



January 4, 2024

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

Re: Fourth Quarter 2023 – SVE System Update Lambe 2C San Juan County, New Mexico Hilcorp Energy Company NMOCD Incident Number: NVF1836050592

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *Fourth 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 October, November, and December 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.

### FOURTH QUARTER 2023 ACTIVITIES

During the fourth 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 fourth quarter of 2023, SVE well MW01 was operated in order to induce flow in the impacted soil zone. Between September 27 and December 20, 2023, the SVE system operated for 2,010.2 hours for a runtime efficiency of 99.7 percent (%). Appendix B presents photographs of the runtime meter for calculating the fourth quarter runtime efficiency. Table 1 presents the SVE system operational hours and calculated percent runtime.

Hilcorp Energy Company Fourth Quarter 2023 – SVE System Update Lambe 2C

### E E N S O L U M

A fourth quarter 2023 air sample was collected on November 27, 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<sup>®</sup> bags and submitted to Eurofins Environment Testing (Formerly Hall Environmental Analysis Laboratory) 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, 431 pounds of TVPH have been removed by the system to date.

### DRILLING AND CONFIRMATION SOIL SAMPLING ACTIVITIES

Based on the remediation timeline presented in the *Update Report and Updated Remediation Workplan* prepared by WSP USA, Inc. and dated September 30, 2021, soil sampling activities were performed on September 22 and 23, 2023 using a sonic drill rig. Soil sampling activities and analytical results were summarized in the Ensolum report titled *Closure Request with Variance* and submitted to the NMOCD on November 22, 2023.

### 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

Hilcorp Energy Company Fourth Quarter 2023 – SVE System Update Lambe 2C

### 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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TABLES

# **ENSOLUM**

## 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
9/27/2023	8,156.7			
12/20/2023	10,166.9	2,010.2	84.0	99.7%

# E N S O L U M

		SOIL VAPOR	EXTRACTION S Hil San J	TABLE 2 SYSTEM EMISSI Lambe 2C corp Energy Comp Juan County, New N	ONS ANALYTIC any lexico	AL RESULTS		
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
6/22/2023	48.3	0.37	4.1	0.29	5.4	120	21.10	0.30
8/23/2023	38.6	0.21	3.1	0.30	4.7	75	21.30	0.53
11/27/2023	23.8	<0.10	1.6	0.16	2.5	51	21.50	0.34

#### 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

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

## 🔁 E N S O L U M

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

### 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
6/22/2023	48.3	0.37	4.1	0.29	5.4	120
8/23/2023	38.6	0.21	3.1	0.30	4.7	75
11/27/2023	23.8	0.10	1.6	0.16	2.5	51
Average	53	0.23	2.5	0.29	3.2	193

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
6/22/2023	44	37,073,496	6,529,512	0.000048	0.00067	0.000063	0.00045	0.021
8/23/2023	46	40,215,535	3,142,039	0.000050	0.00062	0.000051	0.00087	0.017
11/27/2023	47	46,701,986	6,486,451	0.000027	0.00041	0.000040	0.00063	0.011
			Average	0.000039	0.00041	0.000047	0.00055	0.040

Mass Recovery

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	0.15	2.0	0.16	1.1	49	0.025
6/22/2023	14,541	2,473	0.12	1.7	0.15	1.1	53	0.026
8/23/2023	15,680	1,138	0.057	0.71	0.058	1.0	19	0.010
11/27/2023	17,980	2,300	0.063	0.95	0.093	1.5	25	0.013
	Total Ma	ss Recovery to Date	0.67	7.5	0.85	8.7	431	0.22

#### 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





## APPENDIX A

**Field Notes** 



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K/O Liquid Drained (gallons)		
Clean/Dry Air Filter (check)		

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Analytes:	TVPH (8015), VOCs (8260), Fi	xed Gas (CO/CO2/O2)		and the second second
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COMMENTS/OTHER MAINTENANCE:

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# LAMBE 2C SVE SYSTEM BIWEEKLY O&M FORM

SVE SYSTEM - MONTHLY O&M

DATE: 10-30 TIME ONSITE:

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O&M PERSONNEL: \_\_\_\_\_\_ TIME OFFSITE: \_\_\_\_

B Sinclair

SVE ALARMS:	
	NOS TANK

KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	8943.6	1521
Inlet Vacuum (IWC)	15	
K/O Tank Vacuum (IWC)	15	
Inlet Flow Rotameter (scfm)	4.8	
Inlet PID	43.7	
Exhaust PID	2.4	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		
Clean/Dry Air Filter (check)	Search Street, Marcheller, Street,	

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

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LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
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		LAMBE 2C SVE SYSTEM		
		BIWEEKLY O&M FORM		
DATE	11-13		0 5 1	
TIME ONSITE:	11-12	O&M PERSONNE	L: B Dinclair	
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SVE ALARMS:		KO TANK HIGH LEVEL	All and the second s	
		INO TAIVE HIGH LEVEL		
SVE SYSTEM	READING	TIME		
Blower Hours (take photo)	4277.75	1232		
K/O Tank Vacuum (IWC)				Strates Strates of
Inlet Flow Rotameter (sofm)	15			
Inlet PID	11			
Exhaust PID	14.			
K/O Tank Liquid Loval	4.0			
K/O Liquid Drained (gallong)				
Clean/Dry Air Filter (check)				
THE ART				
	the second s			
	SV	E SYSTEM - QUARTERLY SAMPLI	NG	

OPERATING WELLS	1111 (0015), 10003 (0200), 11	xed Gas (CO/CO2/O2)		
Change in Well Operation:				
LOCATION SVE01	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS	

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K/O Liquid Drained (gallons)	11.5	
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	OVE	OVOTEN OULDEEDING CONTRACTOR					
SVE SYSTEM - QUARTERLY SAMPLING							
SAMPLE ID:	SAMPLE ID: SAMPLE TIME:						
Analytes:	TVPH (8015), VOCs (8260), Fi	ixed Gas (CO/CO2/O2)					
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LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS	1 And the West of the second			
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	LAMBE 2C SVE SYSTEM	All in the second second second
DATE: 12-8	BIWEEKLY O&M FORM	
	O&M PERSONNEL: B Sin TIME OFFSITE:	clair
	SVE SYSTEM - MONTHLY O&M	Contraction of the second s
SVE ALARMS:	KO TANK HIGH LEVEL	
SVE SYSTEM READING	TDAT	
Inlet Vacuum (IWC) 9877	.86 1307	
K/O Tank Vacuum (IWC)	1302	
Inlet Flow Rotameter (scfm) 50		
Inlet PID 23.8		
K/O Tank Liquid Level 0.9		
K/O Liquid Drained (gallong)		
Clean/Dry Air Filter (check)		
K/O Liquid Drained (gallons)		

OPERATING WELLS		xed Gas (CO/CO2/O2)		
Change in Well Operation:				
LOCATION SVE01	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS	

COMMENTS/OTHER MAINTENANCE:

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# LAMBE 2C SVE SYSTEM **BIWEEKLY O&M FORM**

DATE: 12-20 TIME ONSITE:

O&M PERSONNEL: <u>B</u> Sinclair TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:

KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	166 87	1410
Inlet Vacuum (IWC)	16	1110
K/O Tank Vacuum (IWC)	16	
Inlet Flow Rotameter (scfm)	48	
Inlet PID	15.7	
Exhaust PID	1.2	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		
Clean/Dry Air Filter (check)		

	SVE	SYSTEM - QUARTERLY SAMPLING	G			
SAMPLE ID:		SAMPLE TIME:				
Analytes:	TVPH (8015), VOCs (8260), Fi	xed Gas (CO/CO2/O2)				
OPERATING WELLS						
Change in Well Operation:						
LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS			
SVE01		18.5				





