ENSOLUM

January 13, 2023

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

Re: Fourth Quarter 2022 – SVE System Update
OH Randel #5
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NVF1602039091
Ensolum Project No. 07A1988025

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *Fourth Quarter 2022 – SVE System Update* report summarizing the soil vapor extraction (SVE) system performance at the OH Randel #5 natural gas production well (Site), located in Unit D of Section 10, Township 26 North, and Range 11 West in San Juan County, New Mexico (Figure 1). Specifically, this report summarizes Site activities performed in October, November, and December of 2022 to the New Mexico Oil Conservation Division (NMOCD).

SVE SYSTEM SPECIFICATIONS

The current operation at the Site consists of two SVE systems, each with a dedicated blower, knockout tank, and control panel. The original SVE system ("SVE Skid 1") was installed at the Site in 2016 by XTO Energy (the previous owner and operator of the Site) and subsequently upgraded by Hilcorp in 2019. This SVE system consists of a 2 horsepower Atlantic Blower AB-301 blower capable of producing 110 standard cubic feet per minute (scfm) of flow and 72 inches of water column (IWC) vacuum. A second SVE system ("SVE Skid 2") was installed at the Site and became operational on March 11, 2022 in order to more efficiently address residual soil impacts at the Site. Specifically, the new system was built with a 3.4 horsepower Republic Manufacturing HRC501 blower capable of producing 221 scfm of flow and 72 IWC vacuum. When operated concurrently, the two SVE systems are able to induce the necessary flow and vacuum on all SVE wells at the Site simultaneously with no need to rotate operating wells.

SVE wells are located and screened in the "Secondary" and "Tertiary" Source Zones, as identified in the WSP USA Inc. *Site Summary Report* dated October 1, 2021. Once the new SVE Skid 2 was installed at the Site, new manifolds were constructed so that SVE Skid 1 operated wells located in the Secondary Source Zone (SVE-5 and SVE-8) and SVE Skid 2 operated wells located in the Tertiary Source Zone (SVE-6, SVE-7, SVE-10, SVE-11, SVE-12, SVE-13, SVE-14, SVE-15, SVE-16, SVE-17, SVE-18, SVE-19, SVE-20, SVE-21, and SVE-22). The SVE well locations are shown on Figure 2.

FOURTH QUARTER 2022 ACTIVITIES

During the fourth quarter of 2022, 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 2022, all SVE wells, except SVE-6 and SVE-11, were operated in order to induce flow in areas with remaining soil impacts. SVE wells SVE-6 and SVE-11 are screened at depths shallower than the remaining soil impacts at the Site and have been turned off in order for the SVE system to induce a higher flow and vacuum on the remaining open wells. Between September 21 and December 24, 2022, SVE Skid 1 operated for 1,853 hours with a runtime efficiency of 100 percent (%) and Skid 2 operated for 1,854 hours with a runtime efficiency of 100%. Table 1 presents the SVE system operational hours and percent runtime. Appendix B presents photographs of the runtime meter for calculating the fourth quarter runtime efficiency.

Emissions samples were collected from sample ports located between the SVE piping manifold and the SVE blower using a high vacuum air sampler. Prior to collection, the emission samples were field screened with a photoionization detector (PID) for organic vapor monitoring (OVM). Fourth quarter 2022 emissions samples were collected from both SVE skids on December 7, 2022. The emission samples were collected directly into two 1-Liter Tedlar® bags and submitted to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for analysis of total volatile petroleum hydrocarbons (TVPH – also known as total petroleum hydrocarbons – gasoline range organics (TPH-GRO)) following United States Environmental Protection Agency (EPA) Method 8015D, volatile organic compounds (VOCs) following EPA Method 8260B, and fixed gas analysis of oxygen and carbon dioxide following Gas Processors Association (GPA) Method 2261.

Table 2 presents a summary of analytical data collected during the sampling events and from historical 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 systems (Tables 3 and 4). Based on these estimates, a total of 714,234 pounds (357 tons) of TVPH have been removed by the systems to date.

Additionally, as noted in the fourth quarter 2022 field notes, the rotameter on the Skid 2 manifold broke and subsequently caused the rotameter to fail in December 2022 (noted as “stuck” in the December 24, 2022 notes). When compared to historical site visits, the recorded flow from Skid 2 of 120 scfm on December 7, 2022 is likely false and due to the rotameter float being stuck at the top of the site tube. As such, the emissions calculations for the fourth quarter were based on a flow rate of 56 scfm based on the November 16, 2022 flow rate and similar applied vacuum observed during the November 16 and December 7, 2022 site visits.

RECOMMENDATIONS

Bi-weekly O&M visits will continue to be performed by Ensolum and/or Hilcorp personnel to verify the SVE systems are 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. Hilcorp will continue operating the SVE systems until asymptotic emissions are observed. At that time, an evaluation of residual petroluem hydrocarbons will be assessed and further recommendations for remedial actions, if any, will be provided to NMOCD. Additionally, a new rotameter will be installed on Skid 2 to replace the broken gauge so that accurate measurements can be collected in the future.

