

**REVIEWED**January 4, 2024 **By Mike Buchanan at 4:37 pm, Mar 25, 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**

Sullivan GC D #1E  
San Juan County, New Mexico  
Hilcorp Energy Company  
NMOCD Incident Number: NCS1518952648

Review of the 4Q2023  
SVE System Update  
for Sullivan GC D 1E:  
Content Satisfactory  
1. Continue to perform  
O&M as scheduled and  
continue running  
system.  
2. Submit reports after  
each quarter of 2024.

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 Sullivan GC D #1E natural gas production well (Site), located in Unit F of Section 26, Township 29 North, Range 11 West in San Juan County, New Mexico (Figure 1). Specifically, this report summarizes Site activities performed in October, November, and December 2023 to the New Mexico Oil Conservation Division (NMOCD).

**SVE SYSTEM SPECIFICATIONS**

The original SVE system was installed at the Site in April 2016 by XTO Energy, the previous Site owner, in response to a release originating from a broken fiberglass line used to transfer natural gas condensate. The original SVE system was purchased from Geotech Environmental Equipment, Inc. (Geotech) and operated successfully until the summer of 2018. Due to a broken SVE blower motor, the Site's SVE system did not operate between 2018 and March of 2022; however, a rental SVE system was brought onto the Site and began operation on December 2, 2021. The blower motor from the original Geotech system was replaced on March 21, 2022, and the Geotech SVE system was put back into service.

The current Geotech SVE system is configured with vacuum applied to wells PR-1, MW-01, MW-02, MW-05, and MW-06 (shown on Figure 2). The SVE system consists of a 3 horsepower Rotron Model EN656 regenerative blower capable of producing 212 standard cubic feet per minute (scfm) of flow and 73 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 verify 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, all SVE wells (PR-1, MW-01, MW-02, MW-05, and MW-06) were operated in order to induce air flow through impacted soil within the source area. Between September 26 and December 18, 2023, the SVE system operated for 1,990 hours, with a runtime efficiency of 100 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 percent runtime.

A fourth quarter emissions sample was collected from the SVE system on November 21, 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 Eurofins Environment Testing (Formerly Hall Environmental Analysis Laboratory), located in Albuquerque, New Mexico, for analysis of total volatile petroleum hydrocarbons (TVPH, also referred to 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 Processor Association (GPA) Method 2261. Table 2 presents a summary of analytical data collected during this sampling event and previous sampling events, with the full laboratory analytical report included in Appendix C.

Emission 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, 90,250 pounds (45 tons) of TVPH have been removed by the system to date.

## RECOMMENDATIONS

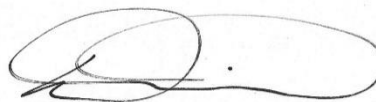
Bi-weekly O&M visits will continue to be performed by Ensolum and/or Hilcorp personnel to verify the SVE system is operating within normal working ranges (i.e., temperature, pressure, and vacuum). Deviations from regular operations will be noted on field logs and included in the following quarterly report.

We appreciate the opportunity to provide this report to the NMOCD. 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

