. 130685-2000

DOCUMENT REVIEW

The dual signatory process is an integral part of Environmental Consulting & Technology, Inc.'s (ECT's) Document Review Policy No. 9.03. All ECT documents undergo technical/peer review prior to dispatching these documents to any outside entity.

This document has been authored and reviewed by the following employees:

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Author	Peer Review
Signature	Lisi Harriger Jones Signature
May 5, 2020	May 5, 2020
Date	Date



FIGURES

LABORATORY ANALYTICAL REPORTS

LOW-FLOW SAMPLING FIELD FORMS

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1.0 INTRODUCTION

This Quarterly Project Update Report was compiled by Environmental Consulting & Technology, Inc. (ECT), on behalf of Lambda Energy Resources, LLC (LER) and details remediation system operations and performance monitoring through the 4th Quarter 2019 (October 1, 2019 through December 31, 2019) for the Hartland 36 Gas Plant location, herein referenced as the "Site".

2.0 PROJECT LOCATION

The Site is a former natural gas processing plant which operated from 1999 to 2015. The property is located in a portion of the East ½ of the Northeast ¼ of Section 36, T03N-R06E, on the south side of Lone Tree Road between North Pleasant Valley Road and South Tipsico Lake Road in Hartland Township, Livingston County, Michigan. A Site Location Map and Site and Surrounding Properties Map are included as Figure 1 and Figure 2, respectively, in Appendix A.

3.0 PROJECT SUBMITTALS

The following presents a chronological summary of previous documents submitted to the Michigan Department of Environment, Great Lakes, and Energy – Oil, Gas, and Minerals Division (EGLE-OGMD) by ECT for the Site:

- Soil Closure Report dated February 15, 2016
- Groundwater Characterization Work Plan dated February 23, 2016
- Groundwater Characterization Work Plan 2 dated July 8, 2016
- Project Update Report dated September 26, 2016
- Groundwater Characterization Work Plan 3 dated October 14, 2016
- Additional Groundwater Characterization Work Plan dated December 29, 2016
- Groundwater Characterization Work Plan 5 dated March 2, 2017
- Biosparging Pilot Study Work Plan dated April 5, 2017
- Groundwater Characterization Report dated July 3, 2017
- Technical Memorandum Biosparging Pilot Study dated July 28, 2017
- Remediation System Design Plan dated August 11, 2017
- Quarterly Project Update Report 1st Quarter 2018 dated April 24, 2018
- Quarterly Project Update Report 2nd Quarter 2018 dated August 8, 2018
- Quarterly Project Update Report 3rd Quarter 2018 dated October 26, 2018
- Quarterly Project Update Report 4th Quarter 2018 dated April 8, 2019
- Quarterly Project Update Report 1st Quarter 2019 dated April 10, 2019
- Quarterly Project Update Report 2nd Quarter 2019 dated August 19, 2019
- Quarterly Project Update Report 3rd Quarter 2019 dated November 25, 2019

Due to unique Site features, most notably the contour of the lower clay confining layer and its effect on the migration of sulfolane within groundwater, activities completed at the Site were often modified in the field compared to the scope of work presented in the referenced work plans.



4.0 PROJECT OVERVIEW

KCS Michigan Resources developed the Site in 1999 and operated the natural gas processing plant into 2006. Merit Energy Company acquired the Site in 2006 and operated the plant until August 2015, when facility decommissioning commenced. LER acquired the Site from Merit Energy Company in July 2018.

In general, operations at the Site included crude oil and brine separation and storage, natural gas compression, dehydration, sweetening (hydrogen sulfide [H₂S] removal), carbon dioxide (CO₂) removal (amine process), and refrigeration for natural gas liquid (NGL) extraction and storage.

Contaminated soil was discovered in September 2015 during facility decommissioning activities at the former sweetening plant/refrigeration building; sulfolane impacts are from the gas treatment chemical Sulfinol®. Remediation activities (excavation and off-Site disposal) completed from September 2015 through December 2016 resulted in disposal of 13,481.4 tons of soil at the Venice Park Landfill in Lennon, Michigan. Verification of soil remediation (VSR) samples collected from the excavations confirmed remediation of impacted soils. Refer to the Soil Closure Report dated February 15, 2016 for a detailed summary of soil remediation and sampling activities.

Groundwater investigation activities commenced on October 29, 2015 and were completed on March 7, 2017. Seven soil borings, 13 temporary monitor wells, including two vertical aquifer profile (VAP) locations, and 37 permanent monitor wells, including 20 shallow screened monitor wells and 17 deep screened monitor wells, have been installed at the Site. The lateral and vertical extents of groundwater impacted with sulfolane have been delineated to non-detectable concentrations (laboratory reporting limit of 10 micrograms per liter, $\mu g/L$). The maximum sulfolane concentration reported from a monitor well at the Site was 11,000 micrograms per liter ($\mu g/L$) from MW-20D on the June 19-21, 2017 sampling event. Refer to the Groundwater Characterization Report dated July 3, 2017 for a detailed summary of groundwater characterization and assessment activities.

A biosparging pilot study was conducted at the Site from May 1, 2017 through June 16, 2017. The pilot study included three tests to evaluate the effectiveness of biosparging to enhance bioremediation of sulfolane dissolved in groundwater at the Site. Data obtained from the pilot study indicates biosparging is an effective remedial alternative for the Site. Concentrations of sulfolane were reduced by 100% within five feet of the biosparge point and 97% to 99% at a distance of 20 feet from the biosparge point. Dissolved oxygen (DO) influence of 4.2-10 milligrams per liter (mg/L) was observed at monitoring locations situated 40 feet from the biosparge point. Refer to the Technical Memorandum – Biosparging Pilot Study dated July 28, 2017 for a summary of pilot study activities and results.

Information obtained from the pilot study was utilized to compile the Remediation System Design Plan dated August 11, 2017. The Remediation System Design Plan presented the biosparge point (BSP) array, remediation system equipment, anticipated remediation system operation and maintenance (O&M), and performance monitoring activities. Biosparge system installation activities commenced at the Site on August 21, 2017 and concluded with startup of the remediation system on November 16, 2017. Remediation system equipment and components were generally consistent with



details and specifications provided in the Remediation System Design Plan and included 41 biosparge points (BSPs). Refer to the Quarterly Project Update Report – 1st Quarter 2018 dated April 24, 2018 for a summary of remediation system installation activities, O&M, and results of performance monitoring events completed through the 1st Quarter 2018.

Performance monitoring results from the 3rd Quarter 2019 indicate the remediation system continues to mitigate concentrations of sulfolane in groundwater with eight of the ten monitor wells that reported a concentration of sulfolane above the cleanup goal from the pre-startup sampling event reported non-detect. The two remaining monitor wells achieved 96.6% (MW-7D) and 99.1% (MW-14D) reduction in the concentration of sulfolane. Refer to the Quarterly Project Update Report – 3rd Quarter 2019 dated November 25, 2019 for a summary of remediation system O&M and results of performance monitoring events completed through the 3rd Quarter 2019.

5.0 REMEDIATION SYSTEM OPERATION AND MAINTENANCE

Personnel from ECT generally completed weekly O&M Site visits during the 4th Quarter 2019. Site visits are completed to assure optimal operating conditions and to monitor remediation system equipment and perform regularly scheduled maintenance. Site visits generally include the following:

- Equipment readings temperature, flow rate, pressure, operation hours, etc.
- Flow rate adjustments
- BSP array changes
- Scheduled equipment maintenance
- Alarm condition assessment (as necessary)

The above information is logged on field forms to assess operating conditions as well as for completing system adjustments with respect to performance monitoring data. The primary performance monitoring parameters utilized to assess remediation system performance are as follows:

- BSP pressure and flow rate
- Sulfolane and sulfate concentrations
- Dissolved oxygen (DO) levels

Remediation system O&M data obtained from site visits is included on Table 1 in Appendix B. Groundwater sampling data is summarized on Table 2 in Appendix B and is further discussed in Section 6.0.

In general, remediation system operations during the 4th Quarter 2019 proceeded consistent with 3rd Quarter 2019. Remediation system operations during the 4th Quarter 2019 were conducted as recommended in the Quarterly Project Update Report – 3rd Quarter 2019, as follows:



In order to target residual sulfolane concentrations at MW-7D and MW-14D, and mitigate the potential for a rebound of sulfolane concentrations MW-13D and MW-19D, the following BSP array was operated continuously:

BSP-1, BSP-2, BSP-3, BSP-4, BSP-5, BSP-8, BSP-9, BSP-10, BSP-14, BSP-15, BSP-17, BSP-18, BSP-22, BSP-23, BSP-45, and BSP-46.

Target BSP flow rates were 20 to 25 standard cubic feet per minute (scfm), pending pressure associated with the operating array.

Remediation system operational performance (i.e. percent runtime) increased for the 4th Quarter 2019 compared to the 3rd Quarter 2019. System shutdowns occurred as a result of 'Heat Exchanger High Temp' alarm conditions that were observed on the October 3, 2019 and October 31, 2019 site visits. Based on hour meter readings and not accounting for system downtime associated with planned O&M and performance monitoring activities (i.e. system shutdown for performance monitoring activities), the remediation system operated at 95.5% efficiency (i.e. runtime) during the 4th Quarter 2019.

6.0 PERFORMANCE MONITORING SUMMARY

The following sections detail performance monitoring activities completed at the Site in the 4th Quarter 2019.

6.1 PERFORMANCE MONITORING EVENTS

Personnel from ECT completed the following performance monitoring event at the Site in the 4th Quarter 2019:

December 3-4, 2019 – Quarterly groundwater sampling event of 14 monitor wells (MW-7, MW-7D, MW-13, MW-13D, MW-14S, MW-14D, MW-15D, MW-17S, MW-17D, MW-18, MW-19S, MW-19D, MW-20S, and MW-20D)

Per recommendations presented in the Quarterly Project Update Report – 3rd Quarter 2018 dated October 26, 2018, and correspondence with EGLE-OGMD staff, three performance monitoring events per year will include the 14 monitor wells with current/previous detections of sulfolane and one performance monitoring event per year will include all (37) monitor wells.

6.2 LABORATORY ANALYSIS

Groundwater samples were collected via low-stress sampling methods in general accordance with USEPA Region 1 Low-Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, Revision Date September 19, 2017. Groundwater samples, including QA/QC samples, were collected and analyzed in general accordance with currently applicable EGLE-RRD guidance. The samples were collected into laboratory supplied containers, placed on ice, and shipped under chain-of-custody protocols to the ALS Environmental laboratory facility located in Holland, Michigan for analysis of the following:



- Sulfolane by USEPA Method 8270D
- Sulfate by Method A4500-SO4 E-11

Copies of laboratory analytical reports are included in Appendix C. Copies of low-flow sampling field forms are included in Appendix D.

6.3 CLEANUP GOALS

The following cleanup goal for sulfolane dissolved in groundwater at the Site was established in previous project submittals:

• EGLE-OGMD Interim Drinking Water Criteria for Sulfolane – 90 μg/L

The following cleanup goal for sulfate resulting from the biodegradation of sulfolane at the Site was established in previous project submittals:

• EGLE Part 201 Residential GCCSL Drinking Water Criteria for Sulfate – 250 mg/L

6.4 GROUNDWATER ANALYTICAL SUMMARY & CLEANUP CRITERIA COMPARISON

The following presents a summary and comparison of groundwater analytical results to the cleanup goal for sulfolane through the quarterly groundwater sampling event completed on June 24-26, 2019:

Monitor wells located west beyond the extent of the lower clay confining layer

• Monitor well clusters MW-6/6D and MW-12S/12D reported sulfolane non-detect from all associated sampling events.

Monitor wells screened below the lower clay confining layer

- Monitor wells MW-19DD and MW-21D reported sulfolane non-detect from all associated sampling events.
- Concentrations of sulfolane were reported below applicable cleanup criteria from MW-15DD from the pre-remediation system startup sampling event (September 11-13, 2017) and a confirmation sampling event (September 21, 2018). The concentration of sulfolane detected in MW-15DD is suspected to be the result of drilling activities completed on August 28, 2017. Sulfolane was reported non-detect from MW-15DD from all subsequent sampling events.

Monitor wells screened within the limits of the clay confining layer (area of sulfolane impact)

- The following monitor wells reported sulfolane non-detect from all associated sampling events:
 - ➤ MW-1, MW-2, MW-2D, MW-3, MW-3D, MW-4, MW-5, MW-8, MW-9, MW-10, MW-11, MW-15, MW-16, MW-16D, MW-22D, and MW-23D



- The following monitor wells previously reported sulfolane above the cleanup goal prior to the
 pre-remediation system startup event, below the cleanup goal at the pre-remediation system
 startup event, and currently report sulfolane non-detect:
 - ➤ MW-19S and MW-20S
- The following monitor wells previously reported sulfolane above the cleanup goal prior to the pre-remediation system startup event and non-detect at and subsequent to the pre-remediation system startup event:
 - ➤ MW-7 and MW-13
- The following presents percent reductions to the concentration of sulfolane (relative to the highest concentration from/after the pre-remediation system startup sampling event) for monitor wells that reported sulfolane above the cleanup goal from the pre-remediation system startup sampling event:
 - ➤ MW-14S, MW-15D, MW-17S, MW-17D, MW-18, and MW-20D: 100%
 - > MW-14D: 99.1% (7,700 to 71 μg/L)
 - > MW-19D: 98.4% (5,900 to 92 μg/L)
 - > MW-13D: 94.9% (730 to 37 μg/L)
 - \rightarrow MW-7D: 70.7% (4,100 to 1,200 µg/L)
- MW-13D was the only monitor well at the Site with a concentration of sulfate (660 μg/L) reported above the cleanup goal (250 μg/L). As noted in the Technical Memorandum Biosparging Pilot Study dated July 28, 2017, natural attenuation/biodegradation (i.e sulfate reduction) of sulfate in the vicinity of MW-13D is expected once biosparging has ceased to that area.

Please refer to Table 2 and Table 3 in Appendix B for a summary of groundwater monitoring data for the Site. Monitor well locations are illustrated on Figure 3 in Appendix A.

7.0 CONCLUSIONS AND RECOMMENDATIONS

As supported by the data presented herein, the remediation system has been effective at reducing concentrations of sulfolane after approximately 25 months of operation. Six of the ten monitor wells that reported a concentration of sulfolane above the cleanup goal from the pre-startup sampling event were reported non-detect at the December 3-4, 2019 sampling event. Three of the four remaining monitor wells, MW-13D, MW-14D, and MW-19D, that reported a concentration of sulfolane above the cleanup goal from the pre-startup sampling event achieved 94.9%, 99.1%, and 98.4% reduction in the concentration of sulfolane, respectively. MW-7D reported a rebound to the concentration of sulfolane, increasing from 140 μ g/L for the 3rd Quarter 2019 sampling event to 1,200 μ g/L for the 4th Quarter 2019 sampling event.

In order to target residual sulfolane concentrations at MW-7D, MW-13D, MW-14D, and MW-19D, the following BSP array will be operated during the 1st Quarter 2020:

BSP-1, BSP-2, BSP-4, BSP-5, BSP-8, BSP-9, BSP-10, BSP-15, BSP-17, BSP-18, BSP-22, BSP-23, and BSP-45.



In order to more closely monitor the concentration of sulfolane at MW-7D, groundwater samples are proposed to be collected from MW-7D in January 2020 and February 2020. The concentrations of sulfolane reported from MW-7D will be evaluated for potential augmentation of the remediation system.

8.0 SCHEDULE

The following schedule of activities is proposed/anticipated for the 1st Quarter 2020:

- Remediation system operations will continue with a minimum of weekly Site visits and adjustments to maximize system operations.
- The next performance/quarterly monitoring event is proposed to be completed during March 2020 and will include the 14 monitor wells with current/previous detections of sulfolane. As described above, performance monitoring will include collecting groundwater samples from MW-7D in January and February 2020.
- A quarterly project update report will be submitted subsequent to receipt of analytical data from the March 2020 sampling event.



APPENDIX A FIGURES





FIGURE 1.
SITE LOCATION MAP

Sources: USGS Quad: Kent Lake, 2015; West Highland, 2015; ECT, 2016.

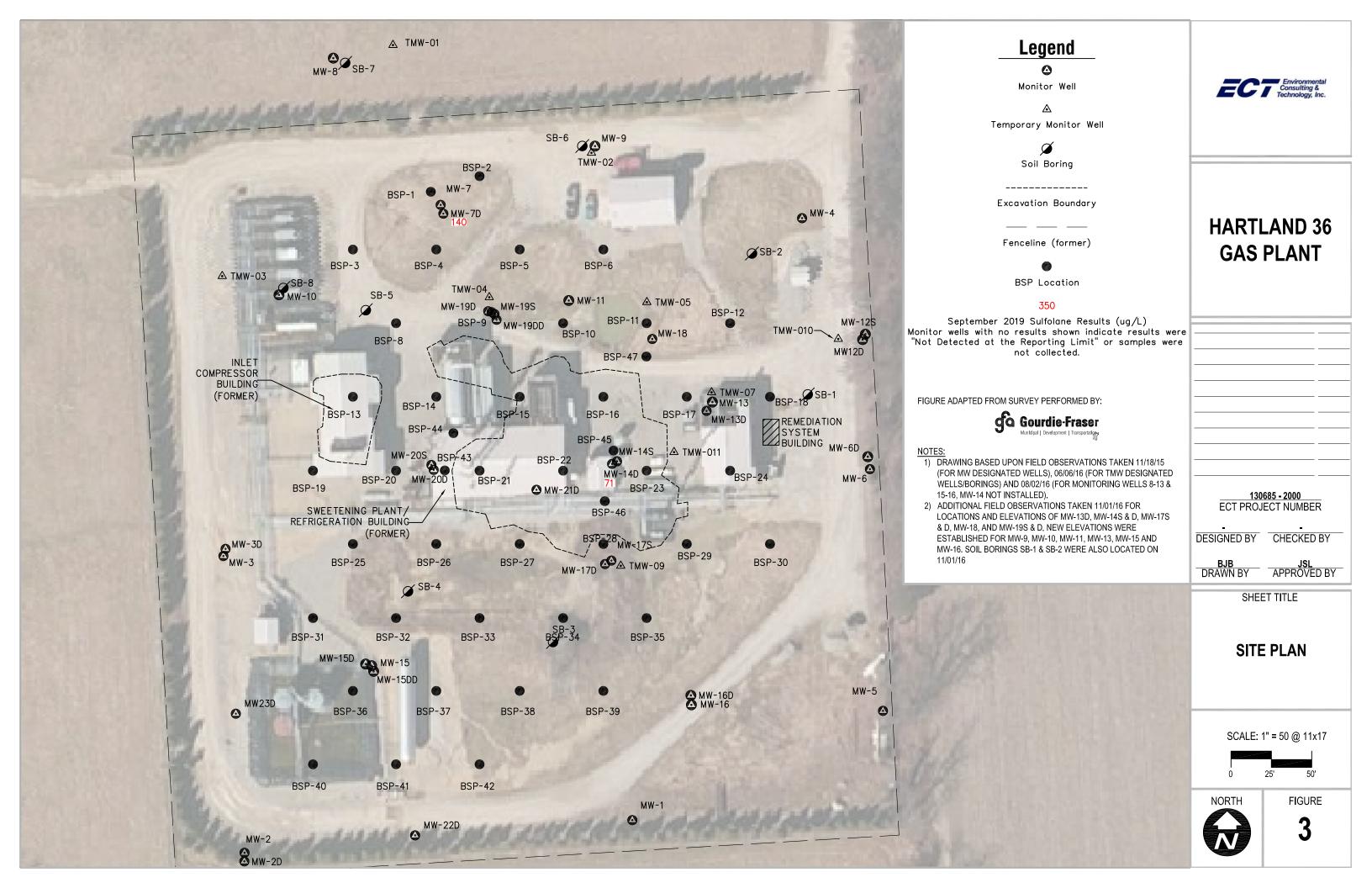




FIGURE 2.
SITE AND SURROUNDING PROPERTIES MAP

Source: Google Earth, 2016.





APPENDIX B

TABLES



REMEDIATION SYSTEM O&M DATA

Hartland 36 Gas Plant

SE/NE/NW Section 36, T03N-R06E, Hartland Township, Livingston County, Michigan ECT Project #13-0685-2000

								ECI	Project #1				-				-			
		10/3	/2019				/2019				7/2019				1/2019				/2019	
	Arr	ival	Depa	rture	Arr	ival	Depa	arture	Arr	rival	Depa	arture	Arr	ival	Dep	arture	Arr	ival	Depa	irture
	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate
BSP #	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)
1			18.5		13	20	13.5	20	13	19	13.5	19	13	20	13	20			15.5	11
2			19.5		13	11	13	11	13	11	14	11	12.5	12	13	12			16	5
3			17.5		13	17	13	17	12.5	19	12.5	19	12	19	13	20			14.5	10
4			18.5		12	20	12.5	20	12.5	20	13	20	11	20	11	20			15.5	12
5			18.5		12	23	10.5	20	11	19	12	20	10.5	20	11	21			15.5	15
6																				
8			16.5		11	25	9	20	9	19	9.5	20	9	20	9	20			15	20
9			19		12.5	14	12.5	14	14	13	14.5	13	13	12	14	15			15.5	4
10			21		14	14.5	14	12	14	11	15	11	13	11	14	12			16.5	13
11																				
12																				
13																				
14			19.5		13	8	13	7	4	6	14.5	6	13.5	6	15	6			15.5	6
15			14.5		9	20	9	20	9.5	19	10.5	22	10	22	9.5	20			14.5	20
16																				
17			18.5		13	5	13	6	13	5	13	5	12.5	5	13	5			15	4
18			17.5		9.5	14	6.5	20	9.5	19	9.5	20	7	20	7	20			14	17
19																				
20																				
21																				
22			17		10	18	10	18	11	17	12	17	10.5	16	11	18			13.5	6
23			19.5		12.5	7	13	8	13	8	13.5	8	12	8	13	9			16	4
24																				
25																				
26																				
27																				
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41																				
42																				
43																				
44																				
45			17.5		12	20	12	20	11.5	20	13.5	22	11.5	22	10.5	20			16.5	20
46			12		5	5	5	5	6	4	6.5	4	5	9	5.5	12			7	4
47																				
Elapsed Time, hrs					5474			37.36		14.70		15.83		32.52		82.98	5514	18.79		19.79
Blower Temp., °F				45	22			25		30		15		30		30			23	
Blower Pressure, psi				1	1			15		.6		6.5	15			16			17	
Manifold Pressure, psi				9.5	14			4.5		.4		14	13			4.5				5.5
Heat Exr Temp., °F				01	11	10	1	10	10	00	9	98	10	08	1	10				2
Comments	System Dov	vn on Arriva	ıl - Heat Exch	anger High					Ī				I					vn on Arriva	l - Heat Exch	anger High
	Temp.																Temp.			
	Ī								I				I				I			

BSP's with closed valves.

