ENSOLUM

April 11, 2023

New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: First Quarter 2023 – SVE System Update
Lambe 2C
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NVF1836050592
Ensolum Project No. 07A1988008

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *First Quarter 2023 – SVE System Update* report summarizing the soil vapor extraction (SVE) system performance at the Lambe 2C natural gas production well (Site), located in Unit H, Section 20, Township 31 North, and Range 10 West in San Juan County (Figure 1). Specifically, this report summarizes Site activities performed in January, February, and March of 2023 to the New Mexico Oil Conservation Division (NMOCD).

SVE SYSTEM SPECIFICATIONS

The current SVE system was installed at the Site in September 2021, with operation beginning on September 24, 2021. The SVE system is configured so vacuum is being applied to well MW01 (shown on Figure 2). SVE well MW01 is screened across the impacted soil interval from approximately 20 feet to 35 feet below ground surface (bgs). The SVE system consists of a 1 horsepower Atlantic Blower model AB-202/1 regenerative blower capable of producing 50 standard cubic feet per minute (scfm) flow and 30 inches of water column (IWC) vacuum. The layout of the SVE system and piping is shown on Figure 2.

FIRST QUARTER 2023 ACTIVITIES

During the first quarter of 2023 Ensolum and Hilcorp personnel performed bi-weekly operation and maintenance (O&M) visits to ensure the system was operating as designed and to perform any required maintenance. Field notes taken during O&M visits are presented in Appendix A. During the first quarter of 2023, SVE well MW01 was operated in order to induce flow in impacted soil zone. Between December 10, 2022 and March 9, 2023, the SVE system operated for 1,978.7 hours for a runtime efficiency of 92.6 percent (%). Appendix B presents photographs of the runtime meter for calculating the first quarter runtime efficiency. Table 1 presents the SVE system operational hours and calculated percent runtime.

A first quarter 2023 air sample was collected on March 9, 2023 from a sample port located between the SVE piping manifold and the SVE blower using a high vacuum air sampler. Prior to collection, the emission sample was field screened with a photoionization detector (PID) for organic vapor monitoring (OVM). The emission sample was collected directly into two 1-Liter Tedlar® bags and submitted to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for analysis of total volatile petroleum hydrocarbons (TVPH – also known as total petroleum hydrocarbons – gasoline range organics (TPH-GRO)) following United States Environmental Protection Agency (EPA) Method 8015D, volatile organic compounds (VOCs) following EPA Method 8260B, and fixed gas analysis of oxygen and carbon dioxide following Gas Processors Association (GPA) Method 2261. Table 2 presents a summary of analytical data collected during this sampling event and historical sampling events, with the full laboratory analytical report included in Appendix C.

Air sample data and measured stack flow rates are used to estimate total mass recovered and total emissions generated by the SVE system (Table 3). Based on these estimates, 333 pounds of TVPH have been removed by the system to date.

RECOMMENDATIONS

Bi-weekly O&M visits will continue to be performed by Ensolum and/or Hilcorp personnel to ensure that the SVE system is operating within normal working ranges (i.e., temperature, pressure, and vacuum). Deviations from regular operations will be noted on field logs and included in the following quarterly report.

We appreciate the opportunity to provide this report to the New Mexico Oil Conservation Division. If you should have any questions or comments regarding this report, please contact the undersigned.

Sincerely,
Ensolum, LLC

Stuart Hyde, LG
Senior Geologist
(970) 903-1607
shyde@ensolum.com

Daniel R. Moir, PG
Senior Managing Geologist
(303) 887-2946
dmoir@ensolum.com

Attachments:

Figure 1	Site Location
Figure 2	As Built Diagram
Table 1	Soil Vapor Extraction System Runtime Calculations
Table 2	Soil Vapor Extraction System Emissions Analytical Results
Table 3	Soil Vapor Extraction System Mass Removal and Emissions
Appendix A	Field Notes
Appendix B	Project Photographs
Appendix C	Laboratory Analytical Reports