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

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Attachments:

Figure 1	Site Location Map
Figure 2	SVE System Layout
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 – Skid 1
Table 4	Soil Vapor Extraction System Mass Removal and Emissions – Skid 2
Appendix A	Field Notes
Appendix B	Project Photographs
Appendix C	Laboratory Analytical Reports

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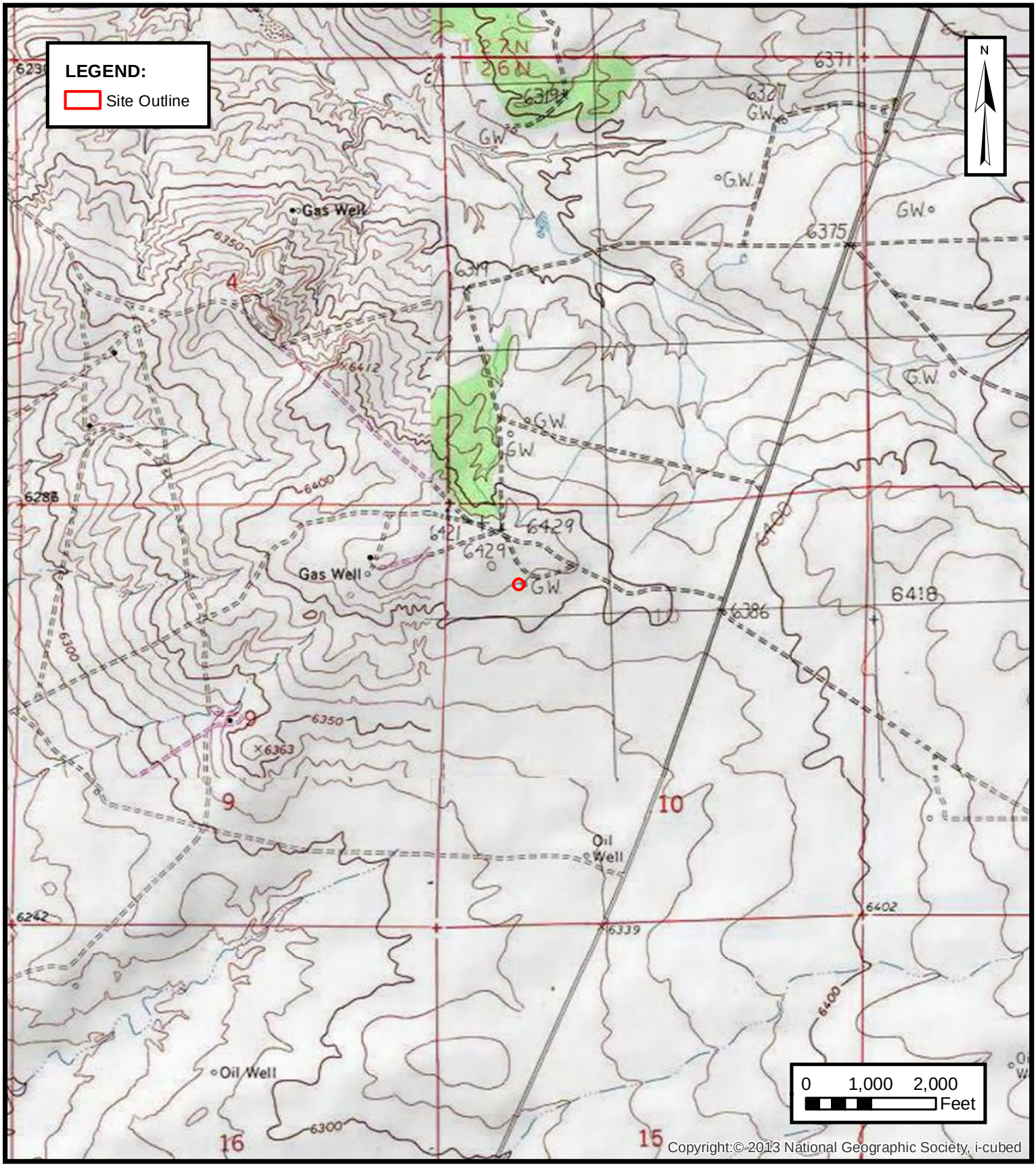
FIGURES