BSPs installed 5/2-3/2018.

BSP-42 permanently removed from manifold 5/2/2018.



REMEDIATION SYSTEM O&M DATA

Hartland 36 Gas Plant

SE/NE/NW Section 36, T03N-R06E, Hartland Township, Livingston County, Michigan ECT Project #13-0685-2000

								ECI	Project #1											
			/2019				/2019				1/2019				1/2019				7/2019	
	Arı	rival	Depa	arture	Arr	ival	Depa	rture	Arr	ival	Depa	arture	Arr	ival	Depa	arture	Arı	rival	Depa	rture
	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate
BSP #	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)
1	12	13	14	18	13	16			12	14	12.5	16	13	17	13	17	13	16		
2	12.5	8	15	12	13	14			12.5	13	12.5	18	15	19	14	19	14	18		
3	11	15	13	19	12.5	18			12	19	12	19	12	19	12	19	12	17		
4	12	15	15	20	13	19			13	17	13	17	15	19	14	19	14	18		
5	12	19	14	20	12.5	22			12.5	21	12.5	21	14	22	13	22	13.5	21		
6	12	15	14	20	12.3	22			12.5	21	12.3	21	14	22	13	22	13.3	21		
8	11.5	24	11	24	10	22			9.5	21	9.5	20	10	21	10	20	9	19		
9	13	0	15.5	15	14	11			13	9	13	10	15	12	14	11	13	11		
10	13.5	12	17	13	15	15			14.5	13	15	14	17	13	15.5	14	14.5	12		
11	15.5	12	1/	15	15	15			14.5	15	15	14	1/	15	15.5	14	14.5	12		
12																				
13	12		16		1.4	40			12	10	12	- 11	445	44	- 14	44	42.5	- 11		
14	13	6	16	8	14	10			13	10	13	11	14.5	11	14	11	12.5	11		
15	11	23	11	22	10.5	22			9.5	21	9.5	21	10.5	21	10	21	9.5	20		
16										_										
17	12	4	14.5	6	13.5	6			13	5	13	6	14	6	14	6	13.5	5		
18	11	25	8	24	7	23			7.5	21	8	20	11	20	8.5	20	9.5	20		
19																				
20																				
21																				
22	11.5	5	14	9	12	10			11.5	10	12	14	13	14	12.5	15	12.5	15		
23	13	5	16	8	14.5	8			16	8	14.5	9	15.5	10	15	10	14	10		
24																				
25																				
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43																				
44																				
45	13	20	14	20	13	19			13	20	13	20	16	20	14.5	20				
46	4	6	8	17	5	10			4.5	10	5	10	8	10	7	10				
47																				
Elapsed Time, hrs	553	24.94	5533	25.83	5534	42.05	5534	12.15	5548	37.73	554	88.66	5565	4.61	556	55.00	5580	02.44	5580	02.56
Blower Temp., °F					15	20			10		10	3300								
Blower Pressure, psi		L4		13 17		16				5.5		5.5	16			16		15	1	
Manifold Pressure, psi		13		15		4.5				.4		14		5		15		4.5		
Heat Exr Temp., °F		75		35		+.5 85				4		36		8		90		92		
	 '			,,,		,,,				-		,,,	°			,,,			roundat	campling
Comments																	event 12/3		groundwater	sampling
										event 12/3	-4/19.									
	<u> </u>												<u> </u>							



BSP-42 permanently removed from manifold 5/2/2018.



REMEDIATION SYSTEM O&M DATA

Hartland 36 Gas Plant

SE/NE/NW Section 36, T03N-R06E, Hartland Township, Livingston County, Michigan ECT Project #13-0685-2000

							Project #1	3-0685-20	00							
			/2019				/2019				/2019				5/2019	
		rival		arture		rival		rture		rival		rture		ival		rture
	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate	Pressure	Flow Rate
BSP #	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(psi)	(scfm)
1	15	20	15	20	13.5	17	13	17	13	18	12	18	11.5	17	12	18
2	16.5	10	17	10	13	16	13	16	13	16	11.5	17	10.5	15	11.5	16
3	14.5	14	14.5	14	13	17	13	17	12.5	19	12.5	20	12.5	15		
4	17	19	17	20	16.5	19	16.5	20	15.5	21	14	20	13	19	13.5	22
5	15	23	14	20	13	18	12	21	11	21	14	20	10	20	10	20.5
6																
8	12	17	13	20	11	22	10	21	9.5	22	8	20	8	19	8	20
9	16.5	11	16.5	12	15	14	15	14	13.5	15	12	14	11	12.5	11.5	14
10	19	19	19	20	18	18	17.5	18	17	19	15.5	20	14	18	14.5	19
11																
12																
13	4.6	_	4.0		45				40.5		4.0					
14	16	8	16	7	15	7	14.5	7	13.5	7	12	7	11	6	0	20
15	11	13	12	20	10.5	20	10	20	9.5	21	8.5	20	8	19	8	20
16 17	16	7	16.5	7	15	6	15	6	14	10	14	9	13	8.5	14	11
17	18.5	22	16.5	20	15 11	19	15	20	10	21	9	20	13 7	8.5 19	7	11
19	16.5	22	12	20	11	19	11	20	10	21	3	20		13	,	19
20																
21																
22	15	16	15.5	20	15	18	15	19	13.5	18	12.5	17	10.5	17	11	20
23	18	6	18	6	17	6	16.5	8	15.5	7	14.5	7	12.5	7	13	12
24	10		10	U	1/		10.5	8	15.5	,	14.5	,	12.3	,	13	12
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44																
45	18.5	25	16.5	20	16	19	15.5	19	15	19	14	20	12	20	12.5	21
46	11	7	11	7	9	7	9	7	8	8	7	7	5	6		
47		22.55		22.75		22.45		1		CO 70				L		L
Elapsed Time, hrs		23.55		23.76		92.45		93.33		62.78		53.30		28.74		29.49
Blower Temp., °F		05		05		85		90		85		00	2			20
Blower Pressure, psi		16		16		15		.5		15		.5		.2		.3
Manifold Pressure, psi		17 75		7.5 78		16		16		16		.5		1.5		.5 04
Heat Exr Temp., °F						58		72	-	75	8	10	1	00	10	J4
Comments		tarted at 12: er sampling														
			p													
<u> </u>																



BSPs installed 5/2-3/2018.

BSP-42 permanently removed from manifold 5/2/2018.