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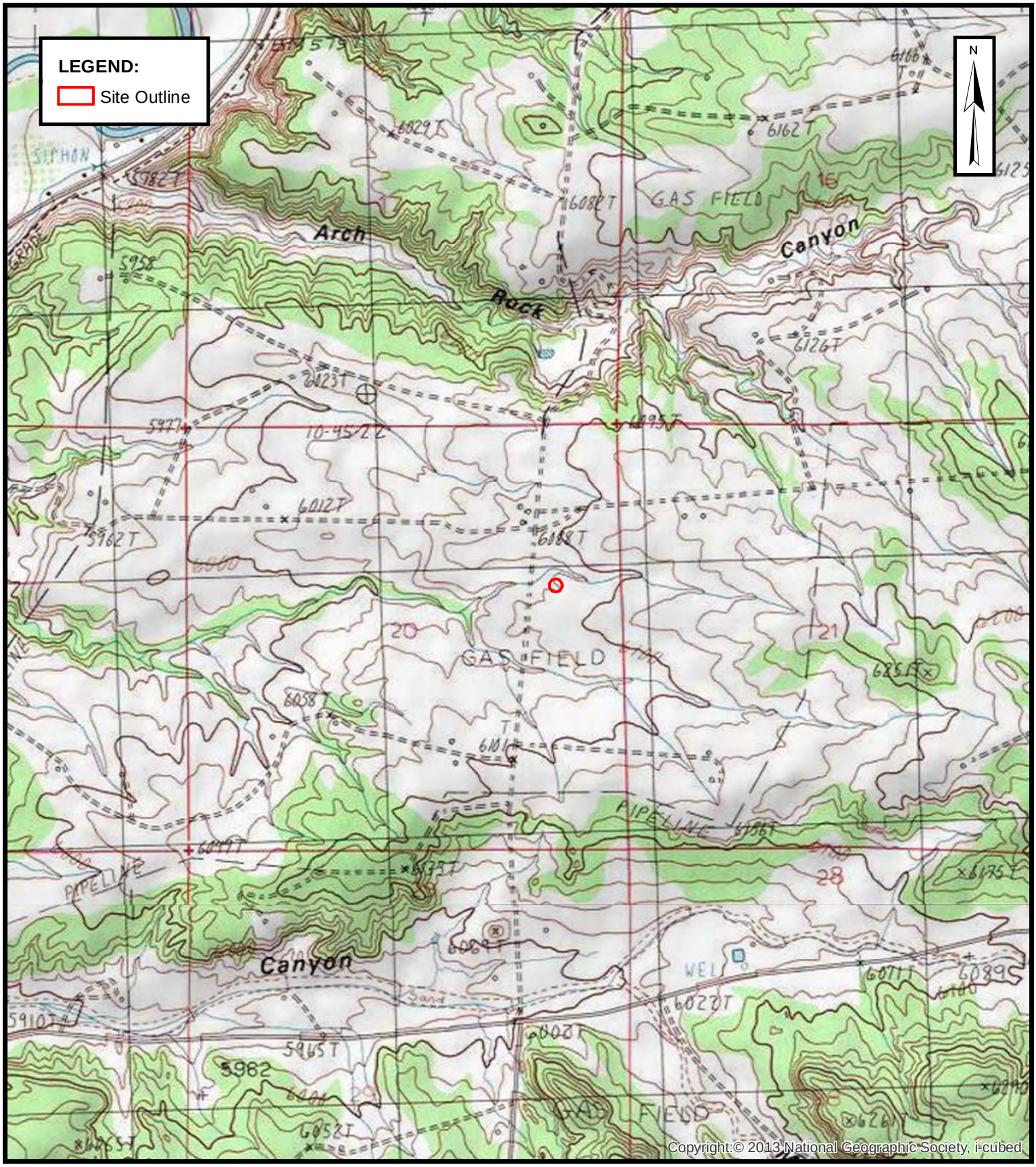
FIGURES