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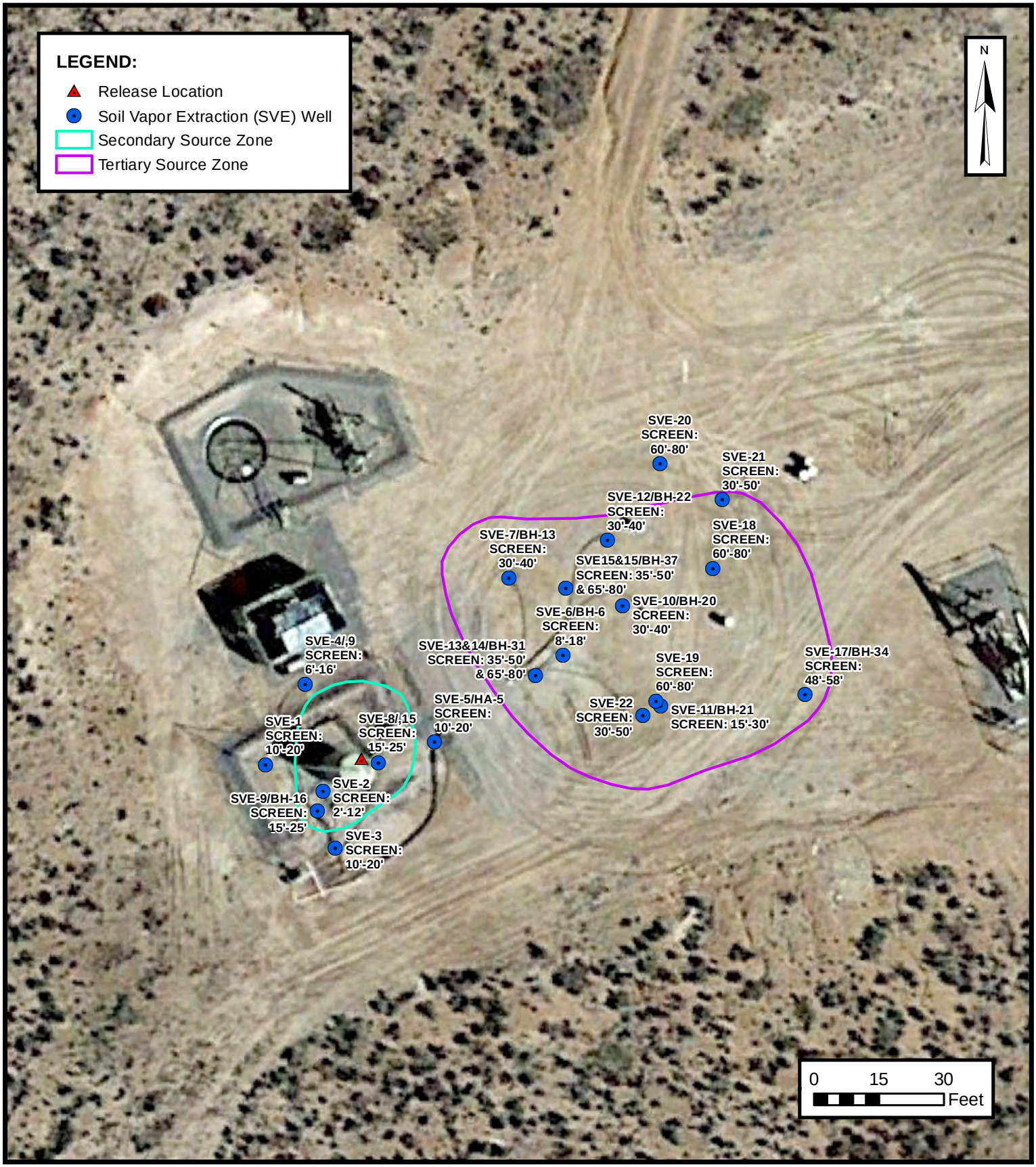
SITE LOCATION MAP

HILCORP ENERGY COMPANY
OH RANDEL #5
NWNW SEC 10 T26N R11W, San Juan County, New Mexico
36.506504° N, 107.996993° W

PROJECT NUMBER: 07A1988025

FIGURE
1



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SVE SYSTEM LAYOUT

HILCORP ENERGY COMPANY
OH RANDEL #5
NWNW SEC 10 T26N R11W, San Juan County, New Mexico
36.506504° N, 107.996993° W

PROJECT NUMBER: 07A1988025

FIGURE
2

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TABLES

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TABLE 1
SOIL VAPOR EXTRACTION SYSTEM RUNTIME CALCULATIONS
Hilcorp Energy Company - OH Randel #5
San Juan County, New Mexico

Ensolum Project No. 07A1988025

SVE Skid 1 - Original System Runtime Operation

Date	Total Operational Hours	Delta Hours	Days	Percent Runtime
9/21/2022	36,745.1	--	--	--
12/7/2022	38,598.3	1,853	77	100%

SVE Skid 2 - New System Runtime Operation

Date	Total Operational Hours	Delta Hours	Days	Percent Runtime
9/21/2022	4,652.8	--	--	--
12/7/2022	6,507.2	1,854	77	100%

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM EMISSIONS ANALYTICAL RESULTS
Hilcorp Energy Company - OH Randel #5
San Juan County, New Mexico

