

Accepted - 09/27/2022

NV



April 11, 2022

New Mexico Oil Conservation Division

New Mexico Energy, Minerals, and Natural Resources Department
1000 Rio Brazos Road
Aztec, New Mexico 87410

Re: First Quarter 2022 – 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 2022 – 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 2022 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 that vacuum is being applied at well MW01 (shown on Figure 2). SVE well MW01 is screened across the impacted soil interval from approximately 20 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 2022 ACTIVITIES

During the first quarter of 2022, WSP USA Inc. (WSP, third-party environmental consultant for the Site) 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 2022, SVE well MW01 was operated in order to induce flow in impacted soil zone. Between January 7 and March 15, 2022, the SVE system operated for 1,444.9 hours for a runtime efficiency of 90 percent (%). Based on runtime hours collected during monthly O&M visits, it appears that the system performed at a runtime efficiency greater than 97% between January 7 and March 3, 2022. Between March 3 and March 9, 2022, power outages at the Site caused extensive downtime that reduced the quarterly runtime efficiency to 90%. Appendix B

Hilcorp Energy Company
Bell Federal Gas Com B 1
April 1, 2022



presents photographs of the runtime meter taken during the first and last field visits of the quarter. Table 1 presents the SVE system operational hours and percent runtime.

A first quarter air sample was collected on March 15, 2022 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 a 1-Liter Tedlar® bag 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, 199 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 proposal, please contact the undersigned.

Sincerely,
Ensolum, LLC

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

Ashley Ager, MS, PG
Development Manager, Geologist
(970) 946-1093
aager@ensolum.com

Attachments:

Figure 1	Site Location
Figure 2	SVE System Configuration
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