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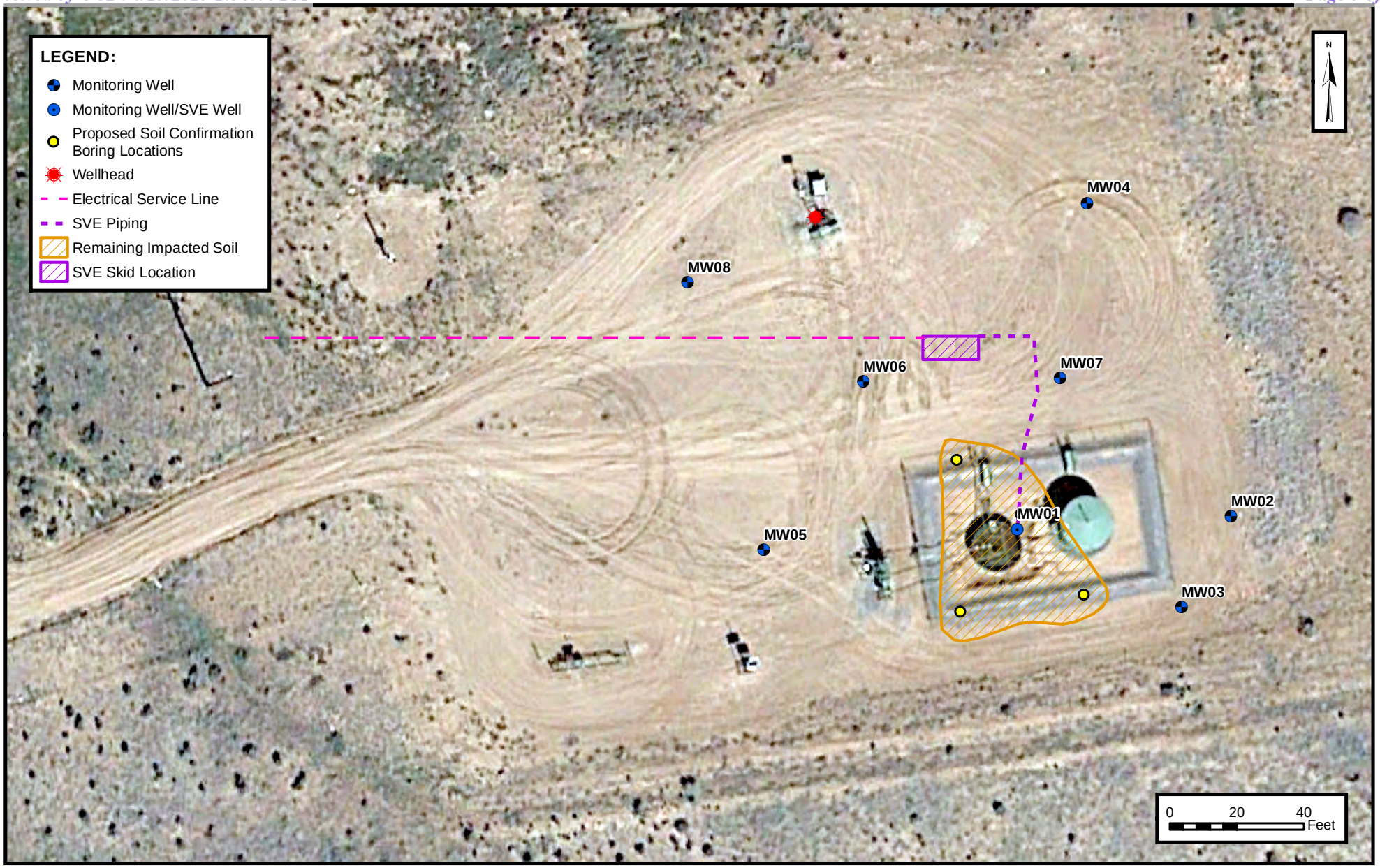
SITE LOCATION MAP

HILLCORP ENERGY COMPANY
LAMBE 2C
SENE SEC 20 T31N R10W, San Juan County, New Mexico
36.885735° N, 107.899592° W

PROJECT NUMBER: 07A1988008

FIGURE
1



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AS BUILT DIAGRAM

HILCORP ENERGY COMPANY
LAMBE 2C
SENE SEC 20 T31N R10W, San Juan County, New Mexico
36.885855° N, 107.899525° W

PROJECT NUMBER: 07A1988008

FIGURE

2

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TABLES

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TABLE 1
SOIL VAPOR EXTRACTION SYSTEM RUNTIME CALCULATIONS
Lambe 2C
Hilcorp Energy Company
San Juan County, New Mexico

Date	Total Operational Hours	Delta Hours	Days	Percent Runtime
12/10/2022	1,723.8	--	--	--
3/9/2023	3,702.5	1,978.7	89.0	92.6%

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM EMISSIONS ANALYTICAL RESULTS
Lambe 2C
Hilcorp Energy Company
San Juan County, New Mexico