Ensolum Project No. 07A1988025

SVE Skid 1 - Original System Analytical Results

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH/GRO (µg/L)	Oxygen (%)	Carbon Dioxide (%)
8/11/2016	4,072	160	1,700	61	500	46,000	--	--
8/17/2018	719	130	230	10	110	8,900	--	--
6/28/2019	1,257	7,200	15,000	360	3,000	460,000	--	--
12/16/2019	1,685	1,800	4,400	83	660	170,000	--	--
3/10/2020	897	1,700	3,300	89	700	130,000	--	--
4/30/2020	1,853	2,440	4,737	128	1,005	186,592	--	--
6/24/2020 (1)	--	--	--	--	--	--	--	--
11/10/2020	1,385	320	1,100	43	380	43,000	21.5%	0.35%
2/10/2021	865	360	950	35	250	32,000	--	--
6/11/2021	400	170	390	11	110	18,000	22.1%	0.15%
9/29/2021	505	99	190	7.0	55	8,200	--	--
12/15/2021	1,163	130	290	6.9	62	37,137	22.2%	0.092%
3/21/2022	274	6.5	23	0.98	11	550	22.4%	0.041%
6/17/2022	88	5.5	19	0.69	7.0	650	21.8%	0.060%
9/22/2022	55	9.0	42	1.9	20	670	21.8%	0.10%
12/7/2022	28	5.2	34	1.5	15	480	21.9%	0.05%

SVE Skid 2 - Original System Analytical Results

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)	Oxygen (%)	Carbon Dioxide (%)
3/21/2022	1,354	310	510	13	120	35,000	21.8%	0.31%
6/17/2022	1,058	200	410	<10	66	33,000	21.3%	0.39%
9/8/2022	1,258	479	1,190	26	1,041	31,900	20.1%	0.50%
12/7/2022	918	230	370	9.1	65	18,000	21.5%	0.36%

Notes:

(1) - blower not operational for sampling in May and June 2020

GRO: gasoline range organics

µg/L: microgram per liter

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

%: percent

--: not sampled

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

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TABLE 3
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS - SKID 1
Hilcorp Energy Company - OH Randel #5
San Juan County, New Mexico

Ensolum Project No. 07A1988025

Flow and Laboratory Analysis

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
8/11/2016	4,072	160	1,700	61	500	46,000
8/17/2018	719	130	230	10	110	8,900
12/16/2019	1,902	1,800	4,400	83	660	170,000
3/10/2020	897	1,700	3,300	89	700	130,000
4/30/2020	1,853	2,440	4,737	128	1,005	186,592
6/24/2020	Blower Not Operational (1)					
11/10/2021	1,385	320	1,100	43	380	43,000
2/10/2021	865	360	950	35	250	32,000
6/11/2021	400	170	390	11	110	18,000
9/29/2021	505	99	190	7.0	55	8,200
12/15/2021	1,163	130	290	6.9	62	37,137
3/21/2022	274	6.5	23	1.0	11	550
6/17/2022	88	6	19	0.7	7	650
9/22/2022	55	9.0	42	1.9	20	670
12/7/2022	28	5.2	34	1.5	15	480
Average	1,015	524	1,243	34	278	48,727

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)
8/11/2016	105	31,500	31,500	0.063	0.67	0.024	0.20	18
8/17/2018	100	59,647,500	59,616,000	0.054	0.36	0.013	0.11	10
12/16/2019	110	109,635,900	49,988,400	0.40	0.95	0.019	0.16	37
3/10/2020	110	121,707,300	12,071,400	0.72	1.6	0.035	0.28	62
4/30/2020 (1)	105	130,917,900	9,210,600	0.81	1.6	0.043	0.33	62
6/24/2020 (1)	Blower Not Operational							
11/10/2021	105	130,917,900	0	0	0	0	0	0
2/10/2021	92	143,580,780	12,662,880	0.12	0.35	0.013	0.11	13
6/11/2021	90	158,657,580	15,076,800	0.089	0.23	0.0077	0.061	8.4
9/29/2021	69	168,249,960	9,592,380	0.035	0.075	0.0023	0.021	3.4
12/15/2021	90	178,207,560	9,957,600	0.039	0.081	0.0023	0.020	7.6
3/16/2022	70	187,343,904	9,136,344	0.018	0.041	0.0010	0.010	4.9
6/17/2022	70	196,703,520	9,359,616	0.0016	0.0055	0.00022	0.0024	0.16
9/21/2022	65	205,627,890	8,924,370	0.0018	0.0074	0.00031	0.0033	0.16
12/7/2022	70	213,411,456	7,783,566	0.0019	0.0099	0.00045	0.0046	0.15
			Average	0.17	0.42	0.012	0.09	16