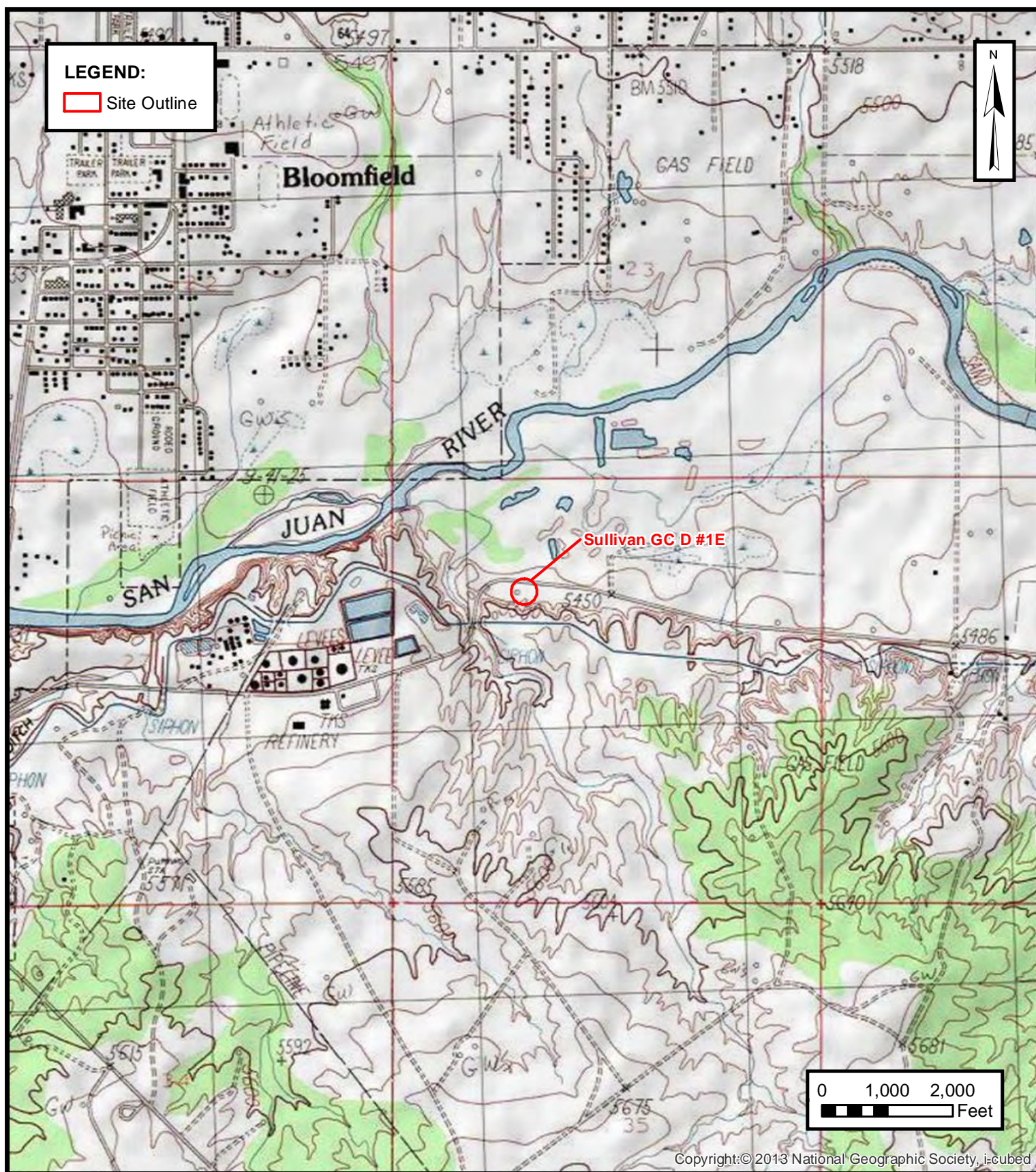
## Attachments:

Figure 1	Site Location
Figure 2	SVE System Layout
Table 1	Soil Vapor Extraction System Runtime Calculations
Table 2	Soil Vapor Extraction System Emission 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