FIGURES

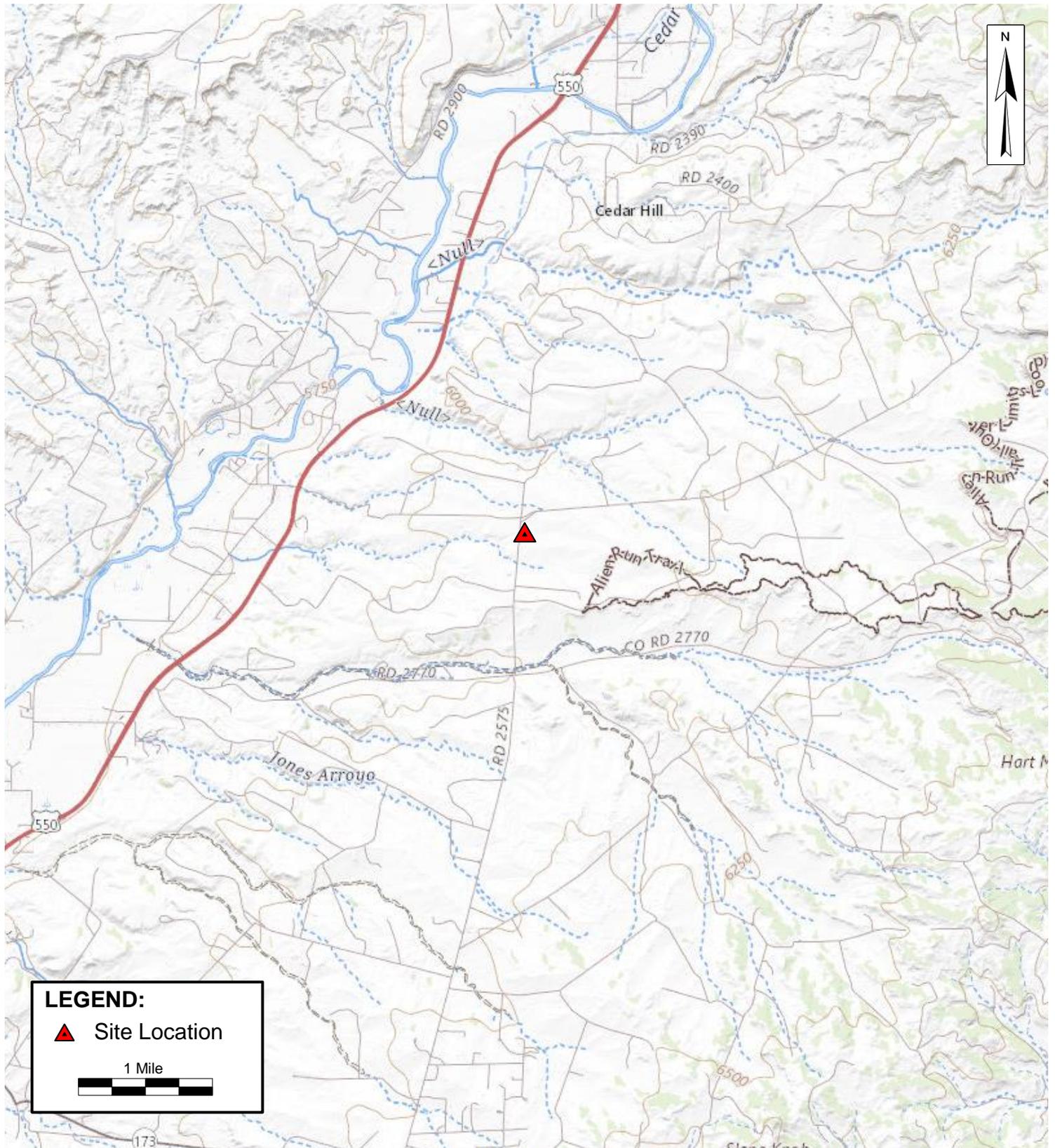


Image Courtesy of ESRI/USGS

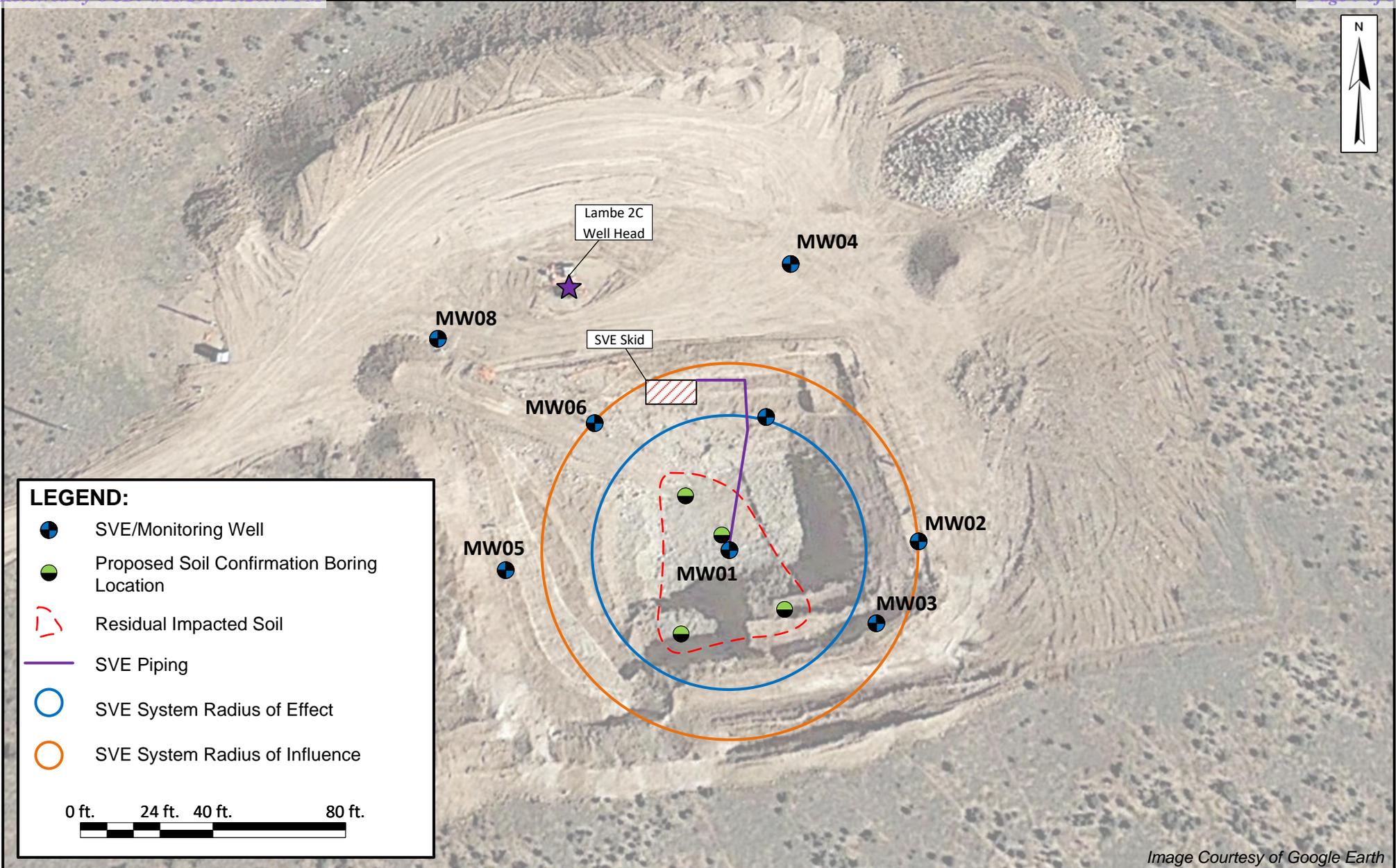


SITE LOCATION
HILCORP ENERGY COMPANY
LAMBE 2C

San Juan County, New Mexico
 36.885885° N, 107.899572° W

07A1988008

FIGURE
1



SVE SYSTEM CONFIGURATION
 HILCORP ENERGY COMPANY
 LAMBE 2C
 San Juan County, New Mexico
 36.885885° N, 107.899572° W
 07A1988008

FIGURE
2



TABLES



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

Ensolum Project No. 07A1988008

Date	Total Operational Hours	Delta Hours	Days	Percent Runtime
1/7/2022	2,442.0	--	--	--
3/15/2022	3,886.9	1,444.9	67.0	90%



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

Ensolum Project No. 07A1988008

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (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	22.1	0.288
3/15/2022	42	<0.1	<0.1	<0.1	0.5	41	22.1	0.249

Notes:

(1): sample collected during a Venturi event

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

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)



TABLE 3
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS
 Hilcorp Energy Company - Lambe #2C
 San Juan County, New Mexico
 Ensolum Project No. 07A1988008

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
Average	77	0.17	1.1	0.30	3.8	407

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
Average				0.000030	0.00021	0.000049	0.00081	0.13