Flow and Laboratory Analysis

Date	Total SVE System Hours	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
8/11/2016	5	5	0.31	3.3	0.12	1.0	90	0.045
8/17/2018	9,941	9,936	539	3,586	132	1,133	102,008	51
12/16/2019	17,515	7,574	3,007	7,214	145	1,200	278,728	139
3/10/2020	19,344	1,829	1,317	2,897	65	512	112,870	56
4/30/2020 (1)	20,806	1,462	1,188	2,307	62	489	90,884	45
6/24/2020 (1)	Blower Not Operational							
11/10/2021	20,806	0	0	0	0	0	0	0
2/10/2021	23,100	2,294	268	809	31	249	29,600	15
6/11/2021	25,892	2,792	249	630	22	169	23,495	12
9/29/2021	28,209	2,317	80	173	5.4	49	7,833	3.9
12/15/2021	30,053	1,844	71	149	4.3	36	14,070	7.0
3/16/2022	32,228	2,175	39	89	2.2	21	10,732	5.4
6/17/2022	34,457	2,228	3.5	12	0.49	5.3	350	0.18
9/21/2022	36,745	2,288	4.0	17	0.72	7.5	367	0.18
12/7/2022	38,598	1,853	3.4	18	0.82	8.5	279	0.14
		Total Mass Recovery to Date	6,770	17,905	470	3,881	671,308	336

Notes:

(1) - blower not operational for sampling in May and June 2020

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

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TABLE 4
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS - SKID 2
Hilcorp Energy Company - OH Randel #5
San Juan County, New Mexico

Ensolum Project No. 07A1988025

Flow and Laboratory Analysis

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
3/21/2022	1,354	310	510	13	120	35,000
6/17/2022	1,058	200	410	*10*	66	33,000
9/8/2022	1,258	479	1,190	26	1,041	31,900
12/7/2022	918	230	370	9.0	65	18,000
Average	1,147	305	620	15	323	29,475

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)
3/16/2022	70	499,800	499,800	0.081	0.13	0.0034	0.031	9.2
6/17/2022	60	8,533,560	8,033,760	0.057	0.10	0.0026	0.021	7.6
9/8/2022	56	15,138,648	6,605,088	0.071	0.17	0.0038	0.12	6.8
12/7/2022 (1)	56	22,499,736	7,361,088	0.074	0.16	0.0037	0.12	5.2
			Average	0.071	0.142	0.0034	0.071	7.2

Flow and Laboratory Analysis

Date	Total SVE System Hours	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
3/16/2022	119	119	10	16	0.41	3.7	1,090	0.55
6/17/2022	2,351	2,232	128	230	5.8	47	17,027	8.5
9/8/2022	4,316	1,966	140	329	7.4	228	13,361	6.7
12/7/2022 (1)	6,507	2,191	163	358	8.0	254	11,448	5.7
		Total Mass Recovery to Date	440	934	22	532	42,926	21

Notes:

(1): rotameter float frozen in place, flow rate based on 11/16/2022 site visit flow rate and similar applied vacuum recorded during 11/16/2022 and 12/7/2022 site visits

cf: cubic feet

cfm: cubic feet per minute

µg/L: micrograms per liter

lb/hr: pounds per hour

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

gray: laboratory reporting limit used for calculating emissions

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APPENDIX A

Field Notes

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 10-3
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours (take photo)	37034.84	4942.5
Inlet Vacuum (IWC)	54	57
Inlet Flow from Rotameter (SCFM)	66	50
Exhaust Vacuum (IWC)	-57	-63
Inlet PID	157	[411
Exhaust PID	69.8	1397
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM - QUARTERLY SAMPLING

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

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		15.4	
SVE-8		52.9	
SVE-9		308	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		666	
SVE-10		407	
SVE-11			
SVE-12		1622	
SVE-13		1028	
SVE-14		1156	
SVE-15		973	
SVE-16		1248	
SVE-17		737	
SVE-18		1744	
SVE-19		1546	
SVE-20		1443	
SVE-21		460	
SVE-22		553	

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 10-18
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:		KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours **(take photo)**	37396.34	5304
Inlet Vacuum (IWC)	53	55
Inlet Flow from Rotameter (SCFM)	65	50
Exhaust Vacuum (IWC)	-56	-63
Inlet PID	137	1376
Exhaust PID	63.3	1482
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM - QUARTERLY SAMPLING

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

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		31.9	
SVE-8		141	
SVE-9		45.5	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		528	
SVE-10		453	
SVE-11			
SVE-12		1529	
SVE-13		1451	
SVE-14		986	
SVE-15		972	
SVE-16		1475	
SVE-17		568	
SVE-18		1612	
SVE-19		1791	
SVE-20		1011	
SVE-21		429	
SVE-22		517	

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 11-2-22
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:		KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours **(take photo)**	37758.04	5665.7
Inlet Vacuum (IWC)	54	57
Inlet Flow from Rotameter (SCFM)	67	50
Exhaust Vacuum (IWC)	-56	-65
Inlet PID	168	1719
Exhaust PID	57.2	1854
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM - QUARTERLY SAMPLING