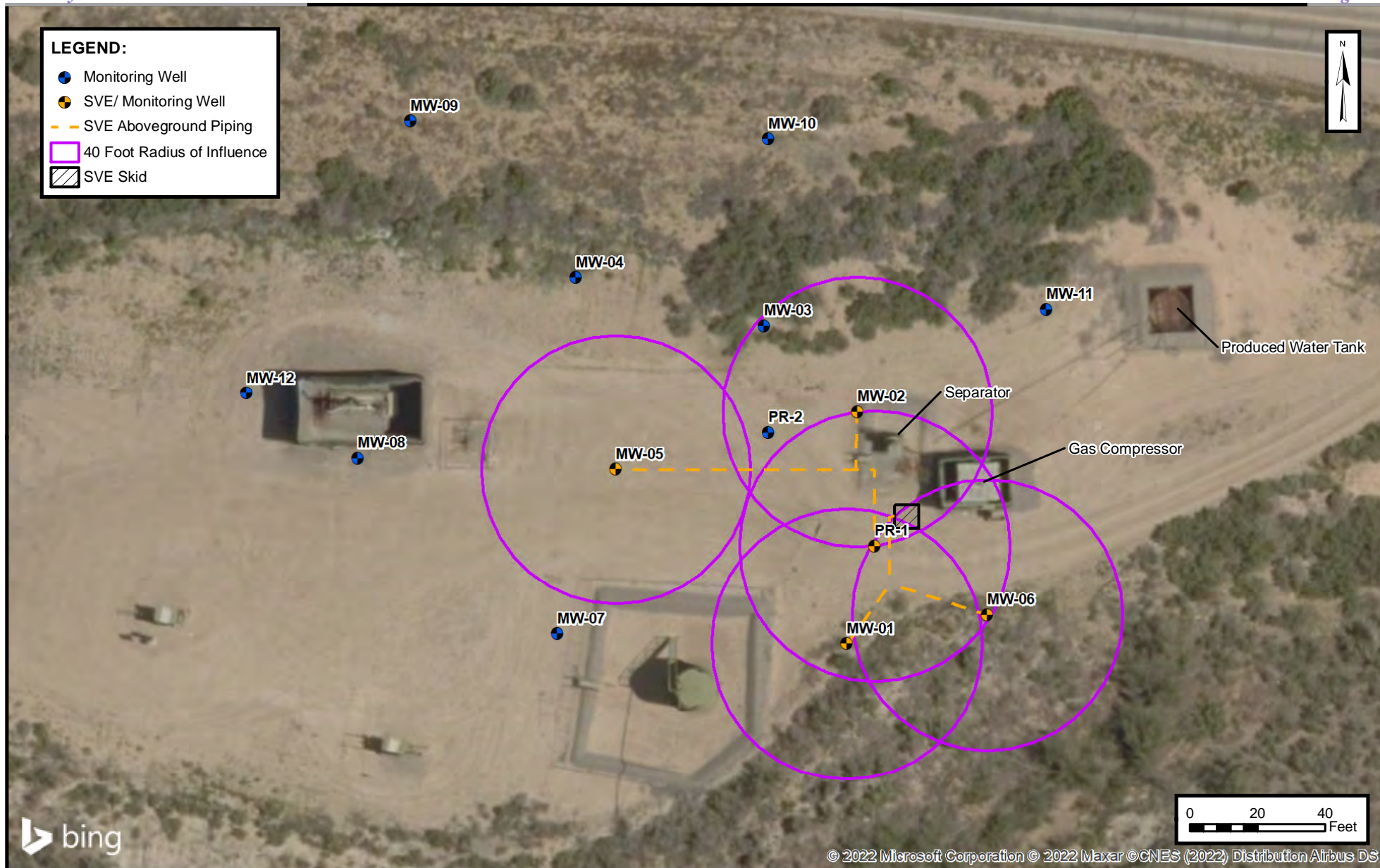
## SITE LOCATION

HILLCORP ENERGY COMPANY  
SULLIVAN GC D #1E  
San Juan County, New Mexico  
36.885855° N, 107.899525° W

PROJECT NUMBER: 07A1988029

**FIGURE**  
**1**





### SVE SYSTEM LAYOUT

HILCORP ENERGY COMPANY  
SULLIVAN GC D #1E  
San Juan County, New Mexico  
36.885855° N, 107.899525° W

PROJECT NUMBER:07A1988029

FIGURE

2



TABLES



**TABLE 1**  
**SOIL VAPOR EXTRACTION SYSTEM RUNTIME CALCULATIONS**  
Sullivan GC D#1E  
Hilcorp Energy Company  
San Juan County, New Mexico