														TABL	E 2															
													H	UMMAR' artland 36	Y & CLE. Gas Plant	ANUP CF			RISON											
	,			,			_			SE		ection 36,		Project #1		Livingstor 00	-	/lichigan	,			<u>, </u>			_			,		
Date	Sulfolane	MW-1 DO	Sulfate	Sulfolane	MW-2 DO	Sulfate	Sulfolane	MW-2D DO	Sulfate	Sulfolane	MW-3 DO	Sulfate	Sulfolane	MW-3D DO	Sulfate	Sulfolane	MW-4 DO	Sulfate	Sulfolane	MW-5 DO	Sulfate	Sulfolane	MW-6 DO	Sulfate	Sulfolane	MW-6D DO	Sulfate	Sulfolane	MW-7 DO	Sulfate
9/11-13/17	ND	8.08		ND	4.14		ND	5.36		ND	6.96		ND	1.03		ND	7.75		ND	7.31		ND	2.77		ND	5.90		ND	1.55	
9/21/17														-																
12/19-20/17 1/25/18	ND 	8.83	6.4	ND 	8.76	16	ND 	5.02	21	ND 	9.81	41	ND 	1.90	27	ND 	7.10	24	ND 	6.85	24	ND 	2.99	42	ND 	9.26	19	ND 	10.07	46
2/27/18									-																					
3/28-29/18	ND	7.87	5.0	ND	7.79	14	ND	4.05	17	ND	11.53	26	ND	1.31	30	ND	9.77	29	ND	6.31	24	ND	3.22	41	ND	6.92	20	ND	9.75	31
6/19-21/18 9/18-20/18	ND ND	15.96 9.98	9.3 8.5	ND ND	10.66 12.08	15 15	ND ND	7.87 10.21	18 21	ND ND	8.43 9.56	11 16	ND ND	1.06 1.87	28 34	ND ND	9.86 11.86	21 23	ND ND	12.49 11.26	28 25	ND ND	10.58 5.56	56 57	ND ND	10.91 8.27	10 22	ND ND	10.49 13.67	17 24
12/17-18/18		9.90	6.5		12.00			10.21			9.56			1.07									5.56			0.21		ND	10.03	41
3/25-26/19																												ND	15.99	44
6/24-26/19	ND	11.22	6.8	ND 	7.00	17	ND	3.79	20	ND 	11.36	15	ND 	4.99	32	ND	11.47	27	ND 	9.78	36	ND 	6.25	61	ND 	7.11	23	ND	12.22	20
9/23-24/19 12/3-4/19																												ND ND	12.78 9.65	25 29
% Decrease																														
Sulfolane Criterion																90														
Sulfate Criterion															2	50														
		MW-7D			MW-8			MW-9			MW-10			MW-11			MW-12S			MW-12D			MW-13			MW-13D				
Date	Sulfolane	DO	Sulfate	Sulfolane	DO	Sulfate	Sulfolane	DO	Sulfate	Sulfolane		Sulfate	Sulfolane	DO	Sulfate	Sulfolane	DO	Sulfate	Sulfolane	DO	Sulfate	Sulfolane	DO	Sulfate	Sulfolane		Sulfate			
9/11-13/17 9/21/17	1,900	0.79		ND 	9.09		ND 	0.73		ND 	7.42		ND 	3.69		ND 	2.65		ND 	1.36		ND 	0.94		660 (730)	0.52	330			
12/19-20/17	4,100	0.89	46	ND	6.34	8	ND	0.57	21	ND	7.95	36	ND	5.04	20	ND	3.98	19	ND	4.00	32	ND	13.79	80	480	0.51	240			
1/25/18															-										400	2.13	240			
2/27/18 3/28-29/18	1,200 820	1.47 0.61	96 81	ND	9.65	12	ND	1.32	26	ND	10.34	48	ND	5.17	 16	ND	7.70	 18	ND	3.45	33	ND	10.12	63	ND ND	9.90 8.41	210 220			
6/19-21/18	180 (170)	1.09	61 (57)	ND	8.58	30	ND	3.36	21	ND	9.98	39	ND	10.94	18	ND	9.09	22	ND	5.26	36	ND	8.08	93	180	2.42	480			
9/18-20/18	170	1.32	58	ND	7.88	9.4	ND	1.66	29	ND	11.83	18	ND	11.00	45	ND	3.52	55	ND	4.27	34	ND	9.36	69	ND	5.06	650			
12/17-18/18 3/25-26/19	270 (300) 1,700	12.68 0.19	37 53																			ND ND	10.41 11.46	94 110	ND 16	0.38 1.95	740 740			
6/24-26/19	510	0.19	84	ND	12.70	17	ND	1.20	26	ND	8.50	61	ND	11.21	40	ND	5.84	27	ND	2.96	37	ND	8.54	140	19	2.61	740			
9/23-24/19	140	2.58	57																			ND	8.93	140	ND	5.07	750			
12/3-4/19 % Decrease	1,200	4.02	48																			ND	10.09	120	37	0.82	660			
												t	1												04.09/			7		
Sulfolane Criterion	70.7%													90											94.9%					
	70.7%																								94.9%					
Sulfolane Criterion	70.7%	 MW-14S			 MW-14D		 	MW-15			 MW-15D			90						MW-16D			 MW-17S		94.9%					
Sulfolane Criterion Sulfate Criterion Date	Sulfolane	MW-14S DO	 Sulfate	Sulfolane	MW-14D DO	Sulfate	Sulfolane	MW-15 DO	Sulfate	Sulfolane	MW-15D	Sulfate	Sulfolane	90 250 MW-15DD		 Sulfolane	MW-16		Sulfolane	MW-16D DO	Sulfate	Sulfolane	MW-17S DO	Sulfate	Sulfolane	MW-17D	 Sulfate			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17	Sulfolane 120	MW-14S DO 0.85	Sulfate	Sulfolane 7,700	MW-14D DO 0.22	Sulfate	Sulfolane ND	MW-15 DO 4.39	Sulfate	Sulfolane	MW-15D DO 0.22	Sulfate	Sulfolane 33	90 250 MW-15DD DO 0.23	Sulfate	Sulfolane	MW-16 DO 3.31	Sulfate	Sulfolane ND	MW-16D DO 0.28	Sulfate	Sulfolane 3,100	MW-17S DO 0.25	Sulfate	Sulfolane	MW-17D DO 0.36	Sulfate			
Sulfolane Criterion Sulfate Criterion Date	Sulfolane 120	MW-14S DO	Sulfate	Sulfolane 7,700	MW-14D DO	Sulfate	Sulfolane	MW-15 DO	Sulfate	Sulfolane 230	MW-15D DO 0.22	Sulfate	Sulfolane 33 48	90 250 MW-15DD DO 0.23 0.64	Sulfate	Sulfolane ND	MW-16	Sulfate	Sulfolane ND	MW-16D DO 0.28	Sulfate	Sulfolane 3,100	MW-17S DO	Sulfate	Sulfolane	MW-17D DO 0.36	Sulfate			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18	Sulfolane 120 100 85	MW-14S DO 0.85	Sulfate 91 56	Sulfolane 7,700 7,100 5,400	MW-14D DO 0.22	Sulfate	Sulfolane ND	MW-15 DO 4.39	Sulfate	Sulfolane	MW-15D DO 0.22	Sulfate	Sulfolane 33	90 250 MW-15DD DO 0.23	Sulfate	Sulfolane	MW-16 DO 3.31 8.42	Sulfate	Sulfolane ND	MW-16D DO 0.28	Sulfate	Sulfolane 3,100 2,400 510	MW-17S DO 0.25 0.88 0.95	Sulfate 49 53	Sulfolane 380	MW-17D DO 0.36 8.10 10.07	Sulfate 33 38			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63	Sulfate 91 56 110	Sulfolane 7,700 7,100 5,400 4,000	MW-14D DO 0.22 0.45 0.43 0.50	Sulfate 39 44 48	Sulfolane ND ND	MW-15 DO 4.39 11.02	Sulfate 14	Sulfolane 230 ND	MW-15D DO 0.22 4.22	Sulfate 46	Sulfolane 33 48 ND	90 250 MW-15DD DO 0.23 0.64 0.56	Sulfate 37	Sulfolane ND ND	MW-16 DO 3.31 8.42	Sulfate 16	Sulfolane ND ND	MW-16D DO 0.28 5.99	Sulfate 24	Sulfolane 3,100 2,400 510 460	MW-17S DO 0.25 0.88 0.95 0.96	Sulfate 49 53 53	\$ulfolane 380 51 ND ND	MW-17D DO 0.36 8.10 10.07 11.02	Sulfate 33 38 38 38			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18	Sulfolane 120 100 85	MW-14S DO 0.85 2.05 3.35	Sulfate 91 56	Sulfolane 7,700 7,100 5,400	MW-14D DO 0.22 0.45 0.43	Sulfate 39 44	Sulfolane ND ND	MW-15 DO 4.39 11.02	Sulfate 14	Sulfolane 230 ND	MW-15D DO 0.22 4.22	Sulfate 46	Sulfolane 33 48 ND	90 250 MW-15DD DO 0.23 0.64 0.56	Sulfate 37	Sulfolane ND ND ND	MW-16 DO 3.31 8.42	Sulfate 16	Sulfolane ND ND	MW-16D DO 0.28 5.99	Sulfate 24	Sulfolane 3,100 2,400 510	MW-17S DO 0.25 0.88 0.95	Sulfate 49 53	Sulfolane	MW-17D DO 0.36 8.10 10.07	Sulfate 33 38			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18	Sulfolane 120 100 85 ND ND 52 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90	Sulfate 91 56 110 120 67 140	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89	Sulfate 39 44 48 50 (51) 77 (77) 110	Sulfolane ND ND ND ND ND ND ND ND ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25	Sulfate 16 39 32	Sulfolane 230 ND ND ND ND ND ND	MW-15D DO 0.22 4.22 6.86 3.80 7.45	Sulfate 46 29 27 20	Sulfolane 33 48 ND	90 250 MW-15DD DO 0.23 0.64 0.56 0.54 0.53 0.60	Sulfate 37 37 42 41	Sulfolane ND ND ND ND ND ND ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate 16 19 43 21	Sulfolane ND ND ND ND ND ND ND ND ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08	Sulfate 24 25 24 22	Sulfolane 3,100 2,400 510 460 52 (52) 55 32	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07	Sulfate 49 53 53 64 68 65	\$ulfolane 380 51 ND	MW-17D a DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83	Sulfate 33 38 38 36 42 (41) 49			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18	Sulfolane 120 100 85 ND ND ND 52 ND ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680 290	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49	Sulfate 39 44 48 50 (51) 77 (77) 110 120	Sulfolane ND ND ND ND ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25	Sulfate 14 16 39 32	Sulfolane 230 ND ND ND ND ND ND ND	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77	Sulfate 46 29 27 20 22	Sulfolane 33 48 ND ND ND ND ND ND		Sulfate 37 42 41	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30	Sulfate	\$ulfolane 380 51 ND ND ND ND ND ND ND ND ND	MW-17D DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83 9.75	Sulfate 33 38 38 36 42 (41) 49 47			
Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18	Sulfolane 120 100 85 ND ND 52 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90	Sulfate 91 56 110 120 67 140	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89	Sulfate 39 44 48 50 (51) 77 (77) 110	Sulfolane ND ND ND ND ND ND ND ND ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25	Sulfate 16 39 32	Sulfolane 230 ND ND ND ND ND ND	MW-15D DO 0.22 4.22 6.86 3.80 7.45	Sulfate 46 29 27 20	Sulfolane 33 48 ND	90 250 MW-15DD DO 0.23 0.64 0.56 0.54 0.53 0.60	Sulfate 37 37 42 41	Sulfolane ND ND ND ND ND ND ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate 16 19 43 21	Sulfolane ND ND ND ND ND ND ND ND ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08	Sulfate 24 25 24 22	Sulfolane 3,100 2,400 510 460 52 (52) 55 32	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07	Sulfate 49 53 53 64 68 65	\$ulfolane 380 51 ND	MW-17D a DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83	Sulfate 33 38 38 36 42 (41) 49			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 11/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.61 0.28 4.90 9.20 11.08 9.88 9.88	Sulfate	Sulfolane 7,700 5,400 4,000 3,000(5,100) 680 290 ND 110 71	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 120 150	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 8.25 8.58	Sulfate 14 16 39 32 55	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96	Sulfate 29 27 20 22 23 28 26	Sulfolane 33 48 ND ND ND ND ND ND ND ND		Sulfate	Sulfolane ND	MW-16 DO 3.31 8.72 16.43 8.12 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND ND ND ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78	Sulfate	Sulfolane 380 51 ND ND ND ND ND ND ND N	MW-17D DO 8.10 10.03 11.02 9.68 10.63 3.83 9.75 9.68 7.19	Sulfate 33 38 38 38 36 42(41) 49 47 45 65 96			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19	Sulfolane 120 100 85 ND ND ND ND ND ND ND N	MW-14S DO 0.85 2.05 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 3,000(5,100) 2,600(2,600) ND 110 71 71	MW-14D DO 0.22 0.45 0.50 0.22 0.22 0.9 0.50 0.22 0.9 0.89 0.49 0.71 0.50 0.22 0.22 0.23 0.21	Sulfate 39 44 48 50 (51) 77 (77) 120 120 120 150 150	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate 14 16 39 32 55	Sulfolane 230 ND ND ND ND ND ND N	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29	Sulfate 46 29 20 22 23 28 26 21	Sulfolane 33 48 ND ND ND ND ND ND ND ND		Sulfate 37 37 42 41 65	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 16.43 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 ND ND ND ND ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98	Sulfate 49 53 53 64 66 61 80 69 73 61	Sulfoland 380 51 51 ND ND ND ND ND ND ND ND ND ND ND ND ND	MW-17D DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87	Sulfate 33 38 38 36 42 (41) 49 47 45 696 80			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 11/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.61 0.28 4.90 9.20 11.08 9.88 9.88	Sulfate	Sulfolane 7,700 5,400 4,000 3,000(5,100) 680 290 ND 110 71	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 120 150	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 8.25 8.58	Sulfate 14 16 39 32 55	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96	Sulfate 29 27 20 22 23 28 26	Sulfolane 33 48 ND ND ND ND ND ND ND ND		Sulfate	Sulfolane ND	MW-16 DO 3.31 8.72 16.43 8.12 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND ND ND ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78	Sulfate	Sulfolane 380 51 ND ND ND ND ND ND ND N	MW-17D DO 8.10 10.03 11.02 9.68 10.63 3.83 9.75 9.68 7.19	Sulfate 33 38 38 38 36 42(41) 49 47 45 65 96			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease	Sulfolane 120 100 85 ND ND ND ND ND ND ND N	MW-14S DO 0.85 2.05 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 3,000(5,100) 2,600(2,600) ND 110 71 71	MW-14D DO 0.22 0.45 0.50 0.22 0.22 0.9 0.50 0.22 0.9 0.89 0.49 0.71 0.50 0.22 0.22 0.23 0.21	Sulfate 39 44 48 50 (51) 77 (77) 120 120 120 150 150	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate 14 16 39 32 55	Sulfolane 230 ND ND ND ND ND ND N	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29	Sulfate 46 29 20 22 23 28 26 21	Sulfolane 33 48 ND ND ND ND ND ND ND ND		Sulfate 37 37 42 41 65	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 16.43 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 ND ND ND ND ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98	Sulfate 49 53 53 64 66 61 80 69 73 61	Sulfoland 380 51 51 ND ND ND ND ND ND ND ND ND ND ND ND ND	MW-17D DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87	Sulfate 33 38 38 36 42 (41) 49 47 45 696 80			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/2-4/19 % Decrease Sulfolane Criterion	Sulfolane 120 100 85 ND ND ND ND ND ND ND N	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 3,000(5,100) 2,600(2,600) ND 110 71 71	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21	Sulfate	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate 14 16 39 32 55	Sulfolane 230 ND ND ND ND ND ND N	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29	Sulfate	Sulfolane 33 48 ND ND ND ND ND ND ND ND		Sulfate 37 37 42 41 65	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 ND ND ND ND ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98	Sulfate 49 53 53 64 66 61 80 69 73 61	Sulfoland 380 51 51 ND ND ND ND ND ND ND ND ND ND ND ND ND	MW-17D DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87	Sulfate 33 38 38 36 42 (41) 49 47 45 696 80			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion	Sulfolane 120 100 85 ND ND S5 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 2,600 (2,800) 680 290 ND 110 71 71 99.1%	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21	Sulfate	Sulfolane ND	MW-15 DO 4.39	Sulfate	Sulfolane 230 ND	MW-15D DO 0.22	Sulfate	Sulfolane 33 48 ND ND ND ND ND ND ND 1 1 1		37 	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 MW-21D	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 53 ND ND ND ND ND 100%	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98	Sulfate	Sulfolane 380 51 ND	MW-23D	Sulfate 33 38 38 38 36 42 (41) 49 47 45 65 96 80			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/2-4/19 % Decrease Sulfolane Criterion	Sulfolane 120 100 85 ND ND ND ND ND ND ND N	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96	Sulfate	Sulfolane 7,700 7,100 5,400 4,000 3,000(5,100) 2,600(2,600) ND 110 71 71	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21	Sulfate	Sulfolane ND	MW-15 DO 4.39	Sulfate 14 16 39 32 55	Sulfolane 230 ND ND ND ND ND ND N	MW-15D DO 0.22	Sulfate	Sulfolane 33 48 ND ND ND ND ND ND ND 1 1 1		Sulfate 37 37 42 41 65	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 11.24	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 ND ND ND ND ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98	Sulfate	Sulfoland 380 51 51 ND ND ND ND ND ND ND ND ND ND ND ND ND	MW-23D	Sulfate 33 38 38 36 42 (41) 49 47 45 696 80			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17	Sulfolane 120 100 85 ND ND S2 ND SUlfolane 2,200	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 MW-18 DO 1.16	Sulfate 91 56 110 120 67 140 120 180 160 100 93	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 880 290 ND 110 71 71 99.1%	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 MW-19S DO 1.64	Sulfate	Sulfolane ND ND ND ND ND ND ND ND ND Sulfolane Sulfolane 5,900	MW-15 DO 4.39 11.02 17.96 7.98 8.25 8.58 MW-19D DO 0.660	Sulfate	Sulfolane 230	MW-15D DO 0.22	Sulfate 46 29 27 20 23 28 26 21 Sulfate	Sulfolane 33 48 ND		Sulfate	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 MW-20D DO 0.45	Sulfate	Sulfolane ND ND ND ND ND ND ND ND Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 0.00 MW-21D DO 6.08	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND ND ND ND ND ND ND Sulfolane ND Sulfolane ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7-98 MW-22D DO 7.76	Sulfate	Sulfolane	MW-23D MW-23D MW-23D MW-23D	Sulfate 33 38 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 12/17-18/18 3/25-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.866 MW-18 DO 1.16 0.67	Sulfate 91 120 67 140 220 180 160 100 93 Sulfate 37	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680 290 ND 110 71 71 99.1% Sulfolane 29 ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 MW-19S DO 1.64 10.32	Sulfate 39 44 48 50 (51) 77 (77) 120 120 150 150 Sulfate 44	Sulfolane	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate	Sulfolane 230 ND	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29 MW-19DD DO 3.82 7.16	Sulfate	Sulfolane 33 48 48 ND ND ND ND ND ND N		Sulfate	Sulfolane ND ND ND ND ND ND Sulfolane 12,000	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate	Sulfolane ND ND ND ND ND ND ND Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.02 6.78 0.7 MW-21D DO 6.08 7.58	Sulfate	Sulfolane 3,100 2,400 52 (52) 55 32 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98 MW-22D DO 7.76 5.74	Sulfate	Sulfolane 380 51 ND	MW-23D MW-23D MW-23D MW-23D	Sulfate 33 38 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate 20			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17	Sulfolane 120 100 85 ND ND S2 ND SUlfolane 2,200	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 MW-18 DO 1.16	Sulfate 91 56 110 120 67 140 120 180 160 100 93	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 880 290 ND 110 71 71 99.1%	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 MW-19S DO 1.64	Sulfate	Sulfolane ND ND ND ND ND ND ND ND ND Sulfolane Sulfolane 5,900	MW-15 DO 4.39 11.02 17.96 7.98 8.25 8.58 MW-19D DO 0.660	Sulfate	Sulfolane 230	MW-15D DO 0.22	Sulfate 46 29 27 20 23 28 26 21 Sulfate	Sulfolane 33 48 ND		Sulfate	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 MW-20D DO 0.45	Sulfate	Sulfolane ND ND ND ND ND ND ND ND Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 0.00 MW-21D DO 6.08	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND ND ND ND ND ND ND Sulfolane ND Sulfolane ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7-98 MW-22D DO 7.76	Sulfate	Sulfolane	MW-23D MW-23D MW-23D MW-23D	Sulfate 33 38 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/5/18 2/27/18 3/28-29/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.67 0.74 0.39 0.71	Sulfate 91 120 67 140 220 180 160 100 93 Sulfate 37 34 33 34 34 34 34 34 34	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680 290 ND 110 71 71 99.1% Sulfolane 29 ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 10.32 10.32 9.45	Sulfate 39 44 48 50 (51) 77 (77) 120 120 150 150 Sulfate 44 44 43	Sulfolane	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29 MW-19DD DO 3.82 7.16 6.27	Sulfate	Sulfolane 33 48 48 ND ND ND ND ND ND 100% Sulfolane 63 49 ND ND ND ND ND ND ND N		Sulfate 37 37 42 41 65 52 Sulfate 55 257 (58)	Sulfolane ND ND ND ND ND ND ND SU ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate	Sulfolane	MW-16D DO 0.28 5.99 3.88 8.12 2.02 6.78 0.78	Sulfate	Sulfolane 3,100 2,400 52 (52) 55 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98 DO 7.76 5.74 5.32	Sulfate 49 53 64 68 65 61 80 69 73 61 Sulfate 12 9,4	Sulfolane 380 51 ND	MW-17D ■ DO ■ 0.36 8.10 11.02 9.68 10.93 7.19 8.87 MW-23D ■ DO 2.87 2.48 3.03	Sulfate 33 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate 19			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 9/18-20/18 12/17-18/18 3/25-26/19 9/23-24/19 % Decrease Sulfolane Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.74 0.39 0.71 3.13	Sulfate 91 120 67 140 220 180 190 93 Sulfate 93 34 33 34 39 39	Sulfolane 7,700 7,100 5,400 4,000 3,000,(5,100) 2,600 (2,200) RD 110 71 71 99.1% Sulfolane 29 ND ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 10.21 MW-19S DO 1.64 10.32 9.45	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 150 150 Sulfate	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.060 DO 0.60 0.38 0.77 0.57 0.47	Sulfate 14 16 39 32 55 Sulfate 73 74 51 54	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 5.65 6.29 MW-19DD DO 3.82 6.27 5.25	Sulfate	Sulfolane 33 48 48 48 48 48 48 48		Sulfate 37 65	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 DO 0.45 1.61 0.61 2.00 3.99	Sulfate	Sulfolane	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 DO 6.08 7.58 1.4.13 4.22	Sulfate 24 25 24 25 24 33 Sulfate 22 22 22 21	Sulfolane 3,100 2,400 510 460 52 (52) 55 32 ND	MW-17S DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 1.43 4.78 7.98 DO 7.76 5.74 5.32 12.97	Sulfate 49 53 64 68 65 61 80 69 73 61 Sulfate 12 9.4 8.0	Sulfolane 380 51 ND	MW-17D 9 DO 8.10 10.03 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87 MW-23D 9 DO 2.87 2.87 3.03 3.03 5.72	Sulfate 33 38 38 36 42 (41) 49 47 45 65 80 Sulfate 19 20			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/5/18 2/27/18 3/28-29/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.67 0.74 0.39 0.71	Sulfate 91 120 67 140 220 180 160 100 93 Sulfate 37 34 33 34 34 34 34 34 34	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680 290 ND 110 71 71 99.1% Sulfolane 29 ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 10.32 10.32 9.45	Sulfate 39 44 48 50 (51) 77 (77) 120 120 150 150 Sulfate 44 44 43	Sulfolane	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58	Sulfate	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29 MW-19DD DO 3.82 7.16 6.27	Sulfate	Sulfolane 33 48 48 ND ND ND ND ND ND 100% Sulfolane 63 49 ND ND ND ND ND ND ND N		Sulfate 37 37 42 41 65 52 Sulfate 55 257 (58)	Sulfolane ND ND ND ND ND ND ND SU ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12	Sulfate	Sulfolane	MW-16D DO 0.28 5.99 3.88 8.12 2.02 6.78 0.78	Sulfate	Sulfolane 3,100 2,400 52 (52) 55 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98 DO 7.76 5.74 5.32	Sulfate 49 53 64 68 65 61 80 69 73 61 Sulfate 12 9,4	Sulfolane 380 51 ND	MW-17D ■ DO ■ 0.36 8.10 11.02 9.68 10.93 7.19 8.87 MW-23D ■ DO 2.87 2.48 3.03	Sulfate 33 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate 19			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 9/18-20/18 12/17-18/18 3/25-26/19 9/23-24/19 % Decrease Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 1/125/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/28-29/18 12/17-18/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.74 0.39 0.71 3.13 0.67 2.28 1.09	Sulfate 91 56 110 120 67 140 220 180 160 93 Sulfate 37 34 33 34 39 49 (49) 53	Sulfolane 7,700 7,100 5,400 4,000 3,000,(5,100) 2,600 (2,800) ND 110 71 71 99.1% Sulfolane 29 ND ND ND ND ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 10.21 10.32 11.14 12.84 84 84 84 84 84 84 84 84 84 84 84 84 8	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 150 150 Sulfate 44 44 43 36 44 47	Sulfolane ND ND ND ND ND ND ND Sulfolane ND ND ND ND ND ND 1 1 2 3.200 ND ND ND ND ND ND 1 1 3.200 ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.0 0.60 0.30 0.77 0.57 0.47 1.08 0.86 0.302 0.24	Sulfate 14 16 39 32 55 55 51 54 63 77 (77) 83 88	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 6.29 DO 3.82 7.16 6.27 5.25 6.89	Sulfate	Sulfolane 33 48 48 48 48 48 48 48		Sulfate 37 37 42 41 65 Sulfate 55 55 45 56 63 48 62	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 DO 0.45 1.61 0.61 0.61 0.61 0.60 0.399 5.37 5.32 10.35	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 4.13 4.22 5.77	Sulfate 24 25 24 33 Sulfate 22 21 21 21	Sulfolane 3,100 2,400 551 510 460 52 (52) 55 32 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 7.98 DO 7.76 5.74 5.32 12.97 7.68	Sulfate 49 53 64 68 65 61 80 69 73 61 Sulfate 12 9,4 8.0 6.8	Sulfolane 380 51 ND	MW-17D 9 DO 8.10 8.10 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87 MW-23D DO 2.87 3.03 5.72 3.12 3.12	Sulfate 33 38 38 36 42 (41) 49 47 45 65 80 Sulfate 20 21			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 11/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/25-26/19 6/24-26/19 % Decrease Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 9/18-20/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.67 0.74 0.39 0.71 3.13 0.67 2.28 1.09 0.97	Sulfate 91 120 67 140 93 Sulfate 93 33 34 49 (49) 53 47 45 (444)	Sulfolane 7,700 7,100 5,400 4,000 3,000(5,100) 680 2,900(2,000) ND 110 71 71 99.1% Sulfolane 29 ND ND ND ND ND ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 2.83 10.21 10.32 9.45 11.14 12.84 8.95 14.18	Sulfate 39 44 45 50 (51) 77 (77) 110 120 120 150 150 444 43 36 44 47 47 47 62	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.060 0.38 0.77 0.57 0.47 1.08 0.86 3.02 0.24 0.17	Sulfate	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29 7.16 7.16 6.27 7.27	Sulfate	Sulfolane		Sulfate 37 37 42 41 65 55 52 57 (58) 63 48 62 72	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 11.24 0.55 1.61 2.00 3.99 5.37 5.32 10.36	Sulfate 19 43 21 23 43 41 46 51 58 80 (81) 99 (84) 94 (94)	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 4.13 4.22 5.77 5.66	Sulfate	Sulfolane 3,100 460 52(52) 55 32 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98 5.74 5.74 5.74 5.74 5.92 7.65 9.20	Sulfate	Sulfolane 380 51 ND	MW-17D DO 0.36 8.10 10.07 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87 MW-23D DO 2.87 2.48 3.03 3.12 6.39	Sulfate 33 38 38 36 42 (41) 49 47 45 65 96 80 Sulfate 19 20 21 30			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 1/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 9/18-20/18 12/17-18/18 3/25-26/19 9/23-24/19 % Decrease Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 1/125/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/28-29/18 12/17-18/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.74 0.39 0.71 3.13 0.67 2.28 1.09	Sulfate 91 56 110 120 67 140 220 180 160 93 Sulfate 37 34 33 34 39 49 (49) 53	Sulfolane 7,700 7,100 5,400 4,000 3,000,(5,100) 2,600 (2,800) ND 110 71 71 99.1% Sulfolane 29 ND ND ND ND ND ND ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 10.21 10.32 11.14 12.84 84 84 84 84 84 84 84 84 84 84 84 84 8	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 150 150 Sulfate 44 44 43 36 44 47	Sulfolane ND ND ND ND ND ND ND Sulfolane ND ND ND ND ND ND 1 1 2 3.200 ND ND ND ND ND ND 1 1 3.200 ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.0 0.60 0.30 0.77 0.57 0.47 1.08 0.86 0.302 0.24	Sulfate 14 16 39 32 55 55 51 54 63 77 (77) 83 88	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 6.29 DO 3.82 7.16 6.27 5.25 6.89	Sulfate	Sulfolane 33 48 48 48 48 48 48 48		Sulfate 37 37 42 41 65 Sulfate 55 55 45 56 63 48 62	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 DO 0.45 1.61 0.61 0.61 0.61 0.60 0.399 5.37 5.32 10.35	Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 4.13 4.22 5.77	Sulfate 24 25 24 33 Sulfate 22 21 21 21	Sulfolane 3,100 2,400 551 510 460 52 (52) 55 32 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 7.98 DO 7.76 5.74 5.32 12.97 7.68	Sulfate 49 53 64 68 65 61 80 69 73 61 Sulfate 12 9,4 8.0 6.8	Sulfolane 380 51 ND	MW-17D 9 DO 8.10 8.10 11.02 9.68 10.63 3.83 9.75 9.68 10.93 7.19 8.87 MW-23D DO 2.87 3.03 5.72 3.12 3.12	Sulfate 33 38 38 36 42 (41) 49 47 45 65 80 Sulfate 20 21			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 12/19-20/17 11/25/18 2/27/18 3/28-29/18 6/19-21/18 3/25-26/19 9/23-24/19 12/3-4/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Sulfate Criterion 2/27/18 2/27/18 3/28-29/18 6/19-21/18 3/28-29/18 6/19-21/18 3/28-29/18 6/19-21/18 3/28-29/18 6/19-21/18 3/28-29/18 6/19-21/18 3/25-26/19 6/24-26/19 9/23-24/19	Sulfolane 120	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 5.96 8.66 MW-18 DO 1.16 0.67 0.74 0.39 0.71 3.13 0.67 2.28 1.09 0.97 1.60	Sulfate 91 120 67 110 120 120 130 160 100 93 Sulfate 37 34 39 49 (49) 53 47 45 (44) 43	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) 680 290 ND 71 71 99.1% Sulfolane 29 ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 3.49 5.71 5.82 2.83 10.21 10.32 10.32 11.14 12.84 8.95 14.18 10.42 9.79	Sulfate 39 44 48 50 (51) 77 (77) 120 120 150 150 Sulfate 44	Sulfolane ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.60 0.60 0.57 0.47 1.08 0.86 3.02 0.24 0.17 8.39	Sulfate	Sulfolane 230	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 22.96 6.29 7.16 7.16 6.27 5.25 6.89 7.27	Sulfate	Sulfolane 33 48 48 48 48 48 48 48		Sulfate	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 12.40 DO 0.45 0.52 1.61 2.00 3.99 5.37 5.32 10.35 10.86 6.26	Sulfate	Sulfolane	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 6.78 1.75 DO 6.08 7.58 4.13 4.22 5.66	Sulfate	Sulfolane 3,100 2,400 510 460 52 (52) 53 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 4.78 7.98 MW-22D DO 7.76 5.74 5.32 12.97 7.65 9.20	Sulfate 49 53 64 68 65 61 80 69 73 61 12 12 9.4 8.0 6.8 8.3	Sulfolane 380 51 ND	MW-23D 8 DO 2.87 MW-23D 9 DO 3.68 10.93 7.19 8.87 MW-23D 3.03 5.72 3.12	Sulfate 33 38 38 36 42 (41) 49 47 45 65 96 80 19 20 19 20 21 30			
Sulfolane Criterion Sulfate Criterion Sulfate Criterion Date 9/11-13/17 9/21/17 11/25/18 2/27/18 3/28-29/18 6/19-21/18 3/28-29/18 6/19-21/18 3/25-26/19 6/24-26/19 9/23-24/19 12/3-4/19 % Decrease Sulfolane Criterion Sulfate Criterion Sulfate Criterion 1/25/18 2/27/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 3/28-29/18 6/19-21/18 9/18-20/18 12/17-18/18 9/18-20/18 12/17-18/18 9/18-20/18 12/17-18/18 9/18-20/18 12/17-18/18	Sulfolane 120 100 85 ND	MW-14S DO 0.85 2.05 3.35 9.63 8.61 0.28 4.90 9.20 11.08 9.88 66 MW-18 DO 1.16 0.67 0.74 0.39 0.71 3.13 0.67 2.28 1.09 0.97 1.60 0.93	Sulfate 91 56 110 120 67 140 220 180 160 100 93 Sulfate 37 34 33 34 39 49 (49) 53 47 45 (44) 49	Sulfolane 7,700 7,100 5,400 4,000 3,000 (5,100) 2,600 (2,800) ND 110 71 71 99.1% Sulfolane 29 ND	MW-14D DO 0.22 0.45 0.43 0.50 0.22 0.09 2.89 3.49 5.71 5.82 10.21 10.32 10.32 11.14 12.84 8.945 14.18 10.42 9.79 11.40	Sulfate 39 44 48 50 (51) 77 (77) 110 120 120 150 150 150 44 43 36 44 47 47 62 58 62	Sulfolane ND ND ND ND ND ND Sulfolane ND ND ND ND ND ND 1 1 2 3.200 ND	MW-15 DO 4.39 11.02 7.96 7.98 8.25 8.58 0.038 0.77 0.57 1.08 0.86 0.302 0.24 0.17 8.39 0.57	Sulfate 14 16 39 32 55 55 54 63 77 (77) 83 88 100 (94) 110 92	Sulfolane 230 ND	MW-15D DO 0.22 4.22 6.86 3.80 7.45 6.77 7.53 5.65 6.29 MW-19DD 3.82 7.16 6.27 5.25 6.89 7.27	Sulfate	Sulfolane 33 48 48 48 48 48 48 48		Sulfate 37 37 42 41 65 52 52 57 (58) 58 63 48 62 72 66 64	Sulfolane ND	MW-16 DO 3.31 8.42 8.73 16.43 8.12 11.24 DO 0.45 0.52 1.61 0.61 2.00 3.99 5.37 5.32 10.35 10.86 6.26 6.26 6.15	Sulfate 16 19 43 21 23 Sulfate	Sulfolane ND	MW-16D DO 0.28 5.99 3.88 8.12 2.08 6.78 MW-21D DO 6.08 4.13 4.22 5.77 5.66	Sulfate 24 25 24 25 24 33 Sulfate 22 21 21 21 24 24 24 24	Sulfolane 3,100 460 52 (52) 55 32 ND	MW-178 DO 0.25 0.88 0.95 0.96 3.28 8.61 3.07 9.30 5.77 1.43 7.98 DO 7.76 5.74 5.32 12.97 7.655 9.20	Sulfate 49 53 64 68 65 61 80 69 73 61 12 9.4 8.0 6.8 8.3	Sulfolane 380 51 ND	MW-23D MW-23D	Sulfate 33 38 38 36 42 (41) 49 47 45 65 80 Sulfate 96 80 91 19 20 21 30			

- Notes

 1) Concentrations of sulfolane reported in micrograms per liter (µg/L), equivalent to parts per billion (ppb).