APPENDIX B

**Project Photographs** 





APPENDIX C

Laboratory Analytical Reports



**Environment Testing** 

Eurofins Environment Testing South Central, LLC 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

December 12, 2023 Mitch Killough HILCORP ENERGY PO Box 4700 Farmington, NM 87499

TEL: (505) 564-0733 FAX:

RE: Lambe 2C

OrderNo.: 2311C49

Dear Mitch Killough:

Eurofins Environment Testing South Central, LLC received 1 sample(s) on 11/28/2023 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 do not hesitate to contact Eurofins Albuquerque for any additional information or clarifications.

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

Sincerely,

andy

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Project: Lambe 2C

Lab ID:

**CLIENT: HILCORP ENERGY** 

2311C49-001

Analytical Report
Lab Order 2311C49

### Hall Environmental Analysis Laboratory, Inc.

Matrix: AIR

Date Reported: 12/12/2023

Client Sample ID: SVE-1
Collection Date: 11/27/2023 1:30:00 PM
Received Date: 11/28/2023 6:45:00 AM

Analyses	Result	RL Qual	Units	DF	Date Analyzed
EPA METHOD 8015D: GASOLINE RANGE					Analyst: <b>JJP</b>
Gasoline Range Organics (GRO)	51	5.0	µg/L	1	12/7/2023 12:19:58 PM
Surr: BFB	165	15-412	%Rec	1	12/7/2023 12:19:58 PM
EPA METHOD 8260B: VOLATILES					Analyst: CCM
Benzene	ND	0.10	ua/L	1	12/6/2023 2:08:00 PM
Toluene	1.6	0.10	ua/L	1	12/6/2023 2:08:00 PM
Ethylbenzene	0.16	0.10	µg/L	1	12/6/2023 2:08:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,2,4-Trimethylbenzene	0.50	0.10	μg/L	1	12/6/2023 2:08:00 PM
1,3,5-Trimethylbenzene	0.42	0.10	μg/L	1	12/6/2023 2:08:00 PM
1,2-Dichloroethane (EDC)	ND	0.10	μg/L	1	12/6/2023 2:08:00 PM
1,2-Dibromoethane (EDB)	ND	0.10	μg/L	1	12/6/2023 2:08:00 PM
Naphthalene	ND	0.20	μg/L	1	12/6/2023 2:08:00 PM
1-Methylnaphthalene	ND	0.40	µg/L	1	12/6/2023 2:08:00 PM
2-Methylnaphthalene	ND	0.40	µg/L	1	12/6/2023 2:08:00 PM
Acetone	ND	1.0	µg/L	1	12/6/2023 2:08:00 PM
Bromobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Bromodichloromethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Bromoform	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Bromomethane	ND	0.20	µg/L	1	12/6/2023 2:08:00 PM
2-Butanone	ND	1.0	µg/L	1	12/6/2023 2:08:00 PM
Carbon disulfide	ND	1.0	µg/L	1	12/6/2023 2:08:00 PM
Carbon tetrachloride	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Chlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Chloroethane	ND	0.20	µg/L	1	12/6/2023 2:08:00 PM
Chloroform	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Chloromethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
2-Chlorotoluene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
4-Chlorotoluene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
cis-1,2-DCE	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
cis-1,3-Dichloropropene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,2-Dibromo-3-chloropropane	ND	0.20	µg/L	1	12/6/2023 2:08:00 PM
Dibromochloromethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Dibromomethane	ND	0.20	µg/L	1	12/6/2023 2:08:00 PM
1,2-Dichlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,3-Dichlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,4-Dichlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Dichlorodifluoromethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1-Dichloroethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1-Dichloroethene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM

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

Qualifiers:

\* Value exceeds Maximum Contaminant Level.D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of standard limits. If undiluted results may be estimated.