Flow and Laboratory Analysis

Date	Total SVE System Hours	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
Total Mass Recovery to Date			0.10	0.80	0.21	2.5	199	0.10

Notes:

- 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

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 1/20/22
TIME ONSITE: 1155

O&M PERSONNEL: Roece Hanson
TIME OFFSITE: 1300

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: No KO TANK HIGH LEVEL No

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	2748.7	1201
Inlet Vacuum (IWC)	15	1202
K/O Tank Vacuum (IWC)	14	1203
Inlet Flow Rotameter (scfm)	41	1204
Inlet PID	25.6	1215
Exhaust PID	22.4	1217
K/O Tank Liquid Level	-	-
K/O Liquid Drained (gallons)	~8	
Clean/Dry Air Filter (check)	✓	1240

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	2.8	22.1		

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 2/3/22
TIME ONSITE: 1410

O&M PERSONNEL: Reece Hanson
TIME OFFSITE: 1440

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: None KO TANK HIGH LEVEL N/A

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	<u>3082.8</u>	<u>1416</u>
Inlet Vacuum (IWC)	<u>15.5</u>	<u>1420</u>
K/O Tank Vacuum (IWC)	<u>15</u>	↓
Inlet Flow Rotameter (scfm)	<u>42</u>	↓
Inlet PID	<u>26.2</u>	↓
Exhaust PID	<u>50.1</u>	↓
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	<u>3.0</u>	
Clean/Dry Air Filter (check)	<u>✓</u>	