**Permanent Geotech SVE Skid Runtime Operation**

Date	Total Operational Hours	Delta Hours	Days	% Runtime
9/26/2023	13,259	--	--	--
12/18/2023	15,249	1,990	83	100%



**TABLE 2**  
**SOIL VAPOR EXTRACTION SYSTEM EMISSIONS ANALYTICAL RESULTS**

Sullivan GC D#1E  
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 (%)
4/18/2016	--	840	1,900	87	840	140,000	--	--
4/20/2016	2,375	840	1,900	87	840	140,000	--	--
4/29/2017	3,520	280	1,000	64	630	65,000	--	--
8/11/2016	4,215	92	700	90	910	23,000	--	--
1/24/2018	2,837	46	140	<5.0	410	21,000	--	--
6/29/2018	3,000	63	210	<5.0	410	27,000	--	--
12/2/2021	741	15	<5.0	<5.0	99	33,000	--	--
3/16/2022	982	<0.10	<0.10	<0.10	1.1	64	19.40	1.23
6/17/2022	327	<0.10	<0.10	<0.10	0.25	10	21.54	0.29
9/22/2022	266	<0.10	<0.10	<0.10	<0.15	<5.0	20.57	1.00
12/10/2022	68	0.75	4.9	0.49	9.0	490	21.02	0.65
3/13/2023	69	0.81	4.4	0.30	5.7	300	21.15	0.51
6/23/2023	139	5.9	12	3.0	6.7	840	21.01	0.55
8/18/2023	76	2.4	2.9	<1.0	1.8	340	20.83	0.68
11/21/2023	186	2.8	18	1.7	18	480	20.94	0.51

**Notes:**

GRO: gasoline range hydrocarbons

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)





**TABLE 3**  
**SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS**  
 Sullivan GC D#1E  
 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)
4/18/2016	--	840	1,900	87	840	140,000
4/20/2016	2,375	840	1,900	87	840	140,000
4/29/2017	3,520	280	1,000	64	630	65,000
8/11/2016	4,215	92	700	90	910	23,000
1/24/2018	2,837	46	140	5.0	410	21,000
6/29/2018	3,000	63	210	5.0	410	27,000
12/2/2021	<b>Rental SVE System Startup</b>					
12/2/2021	741	15	5.0	5.0	99	33,000
3/16/2022	982	0.10	0.10	0.10	1.1	64
3/21/2022	<b>Permanent SVE System Startup</b>					
6/17/2022	327	0.10	0.10	0.10	0.25	10
9/22/2022	266	0.10	0.10	0.10	0.15	5.0
12/10/2022	68	0.75	4.9	0.49	9.0	490
3/13/2023	69	0.81	4.4	0.30	5.7	300
6/23/2023	139	5.9	12	3.0	6.7	840
8/18/2023	76	2.4	2.9	1.0	1.8	340
11/21/2023	186	2.8	18	1.7	18	480
<b>Average</b>	1,343	146	393	23	279	30,102

**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)
4/18/2016	90	0	0	0.28	0.64	0.029	0.28	47
4/20/2016	109	313,920	313,920	0.34	0.77	0.035	0.34	57
4/29/2017	90	1,480,320	1,166,400	0.19	0.49	0.025	0.25	35
8/11/2016	70	6,923,520	5,443,200	0.049	0.22	0.020	0.20	12
1/24/2018	60	--	--	0.015	0.094	0.011	0.15	4.9
6/29/2018	41	53,246,160	46,322,640	0.0084	0.027	0.001	0.063	3.7
12/2/2021	<b>Rental SVE System Startup</b>							
12/2/2021	49	53,246,160	0	0	0	0	0	0
3/16/2022	49	60,581,754	7,335,594	0.0014	0.00047	0.00047	0.0092	3.0
3/21/2022	<b>Permanent SVE System Startup</b>							
6/17/2022	80	70,724,634	10,142,880	0.000030	0.000030	0.000030	0.0002	0.011
9/22/2022	68	80,221,650	9,497,016	0.000025	0.000025	0.000025	0.000051	0.0019
12/10/2022	80	89,341,170	9,119,520	0.00013	0.00075	0.000088	0.0014	0.074
3/13/2023	75	99,328,020	9,986,850	0.00022	0.0013	0.00011	0.0021	0.11
6/23/2023	76	110,408,820	11,080,800	0.00095	0.0023	0.00047	0.0018	0.16
8/18/2023	80	116,845,620	6,436,800	0.0012	0.0022	0.00060	0.0013	0.18
11/21/2023	75	127,065,120	10,219,500	0.00073	0.0029	0.00038	0.0028	0.12
<b>Average</b>				0.064	0.16	0.0088	0.093	12