B Analyte detected in the associated Method Blank

E Above Quantitation Range/Estimated Value

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

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**CLIENT: HILCORP ENERGY** 

**Analytical Report** Lab Order 2311C49

Date Reported: 12/12/2023 Client Sample ID: SVE-1

<b>Project:</b> Lambe 2C		Collec	tion Date:	: 11/27/	2023 1:30:00 PM
Lab ID: 2311C49-001	Matrix: AIR	Recei	ved Date:	: 11/28/	2023 6:45:00 AM
Analyses	Result	RL Qua	l Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: CCM
1,2-Dichloropropane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,3-Dichloropropane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
2,2-Dichloropropane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1-Dichloropropene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Hexachlorobutadiene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
2-Hexanone	ND	1.0	µg/L	1	12/6/2023 2:08:00 PM
Isopropylbenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
4-Isopropyltoluene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
4-Methyl-2-pentanone	ND	1.0	µg/L	1	12/6/2023 2:08:00 PM
Methylene chloride	ND	0.30	µg/L	1	12/6/2023 2:08:00 PM
n-Butylbenzene	ND	0.30	µg/L	1	12/6/2023 2:08:00 PM
n-Propylbenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
sec-Butylbenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Styrene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
tert-Butylbenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1,1,2-Tetrachloroethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1,2,2-Tetrachloroethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Tetrachloroethene (PCE)	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
trans-1,2-DCE	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
trans-1,3-Dichloropropene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,2,3-Trichlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,2,4-Trichlorobenzene	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1,1-Trichloroethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,1,2-Trichloroethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Trichloroethene (TCE)	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Trichlorofluoromethane	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
1,2,3-Trichloropropane	ND	0.20	µg/L	1	12/6/2023 2:08:00 PM
Vinyl chloride	ND	0.10	µg/L	1	12/6/2023 2:08:00 PM
Xylenes, Total	2.5	0.15	µg/L	1	12/6/2023 2:08:00 PM
Surr: Dibromofluoromethane	98.6	70-130	%Rec	1	12/6/2023 2:08:00 PM
Surr: 1,2-Dichloroethane-d4	97.6	70-130	%Rec	1	12/6/2023 2:08:00 PM
Surr: Toluene-d8	102	70-130	%Rec	1	12/6/2023 2:08:00 PM
Surr: 4-Bromofluorobenzene	108	70-130	%Rec	1	12/6/2023 2:08:00 PM

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

**Qualifiers:** 

Value exceeds Maximum Contaminant Level. Sample Diluted Due to Matrix

D Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

% Recovery outside of standard limits. If undiluted results may be estimated. S

- Analyte detected in the associated Method Blank в
- Е Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits Р
- Sample pH Not In Range RL Reporting Limit

Page 2 of 3

\*



## ANALYTICAL SUMMARY REPORT

December 11, 2023

Hall Environmen	ital				
4901 Hawkins S Albuquerque, N	t NE Ste D M 87109-4372				
Work Order:	B23111916	Quote ID: B15626			
Project Name:	Not Indicated				
Energy Laborato	pries Inc Billings MT receiv	ved the following 1 sa	ample for Hall	Environmen	tal on 11/29/2023 for analysis.
Lab ID	Client Sample ID	Collect Date R	eceive Date	Matrix	Test
B23111916-001	2311C49-001B, SVE-1	1 11/27/23 13:30	11/29/23	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:



### LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:Hall EnvironmentalProject:Not IndicatedLab ID:B23111916-001Client Sample ID:2311C49-001B, SVE-1

Report Date: 12/11/23 Collection Date: 11/27/23 13:30 DateReceived: 11/29/23 Matrix: Air