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		<u>49.3</u>		

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 3/1/22
TIME ONSITE: 12:45

O&M PERSONNEL: E. CARION
TIME OFFSITE: _____

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: None KO TANK HIGH LEVEL None

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	<u>36949</u>	<u>12:45</u>
Inlet Vacuum (IWC)	<u>15</u>	
K/O Tank Vacuum (IWC)	<u>15</u>	
Inlet Flow Rotameter (scfm)	<u>39</u>	
Inlet PID	<u>44.1</u>	
Exhaust PID	<u>47.3</u>	
K/O Tank Liquid Level	<u>EMPTY</u>	
K/O Liquid Drained (gallons)	<u>2</u>	
Clean/Dry Air Filter (check)	<u>Clean & Dry</u>	

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		<u>44.1</u>		

COMMENTS/OTHER MAINTENANCE:

LAMBE 2C SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 3/15/22
TIME ONSITE: 12:00

O&M PERSONNEL: E. Carro
TIME OFFSITE: _____

SVE SYSTEM - MONTHLY O&M	
SVE ALARMS: <u>NA</u>	KO TANK HIGH LEVEL: <u>NA</u>

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	<u>3886.9</u>	
Inlet Vacuum (IWC)	<u>15</u>	
K/O Tank Vacuum (IWC)	<u>15</u>	
Inlet Flow Rotameter (scfm)	<u>40</u>	
Inlet PID	<u>42.3</u>	
Exhaust PID	<u>36.4</u>	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	<u>2</u>	
Clean/Dry Air Filter (check)	<u>clean/dry</u>	

SVE SYSTEM - QUARTERLY SAMPLING	
SAMPLE ID: _____	SAMPLE TIME: <u>12:30</u>
Analytes: TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)	
OPERATING WELLS	<u>SVE01</u>

Change in Well Operation: _____

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	FLOW (CFM)	ADJUSTMENTS
SVE01		<u>42.3</u>		

COMMENTS/OTHER MAINTENANCE:



APPENDIX B

Project Photographs

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

<p>Photograph 1</p> <p>Runtime meter taken on January 7, 2022</p>	
<p>Photograph 2</p> <p>Runtime meter taken on March 15, 2022</p>	



APPENDIX C

Laboratory Analytical Reports



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

March 23, 2022

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

RE: Lambe 2C

OrderNo.: 2203828

Dear Devin Hencmann:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/16/2022 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a white background.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report

Lab Order 2203828

Date Reported: 3/23/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: Influent 3-15-22

Project: Lambe 2C

Collection Date: 3/15/2022 12:30:00 PM

Lab ID: 2203828-001

Matrix: AIR

Received Date: 3/16/2022 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	41	5.0		µg/L	1	3/16/2022 11:18:46 AM	G86522
Surr: BFB	159	37.3-213		%Rec	1	3/16/2022 11:18:46 AM	G86522
EPA METHOD 8260B: VOLATILES							Analyst: BRM
Benzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Toluene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Ethylbenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2,4-Trimethylbenzene	0.14	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,3,5-Trimethylbenzene	0.12	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Naphthalene	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
1-Methylnaphthalene	ND	0.40		µg/L	1	3/16/2022 1:22:16 PM	C86526
2-Methylnaphthalene	ND	0.40		µg/L	1	3/16/2022 1:22:16 PM	C86526
Acetone	ND	1.0		µg/L	1	3/16/2022 1:22:16 PM	C86526
Bromobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Bromodichloromethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Bromoform	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Bromomethane	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
2-Butanone	ND	1.0		µg/L	1	3/16/2022 1:22:16 PM	C86526
Carbon disulfide	ND	1.0		µg/L	1	3/16/2022 1:22:16 PM	C86526
Carbon tetrachloride	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Chlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Chloroethane	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
Chloroform	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Chloromethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
2-Chlorotoluene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
4-Chlorotoluene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
cis-1,2-DCE	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
Dibromochloromethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Dibromomethane	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,3-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,4-Dichlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Dichlorodifluoromethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1-Dichloroethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1-Dichloroethene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526