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

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		61.4	
SVE-8		86.8	
SVE-9		76.2	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6		792	
SVE-7		202	
SVE-10			
SVE-11		994	
SVE-12		1946	
SVE-13		2036	
SVE-14		1123	
SVE-15		1951	
SVE-16		575	
SVE-17		2469	
SVE-18		2624	
SVE-19		1640	
SVE-20		176	
SVE-21		334	
SVE-22			

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 11-16-22
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours (take photo)	38090.39	5999.3
Inlet Vacuum (IWC)	54	58
Inlet Flow from Rotameter (SCFM)	68	56
Exhaust Vacuum (IWC)	-55	-65
Inlet PID	32.97	1195
Exhaust PID	47.09	1378
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	5.5	6.5

SVE SYSTEM - QUARTERLY SAMPLING

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

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		6.17	
SVE-8		65.05	
SVE-9		16.62	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6		760.9	
SVE-7		121.9	
SVE-10			
SVE-11		765.7	
SVE-12		1247	
SVE-13		1003	
SVE-14		252.6	
SVE-15		1012	
SVE-16		626.7	
SVE-17		1162	
SVE-18		1038	
SVE-19		988.1	
SVE-20		91.27	
SVE-21		591	
SVE-22			

COMMENTS/OTHER MAINTENANCE:

Drained 6.5g from skid 2. When I restarted the system, some of the PVC in the rotameter site tube broke off.

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 12-7
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours (take photo)	38598.33	6507.2
Inlet Vacuum (IWC)	53	57
Inlet Flow from Rotameter (SCFM)	70	120
Exhaust Vacuum (IWC)	-56	-65
Inlet PID	27.45	918.5
Exhaust PID	41.95	1003
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	3	13

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID: **SAMPLE TIME:**

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

OPERATING WELLS

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		14.73	
SVE-8		29.33	
SVE-9		40.25	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		596.7	
SVE-10		110.6	
SVE-11			
SVE-12		344.8	
SVE-13		385.9	
SVE-14		958.7	
SVE-15		540.5	
SVE-16		1133	
SVE-17		374.1	
SVE-18		1044	
SVE-19		1274	
SVE-20		698.4	
SVE-21		108.1	
SVE-22		381.4	

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 12-24
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours (take photo)	39000.98	6905.1
Inlet Vacuum (IWC)	52	56
Inlet Flow from Rotameter (SCFM)	70	*
Exhaust Vacuum (IWC)	-55	-64
Inlet PID	45.42	969.7
Exhaust PID	42.21	1087
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	4.5	13

SVE SYSTEM - QUARTERLY SAMPLING

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

ZONES

Change in Well Operation:

Zone A - Secondary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-5		8.48	
SVE-8		277.6	
9		57.53	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		556.1	
SVE-10		229.2	
SVE-11			
SVE-12		94.32	
SVE-13		965.6	
SVE-14		1212	
SVE-15		258.5	
SVE-16		950.6	
SVE-17		421.7	
SVE-18		1375	
SVE-19		1175	
SVE-20		487.8	
SVE-21		41.34	
SVE-22		466.8	

COMMENTS/OTHER MAINTENANCE:

* Float stuck

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APPENDIX B

Project Photographs

PROJECT PHOTOGRAPHS
OH Randel #5
San Juan County, New Mexico
Hilcorp Energy Company

Photograph 1 Runtime meter taken on September 21, 2022 from SVE Skid 1 (original SVE system) at 9:40 AM Hours = 36745.10		
Photograph 2 Runtime meter taken on September 21, 2022 from SVE Skid 2 (new SVE system) at 9:41 AM Hours = 4652.8		

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

PROJECT PHOTOGRAPHS
OH Randel #5
San Juan County, New Mexico
Hilcorp Energy Company

Photograph 3 Runtime meter taken on December 7, 2022 from SVE Skid 1 (original SVE system) at 3:53 PM Hours = 38598.33		
Photograph 4 Runtime meter taken on December 7, 2022 from SVE Skid 2 (new SVE system) at 3:53 PM Hours = 6507.2		

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

ENSOLUM

APPENDIX C

Laboratory Analytical Reports

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

December 22, 2022

Kate Kaufman

Hilcorp Energy
PO Box 61529
Houston, TX 77208-1529
TEL: (337) 276-7676
FAX:

RE: OH Randel 5 OrderNo.: 2212576

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 2 sample(s) on 12/9/2022 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,