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH/GRO (µg/L)	Oxygen (%)	Carbon Dioxide (%)
9/25/2019 (1)	782	6.1	42	<5.0	56	--	--	--
10/14/2019 (1)	431	7.3	26	2.6	36	3,600	--	--
9/17/2021 (2)	78	<0.10	<0.10	<0.10	1.1	660	--	--
9/24/2021	97	<0.20	0.9	<0.20	4.3	880	--	--
12/2/2021	92	<0.20	2.3	0.6	6.5	300	22.10	0.288
3/15/2022	42	<0.1	<0.10	<0.10	0.5	41	22.10	0.249
6/16/2022	25	<0.10	0.51	0.14	1.4	110	21.57	0.28
9/28/2022 (3)	122	<0.10	<0.10	<0.10	<0.15	43	21.47	0.41
12/12/2022 (3)	16.9	0.72	8.2	0.51	6.5	170	21.68	0.30
3/9/2023	20.8	0.21	4.1	0.47	<0.10	140	21.64	0.26

Notes:

(1): sample collected during a Venturi event

(2): sample collected during pilot testing of the SVE system

(3): PID measurement collected during operation and maintenance visits on 9/21/2022 and 12/10/2022

GRO: gasoline range organics

µg/L: microgram per liter

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

%: percent

--: not sampled

<0.037 : gray indicates result less than the stated laboratory reporting limit (PQL)

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TABLE 3
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS
Lambe 2C
Hilcorp Energy Company
San Juan County, New Mexico

Flow and Laboratory Analysis

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
9/24/2021	97	*0.20*	0.94	*0.20*	4.3	880
12/2/2021	92	*0.20*	2.3	0.59	6.5	300
3/15/2022	42	*0.10*	*0.10*	*0.10*	0.48	41
6/16/2022	25	*0.10*	0.51	0.14	1.4	110
9/28/2022 (1)	122	*0.10*	*0.10*	*0.10*	*0.15*	43
12/12/2022 (2)	16.9	0.72	8.2	0.51	6.5	170
3/9/2023	20.8	0.21	4.1	0.47	*0.10*	140
Average	59	0.23	2.32	0.30	2.8	241

Vapor Extraction Summary

Date	Flow Rate (cfm)	Total System Flow (cf)	Delta Flow (cf)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Total Xylenes (lb/hr)	TVPH (lb/hr)
9/24/2021	51	4,590	4,590	0.000038	0.00018	0.000038	0.00082	0.17
12/2/2021	40	3,811,470	3,806,880	0.000030	0.00024	0.000059	0.00081	0.088
3/15/2022	40	9,329,550	5,518,080	0.000022	0.00018	0.000052	0.00052	0.026
6/16/2022	42	14,899,002	5,569,452	0.000016	0.000048	0.000019	0.00015	0.012
9/28/2022 (1)	44	20,888,106	5,989,104	0.000016	0.000050	0.000020	0.00013	0.013
12/10/2022 (2)	44	25,438,938	4,550,832	0.000067	0.00068	0.000050	0.00055	0.018
3/9/2023	43	30,543,984	5,105,046	0.000075	0.00099	0.000079	0.00053	0.025
			Average	0.000038	0.00034	0.000045	0.00050	0.050

Flow and Laboratory Analysis

Date	Total Operational Hours (3)	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
9/24/2021	1.5	1.5	0.000057	0.00027	0.000057	0.0012	0.25	0.00013
12/2/2021	1,588	1,586	0.047	0.38	0.094	1.3	140	0.070
3/15/2022	3,887	2,299	0.052	0.41	0.12	1.2	59	0.029
6/16/2022	6,097	2,210	0.035	0.11	0.042	0.33	26	0.013
9/21/2022 (1)	8,366	2,269	0.037	0.11	0.045	0.29	29	0.014
12/10/2022 (2)	10,089	1,724	0.12	1.2	0.087	0.94	30	0.015
3/9/2023	12,068	1,979	0.148	1.96	0.156	1.05	49	0.025
		Total Mass Recovery to Date	0.44	4.2	0.54	5.1	333	0.17

Notes:

(1): PID measurement, SVE system hours, and flow rates were collected during operation and maintenance visit on 9/21/2022

(2): PID measurement, SVE system hours, and flow rates were collected during operation and maintenance visit on 12/10/2022