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	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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix interference		

Analytical Report

Lab Order **2203828**

Date Reported: **3/23/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: Influent 3-15-22

Project: Lambe 2C

Collection Date: 3/15/2022 12:30:00 PM

Lab ID: 2203828-001

Matrix: AIR

Received Date: 3/16/2022 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: BRM
1,2-Dichloropropane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,3-Dichloropropane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
2,2-Dichloropropane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1-Dichloropropene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Hexachlorobutadiene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
2-Hexanone	ND	1.0		µg/L	1	3/16/2022 1:22:16 PM	C86526
Isopropylbenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
4-Isopropyltoluene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
4-Methyl-2-pentanone	ND	1.0		µg/L	1	3/16/2022 1:22:16 PM	C86526
Methylene chloride	ND	0.30		µg/L	1	3/16/2022 1:22:16 PM	C86526
n-Butylbenzene	ND	0.30		µg/L	1	3/16/2022 1:22:16 PM	C86526
n-Propylbenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
sec-Butylbenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Styrene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
tert-Butylbenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Tetrachloroethene (PCE)	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
trans-1,2-DCE	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1,1-Trichloroethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,1,2-Trichloroethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Trichloroethene (TCE)	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Trichlorofluoromethane	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
1,2,3-Trichloropropane	ND	0.20		µg/L	1	3/16/2022 1:22:16 PM	C86526
Vinyl chloride	ND	0.10		µg/L	1	3/16/2022 1:22:16 PM	C86526
Xylenes, Total	0.48	0.15		µg/L	1	3/16/2022 1:22:16 PM	C86526
Surr: Dibromofluoromethane	100	70-130		%Rec	1	3/16/2022 1:22:16 PM	C86526
Surr: 1,2-Dichloroethane-d4	92.4	70-130		%Rec	1	3/16/2022 1:22:16 PM	C86526
Surr: Toluene-d8	98.3	70-130		%Rec	1	3/16/2022 1:22:16 PM	C86526
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	1	3/16/2022 1:22:16 PM	C86526

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	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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix interference		



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ANALYTICAL SUMMARY REPORT

March 22, 2022

Hall Environmental

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

Work Order: G22030304

Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 1 sample for Hall Environmental on 3/17/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G22030304-001	2203828-001B; Influent 3-15-22	03/15/22 12:30	03/17/22	Air	Natural Gas Analysis - BTU Natural Gas Analysis - Compressibility Factor Natural Gas Analysis - GPM Natural Gas Analysis - Molecular Weight Natural Gas Analysis - Routine Natural Gas Analysis - Pressure Base Natural Gas Analysis - Psuedo- Critical Pressure Natural Gas Analysis - Psuedo- Critical Temperature Natural Gas Analysis - Specific Gravity Natural Gas Analysis - Temperature Base

The analyses presented in this report were performed by Energy Laboratories, Inc., 400 W. Boxelder Rd., Gillette, WY 82718, 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 tests results, please contact your Project Manager.

Report Approved By:



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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2203828-001B; Influent 3-15-22
Location:
Lab ID: G22030304-001

Report Date: 03/22/22
Collection Date: 03/15/22 12:30
Date Received: 03/17/22
Sampled By: Not Indicated

Analyses	Result	Units	Qualifier	Method	Analysis Date / By
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NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	22.127	Mol %		GPA 2261	03/18/22 16:06 / blb
Nitrogen	77.624	Mol %		GPA 2261	03/18/22 16:06 / blb
Carbon Monoxide	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Carbon Dioxide	0.249	Mol %		GPA 2261	03/18/22 16:06 / blb
Hydrogen Sulfide	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Methane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Ethane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Propane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Isobutane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
n-Butane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Isopentane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
n-Pentane	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb
Hexanes plus	< 0.001	Mol %		GPA 2261	03/18/22 16:06 / blb