					MCL/		
Analyses	Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS	REPORT						
Oxygen	21.50	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Nitrogen	78.15	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Carbon Dioxide	0.34	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Methane	0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Hexanes plus	<0.01	Mol %		0.01		GPA 2261-95	12/06/23 11:43 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
Hexanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
GPM Total	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
GPM Pentanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/06/23 11:43 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	ND			1		GPA 2261-95	12/06/23 11:43 / jrj
Net BTU per cu ft @ std cond. (LHV)	ND			1		GPA 2261-95	12/06/23 11:43 / jrj
Pseudo-critical Pressure, psia	546			1		GPA 2261-95	12/06/23 11:43 / jrj
Pseudo-critical Temperature, deg R	240			1		GPA 2261-95	12/06/23 11:43 / jrj
Specific Gravity @ 60/60F	0.999			0.001		D3588-81	12/06/23 11:43 / jrj
Air, %	98.26			0.01		GPA 2261-95	12/06/23 11:43 / jrj

- The analysis was not corrected for air.

### COMMENTS

- 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 12/06/23 11:43 / jrj



Billings, MT 406.252.6325 • Casper, WY 307239.0515 of 32 Gillette, WY 307.686.7175 • Helena, MT 406.442.0711

## **QA/QC Summary Report**

Prepared by Billings, MT Branch

|--|

Report Date: 12/11/23

Client:	Hall Environmental				Work Order:	B2311	1916	Repo	rt Date:	: 12/11/23	
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	GPA 2261-95									Batch	: R413302
Lab ID:	B23120241-001ADUP	12 Sam	ple Duplic	ate			Run: GCNG	A-B_231206A		12/06	/23 04:07
Oxygen			21.4	Mol %	0.01				0	20	
Nitrogen			78.0	Mol %	0.01				0.0	20	
Carbon D	Dioxide		0.42	Mol %	0.01				0.0	20	
Hydroger	n 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	e		<0.01	Mol %	0.01					20	
n-Butane			<0.01	Mol %	0.01					20	
Isopentar	ne		<0.01	Mol %	0.01					20	
n-Pentan	e		<0.01	Mol %	0.01					20	
Hexanes	plus		0.11	Mol %	0.01				9.5	20	
Lab ID:	LCS120623	11 Labo	oratory Co	ntrol Sample	)		Run: GCNG	A-B_231206A		12/06	/23 03:15
Oxygen			0.52	Mol %	0.01	104	70	130			
Nitrogen			6.39	Mol %	0.01	106	70	130			
Carbon D	Dioxide		0.99	Mol %	0.01	100	70	130			
Methane			74.6	Mol %	0.01	100	70	130			
Ethane			6.03	Mol %	0.01	100	70	130			
Propane			5.07	Mol %	0.01	103	70	130			
Isobutane	e		1.76	Mol %	0.01	88	70	130			
n-Butane			1.97	Mol %	0.01	98	70	130			
Isopentar	ne		0.98	Mol %	0.01	98	70	130			
n-Pentan	e		0.96	Mol %	0.01	96	70	130			
Hexanes	plus		0.74	Mol %	0.01	93	70	130			

ENERG LABORATORIES

Trust our People. Trust our Data. www.energylab.com Billings, MT 406.252.6325 • Casper, WY 307.235.0515 Gillette, WY 307.686.7175 • Helena, MT 406.442.0711

# Work Order Receipt Checklist

## Hall Environmental

B2311 <sup>-</sup>	1916	)
--------------------	------	---

Login completed by:	Danielle N. Harris		Date F	Received: 11/29/2023
Reviewed by:	ysmith		Rec	eived by: cmj
Reviewed Date:	12/1/2023		Carri	ier name: FedEx
Shipping container/cooler in	good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on all sl	hipping container(s)/cooler(s)?	Yes 🗹	No 🗌	Not Present
Custody seals intact on all sa	ample bottles?	Yes	No 🗌	Not Present 🗹
Chain of custody present?		Yes 🗹	No 🗌	
Chain of custody signed whe	en relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with	n 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 h (Exclude analyses that are c such as pH, DO, Res Cl, Su	nolding time? onsidered field parameters Ilfite, Ferrous Iron, etc.)	Yes 🖌	No 🗌	
Temp Blank received in all s	hipping container(s)/cooler(s)?	Yes	No 🗹	Not Applicable
Container/Temp Blank tempe	erature:	9.2°C No Ice		
Containers requiring zero he bubble that is <6mm (1/4").	adspace have no headspace or	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.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