(3): total operational hours are a summation of runtime hours collected from several blower runtime meters

cf: cubic feet

cfm: cubic feet per minute

µg/L: micrograms per liter

lb/hr: pounds per hour

--: not sampled

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

gray: laboratory reporting limit used for calculating emissions

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APPENDIX A

Field Notes

DIRECTION 129 deg(T)
36.88567°N 107.89925°W
ACCURACY 5 m DATUM WGS84

SAUNDERS
www.saunders-usa.com

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 1-4-22
TIME ONSITE:
O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	2308.39	1015
Inlet Vacuum (IWC)	16	
K/O Tank Vacuum (IWC)	-15	
Inlet Flow Rotameter (scfm)	46	
Inlet PID	5.59	
Exhaust PID	4.69	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	20	
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID: SAMPLE TIME:
Analytes: TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	FLOW (CFM)	ADJUSTMENTS
SVE01		3.4		

COMMENTS/OTHER MAINTENANCE:

2023-01-04
15:03:04-07:00

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 1-19-23
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	2667.16	1320
Inlet Vacuum (IWC)	16	
K/O Tank Vacuum (IWC)	7	
Inlet Flow Rotameter (scfm)	45	
Inlet PID	18.47	
Exhaust PID	17.55	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	6	
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS	

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE01		16.86	

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 2-6-23
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	3098.08	1235
Inlet Vacuum (IWC)	16	
K/O Tank Vacuum (IWC)	14	
Inlet Flow Rotameter (scfm)	44	
Inlet PID	13.6	
Exhaust PID	13.39	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	7	
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS	

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE01		12.15	

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 2-24 O&M PERSONNEL: B Sinclair
TIME ONSITE: TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:		KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	3390.08	1044
Inlet Vacuum (IWC)	15	
K/O Tank Vacuum (IWC)	9	
Inlet Flow Rotameter (scfm)	43	
Inlet PID	25.8	
Exhaust PID	17.6	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	1.5	
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS	

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE01		21.8	

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 3-9
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:		KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	3702.49	1131
Inlet Vacuum (IWC)	15	
K/O Tank Vacuum (IWC)	9	
Inlet Flow Rotameter (scfm)	43	
Inlet PID	21	
Exhaust PID	21.4	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	1	
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	SAMPLE TIME:
Analytes:	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS	

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE01		20.8	

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 3-23
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:	
	KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	3987.9	1102
Inlet Vacuum (IWC)	15	
K/O Tank Vacuum (IWC)	13	
Inlet Flow Rotameter (scfm)	43	
Inlet PID	15.1	
Exhaust PID	14	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		
Clean/Dry Air Filter (check)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
OPERATING WELLS	

Change in Well Operation:

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE01		10.5	

COMMENTS/OTHER MAINTENANCE:

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APPENDIX B

Project Photographs

PROJECT PHOTOGRAPHS
Lambe 2C
San Juan County, New Mexico
Hilcorp Energy Company

Photograph 1 Runtime meter taken on December 10, 2022 at 1:08 PM Hours = 1,723.82		
Photograph 2 Runtime meter taken on March 9, 2023 at 11:31 AM Hours = 3,702.49		

Ensolum, LLC | Environmental & Hydrogeologic Consultants
Durango, Colorado | info@ensolum.com

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APPENDIX C

Laboratory Analytical Reports

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 27, 2023

Mitch Killough
HILCORP ENERGY
PO Box 4700
Farmington, NM 87499
TEL: (505) 564-0733
FAX

RE: Lambe 2C OrderNo.: 2303594

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/10/2023 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2303594**
Date Reported: **3/27/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: SVE-1
Project: Lambe 2C
Collection Date: 3/9/2023 11:30:00 AM
Lab ID: 2303594-001 **Matrix:** AIR **Received Date:** 3/10/2023 7:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	0.21	0.10		µg/L	1	3/16/2023 5:22:00 PM
Toluene	4.1	0.10		µg/L	1	3/16/2023 5:22:00 PM
Ethylbenzene	0.47	0.10		µg/L	1	3/16/2023 5:22:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2,4-Trimethylbenzene	1.4	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,3,5-Trimethylbenzene	1.2	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Naphthalene	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
1-Methylnaphthalene	ND	0.40		µg/L	1	3/16/2023 5:22:00 PM
2-Methylnaphthalene	ND	0.40		µg/L	1	3/16/2023 5:22:00 PM
Acetone	ND	1.0		µg/L	1	3/16/2023 5:22:00 PM
Bromobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Bromodichloromethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Bromoform	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Bromomethane	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
2-Butanone	ND	1.0		µg/L	1	3/16/2023 5:22:00 PM
Carbon disulfide	ND	1.0		µg/L	1	3/16/2023 5:22:00 PM
Carbon tetrachloride	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Chlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Chloroethane	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
Chloroform	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Chloromethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
2-Chlorotoluene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
4-Chlorotoluene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
cis-1,2-DCE	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
Dibromochloromethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Dibromomethane	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
1,2-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,3-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,4-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Dichlorodifluoromethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1-Dichloroethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1-Dichloroethene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2-Dichloropropane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,3-Dichloropropane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
2,2-Dichloropropane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.