GPM @ STD COND/1000 CU.FT., MOISTURE FREE GAS

GPM Ethane	< 0.0003	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Propane	< 0.0003	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Isobutane	< 0.0003	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM n-Butane	< 0.0003	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Isopentane	< 0.0004	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM n-Pentane	< 0.0004	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Hexanes plus	< 0.0004	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Pentanes plus	< 0.0004	gal/MCF		GPA 2261	03/18/22 16:06 / blb
GPM Total	< 0.0004	gal/MCF		GPA 2261	03/18/22 16:06 / blb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730	psia		GPA 2261	03/18/22 16:06 / blb
Calculation Temperature Base	60	°F		GPA 2261	03/18/22 16:06 / blb
Compressibility Factor, Z	1.0000	unitless		GPA 2261	03/18/22 16:06 / blb
Molecular Weight	28.94	unitless		GPA 2261	03/18/22 16:06 / blb
Pseudo-critical Pressure, psia	548	psia		GPA 2261	03/18/22 16:06 / blb
Pseudo-critical Temperature, deg R	240	deg R		GPA 2261	03/18/22 16:06 / blb
Specific Gravity (air=1.000)	1.002	unitless		GPA 2261	03/18/22 16:06 / blb
Gross BTU per cu ft @ std cond, dry	< 0.01	BTU/cu ft		GPA 2261	03/18/22 16:06 / blb
Gross BTU per cu ft @ std cond, wet	< 0.01	BTU/cu ft		GPA 2261	03/18/22 16:06 / blb

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22030304

Report Date: 03/22/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Analytical Run: R269910		
Lab ID: CCV-2203181521	Continuing Calibration Verification Standard							03/18/22 15:22	
Oxygen	0.625	Mol %	0.001	104	90	110			
Nitrogen	1.370	Mol %	0.001	98	85	110			
Carbon Dioxide	0.959	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.021	Mol %	0.001	84	70	130			
Methane	93.456	Mol %	0.001	100	90	110			
Ethane	1.015	Mol %	0.001	101	90	110			
Propane	1.008	Mol %	0.001	101	90	110			
Isobutane	0.496	Mol %	0.001	99	90	110			
n-Butane	0.495	Mol %	0.001	99	90	110			
Isopentane	0.200	Mol %	0.001	100	90	110			
n-Pentane	0.201	Mol %	0.001	100	90	110			
Hexanes plus	0.154	Mol %	0.001	103	90	110			
Lab ID: ICV-2203181526	Initial Calibration Verification Standard							03/18/22 15:26	
Oxygen	0.393	Mol %	0.001	98	75	110			
Nitrogen	5.157	Mol %	0.001	103	90	110			
Carbon Dioxide	4.895	Mol %	0.001	98	90	110			
Hydrogen Sulfide	0.126	Mol %	0.001	127	100	136			
Methane	73.202	Mol %	0.001	100	90	110			
Ethane	5.001	Mol %	0.001	101	90	110			
Propane	4.998	Mol %	0.001	100	90	110			
Isobutane	1.984	Mol %	0.001	99	90	110			
n-Butane	1.964	Mol %	0.001	98	90	110			
Isopentane	0.983	Mol %	0.001	98	90	110			
n-Pentane	0.993	Mol %	0.001	99	90	110			
Hexanes plus	0.304	Mol %	0.001	101	90	110			
Lab ID: ICV1-2203181542	Initial Calibration Verification Standard							03/18/22 15:42	
Nitrogen	98.950	Mol %	0.001	100	90	110			
Carbon Monoxide	1.050	Mol %	0.001	103	90	110			
Lab ID: CCV1-2203181547	Continuing Calibration Verification Standard							03/18/22 15:48	
Nitrogen	99.904	Mol %	0.001	100	85	110			
Carbon Monoxide	0.096	Mol %	0.001	95	90	110			
Lab ID: CCV-2203181615	Continuing Calibration Verification Standard							03/18/22 16:15	
Oxygen	0.622	Mol %	0.001	104	90	110			
Nitrogen	1.358	Mol %	0.001	97	85	110			
Carbon Dioxide	0.957	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.022	Mol %	0.001	88	70	130			
Methane	93.480	Mol %	0.001	100	90	110			
Ethane	1.014	Mol %	0.001	101	90	110			
Propane	1.007	Mol %	0.001	101	90	110			
Isobutane	0.494	Mol %	0.001	99	90	110			
n-Butane	0.494	Mol %	0.001	99	90	110			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22030304