 2) DO dissolved oxygen.

 3) Concentrations of dissolved oxygen and sulfate reported in milligrams per liter (mg/L), equivalent to parts per million (ppm).

 4) (---) Not sampled.

 5) ND Concentration not detected above reporting limit.

 6) Concentrations shown in parenthesis are from duplicate sample.

 7) % Decrease of sulfolane is the most recent sampling event relative to highest reported concentration since the pre-system startup event (9/11-13/17).

 8) Sulfolane criterion established by EGLE-Oil, Gas, and Minerals Division (EGLE-OGMD).

 9) Sulfate criterion Part 201 Residential Generic Cleanup Criteria and Screening Levels (Part 201 Residential GCCSLs), dated January 10, 2018, per R299.44 (Table 1) of the Michigan Administrative Code.

 10) Concentrations that are shaded and bold exceed cleanup criteria.

SULFOLANE GROUNDWATER ANALYTICAL SUMMARY & CLEANUP CRITERIA COMPARISON

Hartland 36 Gas Plant SE/NE/NW Section 36, T03N-R06E, Hartland Township, Livingston County, Michigan ECT Project #13-0685-2000

		ı												CT Project#1	13-0003-200	<u> </u>													
	Screened										******																		100 1110
	Interval (ft bgs)	11/4-5/15	1/27/16	6/3/2016		9/21-22/16	10/12/16	11/3/16		12/21-23/16			4/27/17; 5/1/17		5/30-31/17	6/19-21/17	9/11-13/17		12/19-20/2017				6/19-21/2018						
MW-1	20.1 - 25.1	ND	ND	ND		ND						ND				ND	ND		ND			ND	ND	ND			ND		
MW-2	19.1 - 24.1	ND	ND	ND		ND						ND				ND	ND		ND			ND	ND	ND			ND		
MW-2D	27.7 - 29.7											ND				ND	ND		ND			ND	ND	ND			ND		
MW-3	22.0 - 27.0	ND		ND		ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-3D	30.0 - 32.0										ND	ND				ND	ND		ND			ND	ND	ND			ND		
MW-4	23.1 - 28.1	ND	ND	ND	ND	ND	ND	ND		ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-5	18.0 - 23.0	ND	ND	ND		ND	ND			ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-6	25.4 - 30.4	ND	ND	ND	ND	ND	ND	ND		ND		ND			ND	ND	ND		ND			ND	ND	ND			ND		
MW-6D	39.4 - 44.4				ND	ND	ND	ND		ND		ND			ND	ND	ND		ND			ND	ND	ND			ND		
MW-7	25.2 - 30.2	880	44	510	ND	210				ND		ND				12	ND		ND			ND	ND	ND	ND	ND	ND	ND	ND
MW-7D	39.2 - 44.2								3,100			3,000				2,600	1,900		4,100		1,200	820	180	170	300	1,700	510	140	1,200
MW-8	24.6 - 29.6				ND	ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-9	23.6 - 28.6				ND	ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-10	21.2 - 26.2				ND	ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-11	21.7 - 26.7				ND	ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-12S	20.5 - 25.5				ND	ND	ND	ND		ND		ND			ND	ND	ND		ND			ND	ND	ND			ND		
MW-12D	39.7 - 44.7				ND	ND	ND	ND		ND		ND			ND	ND	ND		ND			ND	ND	ND			ND		
MW-13	19.1 - 24.1				6,600	8,800				3,500		5,100	7,000	3,700	97	ND	ND		ND			ND	ND	ND	ND	ND	ND	ND	ND
MW-13D	27.7 - 29.7							7,800		8,300		5,400	6,900	1,100	420	290	730		480	400	ND	ND	180	ND	ND	16	19	ND	37
MW-14S	18.6 - 23.6							46		460		540	490	160	520	94	120		100	85	ND	ND	52	ND	ND	ND	ND	ND	ND
MW-14D	36.7 - 41.7							7,900		10,000		7,600	9,800	8,600	8,200	7,800	7,700		7,100	5,400	4,000	5,100	2,800	680	290	ND	110	71	71
MW-15	19.3 - 24.3				ND	ND				ND		ND				ND	ND		ND			ND	ND	ND			ND		
MW-15D	37.9 - 42.9										4,600	3,200				670	230		ND			ND	ND	ND	ND	ND	ND	ND	ND
MW-15DD	50 - 55																33	48	ND			ND	ND	ND			ND		
MW-16	19.5 - 24.5				ND	ND				ND		ND	ND	ND	ND	ND	ND		ND			ND	ND	ND			ND		
MW-16D	31.4 - 33.4										ND	ND				ND	ND		ND			ND	ND	ND			ND		
MW-17S	19.9 - 24.9							3,900		5,100		3,000				5,300	3,100		2,400	510	460	52	55	32	ND	ND	ND	ND	ND
MW-17D	35.4 - 37.4							440		510		400				390	400		51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-18	19.9 - 24.9							6,800		6,800		4,300		2,100	4,800	3,800	2,200		660	2,300	2,000	980	14	ND	ND	ND	ND	ND	ND
MW-19S	22.6 - 27.6							2,700		1,500		1,300				24	33		ND			ND	ND	ND	ND	ND	ND	ND	ND
MW-19D	43.0 - 48.0							7,000		7,600		4,300				7,000	5,900		3,200	ND	ND	290	750	170	440	350	98	ND	92
MW-19DD	57 - 62																ND		ND			ND	ND	ND			ND		
MW-20S	17.8 - 22.8								25			97				160	63		49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-20D	31.0 - 33.0								8,700			8,300				11,000	12,000		12,000	10,000	9,300	10,000	6,600	34	19	ND	ND	ND	ND
MW-21D	52.3 - 57.3								ND			ND				ND	ND		ND			ND	ND	ND			ND		
MW-22D	36.4 - 41.4											ND				ND	ND		ND			ND	ND	ND			ND		
MW-23D	28.1 - 30.1											ND				ND	ND		ND			ND	ND	ND			ND		
EGLE-OGMD Clear	nup Criteria															90													
Collection Method		L	F	Bailer/PP													LF												

Notes

1) ft bgs - Feet below ground surface.
2) Collection method - Grab, peristaltic pump (PP), low flow (LF), Bailer.

3) μg/L - Micrograms per liter, equivalent to parts per billion (ppb).
 4) (---) - Not sampled.
 5) ND - Concentration not detected above reporting limit.

5) NU - Concentration not detected above reporting limit.
6) Sulfolane concentrations included on the table are for the higher concentration from samples submitted for duplicate analysis.
7) Cleanup criteria for sulfolane established by EGLE-Oil, Cas, and Minerals Division (EGLE-OGMD).
8) Concentrations that are shaded ______ and bold exceed cleanup criteria.
9) MW-7 sampled on 8/11/2016 for the 8/3-4/2016 sample event.



APPENDIX C

LABORATORY ANALYTICAL REPORTS





16-Dec-2019

Nick Summerland Lambda Energy Resources 1510 Thomas Rd Kalkaska, MI 49646

Re: Lambda (Hartland 36) Work Order: 19120221

Dear Nick,

ALS Environmental received 12 samples on 04-Dec-2019 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 23.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Gary Byar

Electronically approved by: Gary Byar

Gary Byar Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Environmental 為

ALS Group, USA

Date: 16-Dec-19

Client: Lambda Energy Resources
Project: Lambda (Hartland 36)

Work Order: 19120221

Work Order Sample Summary

Lab Samp ID Client Sample ID	Matrix Tag Number	Collection Date	Date Received	Hold
19120221-01 MW-19-S	Groundwater	12/3/2019 10:20	12/4/2019 10:00	
19120221-02 MW-17S	Groundwater	12/3/2019 10:44	12/4/2019 10:00	
19120221-03 MW-19d	Groundwater	12/3/2019 11:20	12/4/2019 10:00	
19120221-04 MW-17D	Groundwater	12/3/2019 11:45	12/4/2019 10:00	
19120221-05 MW-18	Groundwater	12/3/2019 12:05	12/4/2019 10:00	
19120221-06 MW-20D	Groundwater	12/3/2019 13:17	12/4/2019 10:00	
19120221-07 MW-20D Duplicate	Groundwater	12/3/2019 13:17	12/4/2019 10:00	
19120221-08 MW-13s	Groundwater	12/3/2019 13:35	12/4/2019 10:00	
19120221-09 MW-20S	Groundwater	12/3/2019 14:04	12/4/2019 10:00	
19120221-10 MW-13d	Groundwater	12/3/2019 14:30	12/4/2019 10:00	
19120221-11 MW-14s	Groundwater	12/3/2019 15:15	12/4/2019 10:00	
19120221-12 MW-15D	Groundwater	12/3/2019 15:25	12/4/2019 10:00	

Client: Lambda Energy Resources

Project: Lambda (Hartland 36) Work Order: 19120221

Sample ID: MW-19-S **Lab ID:** 19120221-01

Collection Date: 12/3/2019 10:20 AM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	;		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 07:59 PM
Surr: 2-Fluorobiphenyl	62.7		26-79	%REC	1	12/11/2019 07:59 PM
Surr: 4-Terphenyl-d14	69.2		43-106	%REC	1	12/11/2019 07:59 PM
Surr: Nitrobenzene-d5	54.1		29-80	%REC	1	12/11/2019 07:59 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	62		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-17S
 Lab ID: 19120221-02

Collection Date: 12/3/2019 10:44 AM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	6		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 08:20 PM
Surr: 2-Fluorobiphenyl	60.9		26-79	%REC	1	12/11/2019 08:20 PM
Surr: 4-Terphenyl-d14	70.9		43-106	%REC	1	12/11/2019 08:20 PM
Surr: Nitrobenzene-d5	54.3		29-80	%REC	1	12/11/2019 08:20 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	61		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36) Work Order: 19120221

Sample ID: MW-19d **Lab ID:** 19120221-03

Collection Date: 12/3/2019 11:20 AM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	92		10	μg/L	1	12/11/2019 08:41 PM
Surr: 2-Fluorobiphenyl	62.7		26-79	%REC	1	12/11/2019 08:41 PM
Surr: 4-Terphenyl-d14	73.8		43-106	%REC	1	12/11/2019 08:41 PM
Surr: Nitrobenzene-d5	54.4		29-80	%REC	1	12/11/2019 08:41 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	92		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

 Project:
 Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID:
 MW-17D
 Lab ID: 19120221-04

Collection Date: 12/3/2019 11:45 AM

Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	;		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 09:02 PM
Surr: 2-Fluorobiphenyl	63.9		26-79	%REC	1	12/11/2019 09:02 PM
Surr: 4-Terphenyl-d14	72.3		43-106	%REC	1	12/11/2019 09:02 PM
Surr: Nitrobenzene-d5	56.2		29-80	%REC	1	12/11/2019 09:02 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	80		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36) Work Order: 19120221

Sample ID: MW-18 **Lab ID:** 19120221-05

Collection Date: 12/3/2019 12:05 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 07:38 PM
Surr: 2-Fluorobiphenyl	57.0		26-79	%REC	1	12/11/2019 07:38 PM
Surr: 4-Terphenyl-d14	59.5		43-106	%REC	1	12/11/2019 07:38 PM
Surr: Nitrobenzene-d5	48.9		29-80	%REC	1	12/11/2019 07:38 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	49		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-20D
 Lab ID: 19120221-06

Collection Date: 12/3/2019 01:17 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	5		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 09:23 PM
Surr: 2-Fluorobiphenyl	59.7		26-79	%REC	1	12/11/2019 09:23 PM
Surr: 4-Terphenyl-d14	68.8		43-106	%REC	1	12/11/2019 09:23 PM
Surr: Nitrobenzene-d5	53.4		29-80	%REC	1	12/11/2019 09:23 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	84		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project:Lambda (Hartland 36)Work Order: 19120221Sample ID:MW-20D DuplicateLab ID: 19120221-07

Collection Date: 12/3/2019 01:17 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOU	INDS		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 09:44 PM
Surr: 2-Fluorobiphenyl	60.6		26-79	%REC	1	12/11/2019 09:44 PM
Surr: 4-Terphenyl-d14	72.9		43-106	%REC	1	12/11/2019 09:44 PM
Surr: Nitrobenzene-d5	53.2		29-80	%REC	1	12/11/2019 09:44 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	80		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-13s
 Lab ID: 19120221-08

Collection Date: 12/3/2019 01:35 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	3		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 10:05 PM
Surr: 2-Fluorobiphenyl	53.5		26-79	%REC	1	12/11/2019 10:05 PM
Surr: 4-Terphenyl-d14	68.6		43-106	%REC	1	12/11/2019 10:05 PM
Surr: Nitrobenzene-d5	45.3		29-80	%REC	1	12/11/2019 10:05 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	120		4.0	mg/L	4	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-20S
 Lab ID: 19120221-09

Collection Date: 12/3/2019 02:04 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 10:27 PM
Surr: 2-Fluorobiphenyl	59.6		26-79	%REC	1	12/11/2019 10:27 PM
Surr: 4-Terphenyl-d14	69.1		43-106	%REC	1	12/11/2019 10:27 PM
Surr: Nitrobenzene-d5	51.9		29-80	%REC	1	12/11/2019 10:27 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	64		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-13d
 Lab ID: 19120221-10

Collection Date: 12/3/2019 02:30 PM

Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	i		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	37		10	μg/L	1	12/11/2019 10:48 PM
Surr: 2-Fluorobiphenyl	58.9		26-79	%REC	1	12/11/2019 10:48 PM
Surr: 4-Terphenyl-d14	68.0		43-106	%REC	1	12/11/2019 10:48 PM
Surr: Nitrobenzene-d5	51.0		29-80	%REC	1	12/11/2019 10:48 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	660		10	mg/L	10	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-14s
 Lab ID: 19120221-11

Collection Date: 12/3/2019 03:15 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 11:09 PM
Surr: 2-Fluorobiphenyl	54.6		26-79	%REC	1	12/11/2019 11:09 PM
Surr: 4-Terphenyl-d14	67.1		43-106	%REC	1	12/11/2019 11:09 PM
Surr: Nitrobenzene-d5	47.7		29-80	%REC	1	12/11/2019 11:09 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	93		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120221

 Sample ID: MW-15D
 Lab ID: 19120221-12

Collection Date: 12/3/2019 03:25 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	S		SW846	8270D	Prep: SW3510 12/10/19 21:23	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/11/2019 11:30 PM
Surr: 2-Fluorobiphenyl	58.6		26-79	%REC	1	12/11/2019 11:30 PM
Surr: 4-Terphenyl-d14	70.2		43-106	%REC	1	12/11/2019 11:30 PM
Surr: Nitrobenzene-d5	50.0		29-80	%REC	1	12/11/2019 11:30 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	21		1.0	mg/L	1	12/7/2019 03:51 PM

Date: 16-Dec-19

Date: 16-Dec-19

Client: Lambda Energy Resources
Project: Lambda (Hartland 36)

Work Order: 19120221

Case Narrative

Batch R277107, Method SO4_4500E_DISC_W, Sample 19120221-05B The MS/MSD recovery for sulfate was below the lower control limit. The corresponding result in the parent sample may be biased low for this analyte. Client Sample ID: MW-18

Date: 16-Dec-19

QC BATCH REPORT

Client: Lambda Energy Resources

Work Order: 19120221

Project: Lambda (Hartland 36)

Batch ID: 146838	Instrument ID SVM	S8		Method	: SW840	827	70D					
MBLK Sa	mple ID: SBLKW1-146	6838-1468	38			ι	Jnits:µg/L		Analys	is Date: 12	/11/2019	05:10 PM
Client ID:		Run ID:	SVMS8	_191211A		Se	eqNo: 6121	619	Prep Date: 12/1	0/2019	DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane		ND	10									
Surr: 2-Fluorobiphenyl		36.98	0	50		0	74	26-79	0			
Surr: 4-Terphenyl-d14		36.02	0	50		0	72	43-106	0			
Surr: Nitrobenzene-d5		31.75	0	50		0	63.5	29-80	0			
LCS Sa	mple ID: SLCSW1-146	8838-1468	38			Ų	Jnits:µg/L		Analys	is Date: 12	/11/2019	05:31 PN
Client ID:	·			_191211A			eqNo: 6121		Prep Date: 12/1		DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
-						_		00.400	•	701 11 2		
Sulfolane		46.39 33.78	10	100 50		0	46.4 67.6	30-100 26-79	0			
Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14		34.52	0	50 50		0	69	43-106	0			
Surr: Nitrobenzene-d5		30.21	0	50		0	60.4	29-80	0			
MS Sa	mple ID: 19120221-05	A MS				ι	Jnits:µg/L		Analys	is Date: 12	/11/2019	06:55 PN
Client ID: MW-18		Run ID:	SVMS8	_191211A		Se	eqNo: 6121	624	Prep Date: 12/1	0/2019	DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane		53.69	10	100		0	53.7	30-100	0			
Surr: 2-Fluorobiphenyl		30.79	0	50		0	61.6	26-79	0			
Surr: 4-Terphenyl-d14		32.35	0	50		0	64.7	43-106	0			
Surr: Nitrobenzene-d5		26.92	0	50		0	53.8	29-80	0			
MSD Sa	mple ID: 19120221-05	A MSD				ι	Jnits:µg/L		Analys	is Date: 12	/11/2019	07:17 PN
Client ID: MW-18		Run ID:	SVMS8	_191211A		Se	eqNo: 6121	625	Prep Date: 12/1	0/2019	DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane		48.4	10	100		0	48.4	30-100	53.69	10.4	30	
Surr: 2-Fluorobiphenyl		29.55	0	50		0	59.1	26-79	30.79	4.11	40	
Surr: 4-Terphenyl-d14		36.28	0	50		0	72.6	43-106	32.35	11.5	40	
Surr: Nitrobenzene-d5		26.22	0	50		0	52.4	29-80	26.92	2.63	40	
The following samples v	were analyzed in this	batch:	19 19	120221-01A 120221-04A 120221-07A 120221-10A	19	9120 9120	0221-02A 0221-05A 0221-08A 0221-11A	19 19	120221-03A 120221-06A 120221-09A 120221-12A			

Note:

QC BATCH REPORT

Lambda Energy Resources Client:

Work Order: 19120221

Lambda (Hartland 36) **Project:**

Batch ID: R277107	Instrument ID GALLE	ERY		Method	A4500	-so	4 E-11						
MBLK	Sample ID: MB-R277107-F	R277107					Units: mg/l	L	Ana	alysi	is Date: 12	2/7/2019 0	3:51 PM
Client ID:		Run ID: GA	ALLE	RY_191207 <i>A</i>	١	Se	eqNo: 6112	2601	Prep Date:			DF: 1	
Analyte	Re	esult f	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value		%RPD	RPD Limit	Qual
Sulfate		ND	1.0										
MS	Sample ID: 19120221-05B	MS					Units: mg/l	L	Ana	alysi	is Date: 12	2/7/2019 0	3:51 PM
Client ID: MW-18		Run ID: GA	ALLE	RY_191207 <i>A</i>	\	Se	eqNo: 6112	2610	Prep Date:			DF: 1	
Analyte	Re	esult f	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value		%RPD	RPD Limit	Qual
Sulfate	9:	3.02	1.0	50	48.	.52	89	95-118		0			S
MSD	Sample ID: 19120221-05B	MSD					Units: mg/l	L	Ana	alysi	is Date: 12	2/7/2019 0	3:51 PM
Client ID: MW-18		Run ID: GA	ALLE	RY_191207 <i>A</i>	\	Se	eqNo: 6112	2611	Prep Date:			DF: 1	
Analyte	Re	esult f	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value		%RPD	RPD Limit	Qual
Sulfate	,	92.8	1.0	50	48.	.52	88.6	95-118	93	.02	0.237	10	S
LCS1	Sample ID: LCS1-R277107	7				-	Units: mg/l	L	Ana	alysi	is Date: 12	2/7/2019 0	3:51 PM
Client ID:		Run ID: GA	ALLE	RY_191207 <i>A</i>	١	Se	eqNo: 6112	2602	Prep Date:			DF: 1	
Analyte	Re	esult f	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value		%RPD	RPD Limit	Qual
Sulfate	1	0.27	1.0	10		0	103	90-119		0			
LCS2	Sample ID: LCS2-R277107	7				- 1	Units: mg/l	L	Ana	alysi	is Date: 12	2/7/2019 0	3:51 PM
Client ID:		Run ID: GA	ALLE	RY_191207 <i>A</i>	\	Se	eqNo: 6112	2619	Prep Date:			DF: 1	
Analyte	Re	esult f	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value		%RPD	RPD Limit	Qual
Sulfate	5	0.93	1.0	50		0	102	95-118		0			
The following samp	oles were analyzed in this b	atch:	19 19	9120221-01B 9120221-04B 9120221-07B 9120221-10B	1! 1!	9120 9120	0221-02B 0221-05B 0221-08B 0221-11B	19 19	120221-03B 120221-06B 120221-09B 120221-12B				