**Mass Recovery**

Date	Total SVE System Hours	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
4/18/2016	0	0	0.0	0.0	0.0	0.0	0.0	0.0
4/20/2016	48	48	16	37	1.7	16	2,740	1.4
4/29/2017	264	216	41	105	5.5	53	7,452	3.7
8/11/2016	1,560	1,296	63	288	26	261	14,929	7.5
1/24/2018	--	--	--	--	--	--	--	--
6/29/2018	16,848	15,288	128	410	12	961	56,264	28
12/2/2021	<b>Rental SVE System Startup</b>							
12/2/2021	968	0	0.0	0.0	0.0	0.0	0.0	0.0
3/16/2022	3,463	2,495	3.5	1.2	1.2	23	7,559	3.8
3/21/2022	<b>Permanent SVE System Startup</b>							
3/21/2022	0	0	0.0	0.0	0.0	0.0	0.0	0.0
6/17/2022	2,113	2,113	0.063	0.063	0.063	0.43	23	0.012
9/22/2022	4,441	2,328	0.059	0.059	0.059	0.12	4.4	0.0022
12/10/2022	6,341	1,900	0.24	1.4	0.17	2.6	141	0.070
3/13/2023	8,560	2,219	0.49	2.9	0.25	4.6	246	0.12
6/23/2023	10,990	2,430	2.3	5.7	1.1	4.3	394	0.20
8/18/2023	12,331	1,341	1.7	3.0	0.80	1.7	237	0.12
11/21/2023	14,602	2,271	1.7	6.7	0.86	6.3	261	0.13
<b>Total Mass Recovery to Date</b>			258	862	50	1,335	90,250	45

**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



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

HOUSEKEEPING		Check
Inline Filter Clean		
Clean tank level alarm on skimmer		

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

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
MW-01		46.2	
MW-02		41.3	
MW-05		78.1	
MW-06		84.9	
PR-1		55.7	

[illegible]

COMMENTS/OTHER MAINTENANCE:



O&M PERSONNEL: B Sinclair  
TIME OFFSITE:

Inline Filter Clean	
Clean tank level alarm on skimmer	

## OPERATING WELLS

## COMMENTS/OTHER MAINTENANCE:



DATE: 11-8  
TIME ONSITE: \_\_\_\_\_

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

SVE ALARMS: (check if applicable)	HIGH/LOW VACUUM
	KO TANK HIGH LEVEL
	HIGH EXHAUST TEMPERATURE

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	14289	1201
Pre K/O Vacuum (IWC)	31	
Post K/O Vacuum (IWC)	33	
Total Flow (cfm)	82	
Zone 1/ Leg A Flow (scfm)		
Inlet PID	62.8	
Exhaust Post GAC PID	88.7	
Liquid in K/O Sight Tube (Y/N)		
K/O Liquid Drained (gallons)		

<b>SAMPLE ID:</b>		<b>SAMPLE TIME:</b>
<b>Analytes:</b>	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)	

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
MW-01		32.6	
MW-02		30.3	
MW-05		41.4	
MW-06		54.8	
PR-1		57.2	

## Well

[illegible]

COMMENTS/OTHER MAINTENANCE:







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



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

**SVE SYSTEM - MONTHLY O&M**

HIGH/LOW VACUUM
KO TANK HIGH LEVEL
HIGH EXHAUST TEMPERATURE

## SVE SYSTEM

READING

TIME

Blower Hours (take photo)

Pre K/O Vacuum (IWC)

Post K/O Vacuum (IWC)

Total Flow (cfm)

Zone 1/ Leg A Flow (scfm)

Inlet PID

Exhaust Post GAC PID

Liquid in K/O Sight Tube (Y/N)

K/O Liquid Drained (gallons)

## HOUSEKEEPING Check

## Inline Filter Clean

Clean tank level alarm on skimmer

## SVE SYSTEM - QUARTERLY SAMPLING

**SAMPLE ID:**

<b>Analytes:</b>	TVPH (8015), VOCs (8260), Fixed Gas (CO/CO2/O2)
------------------	---

**SAMPLE TIME:**

## OPERATING WELLS

## ZONES

### Change in Well Operation:

**Zone 1/ Leg A**

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
MW-01		84.4	
MW-02		58.5	
MW-05		29.8	
MW-06		141.3	
PR-1		73.8	

## Product Recovery

## Well

[illegible]

COMMENTS/OTHER MAINTENANCE:

Drained  $\frac{3}{8}$  of overflow tank.





## APPENDIX B

### Project Photographs



**PROJECT PHOTOGRAPHS**  
Sullivan GC D #1E  
San Juan County, New Mexico  
Hilcorp Energy Company

<p><b>Photograph 1</b></p> <p>Runtime meter taken on September 26, 2023 at 3:32 PM Hours = 13,259</p>	
<p><b>Photograph 2</b></p> <p>Runtime meter taken on December 18, 2023 at 2:05 PM Hours = 15,249</p>	



## 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](http://www.hallenvironmental.com)

December 08, 2023

Mitch Killough

HILCORP ENERGY

PO Box 4700

Farmington, NM 87499

TEL: (505) 564-0733

FAX:

RE: Sullivan GC D IE

OrderNo.: 2311B45

Dear Mitch Killough:

Eurofins Environment Testing South Central, LLC received 1 sample(s) on 11/22/2023 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](http://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,

A handwritten signature in black ink, appearing to read "Andy Freeman", with a stylized flourish at the end.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109



## Analytical Report

Lab Order 2311B45

Date Reported: 12/8/2023

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: SVE-1

Project: Sullivan GC D IE

Collection Date: 11/21/2023 2:10:00 PM

Lab ID: 2311B45-001

Matrix: AIR

Received Date: 11/22/2023 6:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 8015D: GASOLINE RANGE</b>						Analyst: JJP
Gasoline Range Organics (GRO)	480	25		µg/L	5	11/29/2023 3:15:19 PM
Surr: BFB	195	15-412		%Rec	5	11/29/2023 3:15:19 PM
<b>EPA METHOD 8260B: VOLATILES</b>						Analyst: CCM
Benzene	2.8	0.50		µg/L	5	12/4/2023 2:51:00 PM
Toluene	18	0.50		µg/L	5	12/4/2023 2:51:00 PM
Ethylbenzene	1.7	0.50		µg/L	5	12/4/2023 2:51:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2,4-Trimethylbenzene	0.77	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,3,5-Trimethylbenzene	0.88	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Naphthalene	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
1-Methylnaphthalene	ND	2.0		µg/L	5	12/4/2023 2:51:00 PM
2-Methylnaphthalene	ND	2.0		µg/L	5	12/4/2023 2:51:00 PM
Acetone	ND	5.0		µg/L	5	12/4/2023 2:51:00 PM
Bromobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Bromodichloromethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Bromoform	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Bromomethane	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
2-Butanone	ND	5.0		µg/L	5	12/4/2023 2:51:00 PM
Carbon disulfide	ND	20		µg/L	5	12/4/2023 2:51:00 PM
Carbon tetrachloride	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Chlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Chloroethane	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
Chloroform	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Chloromethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
2-Chlorotoluene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
4-Chlorotoluene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
cis-1,2-DCE	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
Dibromochloromethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Dibromomethane	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Dichlorodifluoromethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1-Dichloroethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1-Dichloroethene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM

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

<b>Qualifiers:</b>	*	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 Quantitative 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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## Analytical Report

Lab Order 2311B45

Date Reported: 12/8/2023

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: SVE-1

Project: Sullivan GC D IE

Collection Date: 11/21/2023 2:10:00 PM

Lab ID: 2311B45-001

Matrix: AIR

Received Date: 11/22/2023 6:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 8260B: VOLATILES</b>						Analyst: CCM
1,2-Dichloropropane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,3-Dichloropropane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
2,2-Dichloropropane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1-Dichloropropene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Hexachlorobutadiene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
2-Hexanone	ND	5.0		µg/L	5	12/4/2023 2:51:00 PM
Isopropylbenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
4-Isopropyltoluene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
4-Methyl-2-pentanone	ND	5.0		µg/L	5	12/4/2023 2:51:00 PM
Methylene chloride	ND	1.5		µg/L	5	12/4/2023 2:51:00 PM
n-Butylbenzene	ND	1.5		µg/L	5	12/4/2023 2:51:00 PM
n-Propylbenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
sec-Butylbenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Styrene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
tert-Butylbenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Tetrachloroethene (PCE)	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
trans-1,2-DCE	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
trans-1,3-Dichloropropene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Trichloroethene (TCE)	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Trichlorofluoromethane	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
1,2,3-Trichloropropane	ND	1.0		µg/L	5	12/4/2023 2:51:00 PM
Vinyl chloride	ND	0.50		µg/L	5	12/4/2023 2:51:00 PM
Xylenes, Total	18	0.75		µg/L	5	12/4/2023 2:51:00 PM
Surr: Dibromofluoromethane	98.6	70-130		%Rec	5	12/4/2023 2:51:00 PM
Surr: 1,2-Dichloroethane-d4	90.7	70-130		%Rec	5	12/4/2023 2:51:00 PM
Surr: Toluene-d8	101	70-130		%Rec	5	12/4/2023 2:51:00 PM
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	5	12/4/2023 2:51:00 PM

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

<b>Qualifiers:</b>	*	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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of standard limits. If undiluted results may be estimated.		

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## ANALYTICAL SUMMARY REPORT

December 06, 2023

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

Work Order: B23111814 Quote ID: B15626

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 1 sample for Hall Environmental on 11/28/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23111814-001	2311B45-001B, SVE-1	11/21/23 14:10	11/28/23	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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Billings, MT 406.252.6325 • Casper, WY 307.235.0515  
Gillette, WY 307.686.7175 • Helena, MT 406.442.0711

## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Hall Environmental  
**Project:** Not Indicated  
**Lab ID:** B23111814-001  
**Client Sample ID:** 2311B45-001B, SVE-1

**Report Date:** 12/06/23  
**Collection Date:** 11/21/23 14:10  
**Date Received:** 11/28/23  
**Matrix:** Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>GAS CHROMATOGRAPHY ANALYSIS REPORT</b>							
Oxygen	20.94	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Nitrogen	77.96	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Carbon Dioxide	0.51	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Methane	0.53	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Ethane	0.03	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Hexanes plus	0.03	Mol %		0.01		GPA 2261-95	12/04/23 02:37 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
Hexanes plus	0.013	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
GPM Total	0.013	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj
GPM Pentanes plus	0.013	gpm		0.001		GPA 2261-95	12/04/23 02:37 / jrj

### CALCULATED PROPERTIES

Gross BTU per cu ft @ Std Cond. (HHV)	7		1		GPA 2261-95	12/04/23 02:37 / jrj
Net BTU per cu ft @ std cond. (LHV)	7		1		GPA 2261-95	12/04/23 02:37 / jrj
Pseudo-critical Pressure, psia	546		1		GPA 2261-95	12/04/23 02:37 / jrj
Pseudo-critical Temperature, deg R	241		1		GPA 2261-95	12/04/23 02:37 / jrj
Specific Gravity @ 60/60F	0.998		0.001		D3588-81	12/04/23 02:37 / jrj
Air, %	95.67		0.01		GPA 2261-95	12/04/23 02:37 / jrj

- The analysis was not corrected for air.