### **Contact and Corrective Action Comments:**

None

ở eurofins Emirament Testing	CHAIN OF CUSTODY	RECORD MAG	E:   OF:   Eurofins Environ. Websi	ment Testing South Central, LLC 4901 Havkins NE Albuquerque, NM 87109 TEL: 505-345-4107 Ye: www.hallenvironmental.com
SUB CONTRATOR Energy Labs -Billings COMPANY ADDRESS 1120 South 27th Street CITY, STATE, ZIP Billings, MT 59107	Energy Laboratories	PHONE: ACCOUNT #	(406) 869-6253 FAX (406) 869-6253 (406) FAX	406) 252-6069
ITEM SAMPLE ID	BOTTLE TYPE MATRIX	COLLECTION	*CONTAINER:	COMMENTS
1 2311C49-001B SVE-1	TEDLAR Air	11/27/2023 1:30:00 PM	1 Natural Gas Analysis O2+CO2	
SPECIAL INSTRUCTIONS / COMMENTS.				
Please include the LAB ID and the CLIENT SAMPLE ID	on all final reports. Please e-mail results	to lab@hallenvironmen	intal.com. Please return all coolers and blue ice. That	nk you.
Relinquished By: Date: 128/2023 Time 9:29 AN	Received By:	ate. Time.	REPORT TRANSMITT HARDCOPY (extra cost)	TAL DESIRED:
Relinquished By: Date Date	Received By.	Date: Time:		1

### Received by OCD: 1/8/2024 1:31:32 PM

Attempt to Cool ?

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Temp of samples

ystalthes Wears OF35

3rd BD

2nd BD

Received By Received By

RUSH

Standard

TAT:

Time. Time

Date:

Relinquished By:

Comments:

FOR LAB USE ONLY

**Client:** 

HILCORP ENERGY

Project:	Lambe 2C										
Sample ID: 2311c4	49-001adup	SampT	ype: DU	Р	Tes	tCode: EF	A Method	8015D: Gasoli	ne Range		
Client ID: SVE-1		Batch	ID: GA	101668	F	RunNo: <b>1(</b>	1668				
Prep Date:		Analysis D	ate: 12	/7/2023	5	SeqNo: 37	45163	Units: µg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organio	cs (GRO)	51	5.0						0.468	20	
Surr: BFB		3300		2000		166	15	412	0	0	