Report Date: 03/22/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Analytical Run: R269910		
Lab ID: CCV-2203181615	Continuing Calibration Verification Standard						03/18/22 16:15		
Isopentane	0.199	Mol %	0.001	99	90	110			
n-Pentane	0.200	Mol %	0.001	100	90	110			
Hexanes plus	0.153	Mol %	0.001	102	90	110			
Method: GPA 2261							Batch: R269910		
Lab ID: G22030304-001ADUP	Sample Duplicate		Run: Varian GC_220318A				03/18/22 16:10		
Oxygen	22.129	Mol %	0.001				0.0	10	
Nitrogen	77.623	Mol %	0.001				0.0	10	
Carbon Monoxide	< 0.001	Mol %	0.001					10	
Carbon Dioxide	0.248	Mol %	0.001				0.4	10	
Hydrogen Sulfide	< 0.001	Mol %	0.001					10	
Methane	< 0.001	Mol %	0.001					10	
Ethane	< 0.001	Mol %	0.001					10	
Propane	< 0.001	Mol %	0.001					10	
Isobutane	< 0.001	Mol %	0.001					10	
n-Butane	< 0.001	Mol %	0.001					10	
Isopentane	< 0.001	Mol %	0.001					10	
n-Pentane	< 0.001	Mol %	0.001					10	
Hexanes plus	< 0.001	Mol %	0.001					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Work Order Receipt Checklist

Hall Environmental

G22030304

Login completed by: Jill S. Jeffress

Date Received: 3/17/2022

Reviewed by: Misty Stephens

Received by: jsj

Reviewed Date: 3/22/2022

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: 20.4°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



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

Hall Environmental Analysis Laboratory
 1901 Hawkins NE
 Albuquerque, NM 87109
 TEL. 505-345-3975
 FAX 505-345-4107
 Website clients.hallenvironmental.com

SUB CONTRACTOR		Energy Labs-Gillette		COMPANY		Energy Laboratories		PHONE		FAX	
ADDRESS		400 W Boxelder Rd		ACCOUNT #				EMAIL			
CITY, STATE, ZIP		Gillette, WY 82718									
ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS				
1	2203828-001B	Influent 3-15-22	TEDLAR	AIR	3/15/2022 12:30:00 PM	1	FIXED GASES O2, CO2, CO * RUSH 7 DAY TAT*				

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	SM	Date	3/16/2022	Time	9:24 AM	Received By	Jim Jeffers	Date	3/17/22	Time	1:00 P
Relinquished By		Date		Time		Received By		Date		Time	
Relinquished By		Date		Time		Received By		Date		Time	

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

Temp of samples 20.4 °C
 Attempt to Cool? no

FOR LAB USE ONLY
 HARD COPY (extra cost) FAX EMAIL ONLINE

Comments: FE0 BY 12



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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2203828 RcptNo: 1

Received By: Tracy Casarrubias 3/16/2022 8:00:00 AM

Completed By: Sean Livingston 3/16/2022 8:59:50 AM

Reviewed By: [Handwritten signature]

[Handwritten signature]

Chain of Custody

- 1. Is Chain of Custody complete? Yes [checked] No [] Not Present []
2. How was the sample delivered? Courier

Log In

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

of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by: [Handwritten signature]

Special Handling (if applicable)

- 15. Was client notified of all discrepancies with this order? Yes [] No [] NA [checked]

Person Notified: _____ Date: _____
By Whom: _____ Via: [] eMail [] Phone [] Fax [] In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. Cooler Information

Table with 7 columns: Cooler No, Temp °C, Condition, Seal Intact, Seal No, Seal Date, Signed By. Row 1: 1, NA, Good, [], [], []

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 97378

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 97378
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 124692 for most updated status.	9/27/2022