Date: 16-Dec-19 ALS Group, USA

Client: Lambda Energy Resources **QUALIFIERS, Project:** Lambda (Hartland 36) **ACRONYMS, UNITS**

WorkOrder: 19120221

Qualifier **Description** Value exceeds Regulatory Limit ** Estimated Value a Analyte is non-accredited B Analyte detected in the associated Method Blank above the Reporting Limit Е Value above quantitation range Н Analyzed outside of Holding Time Hr BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated. J Analyte is present at an estimated concentration between the MDL and Report Limit ND Not Detected at the Reporting Limit O Sample amount is > 4 times amount spiked Dual Column results percent difference > 40% R RPD above laboratory control limit S Spike Recovery outside laboratory control limits U Analyzed but not detected above the MDL X Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level. Description DUP Method Duplicate LCS Laboratory Control Sample

Acronym

LCSD Laboratory Control Sample Duplicate

LOD Limit of Detection (see MDL)

LOQ Limit of Quantitation (see PQL)

MBLK Method Blank

MDL Method Detection Limit

MS Matrix Spike

MSD Matrix Spike Duplicate

POL Practical Quantitation Limit

RPD Relative Percent Difference

TDL Target Detection Limit

TNTC Too Numerous To Count

APHA Standard Methods A

D **ASTM**

Е **EPA**

SW SW-846 Update III

Units Reported Description

 $\mu g/L$ Micrograms per Liter mg/L Milligrams per Liter

Client Name: LAMBDA-KAL

Sample Receipt Checklist

Date/Time Received:

04-Dec-19 10:00

Work Order:	1912022	<u>:1</u>			Received by	y: <u>DS</u>			
Checklist comp	_	Diane Shaw		04-Dec-19	Reviewed by:	Gary Byar			05-Dec-19
Matrices: Carrier name:		eSignature <u>dwater</u>		Date		eSignature			Date
Shipping contai	ner/coole	r in good condition?		Yes 🗸	No 🗌	Not Present			
Custody seals in	ntact on s	shipping container/coole	r?	Yes 🗸	No 🗌	Not Present			
Custody seals in	ntact on s	sample bottles?		Yes	No 🗌	Not Present	\checkmark		
Chain of custod	ly present	?		Yes 🗸	No 🗌				
Chain of custod	ly signed	when relinquished and	received?	Yes 🗸	No 🗌				
Chain of custod	ly agrees	with sample labels?		Yes 🗸	No 🗌				
Samples in prop	per contai	iner/bottle?		Yes 🗸	No 🗌				
Sample contain	ers intact	?		Yes 🗸	No \square				
Sufficient samp	le volume	e for indicated test?		Yes 🗸	No 🗆				
All samples rec	eived with	nin holding time?		Yes 🗸	No \square				
Container/Temp	p Blank te	emperature in compliance	e?	Yes 🗸	No \square				
Sample(s) received Temperature(s)				Yes 3.0/3.0, 2.6	No □	SR2			
Cooler(s)/Kit(s):	:								
Date/Time sam Water - VOA via		nt to storage: zero headspace?		12/4/2019 Yes	1:17:32 PM No	No VOA vials sub	mitted	✓	
Water - pH acce	eptable up	oon receipt?		Yes 🗸	No 🗌	N/A			
pH adjusted? pH adjusted by:	:			Yes _	No 🗸	N/A			
Login Notes:	===	======	====:	====	=====	:====	==:	====	:====
Client Contacte Contacted By:	d:		Date Contacted Regarding:	:	Person	Contacted:			
Ţ									
Comments:									
CorrectiveAction	n:							SPC	Page 1 of 1



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Page __/ of

COC ID:

47064 ALS Project Manager: ALS Work Order #: Customer Information **Project Information** Parameter/Method Request for Analysis Purchase Order Hartland 36 Gas Plant **Project Name** (1) Amber Liter **Work Order** Project Number Company Name ECT, Inc. **Bill To Company** C Send Report To **Invoice Attn** D Thomas R.L. E Address Address F City/State/Zip Traverse City, UL 49684 City/State/Zip Kalkaska, ms 49646 G **Phone** 231-946-4200 Phone 231-158-6411 H 131-946-8204 Fax Fax il colondowski & cetine . com e-Mail Address wichigan invoices a landacuargy licetom e-Mail Address Sample Description Date Time Matrix Pres. # Bottles C G H Hold MW-19-5 12/3/19 10:20 (JW X X 2 MW-175 13/3/19 10-14 C. w × * MW-191 12/3/19 6W 11:20 MW-17 D 10/3/19 1145 600 y à 1 MW-14 12/3/10 12:05 GW X Z X MW-14 M5/M5D 12/3/14 1Z:05 6W X MW-200/ DuplicaTe 4 3 1.317 تبنين × Y MW-133 12/3/19 13:35 60 X X MW-205 6/3/19 1404 Gu a × X MW-132 12/15/19 GW 14:30 Z X Sampler(s) Please Print & Sign Crum Magriper Shipment Method Turnaround Time in Business Days (BD) Other Joseph Kniss Standard Results Due Date: ☐ 10 BD □ 5 BD □ 3 BD □2 BD Relinquished by:

Joseph Kniss Ed / □180 Date: Received by: 12/3/14 16:10 Notes: Relinquished by: Date: Time: Received by (Laboratory) Cooler ID **Cooler Temp** QC Package: (Check One Box Below) 1000 Logged by (Laboratory): Checked by (Laboratory): ☐ Level II Std QC ☐ TRRP Checklist SRZ 3.0°C 1300 ☐ Level III Std QC/Raw Date ☐ TRRP Level IV حرائم Level IV SW846/CLP Preservative Key: 1-HCI 2-HNO. 3-H2SO4 5-Na₂S₂O₃ 4-NaOH 6-NaHSO, 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

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(~ 6					ALS Project Manage Project Information				Parameter/Method Request for Analysis									ユ
Cu	stomer Information)		Proje	ct Informat	ion						er/Me	thod I	Reque	st for	Analy:	sis	
Purchase Order	Some as	page #1	Project N	ame				A	Sul	folam	-				((1)	Ambu	- Liter
Work Order			Project Nun	nber		1		В	50	JFate	•					125 p		
Company Name			Bill To Comp	oany		Maria Constant		С								•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
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	Sample Description		Date	Time	Matrix	Pres.	# Bottles	A	В	6	D		F	G	Н		J	Hold
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Joseph Kmiss Relinquished by: Acon Lines Relinquished by:	Ext M.	Date: /2/3/19	Time:	Received by:	PS	\sim		Notes:										
Relinquished by:	105	Date:	16:10 Time:	Received by (L	aboratory):	$\int_{\mathcal{S}}$		Coo	ler ID	Coole	er Temp				k One B	ox Belo	w)	
Logged by (Laboratory):	J&\	Date:	Time:	Checked by (L	aboratory	-	2	S	22.	13.	ਰ⁻ਵ		Level II : Level III		/Raw Dat			Checklist Level IV
Preservative Key:	DES 1-HCI 2-HNO ₃	12/4/19 3-H2SO4 4-N	じろ <u>み</u> aOH 5-Na ₂ S ₂ O	s 6-NaHS	O ₄ 7-Othe	8-4°C	9-5035	PH	(8	2.0	Q C			SW846/			WWW.AFAAAA	

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

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3. The Chain of Custody is a legal document. All information must be completed accurately.



16-Dec-2019

Nick Summerland Lambda Energy Resources 1510 Thomas Rd Kalkaska, MI 49646

Re: Lambda (Hartland 36) Work Order: 19120372

Dear Nick,

ALS Environmental received 3 samples on 05-Dec-2019 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 10.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Gary Byar

Electronically approved by: Gary Byar

Gary Byar Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Environmental 為

ALS Group, USA

Date: 16-Dec-19

Client: Lambda Energy Resources
Project: Lambda (Hartland 36)

Work Order: 19120372

Work Order Sample Summary

Lab Samp II	Client Sample ID	<u>Matrix</u>	Tag Number	Collection Date	Date Received	<u>Hold</u>
19120372-01	MW-14d	Water		12/4/2019 10:40	12/5/2019 10:00	
19120372-02	MW-7d	Water		12/4/2019 11:35	12/5/2019 10:00	
19120372-03	MW-7	Water		12/4/2019 12:25	12/5/2019 10:00	

ALS Group, USA

Client: Lambda Energy Resources

Project: Lambda (Hartland 36)
 Work Order: 19120372

 Sample ID: MW-14d
 Lab ID: 19120372-01

Collection Date: 12/4/2019 10:40 AM Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS	;		SW846	8270D	Prep: SW3510 12/11/19 16:03	Analyst: EE
Sulfolane	71		10	μg/L	1	12/11/2019 11:51 PM
Surr: 2-Fluorobiphenyl	55.7		26-79	%REC	1	12/11/2019 11:51 PM
Surr: 4-Terphenyl-d14	86.5		43-106	%REC	1	12/11/2019 11:51 PM
Surr: Nitrobenzene-d5	48.9		29-80	%REC	1	12/11/2019 11:51 PM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	150		4.0	mg/L	4	12/10/2019 12:16 PM

Date: 16-Dec-19

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Client: Lambda Energy Resources

Project: Lambda (Hartland 36) Work Order: 19120372

 Sample ID:
 MW-7d
 Lab ID:
 19120372-02

 Collection Date:
 12/4/2019 11:35 AM
 Matrix:
 WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/11/19 16:03	Analyst: EE
Sulfolane	1,200		50	μg/L	5	12/12/2019 02:32 PM
Surr: 2-Fluorobiphenyl	68.5		26-79	%REC	1	12/12/2019 12:12 AM
Surr: 4-Terphenyl-d14	88.1		43-106	%REC	1	12/12/2019 12:12 AM
Surr: Nitrobenzene-d5	60.2		29-80	%REC	1	12/12/2019 12:12 AM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	48		1.0	mg/L	1	12/10/2019 12:16 PM

Date: 16-Dec-19

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Client: Lambda Energy Resources

Project: Lambda (Hartland 36) Work Order: 19120372

 Sample ID:
 MW-7
 Lab ID:
 19120372-03

 Collection Date:
 12/4/2019 12:25 PM
 Matrix:
 WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			SW846	8270D	Prep: SW3510 12/11/19 16:03	Analyst: EE
Sulfolane	ND		10	μg/L	1	12/12/2019 12:33 AM
Surr: 2-Fluorobiphenyl	52.7		26-79	%REC	1	12/12/2019 12:33 AM
Surr: 4-Terphenyl-d14	89.1		43-106	%REC	1	12/12/2019 12:33 AM
Surr: Nitrobenzene-d5	46.5		29-80	%REC	1	12/12/2019 12:33 AM
SULFATE			A4500-	SO4 E-11		Analyst: JDR
Sulfate	29		1.0	mg/L	1	12/10/2019 12:16 PM

Date: 16-Dec-19

Note: See Qualifiers page for a list of qualifiers and their definitions.

Date: 16-Dec-19

Client: Lambda Energy Resources

Work Order: 19120372

Project: Lambda (Hartland 36)

QC BATCH REPORT

Batch ID: 146909	Instrument ID SVMS8		Method	: SW846	82	70D					
MBLK San	nple ID: SBLKW1-146909-14 6	6909			ι	Units:µg/L		Analys	sis Date: 12	/11/2019	05:52 PM
Client ID:	Run II	D: SVMS8	_191211A		Se	eqNo: 612 1	1621	Prep Date: 12 /	11/2019	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	ND	10									
Surr: 2-Fluorobiphenyl	30.45	0	50		0	60.9	26-79	O			
Surr: 4-Terphenyl-d14	44.71	0	50		0	89.4	43-106	0	١		
Surr: Nitrobenzene-d5	27.78	0	50		0	55.6	29-80	0	1		
LCS San	nple ID: SLCSW1-146909-146	5909			Į	Units: µg/L		Analys	sis Date: 12	/11/2019	06:13 PM
Client ID:	Run II	D: SVMS8	_191211A		Se	eqNo: 612 1	1622	Prep Date: 12 /	11/2019	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	55.55	10	100		0	55.6	30-100	0	ı		
Surr: 2-Fluorobiphenyl	32.3	0	50		0	64.6	26-79	C	1		
Surr: 4-Terphenyl-d14	44.3	0	50		0	88.6	43-106	0	1		
Surr: Nitrobenzene-d5	30.67	0	50		0	61.3	29-80	0	1		
LCSD San	nple ID: SLCSDW1-146909-1	46909			ι	Units: µg/L		Analys	sis Date: 12	/11/2019	06:34 PM
Client ID:	Run II	D: SVMS8	_191211A		Se	eqNo: 612 1	1623	Prep Date: 12/	11/2019	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	52.05	10	100		0	52	30-100	55.55	6.51	30	
Surr: 2-Fluorobiphenyl	33.82	0	50		0	67.6	26-79	32.3	4.6	40	
Surr: 4-Terphenyl-d14	47.39	0	50		0	94.8	43-106	44.3	6.74	40	
Surr: Nitrobenzene-d5	29.57	0	50		0	59.1	29-80	30.67	3.65	40	
The following samples w	vere analyzed in this batch:	19	9120372-01A	. 19	120)372-02A	19	120372-03A			

Client: Lambda Energy Resources

Work Order: 19120372

Project: Lambda (Hartland 36)

QC BATCH REPORT

Batch ID: R277341	Instrument ID GAL	LERY		Method	: A4500	-SO4	E-11					
MBLK	Sample ID: MB-R27734	1-R277341	l			Uı	nits: mg/ l	L	Anal	lysis Date: 12	2/10/2019	12:16 PM
Client ID:		Run ID	GALLE	RY_191210I	3	Sec	No: 611 9	9565	Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate		ND	1.0	<u> </u>			70.120			701 ti 2		
MS	Sample ID: 19120372-0	2BMS				U	nits: mg/ l	L	Anal	lysis Date: 12	2/10/2019	12:16 PM
Client ID: MW-7d		Run ID	GALLE	RY_191210I	В	Sec	No: 611 9	9572	Prep Date:		DF: 4	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate		99.19	4.0	50	48.	15	102	95-118		0		
MSD	Sample ID: 19120372-0	2BMSD				Uı	nits: mg /l	L	Anal	lysis Date: 12	2/10/2019	12:16 PM
Client ID: MW-7d		Run ID	GALLE	RY_191210I	В	Sec	No: 611 9	9573	Prep Date:		DF: 4	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate		99.3	4.0	50	48.	15	102	95-118	99.	19 0.111	10	
LCS1	Sample ID: LCS1-R277	341				U	nits: mg/ l	L	Anal	lysis Date: 12	2/10/2019	12:16 PM
Client ID:		Run ID	GALLE	RY_191210I	3	Sec	No: 611 9	9566	Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate		10.2	1.0	10		0	102	90-119		0		
LCS2	Sample ID: LCS2-R277	341				Uı	nits: mg/ l	L	Anal	lysis Date: 12	2/10/2019	12:16 PM
Client ID:		Run ID	: GALLE	RY_191210I	3	Sec	No: 611 9	9589	Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate		53.19	1.0	50		0	106	95-118		0		
The following samp	les were analyzed in this	batch:	19	120372-01B	19	91203	372-02B	19	120372-03B			

ALS Group, USA

Date: 16-Dec-19

Client: Lambda Energy Resources
Project: Lambda (Hartland 36)

West Orders

Lambda Energy Resources

ACRONYMS, UNITS

WorkOrder: 19120372

Qualifier **Description** Value exceeds Regulatory Limit ** Estimated Value a Analyte is non-accredited B Analyte detected in the associated Method Blank above the Reporting Limit Е Value above quantitation range Н Analyzed outside of Holding Time Hr BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated. J Analyte is present at an estimated concentration between the MDL and Report Limit ND Not Detected at the Reporting Limit O Sample amount is > 4 times amount spiked Dual Column results percent difference > 40% R RPD above laboratory control limit S Spike Recovery outside laboratory control limits U Analyzed but not detected above the MDL X Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level. **Acronym** Description DUP Method Duplicate LCS Laboratory Control Sample LCSD Laboratory Control Sample Duplicate LOD Limit of Detection (see MDL) LOQ Limit of Quantitation (see PQL) MBLK Method Blank MDL Method Detection Limit MS Matrix Spike MSD Matrix Spike Duplicate POL Practical Quantitation Limit RPD Relative Percent Difference TDL Target Detection Limit TNTC Too Numerous To Count APHA Standard Methods A D **ASTM** Е **EPA** SW SW-846 Update III

Units Reported Description

μg/L Micrograms per Liter mg/L Milligrams per Liter

Sample Receipt Checklist

Client Name:	LAMBDA-KAL	=			Date/Time	Received:	05-Dec-18	10:00	<u>)</u>	
Work Order:	<u>19120372</u>				Received b	y:	<u>KRW</u>			
Checklist compl	leted by Kei	th Wierenga	05-Dec-	19	Reviewed by:	Nathan \	Villiams	3		06-Dec-19
Matrices: Carrier name:	Water UPS	ure	Date			esignature				Date
Shipping contain	iner/cooler in go	ood condition?	Yes	s 🗸	No 🗌	Not Prese	ent 🗌			
Custody seals in	ntact on shippir	ng container/cooler?	Yes	s 🗸	No 🗌	Not Prese	ent 🗌			
Custody seals in	intact on sample	e bottles?	Yes	s \square	No 🗌	Not Prese	ent 🗸			
Chain of custod	dy present?		Yes	s 🗸	No 🗌					
Chain of custod	dy signed when	relinquished and received	? Yes	s 🗸	No 🗌					
Chain of custod	dy agrees with s	sample labels?	Yes	s 🗸	No 🗌					
Samples in prop	per container/b	ottle?	Yes	s 🗸	No 🗌					
Sample contain	ners intact?		Yes	s 🗸	No 🗌					
Sufficient sample	le volume for ir	ndicated test?	Yes	s 🗸	No 🗆					
All samples rece			Yes	s 🗸	No 🗆					
		ature in compliance?	Yes		No 🗆					
Sample(s) recei		·	Yes	s 🗸	No 🗆					
Temperature(s)		s):	3.8/3			SR2	2			
Cooler(s)/Kit(s):	:									
Date/Time samp	ple(s) sent to s	torage:	12/5/	2019	4:31:07 PM					
Water - VOA via	als have zero h	eadspace?	Yes	s 🗌	No _	No VOA vials	submitted	✓		
Water - pH acce	eptable upon re	eceipt?	Yes	s 🗸	No 🗌	N/A				
pH adjusted? pH adjusted by:	:		Yes	s \square	No 🗹	N/A				
Login Notes:										
					- — — — —					
Client Contacte	ed:	Date Co	ntacted:		Person	Contacted:				
Contacted By:		Regardi	ng:							
,		J	-							
Comments:										
CorrectiveAction	n:									



Preservative Kev: 1-HCl

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+1 801 266 7700

South Charleston, WV +1 304 356 3168

York, PA +1 717 505 5280

COC ID:

47066 19120372 ALS Work Order #: Gary Byour ALS Project Manager: Parameter/Method Request for Analysis Project Information **Customer Information** Hartland 36 Ges Plant (1) Ander liter Sulfolone **Project Name Purchase Order** Bulfate В **Project Number** Work Order C ECT INC. **Bill To Company Company Name** D Invoice Attn Send Report To E 1510 Thomas Rd. Address Address F G Kulkadia, MI 49646 Traverse City, MI 49684 City/State/Zip City/State/Zip H 231-946-8200 251-258-641 **Phone** Phone 231-946-8208 Fax Fax michigen, invoices & laundrenegalle your Hewardowski & ectine com e-Mail Address e-Mail Address H Hold # Bottles Matrix Pres. C Time Sample Description Date No. X X 12/4/19 10:40 6W MW-14d 1 2 X (JU) mw-71 2 1 (7W D X MW-7 3 6 8 9 10 Results Due Date: Turnaround Time in Business Days (BD) Other _ **Shipment Method** Sampler(s) Please Print & Sig urs (grown) □180 Joseph Kniss □2 BD ☐ 10 BD X 5 BD 13 BD Received by: Relinquished by: roject: MERITENERBY - MISC Jeey Kniss 17:30 Ps Received by (Laboratory): QC Package: (Check One Box Below) Cooler Temp Cooler ID Time: Relinquished by: 1000 Level II Std QC ☐ TRRP Checklist 522 ☐ Level III Std QC/Raw Date ☐ TRRP Level IV Logged by (Laboratory): ☐ Level IV SW846/CLP P418 1630