### Qualifiers:

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

WO#: 2311C49 12-Dec-23

🔅 eurofins En	vironment Testin T	Eurofins Enviro Albi EL: 505-345-3975 Website: www.ha	nment Testin Cent 4901 Hav uquerque. N FAX: 505-3 illenvironme	g South ral. LLC whins NE St M 87109 45-4107 mtal.com	ample Log-In	Check List
Client Name: Hilcorp Ene	rgy Worł	Order Number:	2311C49		Rcpt	No: 1
Received By: Tracy Cas	arrubias 11/28/2	2023 6:45:00 AN	Λ			
Completed By: Tracy Cas	arrubias 11/28/2	2023 9:25:03 AN	٨			
Reviewed By: Ju II	28/23					
Chain of Custody						
1. Is Chain of Custody compl	ete?		Yes 🗌	No 🛛	Not Present	]
2. How was the sample delive	ered?		<u>Courier</u>			
Log In 3. Was an attempt made to c	ool the samples?		Yes 🗌	No 🗖		]
4. Were all samples received	at a temperature of >0° C	to 6.0°C	Yes 🗌	- No [	] NA 🗹	
5. Sample(s) in proper contai	ner(s)?		Yes 🗹	No [	]	
6. Sufficient sample volume for	or indicated test(s)?		Yes 🗹	No 🗌	]	
7. Are samples (except VOA a	and ONG) properly preserv	ed?	Yes 🗹	No 🗌	]	
8. Was preservative added to	bottles?		Yes 🗌	No 🔽	] NA [	]
9. Received at least 1 vial with	headspace <1/4" for AQ	/OA?	Yes 🗌	No 🗌	] NA 🗹	]
10. Were any sample containe	rs received broken?		Yes 🗌	No 🔽	# of preserved	
11. Does paperwork match bot (Note discrepancies on cha	tle labels? in of custody)		Yes 🗹	No 🗌	for pH:	or >12 unless noted)
12. Are matrices correctly ident	ified on Chain of Custody?		Yes 🗹	No 🗌	Adjusted?	
13. Is it clear what analyses we	re requested?		Yes 🗹	No 🗌		SIM 11/28/22
14. Were all holding times able (If no, notify customer for a	to be met? uthorization.)		Yes 🗹	No	Checked by	JULI Made
Special Handling (if app	licable)					
15. Was client notified of all dis	screpancies with this order	?	Yes 🗌	No 🗌	) NA 🗹	2
Person Notified:		Date:			-	
By Whom:		Via:	] eMail [	] Phone 🗌 F	ax 🗌 In Person	
Regarding:						
Client Instructions:	Mailing address and phone	e number are mis	ssing on CC	OC - TMC 11/2	3/23	
10. Additional remarks:						
17. <u>Cooler Information</u> Cooler No Temp °C 1 N/A	Condition Seal Intact Good Yes	Seal No S	eal Date	Signed By		

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Received by OCD:

teceived by OCD: 1/8/2024 1:31:32 PM		Page 31 of 32
Chain-of-Custody Record	Turn-Around Time:	
Client: Hilcorp	🗹 Standard 🛛 Rush	ANALYSIS LABORATORY
	Project Name:	www.hallenvironmental.com
Mailing Address:	Lambe 2C	4901 Hawkins NE - Albuquerque, NM 87109
	Project #:	Tel. 505-345-3975 Fax 505-345-4107
Phone #:		Analysis Request
email or Fax#: brandon. Sin clair Chileorp. com	Project Manager:	50, 50, 50, 50, 50, 50, 50, 50, 50, 50,
QA/QC Package:		(808) 2.80 2.90 2.40 2.90 2.90 2.90 2.90 2.90 2.90 2.90 2.9
Standard Level 4 (Full Validation)	Mitch Killough	2. PG
Accreditation:	Sampler: Brandon Sinchir	MT 808 10 10 10 10 10 10 10 10 10 10 10 10 10
	On Ice: 7 Yes & Nome That	28C 160 160 160 160 160 160 160 160
	# 01 CUOIEIS.	TE DO(( 101-1) 101-1 10-
		/ Meti by 8 by 8 by 8 by 8 by 8 by 8 c c c c c c c c c c c c c c c c c c c
	Container Preservative HEAL No.	71EX 817EX 917EX 90811 9260 9280 9280 9280 9280 9280 9280 9280 928
Date Time Matrix Sample Name	I ype and # I ype	
11-27 1330 air SVE-1	2 Tellar 001	
Date: Time: Relinquished by:	Received by: Via: Date Time	Remarks:
11-27 1434 Yr X	1 N NCN "127/23 1434	
Date: Time: Relinquished by:	Received by: Via: COUMER Date Time 6:45	
If nervesary setmates submitted to Hall Environmental may be set	wbcontracted to other accredited Taboratories. This serves as notice of thi	is possibility. Any sub-contracted data will be clearly notated on the analytical report.

Released to Imaging: 3/26/2024 1:52:26 PM

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 301156

CONDITIONS Operator: OGRID: HILCORP ENERGY COMPANY 372171 1111 Travis Street Action Number: Houston, TX 77002 301156 Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

#### CONDITIONS

Created	Condition	Condition
By		Date
nvelez	Accepted for the record.	3/26/2024