### COMMENTS

-	-	12/04/23 02:37 / jrj
- 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: B23111814

Report Date: 12/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: GPA 2261-95</b>										Batch: R413227
<b>Lab ID: LCS120423</b>	11	Laboratory Control Sample			Run: GCNGA-B_231204A			12/04/23 03:28		
Oxygen		0.63	Mol %	0.01	126	70	130			
Nitrogen		7.07	Mol %	0.01	118	70	130			
Carbon Dioxide		0.97	Mol %	0.01	98	70	130			
Methane		74.3	Mol %	0.01	99	70	130			
Ethane		5.90	Mol %	0.01	98	70	130			
Propane		4.85	Mol %	0.01	98	70	130			
Isobutane		1.82	Mol %	0.01	91	70	130			
n-Butane		1.90	Mol %	0.01	95	70	130			
Isopentane		0.94	Mol %	0.01	94	70	130			
n-Pentane		0.94	Mol %	0.01	94	70	130			
Hexanes plus		0.72	Mol %	0.01	90	70	130			
<b>Lab ID: B23111683-001ADUP</b>	12	Sample Duplicate			Run: GCNGA-B_231204A			12/04/23 11:37		
Oxygen		18.2	Mol %	0.01				0.3	20	
Nitrogen		78.8	Mol %	0.01				0	20	
Carbon Dioxide		2.86	Mol %	0.01				1.0	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		0.15	Mol %	0.01				6.5	20	

**Qualifiers:**

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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# Work Order Receipt Checklist

Hall Environmental

B23111814

Login completed by: Addison A. Gilbert

Date Received: 11/28/2023

Reviewed by: ysmith

Received by: aag

Reviewed Date: 11/30/2023

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on all shipping container(s)/cooler(s)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on all sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>
Container/Temp Blank temperature:	10.4°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input checked="" type="checkbox"/>

## 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



Environment Testing

## CHAIN OF CUSTODY RECORD

PAGE: 1 OF 1

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

SUB CONTRACTOR		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	ANALYTICAL COMMENTS
1	2311B45-001B	SVE-1	TEDLAR	Air	11/21/2023 2:10:00 PM	1 Natural Gas Analysis 02 + CO2

EUI: 02311814

## 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:	Time:	Received By:	Date:	Time:	REPORT TRANSMITTAL DESIRED:	
	11/22/2023	7:13 AM				<input type="checkbox"/> HARDCOPY (extra cost)	<input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	FOR LAB USE ONLY	
			O. Lopez	28 Nov 23	0940	Temp of samples	Attempt to Cool ?
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Comments:	



## Sample Log-In Check List

Client Name: HILCORP ENERGY

Work Order Number: 2311B45

RcptNo: 1

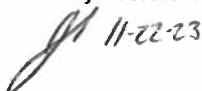
Received By: Tracy Casarrubias

11/22/2023 6:20:00 AM

Completed By: Tracy Casarrubias

11/22/2023 7:10:18 AM

Reviewed By:

 11-22-23
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  $>0^{\circ}\text{C}$  to  $6.0^{\circ}\text{C}$ ? 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:

(&lt;2 or &gt;12 unless noted)

Adjusted?

Checked by:

7/11/22/23

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:

Mailing address and phone number are missing on COC - TMC 11/22/23

16. Additional remarks:

17. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	N/A	Good	Yes			



**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 301161

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 301161
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Review of the 4Q2023 SVE System Update for Sullivan GC D 1E: Content Satisfactory 1. Continue to perform O&M as scheduled and continue running system. 2. Submit reports after each quarter of 2024.	3/25/2024