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

4-NaOH 5-Na₂S₂O₃

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

6-NaHSO4

7-Other

9-5035

3. The Chain of Custody is a legal document. All information must be completed accurately.

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Other ---

APPENDIX D

LOW-FLOW SAMPLING FIELD FORMS



CLIENT:	Lambda Coa		-						
V-	Lambda Ener				Monitor	ing Location:		_ Hartland #36	
	13390 Lone T					Sample ID:		MW >	
	Hartland Tow	nship, Mic	higan			Well Type:		2" PVC	
PROJECT:	130685.2000	* -	•						
INSPECTION							=-		
		3							
Label on well?		ES NO REMED			Is cement pad in			NO REMEDIE	D
Is reference mark vi		THE NO PENED				ng locked and in go		NO REMEDIE	D
Standing water pres		YES NE REMED			Is inner cap in pla	ice and properly se	aling well?	NO REMEDIE	D
Indication of surface	runoff in well?	YES TO REMED	ED		Is well casing in v	risibly good repair?		NO REMEDIE	D
Repair Notes					<u> </u>		<u></u>		_
STATIC WAT	ER LEVEL					1			
					Date: 12/4	/14_	Time: 11:1	44	
Top of Casing E	levation:	/							
Depth to Water:		23.45		Measured wit	h.	ELECTRONIC TAPE	CHANGED TAD		
Elevation of War	ter:			Well depth ve			E CHALKED TAP	E DIREM	
				wen acpair ve	Tilled:	1=5			
WELL PURGI	NG -								
					Date: 12/4/	/10		11.1.1	
Purge Method:	PERISTALTIC	BLADDER	OTHER		Date: 144/	77	Start Time:	11:48	
				7					
Measured Well C	Depth:		Screen Lengti	h: 5		Depth to Scre	en Midpoint		
			_				err whoponit.		-
	Water Level	Drawdown	Pumping Rate	Toma	Spon Cond	Dies O			
Time				Temp	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time 	23.54	0.09	(ml/min)	(C)	(umho/cm)	(mg/l)	(S.U.)	70.7	(NTU)
		When the American commence of the commence of	250	7.54	497	9.87	7.12	10.7	1.40
12:15	23.54	0.09	250	2.5%	497	967	7.13	71.7	1.5)
12:20	23.54	0.09	Z56	7.57	497	9.65	7.12	71.9	1.47
_ Final_	23.54								1.42
		***	**************************************						
									
		Stabili	zation Criteria:	-6-	13	13	17	(3)	
Total Volume Pu	road (gall) 7	gal	zation Citteria.	+/*370	+1-0%	+/610%	+/- 0.1 Units	+/- (0)	+ (18%
Total Voidille I d	igeo (gai)	1-01				(if > 0.5 mg/l)			(if > 5 NTU)
FIELD ANALY	/010		<u> </u>		Stabiliza	ation Criteria Referenc	ce Doc USEPAEQ	ASOPIGW 001 Rev #	J. January 19, 2010
FIELD ANAL		17.70							
	Time:	12:20				CALIBRATI	ON CHECK /		Mark if
	Temperature:	7.57	deg C			Standard (conc.)	Reguling		Recalibrated
Specia	fic Conductance:	417	umhos/cm		Specific Cond		ı / ·		necalibrated
	ssolved Oxygen:					11. 11. 11. 11.		os/cm	/
			mg.L		Dissolved Oxygen:		mg/L		
	pH:		S.U		pH:		SU	/	
	ORP:		mV		Eh:		mV		
}	Turbidity:	1.42	NTU		Turbidity:		NTU		DO 3740
					•				
SAMPLE COL	LECTION	Time	12.25			Sample Duplic		10	
Appearance of S		Clean						Zhow	
			7700			Sample Metho)d;	1-101/	
NO BOTTLES	SIZE	TYPE	FILTERED		00505	District			
1	mi	glass plastic		New Justin		AVATIVE:		PARAMETER	
			yes no	Nane HUI, H	NO ₃ , NaOH, H ₂ SO	4. ZnAc, TSP, BAK		Sulfolane	
		giass plast c	yes no	Nane HCI, H	NO ₃ , NaOH, H ₂ SO	. ZnAc, TSP, BAK		Sulfate	
	mi	glass plastic	yes no	None, HCI, H	NO3, NaOH, H ₂ SO	, ZnAc, TSP, BAK			
-	m	glass plastic	yes no						
	m	glass plastic	yes no						
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H2SO	4. ZnAc, TSP. BAK			
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H₂SO	. ZnAc, TSP, BAK			
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H ₂ SO	4. ZnAc, TSP, BAK			
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	J. ZnAc, TSP. BAK			
	ml	glass plastic	yes no			. ZnAc, TSP, BAK			
	mi	glass plastic	yes no			. ZnAc. TSP, BAK			
SAMPLING P	ERSONNEL								
		ر ا	. s//	Chair	or Custody No	0			
Name (SIGNA	TURE):		m the	Name (SIGNATURE):	:			

CLIENT: Lambda Ener	'qy	Monitoring Location: Hartland #36
LOCATION: 13390 Lone T		Sample ID:MW7_d
	ınship, Michigan	Well Type:2" PVC
PROJECT: 130685.2000		
INSPECTION	<i>∩</i>	4
Label on well?	NO REMEDIED	Is cement pad in good repair?
Is reference mark visible?	- n	Is protective casing locked and in good repair?
Standing water present? Indication of surface runoff in well?	YES REMEDIED	Is inner cap in place and properly sealing well?
Repair Notes:	TES TO MENELIEU	Is well casing in visibly good repair?
STATIC WATER LEVEL		3 1
	•	Date: 12/4/19 Time: 10:53
Top of Casing Elevation:		
Depth to Water.	24.12	Measured with: ELECTRONIC TAPE CHALKED TAPE OTHER
Elevation of Water:		Well depth verified?
WELL PURGING	1	
		Date 12/4/19 Start Time 10:57
Purge Method: PERISTALTIC	BLADDER OTHER	Date 16.11 Start Time 10.17
Measured Well Depth: 48-50	Screen Léngt	the 5
weastred well beptil.	Screen Length	th: Depth to Screen Midpoint
Water Level	Drawdown Pumping Rate	te Temp Spec Cond. Diss Oxy pH ORP Turbidity
Time (feet)	(feet) (ml/min)	
1):26 24.15	0.03 250	(°C) (umho/cm) (mg/l) (S.U.) (mV) (NTU) 7.42 630 3.92 6.42 68.2 4.94
11:25 24.15	0.03 250	7.50 427 3.96 6.42 65.9 4.77
11:30 24.15	C.03 250	7.46 825 M 4.02 6.42 64.3 2.25
Fine 1 24.15	2.19	00) 44.00 0.10 84.1
	tallite vide Maladade de la videnciale	
	Stabilization Criteria:	a: (/-3% +(-3% +/-10% +/-6.1 Uhits +/(TO)nV +/-10%
Total Volume Purged (gal):Z	god	(if > 0.5 mg/l) (if > 5 NTU)
12000		Stabilization Criteria Reference Doc USEPA EQASOP-GW 001 Rev #3, January 19, 2010
FIELD ANALYSIS		
Time:	11:30	CALIBRATION CHECK Mark if
Temperature:		Standard (conc.) Reading Recalibrated
Specific Conductance:	875 umhos/cm	n Specific Condumhos/cm
Dissolved Oxygen:	4.6Z mg.L	Dissolved Oxygenmg/L
pH:	GHZ su	pH SU
ORP:	64.3 mv	Eh: mV
Turbidity:	Z.Z5NTU	Turbidity: NTU
SAMPLE COLLECTION	Time	Sample Duplicate ?:
Appearance of Sample:	Cheer no other	Sample Method: Low Flow
NO./BOTTLES: SIZE:11000m	TYPE: FILTERED:	PRESERVATIVE: PARAMÉTER
		None HCI, HNO ₃ , NaOH, H ₂ SO ₃ , ZnAc, TSP, BAK Sulfolane
		None HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZhAc, TSP, BAK Sulfate
m m	Since breeze yes to	None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m:	3,000 1,000 1,0	None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m		None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m		None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m	3)	None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m		None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
	l	None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
m	glass plastic yes no	None, HCI, HNO ₃ , NaOH, H ₂ SO ₄ , ZnAc, TSP, BAK
SAMPLING PERSONNEL	1/1//.	Chain of Custody No
Name (SIGNATURE):	her/the	Name (SIGNATURE):

CLIENT:	Lambda Enei	rav	-		40 th			11 11 1	
LOCATION:					Monitor	ing Location:		_ Hartland #36	
LOCATION:	13390 Lone T					Sample ID:		_MW <i> 34</i>	7
	Hartland Tow	rnship, Mic	higan			Well Type:		2" PVC	
PROJECT:	130685.2000								
INSPECTION		B							
Label on well?		S NO REME	DIED		Is cement pad in	anod renair?		NO REMEDI	
Is reference mark vi	isible?	Ø 1/A REMEI				ng locked and in go	and rangie?	NO REMEDI	
Standing water pres	ent?	YES A REME				ice and properly se		NO REMEDI	
Indication of surface	runoff in well?	YES Q REMEI				risibly good repair?		NO REMEDI	
Repair Notes:					to well easing it t	ision good repair :		NO HEMEDI	EU
STATIC WAT	ER LEVEL	100				1			
20 20 20					Date: 12/3	lia	Time: 12:5	1	
Top of Casina F	Invation				Date 10/1	h .f. —	Time: 1215		ĵ.
Top of Casing E		20.66							
Depth to Water		0.00		Measured wit		ELECTRON C TAP	E CHALKED TAPE	E OTHER	
Elevation of Wa	ter:	-		Well depth ve	rified?	YES (NO)			
WELL PURG	ING					1.		- 52	
Purge Method:	PERISTALLIC	BLADDER	OTHER		Date: 12/8	1/19	Start Time:	13:03	
1	<u></u>		24. 24.	- 1				-	
Measured Well [Depth: 36.30		Screen Length	5'		Donth to Co	on Mid-		
	o Cptite		Ociden Length			Depth to Scre	en Miapoint		-
	101-4-411	D 1		_					
	Water Level	Drawdown	Pumping Rate	Temp	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	SPY	(umho/cm)	(mg/l)	(S.U.)_	(mV)	(NTU)
15:70	70.79	0.11	210	/1./	690	10.19	819	68.9	1.67
17:25	20.79	0.11	210	11.4	690	10.64	8.16	64.6	1.65
17:30	20.79	0.11	210	16.9	690	10.84	70.10	63.2	
F	20.79				0.10	70.07		67.4	1.49
7 1000	20.21								

						0.00			
l									
								5.94	
4		Stabil	ization Criteria:	+1-130/	160)	62		1	-
Total Volume Pu	rged (gal):/.	Stabil	zation Criteria.	+/-(3)	+/3%	+/-(10%)	+/- 0(1) nits	+/- 100mV	+610%
I old volume re	rged (gai)	290			Conto	(if > 0.5 mg/l)			(if ≥ 5 NTU)
FIELD ANAL	Veie				Stabiliza	ation Criteria Referen	ce Doc USEPA EQA	SOP-GW 001 Rev #	3, January 19, 2010
TILLD ANAL		13:30							
	Time:					CALIBRAT	ION CHECK		Mark if
ı	Temperature	11.9	deg C			Standard (conc.)	Reading		Recalibrated
Speci	fic Conductance:	690	umhos/cm		Specific Cond.		umho:	s/cm	7.7
Di	ssolved Oxygen	10.09	mg:L		Dissolved Oxygen			3.0	
I	pH:	and a second	S.U.				mg/L		
ı	ORP.						S.U		
ı			mV				mV		
ı	Turbidity		NTU		Turbidity:		NTU		
0.11151.5.5.						43			
SAMPLE CO		Time:		1		Sample Dupli	cate ?:	16	
Appearance of S	iample:	Clear,	in oder, i	shew		Sample Metho		Flord	
l .								Ctop	70
NO./BOTTLES:	SIZE	TYPE:	FILTERED:		PRESE	RVATIVE		PARAMETER	
1	1000ml	glass plastic	yes no	None HCI, H		J. ZnAc TSP, BAK			
1	<u>125</u> ml	giass plastic	yes no			. ZnAc, TSP, BAK			
	ml	glass plastic	yes no			. ZnAc TSP, BAK			
	ml	glass plastic	yes no			4. Znac TSP, BAK			
	ml	glass plastic	yes no			4. Znac TSP, BAK			
	mi	glass plastic	yes no	None HCL H	NO. Nach 11 50	. Znac. TSP, BAK . Znac. TSP, BAK			
	ml	glass plastic	yes no						
Acres Acres and	ml	glass plastic		Noss PCL (NO. NEOU !! CO	, ZnAc, TSP, BAK			
	ml	glass plastic	yes no	None HUI, H	NO NEON HISO	4, ZnAc, TSP, BAK			
	ml	glass plastic	yes no			, ZnAc, TSP, BAK			
	mi		yes no	None_HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc, TSP, BAK			
		glass plastic	yes no	None, HCI, H	NO3, NAUH, H2SO	4, ZnAc. TSP, BAK			
SAMPLING P	ERSONNEL	1	V	Chain	of Custody No				
Name (SIGNA	TURE):	1	this						
10101171	1	in	7//	ivalile	SIGNATURE):				

CLIENT: La	ambda Ener						· · · · ·			
	ambda Ener				Monitoring Location: Hartland #36					
	3390 Lone T					Sample ID:		_MW <i><u> 3_&</u>_</i>		
	artland Tow	nship, Mich	nigan			Well Type:		2" PVC		
	30685.2000									
INSPECTION						19.512		0		
Label on well?		NO REMEDI	ED		is cement pad in	nond repair?		NO REMEDIES	_	
Is reference mark visible	67	NO REMEDI	ED				od tenair?	YES NO REMEDIEL		
Standing water present	?	YES () REMEDI	ED		Is protective casing locked and in good repair? Is inner cap in place and properly sealing well? Is inner cap in place and properly sealing well? In page 12 Page 1					
Indication of surface run	noff in well?	YES A REMEDI	ED			isibly good repair?		YES NO REMEDIED		
Repair Notes:			4180			, , , , , , , , , , , , , , , , , , , ,		O HELLEDIES	·	
STATIC WATER	RLEVEL						· · · ·			
190					Date: 12/3	iΛ	Time _/3:4	4		
Top of Casing Elev	ation				outo In Land		111110			
Depth to Water:		19.92		Measured wit	h:	E E E POZE TOO	E CHALKED TAPE			
Elevation of Water:				Well depth ve		VEGE (R)	L GMACKED LAPE	: UTHER		
				Tron depair ve	inieu i	153				
WELL PURGING	G I				-	,				
		BLADDER			Date: 12/8/	1.00	. 4	3:49		
uige Wethod	EHISTALTIC	BLADUEH	OTHER	-	Date: 12/9		Start Time: _/	2171		
Manager al Maril Da	oth: 32.20	5		I.						
Measured Well Dep	oth: Jara		Screen Length		60	Depth to Screen	en Midpoint: _		§	
									1	
	Water Level	Drawdown	Pumping Rate	Temp	Spec Cond.	Diss Oxy	pН	ORP	Turbidity	
Time	(feet)	(feet)	(ml/min)	(*Ç)	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)	
14:05	20.12	0.20	220	_18.2	1560	1.05	7.77	49.3	10.7	
14:10	20.12	0.20	220	11.3	1560	1.04	7.21	42.4	5.03	
14:15	20.12	C.20	220	11.4	1560	0.96	>.20	35.6	3.44	
14:70	20.12	0.20	220	_11.Z	1560	0.81		31.6	1.95	
14:25	Z0.1Z	0.20	220	11.2			7.21	30.6		
Firel	20.14			_11.4	1530	0.82	7.20	<u>25.6</u>	2.Z3	
7700	20.									
		T-0-illi-de-direkte inn								
ļ.		Stabiliz	ation Criteria:	+/-3/10	+6.8%	+1/10%	+/- 0(1) nits	+/- 10mV	+1.1800	
Total Volume Purge	ed (gal): 4	god				(if > 0.5 mg/l)			(if > 5 NTU)	
					Stabiliza	ition Criteria Referenc	e Doc USEPA EQA	SOP-GW 001 Rev #3		
FIELD ANALYS	IS									
	Time:	14:25				CALIBRATI	ONICHECK		Marata d	
	Temperature:	11.2	deg C			10.000			Mark if	
	Conductance:	1550	umhos/cm		5	Standard (conc.)	Reading		Recalibrated	
	olved Oxygen:				Specific Cond.		umhos	s/cm		
Diase			mg.L		Dissolved Oxygen:	\	mg/L)		
	pH:		S U		pH:		S U	.		
	ORP:		mV		Eh:		mV	.		
	Turb dity:	2.23	NTU		Turbidity:		NTU			
					(10)					
SAMPLE COLL	ECTION	Time: _				Sample Duplic	ate ?:			
Appearance of Sam	iple:	Clew, 40	odur			Sample Metho				
NO./BOTTLES:	SIZE:	TYPE	FILTERED:		PRESER	AVATIVE.		PARAMETER:		
	1000 m1	g ass plastic	yes no	None HCI, H	NO, NaOH, H ₂ SO,	, ZnAc, TSP, BAK		Sulfolane		
1	<u> 125 ml</u>	giass plastic	yes no					Sulfate .		
	m1	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc TSP, BAK		ganato :		
	mt	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO.	, ZnAc, TSP, BAK		-		
	ml	glass glastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc TSP, BAK				
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO.	, ZnAc. TSP. BAK				
	m1	glass plastic	yes no	None, HCI, H	NO, NaOH, H.SO.	, ZnAc TSP, BAK				
	m)	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	, ZnAc, TSP, BAK				
	ml	glass plastic	yes no	None, HCl, H	NO, NaOH, H,SO	, ZnAc. TSP. BAK				
	m1	glass plastic	yes no	None, HCI, H	NO3, NaOH, H2SO.	L ZnAc. TSP, BAK				
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	, ZnAc, TSP, BAK				
SAMPLING PER	RSONNEL		- /							
		1	·V-),				
Name (SIGNATU	HE):	- hand		Name i	SIGNATURE):					

CLIENT: Lambda Ener	ray		The Manifest	11	_ -	** **	
			Monitor	ing Location:		_ Hartland #36	i
				Sample ID	:	_MW145	
	/nship, Michigan			Well Type	:	2" PVC	
PROJECT: 130685.2000							
INSPECTION							_
Label on well?	NO REMEDIED		to			0	
Is reference mark visible?	ES NO REMEDIED		Is cement pad in	•		NO REMEDI	ED
Standing water present?	YES REMEDIED			ng locked and in g		NO REMEDI	ED
Indication of surface runoff in well?	YES O REMEDIED		Is inner cap in place and properly sealing well? Is well casing in visibly good repair? Is well casing in visibly good repair?				
Repair Notes	123 WELLEDIED		is well casing in v	risibly good repair?	,	NO REMEDI	0
STATIC WATER LEVEL				,			
STATIO WATER LEVEL	ı		17/2	lse.	171.7	116	
			Date 12/3	117	Time: 14:	40	
Top of Casing Elevation:	2/00/12 19.62			0			
Depth to Water:	TOOME 14.07	Measured wi	th:	ELECTRO NO TAR	PE CHALKED TAR	E OTHER	
Elevation of Water:		Well depth v	erified?	VES NO			
WELL PURGING				,	<u> </u>		
Purge Method PERISTALTIC	BLADDER OTHER		Date 12/8/	19	Start Time	14:42	
ange memod. Takishen	DEADUER OTHER		Date 1-/4/	1.1.	Start Time:	111-11	
11. 7/57	_	5					
Measured Well Depth: 26.52	Screen Lengtl	th:	-	Depth to Scre	een Midpoint:		
					er control		
Water Level	Drawdown Pumping Rate	e Temp	Spec Cond	Diss Oxy	ρН	ORP	Turbidity
Time 19.43 feet)	, ,		(umho/cm)		*		Turbidity
15:00 2000	(feet) (ml/min) 0.03 2.20	11.9(C)	840	(mg/l) 4.64	(S.U.)	(mV)	(NTU)
15:05 11.85	0.03 220	11.4	430		7.77	52.0	7.17
-1	The second secon			4.77	7.75	37.6	6.48
15:10 19.85	0.03 220	11.4	446	8.66	2.75	33.5	6.Z7
Final 19.65			= 11 LE 2004 D				
	desire and the separate property of the second						
						3	
	Stabilization Criteria:	+1-34%	+13%	+//10%	+/- 0/1 Chits	+/-10 mV	A- 20 %
Total Volume Purged (gal):	gul			(if > 0.5 mg/l)		77 (1117	(if > 5 NTU)
	•		Stabiliza	ation Criteria Referer	nce Doc USEPA EO	ASOP GW 001 Rev #	
FIELD ANALYSIS		-		-			
Time:	15:10						
	11.		11	CALIBRAT	TION CHECK		Mark if
Temperature:			\	Standard (conc.)	Reading		Recalibrated
Specific Conductance:			Specific Cond.	1	umh	os/cm	<u> </u>
Dissolved Oxygen:			Dissolved Oxygen:		mg/L		
pH:	5-6		pH.		S.U		
ORP:			Eh:				
Turbidity:	777				mV		7
Tarbidity.	NTU		Turbidity:		NTU		
SAMBLE COLLECTION	- 15						
SAMPLE COLLECTION	Time: 15:15	-		Sample Dupli		100	
Appearance of Sample:	Clear, no oder			Sample Meth	od: Zo:	2 Flew	
7 (-2.5)							
NO./BOTTLES: SIZE:	TYPE. FILTERED:		PRESER	RVATIVE		PARAMETER	
1	glass plastic yes no	None HCI, I	HNO3, NaOH, H ₂ SO	ZnAc TSP, BAK	ζ		
	glass plastic yes no	Name HCI, I	INO3, NaOH, H SO	ZnAc TSP BAK	(Sulfate	
mı		None, HCL I	HNO3, NaOH, H ₂ SO	ZnAc TSP RAM	(- Canalia	
ml	- ' '	None, HCI I	INO3. NaOH, H ₂ SO	ZnAc TSP BAL			
ml			1NO3, NaOH, H2SO				
mi	3 5 100	None HCL	-NO. Nach History	Znår TSD Dar	` —		
ml	gine providing	None HCL	HNO, NaOH, HISO	TALL TOO DAY		***	
mi	grand year no	None, MOI, P	HNO ₃ , NaOH, H ₁ SO,	ZIAC, ISP, BAR			
mi	3 p ,00 110	None, HUI, I	HNO ₃ , NaOH, H ₂ SO,	4, Znac TSP, BAR	`	<u>.</u>	
	, , , , , , , ,	None, HUI, I	HNO ₃ , NaOH, H ₂ SO	ZnAc, TSP, BAK	·		
ml	3 p yee 110	None, HCI, I	INO₃, NaOH, H₂SO	, Znac. TSP, Bar	·		
	glass plastic yes no	None, HCI, I	HNO₃, NaOH, H₂SO	4. ZnAc. TSP. BA	Κ		
SAMPLING PERSONNEL	1 1/	Chai	n of Custody No				
Name (SIGNATURE)	// //		•				
Name (SIGNATURE):	- Juny	Name	(SIGNATURE):				