Analytical Report
Lab Order **2303594**
Date Reported: **3/27/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: SVE-1
Project: Lambe 2C
Collection Date: 3/9/2023 11:30:00 AM
Lab ID: 2303594-001 **Matrix:** AIR **Received Date:** 3/10/2023 7:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
1,1-Dichloropropene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Hexachlorobutadiene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
2-Hexanone	ND	1.0		µg/L	1	3/16/2023 5:22:00 PM
Isopropylbenzene	0.15	0.10		µg/L	1	3/16/2023 5:22:00 PM
4-Isopropyltoluene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
4-Methyl-2-pentanone	ND	1.0		µg/L	1	3/16/2023 5:22:00 PM
Methylene chloride	ND	0.30		µg/L	1	3/16/2023 5:22:00 PM
n-Butylbenzene	ND	0.30		µg/L	1	3/16/2023 5:22:00 PM
n-Propylbenzene	0.22	0.10		µg/L	1	3/16/2023 5:22:00 PM
sec-Butylbenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Styrene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
tert-Butylbenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Tetrachloroethene (PCE)	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
trans-1,2-DCE	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1,1-Trichloroethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,1,2-Trichloroethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Trichloroethene (TCE)	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Trichlorofluoromethane	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
1,2,3-Trichloropropane	ND	0.20		µg/L	1	3/16/2023 5:22:00 PM
Vinyl chloride	ND	0.10		µg/L	1	3/16/2023 5:22:00 PM
Xylenes, Total	7.9	0.15		µg/L	1	3/16/2023 5:22:00 PM
Surr: Dibromofluoromethane	89.6	70-130		%Rec	1	3/16/2023 5:22:00 PM
Surr: 1,2-Dichloroethane-d4	87.6	70-130		%Rec	1	3/16/2023 5:22:00 PM
Surr: Toluene-d8	105	70-130		%Rec	1	3/16/2023 5:22:00 PM
Surr: 4-Bromofluorobenzene	96.1	70-130		%Rec	1	3/16/2023 5:22:00 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **CCM**
Gasoline Range Organics (GRO)	140	5.0		µg/L	1	3/16/2023 5:22:00 PM
Surr: BFB	99.2	70-130		%Rec	1	3/16/2023 5:22:00 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.

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ANALYTICAL SUMMARY REPORT

March 24, 2023

Hall Environmental
4901 Hawkins St NE Ste D
Albuquerque, NM 87109-4372

Work Order: B23030910 Quote ID: B15626

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 1 sample for Hall Environmental on 3/14/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23030910-001	2303594-001B, SVE-1	03/09/23 11:30	03/14/23	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Not Indicated
Lab ID: B23030910-001
Client Sample ID: 2303594-001B, SVE-1

Report Date: 03/24/23
Collection Date: 03/09/23 11:30
DateReceived: 03/14/23
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.64	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Nitrogen	78.10	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Carbon Dioxide	0.26	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Methane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Ethane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Propane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Hexanes plus	<0.01	Mol %		0.01		GPA 2261-95	03/15/23 10:16 / ikc
Propane	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
Hexanes plus	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
GPM Total	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
GPM Pentanes plus	< 0.001	gpm		0.001		GPA 2261-95	03/15/23 10:16 / ikc
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	ND			1		GPA 2261-95	03/15/23 10:16 / ikc
Net BTU per cu ft @ std cond. (LHV)	ND			1		GPA 2261-95	03/15/23 10:16 / ikc
Pseudo-critical Pressure, psia	546			1		GPA 2261-95	03/15/23 10:16 / ikc
Pseudo-critical Temperature, deg R	239			1		GPA 2261-95	03/15/23 10:16 / ikc
Specific Gravity @ 60/60F	0.999			0.001		D3588-81	03/15/23 10:16 / ikc
Air, %	98.86			0.01		GPA 2261-95	03/15/23 10:16 / ikc
- The analysis was not corrected for air.							
COMMENTS							
-						-	03/15/23 10:16 / ikc