CLIENT: LOCATION:	OCATION: 13390 Lone Tree Road Hartland Township, Michigan					Monitoring Location: Hartland #36 Sample ID: MW- ドゥー Well Type: 2* PVC			
PROJECT:	130685.2000		. A.						
INSPECTION		0							
Label on well? Is reference mark vi Standing water pres Indication of surface Repair Notes	ent? runoff in well?	NO REMEDIE REMEDIE YES NO REMEDIE YES NO REMEDIE	D D		Is cement pad in g Is protective casing Is inner cap in plac Is well casing in vis	g locked and in go e and properly sea		NO REMEDIED NO REMEDIED NO REMEDIED LES NO REMEDIED	
STATIC WAT	ER LEVEL				19/11/)	6 .		
Top of Casing E Depth to Water: Elevation of Wa		19.53		Measured wit Well depth ve	Date: 12/4/ h: rified?		Time: 4:4		
WELL PURG	ING			···	/ /	· 			
Purge Method:	PERISTAUTIC	BLADOER (THER		Date: 12/4/1	9	Start Time:	: 50	
Measured Well [Depth: 45.11		Screen Length	51	200		en Midpoint: _		
:::	Water Level	Drawdown F	Pumping Rate	Temp	Spec Cond	Diss Oxy	ρН	ORP	Turbidity
Time 16:10 10:15 10:20 10:25 10:30 10:35 10:36	(feet) 19.55 19.55 19.55 19.55 19.55 19.55	(feet) 0.07 c.c2 U.07 & 02 0.02	(ml(min) 180 186 180 180 180 180	7.67 7.97 7.91 7.91 7.92 7.79 7.79	(umho/cm) 400 744 295 344 297	(mg/l) 20.66 18.20 15.75 12.65 11.38	(S.U.) 6.33? 6.38 6.40 6.41 6.42	(mV) 95.1 91.4 89.5 85.7 83.3 61.6	Turbidity (NTU) 17.9 14.4 5.04 4.73 4.67
		W-W							
									2 (2)
Total Volume Pu		Stabiliz	ation Criteria	+1/3%	+/_38°o	(if > 0.5 mg/l)	+/- Of Units	+/- 20 TTV SOP GW 001 Rev #3	+ 30 % (if > 5 NTU) January 19 2010
FIELD ANAL	YSIS	1							
R .	Time: Temperature: fic Conductance: issolved Oxygen: pH: ORP: Turbidity:	1021 6.42 61.6	deg C umhos/cm mg.L S.U mV		En:	Standard (conc.)	Reading umhos mg/L S.U. mV		Mark if Recalibrated
SAMPLE CO		Time: _	10:40		dia		cate ?:		
Appearance of S	Sample:	Lker	no alex		990	Sample Metho	od Low	Flow	
NO/BOTTLES:	SIZE: 1000 ml 125 ml ml ml ml ml ml ml ml ml	glass plastic	yes no	Nane HCI, H Nane, HCI, H Nane, HCI, H None, HCI, H None, HCI, H None, HCI, H None, HCI, H Nane, HCI, H	NO3, NaOH, H3SO3, NaOH, H3SO3, NaOH, H3SO3, NaOH, H2SO3,	L ZAAC, TSP, BAK			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
SAMPLING F	ERSONNEL				of Custody No				
Name (SIGNA		Fre	1/2	•	(SIGNATURE):			 -	

CLIENT:	Lambda Ener	· CO 1 /	-		8814 1				
					Monitori	ng Location:		Hartiand #36	
LOCATION:	13390 Lone T					Sample ID:		MW <i> S</i>	7.0
l .	Hartland Tow	ınship, Micl	higan			Well Type:		2" PVC	
PROJECT:	130685.2000								
INSPECTION								-	
Label on well?		VES NO REMED	wen.		Ob server and in a				
Is reference mark vi	sible?	YES NO REMED			Is cement pad in o	-		YES NO REMED	
Standing water pres		YES NO REMED				ig locked and in go ce and properly sea	. ' .	NO REMEDI	
Indication of surface		YES NO REMED				ce and properly sea isibly good repair?		YES NO REMEDI	
Repair Notes					13 MON COSING IN A	sibily good repair:	(YES NO RENEDI	ED
STATIC WAT	ERIEVEL		1					-	
					0-1- 11/2	40			
Top of Casing E	levation:				Date: 12/3/	7.7.	Time:		
Depth to Water:		18.77			00				
Elevation of Wa		_14://_		Measured wit	100	ELECTION C TAPE	CHALKED TAPE	OTHER	
Elevation of wa	ter			Well depth ve	rified?	YES NO			
WELL SUBS	110	<u> </u>							
WELL PURG									
Purge Method:	PERISTALTIC	BLADDER	OTHER		Date in 3	119	Start Time:	1444	
ļ		1				-			
Measured Well [Depth: 46.00)	Screen Length	1*		Denth to Screen	en Midpoint:		
						Dopin to Suffe	ст маропп.	-	
	Water Level	Drawdown	Pumping Data	Ta	Spec Commit	Dia C			2249
Time			Pumping Rate	•	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	(°C)	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)
	18.77								110
1500	18-77	0.0	200	7.77	492	6.14	6.82	P3.0	1.86
1505	18.77	0.0	200	692-857	58 491	6.32	6.81	854	1.18
1510	18.78	0.01	200	7.64	489	6.31	6.81	86.9	0.94
15-15	18.78	0.01	300	7.67	440	6.29	68969	87.3	1.00
							6.84		
							_ 8.0 /		
									
		-							
_		Stabili	zation Criteria:	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 Units	+/- 10 mV	+/- 10 %
Total Volume Pu	ırged (gal)					(if > 0.5 mg/l)			(if > 5 NTU)
					Stabiliza	tion Criteria Referenc	ce Doc USEPA EQAS	SOP-GW 001 Rev	3. January 19, 2010
FIELD ANAL	YSIS								
	Time:	1515				CALIBRATI	ION CHECK		Mark if
	Temperature:	7.67	deq C			Standard (conc.)	Reading		ana 20 m
Speci	fic Conductance:		umhos/cm		Specie Cond			ł	Recalibrated
1 22	ssolved Oxygen:	4						/cm	
	, ,		200		Dissolved Oxygen:				-
					pH:		S.U.		
	ORP:				Eh:		mV		
1	Turbidity:	1.00	NTU		Turbidity:		NTU		
211111									
SAMPLE CO			1525			Sample Duplic	cate ?: ١٠/٥	,	
Appearance of S	Sample:	Clear c	aler1ess				d Person	Tric La	-F4-
NO./BOTTLES.	SIZE	TYPE.	FILTERED		PRESER	AVATIVE		PARAMETER:	
1	1000 ml	glass plastic	yes no	None HCI, H	NO ₃ , NaOH, H ₂ SO,			Sulfolane	
1	<u>125</u> ml	giass plastic	yes no						
l	ml	glass plastic	yes no	None, HCI, H	NO, NaOH H-SO	ZnAc. TSP. BAK		90,1010	
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H-SO	ZnAc TSP BAK			
	ml	glass plastic	yes no	None, HCl. H	NO. NaOH HISO	ZnAc TSP BAK		**-	
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	ZnAc TSP RAK			
	ml	glass plastic	yes no						
2-11/1997 (2-12-12-12-12-12-12-12-12-12-12-12-12-12	mi	glass plastic	yes no						
	mi	glass plastic	yes no	None, HCL H	NOs NaOH, H-SO	ZnAc TSP BAY			**-
	mi		yes no	None, HCI, H	NOs NaOH HISO	ZOAC TSP BAY			
	mt		yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	ZnAc TSP BAK			· · · · · · · · · · · · · · · · · · ·
SAMPLING P	EBSONNEI			-		_			
				Chair	or Custody No)			
Name (SIGNA	TURE):		2//	Name	(SIGNATURE):				

CLIENT:	Lambda Ener	ray			Maniton		<u></u>		
	13390 Lone 1				Monitor	ing Location:		Hartland #36	
	Hartland Tow		higan					_MW1_7	2
	130685.2000	manp, mc	iligali			Well Type:		2" PVC	
INSPECTION	100003.2000		-:	===					
Label on well?		A							
Is reference mark vi	sible?	NO REME			Is cement pad in	•		YES NO REMEDI	
Standing water pres		YES AND REME				ng locked and in go ice and properly se	,	(YE) NO REMEDI	4.2
Indication of surface		YES NO REVEL				isibly good repair?	2	YES NO REMEDI	
Repair Notes:		***************************************				, g		TES NO HESEDI	· ·
STATIC WAT	ER LEVEL							<u></u>	
63 2					Date: 12/3,	/19	Time:		
Top of Casing E					53.000	,	-		
Depth to Water:		13.53		Measured wit		ELECTRONIC TAP	CHALKED TAP	E OTHER	
Elevation of War	ter.	37.09		Well depth ve	rified?	YES NO			
WELL DISDO	NO							-	
WELL PURGI									
Purge Method: (PERISTALTIC	BLADDER	OTHER		Date		Start Time:	0956	
Measured Well D	epth:		Screen Length	1:		Depth to Scre	en Midpoint		-
			_						~
	Water Level	Drawdown			Spec Cond.	Diss Oxy	рΗ	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	(°C)	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)
INITIAL	18.53		2	-					
1010		0.05	250	7.30	615	11.45	6.46	103.5	3.65
10,00	13.53	0.05	225	7.42	612	16.12	6.54	991.1	7.93
1025	13.53	0.05	275	7.47	612	4.24	6.54	99.5	4.44
1030	13.53	0.05	22.5	7.24	612	3. ≥5	6.52	73.8	4.33
1000	13.58	w.e.5	_2,2 <u>.5</u> "	7.70	610	4 653	0_6.51	93.7	- المناف
			***			7.98			4-31
6.50	- Tra	. 7.	1						
Cortinal.	WALLET "	ileer n	e roto:						
		Ctabili	zation Criteria:	+/-3%				/_	
Total Volume Pu	rged (gal): 1 1/4	/ Stabili	zalion Chlena.	+/- 370	+/- 3%	+/- 10%	+/- 0.1 Units	+/- 10 mV	+/- 10 %
					Stabiliza	(if > 0.5 mg/l) stop Criteria Referen	ce Doc TISEPA EDA	SOP GW ma Dow	(if > 5 NTU) 3, January 19, 2010
FIELD ANALY	/SIS						oc occ. col. n Egr	SOF GW OUT NEV #	3, January 19, 2010
	Time:	1030				CALIBRAT	ION CHECK		Market
	Temperature:	7.70	deg. C			Standard (conc.)			Mark if
Specia	ic Conductance:		umhos/cm		Specific Cond	Standard (conc.)	4	n/am	Recalibrated
	ssolved Oxygen:		mg/L		Dissolved Oxygen:			s, cm	
	pH:		SU						
	ORP:	93.7	mV						
	Turbidity:	4.31	NTU		Turbidity		NTU		
					,		1410		
SAMPLE COL		Time:	1044	.		Sample Dupli	cate ?:	2	
Appearance of S	ample:	Clear o	ela less				od Perismali		Tau
						,			`
NO./BOTTLES:	SIZE:	TYPE:	FILTERED:			RVATIVE:		PARAMETER:	
11	1000ml 125ml	glass plastic	yes no	None HCI, H	NO ₃ NaOH, H ₂ SO,	. ZnAc, TSP, BAK		Sulfolane	
	ml	glass plastic	,	None HCI, H	NO ₃ , NaOH, H ₂ SO,	. ZnAc, TSP, BAK		Sulfate	
	ml	glass plastic	yes no yes no	None HCI H	NO₃, NaOH, H₂SO. NO₃, NaOH, H.SO.	ZDAC TSP, BAK			
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H2SO, NO3, NaOH, H2SO,	, Zino, Far. DAK , ZnAc TSP BAY			
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO.	, ZnAc, TSP, BAK	***************************************		—— I
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	, ZnAc, TSP, BAK			
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	. ZnAc, TSP, BAK			
	ml	3	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	. ZnAc, TSP, BAK			
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	J. ZnAc, TSP, BAK			
0.11151 (1) =	mi	glass plastic	yes no		NO ₃ , NaOH, H ₂ SO,				
SAMPLING P	ERSONNEL		11/1/	Chain	of Custody No),			
Name (SIGNA	TURE): SZ		-//m//	-	(SIGNATURE):				

≟NT:	Lambda Fue								
JCATION:	Lambda Ene 13390 Lone 1				Monitoring Location: Sample ID:			_ Hartland #36	
LOCATION.	Hartland Tov		higan						D
PROJECT:	130685.2000	vnsnip, wiic	nigan			Well Type:		2* PVC	
INSPECTION									
Label on well?		NO REME	NED.		Is coment and in				
Is reference mark v	risible?	(YES NO REMES			Is cement pad in a	good repair? ng locked and in go	od renair?	YES NO REMEDIE	-
Standing water pres	sent?	YES A REME				ce and properly se		NO REMEDIE	The second second
Indication of surface	e runoff in well?	YES NO REME	DIED			isibly good repair?		YES NO REMEDIE	
Repair Notes:	ED LEVEL		<u>.</u>						
STATIC WAT	EHLEVEL	J			- 10	m 4. c			
Top of Coning 5	Tlourstine.	19	י סג.		Date: _12/:	3/1_4	Time:		
Top of Casing 8 Depth to Water		التصلال	1 China	Measured with					
Elevation of Wa		Jane	~~ (~ /~ /~ /	Well depth ve		YES CIO	CHALKED TAP	E OTHER	
			•	veli deptil ve	ined:	785 (11)			
WELL PURG	ING						-		
Purge Method:	(PERISTALTIC)	BLADDER	OTHER		Date: 13/3	3/9	Start Time	lici	
							Otali Time		
Measured Well	Depth: 40.	24	Screen Length:	12531		Depth to Scre	en Midpoint.		
			_			•			
1	Water Level	Drawdown	Pumping Rate	Temp	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	(°C)	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)
i-sitial	19-01-19								, , , , ,
11.15	19218	0.00	5250	7.17	619	9.30	6.87	FE. 2	7.30
1120	19.13	0.02	250	7.25	6.4.2	7.45	€.87	86.5	6.43
1130	19.18	3.02	350	7.37	642	9.09	6.86	36.50	4-54
1135	19.17	0.02	250	7.28	644	47.16	6.84	81.7	4.11
11.32	- 1-1,17	0.03	350	7.15	623	8.27	6.35	37.6	2.72
		***************************************	The Marie States of Supplies						
ļ ————————————————————————————————————	Com 10	war al		vola					
	- Chican-i D	Laviu C.		UMA					
-,		Stabil	ization Criteria:	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 Units	+/- 10 mV	1/ 10.9/
Total Volume Pr	urged (gal):			., 0,0	17 070	(if > 0.5 mg/l)	+/- O. I DIRES	+/* 10 1110	+/- 10 % (if > 5 NTU)
					Stabliza		ce Doc USEPA EQ.	ASOP-GW 001 Rév #	
FIELD ANAL	YSIS								
	Time:					CALIBRAT	ION CHECK		Mark if
1	Temperature:		deg. C			Standard (conc.)	Reading		Recalibrated
Spec	ific Conductance:	633_	umhos/cm		Specific Cond.;		umho	os/cm	001.00000
	issolved Oxygen:		mg/L	1	Dissolved Oxygen:		mg/L		
1		6.85	S.U.			= 84			-
1		87.6							
1	Turbidity:	<u>ə, zə</u>	NTU		Turbidity:		ити		
SAMPLE CO	LLECTION	Time	A a disabase						
	Sample: C		1145			Sample Duplic		Carlo Company	ا ،
, specialize of t	Sample:		1.627		_	Sample Metho	00 15121	ATTIC Law	+1000
NO/BOTTLES:	SIZE:	TYPE.	FILTERED:		PRESER	RVATIVE		PARAMETER	
1	1000 m		yes no	Nane HOI, Ht				Sulfolane	
1	<u>125</u> m		yes no	None HCI, Hi	NO NaOH HISO	. ZnAc, TSP, BAK		Sulfate	
	m	, , , , , , , , , , , , , , , , , , ,	yes no	None, HCI, HI	NaOH H₂SO	J. ZnAc. TSP, BAK			
	m		yes no						
	m	g p	yes no yes no	None, HCI, HI	NO NaOH H₂SO.	, Znac, TSP, BAK	-		
	m	3	yes no						
	m	3 p	yes na	None, HCI, HI	NO NaOH H-SO	ZnAc, TSP, BAK			
	m	giorn pinens	yes no						
	m	gines planting	yes no	None, HCI, HI	NO. NaOH, H ₂ SO.	. ZnAc. TSP. BAK			
	m	glass plastic	yes no	None, HCI, HI	NO ₃ , NaOH, H ₂ SO,	, ZлAc, TSP, BAK			
SAMPLING F	PERSONNEL		111)			
Name (SIGNA	ATURE): 5	Com my	half		SIGNATURE			_	



CLIENT: Lambda En	arau			1 1 41			
			Monitor	ing Location:		Hartland #36	
LOCATION: 13390 Lone				Sample ID:		_MW- <u>_146_</u>	
	wnship, Michigan			Well Type:		2" PVC	
PROJECT: 130685.2000)						
INSPECTION	1	·					
Label on well?	NO REMEDIED		to one and the			R	
Is reference mark visible?	NO REMEDIED		Is cement pad in			NO REMEDIE	
Standing water present?	YES PEMEDED			ng locked and in go	710,000	O NO REMEDIE	
Indication of surface runoff in well?	YES O REMEDIED			ice and properly se risibly good repair?	7 h = 1,00000	NO REMEDIE	
Repair Notes	NEW COLOR		is well casing in v	asiny guod repair		NO REMEDIE	D
STATIC WATER LEVEL				1			
	_		Date 12/3	10	Time: 11:3	al.	0.0
Ten of Continue Electrical			Date:	114	Time: /1:3	0	
Top of Casing Elevation:	20.78						
Depth to Water	20.19	Measured wit		ELECTRONIC TAP	E CHALKED TAPE	OTHER	
Elevation of Water:		Well depth ve	erified?	YES ON			
WELL PURGING	_		1	1		-	
Purge Method: PERISTALTIC	BLADDER OTHER		Date: 12/3	1/19	Start Time	11: 34	
				1			
Measured Well Depth: 27	Screen Lengt	th:		Depth to Scre	on Midoniat		
	Concentrating			Deptit to Scre	en wapoint _		4.1
Minter Level	Depute Director Co		0	D 1 S			_
Water Level	Drawdown Pumping Rate		Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time (feet)	(feet) (ml/min)	(°C)	(umho/cm)	(mg/l)	(S.U.)	(mV) ~	(NTU)
11:36 20.82	004 700	10.9	930	0.97	7.25	698	2.96
11:53 20.82	0.04, 200	11.0	970	0.97	7.24	66.4	2.54
12:00 21.82	C.04 200	_10.0	900	0.93	7.74	594	2.01
Fin 20.82						-7117	
	The second secon						
	sk-skraliske magazp						
	- Committee - Control relations - Sp						
	abundanlari menar man, apan, any ay akao wana panj anjanja alimaga-						
	Stabilization Criteria:	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 Units	+/- 10 mV	+/- 10 %
Total Volume Purged (gal): /	5 gal			(if > 0.5 mg/l)	5.1 5145	., (0,	(if > 5 NTU)
			Stabiliz		ce Doc, USEPA EQAS	SOP-GW 001 Rev #	
FIELD ANALYSIS							, , , , , , , , , , , , , , , , , , , ,
Time	12:00			a delina e a			
Temperature	10 6		7		ION CHECK		Mark if
·	Cinci		\	Standard (conc.)	Reading		Recalibrated
Specific Conductance			Specific Cond.		umhos	/cm	
Dissolved Oxyger	n: <u>0.43</u> mg.L		Dissolved Oxygen		mg/L		
pͰ			pH.		SU		
ORF					mV		
Turbidity	/:				NTU		
·			· Groidity		13		
SAMPLE COLLECTION	Time: 12:05			Camala Duelli		11015	
Appearance of Sample:	Cher, wo ocher	•			cate ?: <u>₩5</u>		
The state of Gampie.				Sample Metho	od: <u>Low 7</u>	THOW	
NO./BOTTLES: SIZE:	TYPE: FILTERED:		20505				
		Nove USL		RVATIVE		PARAMETER	
1 125				, ZnAc, TSP, BAK		Sulfolane	
2 1000		None HCI, H	NO ₃ , NaUH, H ₂ SO	, ZnAc, TSP, BAK		Sulfate	
125					m3/		
	-1	HCI, H	NU ₃ , NaOH, H ₂ SO	, ZnAc. TSP. BAK			
 ';		None, HCl, H	NO ₃ , NaOH, H ₂ SO	. ZnAc. TSP BAK			
	-1 (1	None, HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc. TSP, BAK	W W W		
	-I						
	ml	None, HCI, H	NO3, NaOH, H2SO	, ZnAc. TSP. BAK			
				, ZnAc, TSP, BAK	P.P.		
 !	ni , , , , ,	None, HCI, H	NO3, NaOH, H2SO	, ZnAc, TSP, BAK			
	3 pictis /60 118	None, HCI, H	NO3, NaOH, H2SO	, ZnAc, TSP, BAK			
SAMPLING PERSONNEL	1 // 1//.						
Name (SIGNATURE):	- //m//h		(SIGNATURE):				

CLIENT:	Lambda Enec								
	Lambda Ener				Monitor	ing Location:		_ Hartland #36	
LOCATION:	13390 Lone T					Sample ID:		_MW <i> 9:</i> 5_	
	Hartland Tow	nship, Mich	nigan			Well Type:		2" PVC	
PROJECT:	130685.2000	-				• • •			
INSPECTION		- 5							
Label on well?		Δ.						A	
100 Oct 100		NO REMEDI			s cement pad in			NO REMEDIE	D
Is reference mark v		YES NO REMEDI				ng locked and in g		NO REMEDIS	D
Standing water pres		YES REMEDI				ace and properly se		NO REMEDIE	D
Repair Notes	S TRUOTE IN AGILY	YES O REMEDI	EO		Is well casing in v	visibly good repair?		ES NO REMEDIE	O O
STATIC WAT	ED LEVEL T								
STATIC WAT	EHTEVEL				11/1	. 6	0		
22 399					Date: 12/3	7	Time: 4:4	U	
Top of Casing E									
Depth to Water		22.06		Measured wit	h:	ELECTEONIC TAP	E CHALKED TAP	E OTHER	
Elevation of Wa	iter:		,	Well depth ve	rified?	YES A			
		_				ν			
WELL PURG	ING				-	1			
Purge Method:	PEAISTALTIC	BLADDER	OTHER		Date 12/8	/19	Start Time	1:47	
args mounds	, despiration	DEADOEN	OTHER	4.	Date	1.1	Start Time	- 17	
Managerad Mail I	Depth: 30.27		0	5'					
Measured Well I	Depth: Join		Screen Length			Depth to Scre	en Midpoint		
	Water Level	Drawdown	Pumping Rate	Temp	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time	22.25	(feet)	(ml/min)	(°C)	(umho/gm)	(mg/l)	(S.U.)	(mV)	,
10:05			(ml/min)	10.3	405	(mg/l) 11.35	8.64	100.3	(NTU) 4.84
10:10	22.25	019	200	10.7	405	11.40	8 05	929	2.57
16:15	22.25	0.19	200	10.4	464	11.40	8.05	6-	
Final	22.26				704	11.10	3.07	_ (0. (3.11
1 1 1 1 1 1 1									
									_
		-							
		12"							
			tion on any any and a second						
		Stabilis	zation Criteria	166			100	1.00	
Total Volume Pu	urged (gal): 1.75	See 1	tation Citteria.	+1- 670	+6	(if > 0.5 mg/l)	+/- 0 / Units	+/- 10 PNV	+/630%
	31900 (901)	-/			Front -		-85		(if > 5 NTU)
FIELD ANAL	VSIS I				Stabiliz	ation Criteria Hererer	ice Duc USEPA EQ	ASOP-GW 001 Rev #	3. January 19, 2010
TICED AIVAE		10:15							de
1	Time	10.17				CALIBRAT	TON CHECK		Mark if
1	Temperature	1/41	deg C			Standard (conc.)	Reading		Recalibrated
Spec	ific Conductance	404	umhos/cm		Specific Cond	;	umho	s/cm	
D	issolved Oxygen	11.40	mg.L		Dissolved Oxygen		mg/L	_	
I	pH.	8.05	S.U						
	ORP.	90.1	mV				S.U.		97
Į.	Turbidity	3.11	NTU				1		
	ratbidity		NIO		Furbidity		UTM		
SAMPLE CO	LLECTION	T: -	10.00						
		Chur, no	10:20			Sample Dupli		VO	
Appearance of S	Sample:	cor, no	aw			Sample Meth	od: LOW	PICN	
NO BOTTLES	SIZE	TYPE	FILTERED	1, 1000		RVATIVE		PARAMETER:	
	mi	glass plastic	yes no	None HOI, H	NO3. NaOH, H2SO), ZnAc, TSP, BAR	(Sulfo ane	
	125m	giass plastic	yes no	None HOI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc, TSP, BAK	·	Sulfate	
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	. ZnAc, TSP, BAH	·		
	m	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	. ZnAc. TSP, BAR	·	SIII	
	m	glass plastic	yes no	None, HCI, H	NO3, NaOH, H ₂ SO	. ZnAc. TSP, BAH	(
	ml	glass plastic	yes no	Nane, HCI, H	NO ₃ , NaOH, H ₂ SO	J. ZnAc. TSP, BAH	<		
	ml	glass plastic	yes no	None, HCI, H	NO3, NaOH, H2SC	, ZnAc TSP, BAR	(
	mi	glass plastic	yes no	None, HCl, H	NO ₃ , NaOH, H ₂ SC	. Znac TSP, BAH	ζ		-
	m1	glass plastic	yes no	None, HCl, H	NO ₃ , NaOH, H ₂ SC	, ZnAc TSP, BAH	·		
l	m1	glass plastic	yes no	None, HCl, H	NO, NaOH, H2SC	, Znac, TSP, BAK	ζ		
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SC),, ZnAc, TSP, BAR	ζ		
SAMPI ING P	PERSONNEL	.00	1						
			/1/	Chair	or Custody No	0			
Name (SIGNA	TURE):	for	1 -	Name	(SIGNATURE)				

CLIENT:	Lambda Ener	· CIV					<u> </u>		
					Monitori	ing Location:		_ Hartland #36	
	13390 Lone T					Sample ID:	7	MW-19 d	
	Hartland Tow	nship, Mich	igan			Well Type:		2" PVC	
	130685.2000	,				wen type.		2 7 70	
	100000.2000				· · · · · · · · · · · · · · · · · · ·				
INSPECTION		,							
Label on well?		NO REMEDIE	:D		Is cement pad in o	good renair?		NO REMEDIE	
Is reference mark vis	sible?	NO REMEDIE	to.			ng locked and in go	and consists	ين	
Standing water pres	ent?	YES NO REMEDIE				_	· 100	NO REMEDIE	
Indication of surface		V !				ce and properly se		NO REVIEDIE	
Repair Notes.	TOTOR IN MER	YES (1) REMEDIE	.D		is well casing in vi	isibly good repair?		ES NO REMEDIE	D
STATIC WAT	ERLEVEL				الالما				
					Date. 12/3/	19	Time: 10:4	l <i>0</i>	
Top of Casing E	levation				Date -	Million Control	Time: 7		
	ievanori.	0.00				al			
Depth to Water:		21.67		Measured wit	n:	ELECT PENIC TAP	E CHALKED TAPE	E OTHER	
Elevation of Wat	ter:			Well depth ve	rified?	YES 4			
				•					
WELL PURG!	NG								
					/-	1.			
Purge Method	PERSTALTIC	BLADDER	THER	1122	Date: 12/3	/19	Start Time:	10:45	
	_			_	5.79.1557		e eretta	A.T. and A.	
Measured Well C	enth: 50.0	0	Para a = 4						
IMICASUIEU WEILL	reptin.		Screen Length			Depth to Scre	en Midpoint		
	Water Level	Drawdown f	Pumping Rate	Temp	Spec Cond.	Dice Own	-11	000	10 To 4 1 10
Time			1000 -000	1.0		Diss Oxy	pН	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	("C)	(umho/cm)	(mg/l) /- (7	(S.U.)	(mV)_	(NTU)
11:00	21.93	0.06	200	14.3	_860	1.17	7-14	102.8	7.17
11:05	21.93	0.06	200	9.8	4,58	0.56	710	92.6	6.51
11:10	21.43	0.06	200	9.7			-612	76.6	0.7
					450	0.54	7.18	44.9	6.02
11:15	21.93	0.06	200	9.9	840	0.57	7.18	45.8	2.25
From	21.93								
		44							
			NEW STATE CONTINUES CALLED STATE						
				- 1					_
		Stabiliz	ation Criteria	1.3	1 20/	1/1/20	+/- 0.0 Pnits	16/21	
Total Volume Pu	rged (gal): Z	casa 1	anon ontena.	7090	#C0%	+0.00%	+/· UILEnits	+/- 1WmV	4.70%
Total Volume I u	rgeo (gai)	Jac.		_		(if > 0.5 mg/l)			(if > 5 NTU)
CIEC D. ANIAL I	1010				Stabiliza	tion Criteria Referen	ce Doc USEPA EQA	ASOP GW 001 Rev #:	3 January 19 2010
FIELD ANALY	rsis	759							
	Time:	11:15				64410047			
		9.9				CALIBRAT	ION CHECK		Mark if
	Temperature:		deg. C			Standard (conc.)	Reading		Recalibrated
Speci	fic Conductance:	840	umhos/cm		Specific Cond		umho	is/cm	
	ssolved Oxygen:	0.57	mg/L		Dissolved Oxygen:				
		- 14			-		mg/L		-\
	pH:		S.U.		pH		SU		
	ORP.		mV		Eh:		mV		100000000000000000000000000000000000000
	Turbidity:	7.27	NTU		Turbidity:		NTU		
-37					- arounty		I		
SAMPLE COL	LECTION		1417						
SAMPLE COI		Time: _	11:20			Sample Dupli	cate ?: 🚜	JO	
Appearance of S	ample:	Cher	no cour	ganth.		Sample Meth	/	Flow	
	p New Care					eample mean	<u></u>		
NO/BOTTLES:	SIZE:	TYPE:	EN TERES.		Part =	31/4711-			
1			FILTERED:			RVATIVE		PARAMETER:	
		glass plastic	yes no	Nane HCI, H	NO3, NaOH, H ₂ SO,	., ZnAc, TSP, BAK		Sulfolane	
	<u>125</u> ml	glass plastic	yes inc	Nane HCI, H	NO ₃ , NaOH, H ₂ SO,	. ZnAc, TSP, BAK		Sulfate	
	ml	glass plastic	yes no						
10	ml	glass plastic	yes no						
	ml	glass plastic		None HCI II	MO. AlaON, 11250;	Zancitos ser			
			-	None, nui, H	NO ₃ , NaOH, H ₂ SO,	4. ZRAC, TSP, BAK			
	mi	glass plastic	yes no	None, HÇI, H	NO3, NaOH, H2SO.	, Znac, TSP, BAK			
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	4. ZnAc. TSP, BAK	·		
	ml	glass plastic	yes no .						
	mI	glass plastic	yes no	None HCI H	NO. NaOH HISO	ZDAC TSD DAK			
	ml		yes 'no	Mone HC1 L	NO. Nace E co	Jaka Too on!			
1	m1	- '	-	None, not, H	NO ₃ , NaOH, H ₂ SO,	I, ZDAC, TSP, BAK			
		glass plastic	yes no	none, HCI, H	NO ₃ , NaOH, H ₂ SO,	4, Znac, TSP, BAK			
SAMPLING P	ERSONNEL	_	. /		of Custody No				
					-				
Name (SIGNA	(URE):	-/mg	11/2	Name	SIGNATURE):				

CLIENT:	Lambda Ener	rav							
LOCATION:					Monitoring Location: Hartland #36				
LOCATION:	13390 Lone T					Sample ID:		_MW _	205
	Hartland Tow	rnship, Mic	higan			Well Type:		2" PVC	
PROJECT:	130685.2000								
INSPECTION									
Label on well?		NO REMED	(ED		is cement pad in	good regain?		MCD 110 001110	
Is reference mark vi	isible?	(YES) NO REMES			-	good repair? ng locked and in go	nod repair?	YES NO REMEDI	- 1 and
Standing water pres	ent?	YES (NO REMES				ice and properly se		_	
Indication of surface	runoff in well?	YES NO REMED				isibly good repair?		_	
Repair Notes					is new casing in v	isibly good repair?	•	YES NO REMEDI	ED .
STATIC WAT	ER LEVEL							-	
		ı			Data 11/2	110	-		
Top of Casing E	levation				Date 4/3	y	Time:		
Depth to Water:		21-65	,	Management					
Elevation of Wa		oct no		Measured with			CHALKED TAPE	OTHER	
cievation of vya	ier.			Well depth ve	rified?	YES NO			
WELL PURG	INC		· · · · · · · · · · · · · · · · · · ·	<u></u>					
						,			
Purge Method:	PERISTALTIC	BLADDER	OTHER		Date: 12/3	//9	Start Time:	1330	
	250						•		
Measured Well D	Depth: 25.10		Screen Length	n:		Depth to Scre	en Midpoint: _		
						Departo Scie	en wildpoint.		
	Water Level	Drawdown	Pumping Rate	Т	C C :	D			
T:				•	Spec Cond.	Diss Oxy	pН	ORP	Turbidity
Time	(feet)	(feet)	(ml/min)	(°C)	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)
initial	31,65			2					, ,
1345	21.73	0.08	200	7,97	_583	7.03	6.95	83.0	2.47
1350	21.73	0.08	200	7,92	582	7.12	692	85.3	
1355	21.73	0.08	200	8.08	582	7.23	6.93	85.7	1.27
		WWW-0-0-0-distancements. In squages						03.7	1.21

			~						
		~*************************************							
				/					
		Stabili	zation Criteria:	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 Units	1/ 10 = 1/	1 100
Total Volume Pu	irged (gal):			*/* 0 /0	77-376	(if > 0.5 mg/l)	+/+ U. I Units	+/- 10 mV	+/- 10 %
					Statistics		Dec 115501 501	505 618 664 5-	(if > 5 NTU) 3 January 19, 2010
FIELD ANALY	YSIS				Otheriza	ALON CHENA HEIGIGH	CE DOC OSEPA ECIA	SUP-GV7 DU1 HeV I	13 January 19, 2010
	Time:	1 1355							
						CALIBRAT	ION CHECK		Mark if
	Temperature	8.08	deg. C			Standard (conc.)	Reading		Recalibrated
	fic Conductance:	287	umhos/cm		Specific Cond.:	12	umhos	s/cm	[
Di	issolved Oxygen:		mg/L	!					
	pH:	6.93	S U				K.		
	ORP.	85.7	mV						3 11 13
	Turbidity:	1.21	NTU						
	rai biaity.		NIU		Furbidity		NTU		
SAMPLE CO	LECTION	T -	triest d					.	
		Time				Sample Dupli		10	_
Appearance of S	sample:	lear on	tor less			Sample Metho	od: Perist	aric Le	entlow
NO (BOTTLES)	m. 100	****							
NO/BOTTLES:	SIZE.	TYPE	FILTERED:			AVATIVE.		PARAMETER	
11	m1	glass plastic	yes no						
	<u>125</u> m1	* L	yes no	None HCI, Ht	103, NaOH, H ₂ SO,	4. ZnA¢, TSP, BAK		Sulfate	
	m1	3 p	yes no	None, HCI, HI	NaOH, H ₂ SO,	J. ZnAc, TSP, BAK			
	m1	g p-asid	yes no	None, HCI, HI	NO3, NaOH, H2SO.	J. ZnAc. TSP, BAK			
	ml	J p	yes no	None, HCI, HI	NO ₃ , NaOH, H ₂ SO,	. ZnAc. TSP, BAK			
	ml		yes no	None, HCI, Ht	NO ₁ , NaOH, H ₂ SO,	J. ZnAc. TSP, BAK			
-	ml	3	yes na	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	4. ZnAc, TSP, BAK			
	m	3.200 \$.000	yes no	None, HCI, HI	NO3, NaOH, H2SO,	. ZnAc. TSP, BAK			
	ml	glass plastic	yes na	None, HCI, HI	NO ₃ , NaOH, H ₂ SO	4. ZπAc, TSP, BAK			
	ml	3 p	yes no	None, HCI, HI	NO ₃ , NaOH, H ₂ SQ,	4. ZnAc. TSP, BAK			
	m	glass plastic	yes no	None, HCI, Ht	NO ₃ , NaOH, H ₂ SO,	. ZnAc, TSP, BAK			
SAMPLING P	ERSONNEL								
Name (SIGNA		En Enfor							
MANDIC) SILIBIT	ולני וויוויויו		Land	Name (SIGNATURE):				

CLIENT:	Lambda Energy				Monitoring Location:			Hartland #36	
LOCATION: 13390 Lone Tree Road					Sample ID:			_MW20D	
Hartland Township, Michigan			Well Type:				2" PVC		
PROJECT:	130685.2000								
INSPECTION									
			ES NO REMEDIED		Is cement pad in good repair?			YES NO REMED	IEO
Ctender water and the		YES NO REMEDIED		Is protective casing locked and in good repair?			YES NO REMED	EO	
Indication of surface runoff in well?		YES NO REMEDIED YES NO REMEDIED			Is inner cap in place and property sealing well? Is well casing in visibly good repair?			YES NO REMED	
Repair Notes:	16	120 110 116/1166			is well casing in v	isibiy good repair?		YES NO REMED	IED
STATIC WAT	ER LEVEL				-				
			~		Date. 12/	3//4	Time:		
Top of Casing E	levation:	6.3	/ ,			7			
Depth to Water:		37.18	- 21.48	Measured wit	h:	LECTRONIC TAP	CHALKED TAP	E OTHER	
Elevation of Wa	ter:			Well depth ve	erified?	YES NO	60 10000		
WELL PURG	INC			<u> </u>			<u> </u>		
		(<u>C.</u>)			- 12/2/			440-	
Purge Method:	PERISTALTIC	BLADDER	OTHER		Date:/2/3/	15_	Start Time:	1155	
Maasurad Wall F	Depth:		Caroon Leasth			5 41 4 6	8		
Wedsoled Well E	э ерин.	Screen Length:			Depth to Screen Midpoint:				
	Water Level	Drawdown	Pumping Data	Tome	00	5: 0			
Time	(feet)	(feet)	Pumping Rate (ml/min)	Temp (°C)	Spec Cond.	Diss Oxy	pH	ORP	Turbidity
	21.48	(1001)	(manua)	7.6'	(umho/cm)	(mg/l)	(S.U.)	(mV)	(NTU)
1240	22.62	1.14	200	7.63	547	6.84	7.15	3	
1245	22.55	1.07	150	7.33	5-5-8	6,40	7.09	845	11.7
1250	2246	0.98	150	7, 20	562	64.3	7.05	85.5	8.43
1255	22.43	0.95	150	7.21	562	625	7.02	83.7	6.44
1300	22.43	0.95	150	7,21	564	6.24	7.01	86.3	5.87
1305	23.44	0.96	150	7.28	564	6,5	7.01	85.4	5.49
			the days				7.01		3.77
Tatal Mahasa B	urged (gal):_ 13/	Stabili	zation Criteria:	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 Units	+/- 10 mV	+/- 10 %
l otal Volume Pu	irged (gal):_ ' /	7_				(if > 0.5 mg/l)			(if > 5 NTU)
FIELD ANAL	YSIS				Stabiliza	ition Criteria Referen	te Ood USEPA EQ	ASOP-GW 001 Rev I	3. January 19, 2010
	Time:	1305							
	Temperature:		don C				ON CHECK		Mark if
Speci	fic Conductance:		dég. C umhos/cm		F4- G4	Standard (conc.)	Reading I		Recalibrated 1
	issolved Oxygen:		mg/L						
11 3		7.01	SU						-
1		85.4							
		5.49	NTU						
L					, arbiarty.		NIU		
SAMPLE CO	LLECTION	Time:	1317			Sample Duplic	cate 2: 44 e	-5	
Appearance of S	Sample:	-lear Od	or less					ITIC Lou	Flor
l						•			e , .ce
NO/BOTTLES.	StZE: 1000ml	TYPE:	FILTERED:			EVITAVE		PARAMETER	
	125 ml		yes no	None HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc, TSP, BAK		Sutfolane	
t	1000 ml	glass plastic	,	Name HCI, H	NO3, NaOH, H ₂ SO,	. ZnAc, TSP, BAK		Sulfate	
	135 m	glass plastic	yes (no			,, ZnAc, TSP, BAK ,, ZnAc, TSP, BAK			
	mi	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H-SO	, ZnAc, TSP, BAK		2 CHTTLE	
	ml	glass plastic	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO	ZnAc, TSP, BAK			
	ml	• ,	yes na	None, HCI, H	NO ₃ , NaOH, H ₂ SO	, ZnAc, TSP, BAK			
	m	3	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	., ZnAc, TSP, BAK			
	ml	3 p.00	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	, ZnAc, TSP, BAK			
	ml	3.000 6.000	yes no	None, HCI, H	NO ₃ , NaOH, H ₂ SO,	, ZnAc, TSP, BAK			.
SAMPLING S		glass plastic	yes no			., ZпАс, TSP, BAK			
SAMPLING P		ر بر سما	7 .	Chain	of Custody No), -			
Name (SIGNA	TURE):	em of	orball	Name (SIGNATURE):				