- BTU, GPM, and specific gravity are corrected for deviation from ideal gas behavior.
- GPM = gallons of liquid at standard conditions per 1000 cu. ft. of moisture free gas @ standard conditions.
- To convert BTU to a water-saturated basis @ standard conditions, multiply by 0.9825.
- Standard conditions: 60 F & 14.73 psi on a dry basis.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Hall Environmental **Work Order:** B23030910 **Report Date:** 03/24/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **GPA 2261-95**										Batch: R398983
Lab ID: **B23030934-001ADUP**	12	Sample Duplicate				Run: GCNGA-B_230315A				03/15/23 12:58
Oxygen		21.2	Mol %	0.01				0	20	
Nitrogen		78.2	Mol %	0.01				0.0	20	
Carbon Dioxide		0.55	Mol %	0.01				0.0	20	
Hydrogen Sulfide		<0.01	Mol %	0.01					20	
Methane		<0.01	Mol %	0.01					20	
Ethane		<0.01	Mol %	0.01					20	
Propane		<0.01	Mol %	0.01					20	
Isobutane		<0.01	Mol %	0.01					20	
n-Butane		<0.01	Mol %	0.01					20	
Isopentane		<0.01	Mol %	0.01					20	
n-Pentane		<0.01	Mol %	0.01					20	
Hexanes plus		<0.01	Mol %	0.01					20	
Lab ID: **LCS031523**	11	Laboratory Control Sample				Run: GCNGA-B_230315A				03/15/23 13:25
Oxygen		0.61	Mol %	0.01	122	70	130			
Nitrogen		5.94	Mol %	0.01	99	70	130			
Carbon Dioxide		0.99	Mol %	0.01	100	70	130			
Methane		74.9	Mol %	0.01	100	70	130			
Ethane		5.95	Mol %	0.01	99	70	130			
Propane		4.94	Mol %	0.01	100	70	130			
Isobutane		1.95	Mol %	0.01	97	70	130			
n-Butane		1.95	Mol %	0.01	97	70	130			
Isopentane		0.99	Mol %	0.01	99	70	130			
n-Pentane		0.99	Mol %	0.01	99	70	130			
Hexanes plus		0.80	Mol %	0.01	100	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

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Work Order Receipt Checklist

Hall Environmental

B23030910

Login completed by: Leslie S. Cadreau
Date Received: 3/14/2023
Reviewed by: gmccartney
Received by: tae
Reviewed Date: 3/17/2023
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	12.8°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

SUB CONTRATOR: **Energy Labs -Billings**	COMPANY: **Energy Laboratories**	PHONE: **(406) 869-6253**	FAX: **(406) 252-6069**
ADDRESS: **1120 South 27th Street**		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: **Billings, MT 59107**			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2303594-001B	SVE-1	TEDLAR	Air	3/9/2023 11:30:00 AM	1	FIXED GASES

B23030910

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 3/10/2023	Time: 9:01 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Fabiola Edwards	Date: 3/14/23	Time: 0945

TAT: Standard ☐ **RUSH** Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples ____ ℃ Attempt to Cool ? ____
Comments: ____

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2303594 RcptNo: 1

Received By: Tracy Casarrubias 3/10/2023 7:10:00 AM

Completed By: Tracy Casarrubias 3/10/2023 8:57:12 AM

Reviewed By: JN 3/10/23

Chain of Custody

1. Is Chain of Custody complete?	Yes ☐	No ☑	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☑	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☑
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: KDL 3.10.23

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	NA	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp

Mailing Address:

Phone #:

email or Fax#: brandon.sinclair@hilcorp.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Lambe 2C

Project #:

Project Manager: Mitch Killough

Sampler: Brandon Sinclair

On Ice: ☐ Yes ☑ No

# of Coolers: 1

Cooler Temp (Including CF): N/A (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2303594	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	8015 TVPH	Fixed gases O,&CO2				
3-9	1130	air	SVE-1	2 Tedlar		001								✓			✓	✓				

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
3-9	1545				3/9/23	1545
3/9/23	1804			Courier	3/10/23	7:10

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 207603

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 207603
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	1. Continue with O & M schedule. 2. Submit next quarterly report by July 31, 2023.	5/11/2023