Andy Freeman

Laboratory Manager

4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2212576**
Date Reported: **12/22/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Skid 1
Project: OH Randel 5
Collection Date: 12/7/2022 3:00:00 PM
Lab ID: 2212576-001 **Matrix:** AIR
Received Date: 12/9/2022 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **CCM**	
Gasoline Range Organics (GRO)	480	50		µg/L	10	12/14/2022 5:26:00 PM	R93255
Surr: BFB	93.0	70-130		%Rec	10	12/14/2022 5:26:00 PM	R93255
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	5.2	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Toluene	34	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Ethylbenzene	1.5	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2,4-Trimethylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,3,5-Trimethylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Naphthalene	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1-Methylnaphthalene	ND	4.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
2-Methylnaphthalene	ND	4.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Acetone	ND	10		µg/L	10	12/14/2022 5:26:00 PM	R93255
Bromobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Bromodichloromethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Bromoform	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Bromomethane	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
2-Butanone	ND	10		µg/L	10	12/14/2022 5:26:00 PM	R93255
Carbon disulfide	ND	10		µg/L	10	12/14/2022 5:26:00 PM	R93255
Carbon tetrachloride	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Chlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Chloroethane	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Chloroform	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Chloromethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
2-Chlorotoluene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
4-Chlorotoluene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
cis-1,2-DCE	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
cis-1,3-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Dibromochloromethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Dibromomethane	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,3-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,4-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Dichlorodifluoromethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1-Dichloroethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1-Dichloroethene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255

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

Qualifiers:

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

Analytical Report
Lab Order **2212576**
Date Reported: **12/22/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Skid 1
Project: OH Randel 5
Collection Date: 12/7/2022 3:00:00 PM
Lab ID: 2212576-001 **Matrix:** AIR **Received Date:** 12/9/2022 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,2-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,3-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
2,2-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Hexachlorobutadiene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
2-Hexanone	ND	10		µg/L	10	12/14/2022 5:26:00 PM	R93255
Isopropylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
4-Isopropyltoluene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
4-Methyl-2-pentanone	ND	10		µg/L	10	12/14/2022 5:26:00 PM	R93255
Methylene chloride	ND	3.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
n-Butylbenzene	ND	3.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
n-Propylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
sec-Butylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Styrene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
tert-Butylbenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Tetrachloroethene (PCE)	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
trans-1,2-DCE	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
trans-1,3-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2,3-Trichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2,4-Trichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1,1-Trichloroethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,1,2-Trichloroethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Trichloroethene (TCE)	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Trichlorofluoromethane	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
1,2,3-Trichloropropane	ND	2.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Vinyl chloride	ND	1.0		µg/L	10	12/14/2022 5:26:00 PM	R93255
Xylenes, Total	15	1.5		µg/L	10	12/14/2022 5:26:00 PM	R93255
Surr: Dibromofluoromethane	78.7	70-130		%Rec	10	12/14/2022 5:26:00 PM	R93255
Surr: 1,2-Dichloroethane-d4	67.8	70-130	S	%Rec	10	12/14/2022 5:26:00 PM	R93255
Surr: Toluene-d8	99.5	70-130		%Rec	10	12/14/2022 5:26:00 PM	R93255
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	10	12/14/2022 5:26:00 PM	R93255

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

Qualifiers:

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

Analytical Report
Lab Order **2212576**
Date Reported: **12/22/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Skid 2
Project: OH Randel 5
Collection Date: 12/7/2022 3:30:00 PM
Lab ID: 2212576-002 **Matrix:** AIR **Received Date:** 12/9/2022 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **CCM**	
Gasoline Range Organics (GRO)	18000	250		µg/L	50	12/15/2022 5:21:00 PM	R93346
Surr: BFB	93.5	70-130		%Rec	50	12/15/2022 5:21:00 PM	R93346
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	230	5.0		µg/L	50	12/15/2022 5:21:00 PM	R93346
Toluene	370	10		µg/L	100	12/19/2022 7:46:00 PM	R93413
Ethylbenzene	9.1	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2,4-Trimethylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,3,5-Trimethylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Naphthalene	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1-Methylnaphthalene	ND	4.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
2-Methylnaphthalene	ND	4.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Acetone	13	10		µg/L	10	12/14/2022 5:49:00 PM	R93255
Bromobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Bromodichloromethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Bromoform	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Bromomethane	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
2-Butanone	ND	10		µg/L	10	12/14/2022 5:49:00 PM	R93255
Carbon disulfide	ND	10		µg/L	10	12/14/2022 5:49:00 PM	R93255
Carbon tetrachloride	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Chlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Chloroethane	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Chloroform	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Chloromethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
2-Chlorotoluene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
4-Chlorotoluene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
cis-1,2-DCE	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
cis-1,3-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Dibromochloromethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Dibromomethane	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,3-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,4-Dichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Dichlorodifluoromethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1-Dichloroethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1-Dichloroethene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255

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

Qualifiers:

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

Analytical Report
Lab Order **2212576**
Date Reported: **12/22/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Skid 2
Project: OH Randel 5
Collection Date: 12/7/2022 3:30:00 PM
Lab ID: 2212576-002 **Matrix:** AIR **Received Date:** 12/9/2022 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,2-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,3-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
2,2-Dichloropropane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Hexachlorobutadiene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
2-Hexanone	ND	10		µg/L	10	12/14/2022 5:49:00 PM	R93255
Isopropylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
4-Isopropyltoluene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
4-Methyl-2-pentanone	ND	10		µg/L	10	12/14/2022 5:49:00 PM	R93255
Methylene chloride	ND	3.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
n-Butylbenzene	ND	3.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
n-Propylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
sec-Butylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Styrene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
tert-Butylbenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Tetrachloroethene (PCE)	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
trans-1,2-DCE	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
trans-1,3-Dichloropropene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2,3-Trichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2,4-Trichlorobenzene	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1,1-Trichloroethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,1,2-Trichloroethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Trichloroethene (TCE)	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Trichlorofluoromethane	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
1,2,3-Trichloropropane	ND	2.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Vinyl chloride	ND	1.0		µg/L	10	12/14/2022 5:49:00 PM	R93255
Xylenes, Total	65	1.5		µg/L	10	12/14/2022 5:49:00 PM	R93255
Surr: Dibromofluoromethane	87.6	70-130		%Rec	10	12/14/2022 5:49:00 PM	R93255
Surr: 1,2-Dichloroethane-d4	71.6	70-130		%Rec	10	12/14/2022 5:49:00 PM	R93255
Surr: Toluene-d8	127	70-130		%Rec	10	12/14/2022 5:49:00 PM	R93255
Surr: 4-Bromofluorobenzene	99.8	70-130		%Rec	10	12/14/2022 5:49:00 PM	R93255

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

Qualifiers:

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

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ANALYTICAL SUMMARY REPORT

December 15, 2022

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

Work Order: B22120988 Quote ID: B15626

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 2 samples for Hall Environmental on 12/13/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B22120988-001	2212576-001B, Skid 1	12/07/22 15:00	12/13/22	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60
B22120988-002	2212576-002B, Skid 2	12/07/22 15:30	12/13/22	Air	Same As Above

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

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

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

Report Approved By:

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Not Indicated
Lab ID: B22120988-001
Client Sample ID: 2212576-001B, Skid 1

Report Date: 12/15/22
Collection Date: 12/07/22 15:00
DateReceived: 12/13/22
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.92	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Nitrogen	78.02	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Carbon Dioxide	0.05	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Methane	0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Hexanes plus	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 10:50 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
Hexanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
GPM Total	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
GPM Pentanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 10:50 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	ND			1		GPA 2261-95	12/14/22 10:50 / jrj
Net BTU per cu ft @ std cond. (LHV)	ND			1		GPA 2261-95	12/14/22 10:50 / jrj
Pseudo-critical Pressure, psia	545			1		GPA 2261-95	12/14/22 10:50 / jrj
Pseudo-critical Temperature, deg R	239			1		GPA 2261-95	12/14/22 10:50 / jrj
Specific Gravity @ 60/60F	0.998			0.001		D3588-81	12/14/22 10:50 / jrj
Air, %	100.16			0.01		GPA 2261-95	12/14/22 10:50 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	12/14/22 10:50 / 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)

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Not Indicated
Lab ID: B22120988-002
Client Sample ID: 2212576-002B, Skid 2

Report Date: 12/15/22
Collection Date: 12/07/22 15:30
DateReceived: 12/13/22
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.53	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Nitrogen	78.12	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Carbon Dioxide	0.36	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Methane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Hexanes plus	<0.01	Mol %		0.01		GPA 2261-95	12/14/22 11:52 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
Hexanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
GPM Total	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
GPM Pentanes plus	< 0.001	gpm		0.001		GPA 2261-95	12/14/22 11:52 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	ND			1		GPA 2261-95	12/14/22 11:52 / jrj
Net BTU per cu ft @ std cond. (LHV)	ND			1		GPA 2261-95	12/14/22 11:52 / jrj
Pseudo-critical Pressure, psia	546			1		GPA 2261-95	12/14/22 11:52 / jrj
Pseudo-critical Temperature, deg R	240			1		GPA 2261-95	12/14/22 11:52 / jrj
Specific Gravity @ 60/60F	0.999			0.001		D3588-81	12/14/22 11:52 / jrj
Air, %	98.36			0.01		GPA 2261-95	12/14/22 11:52 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	12/14/22 11:52 / 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:** B22120988 **Report Date:** 12/15/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **GPA 2261-95**										Batch: R393749
Lab ID: **B22120988-001ADUP**	12	Sample Duplicate				Run: GCNGA-B_221214A				12/14/22 11:20
Oxygen		21.9	Mol %	0.01				0.0	20	
Nitrogen		78.0	Mol %	0.01				0	20	
Carbon Dioxide		0.05	Mol %	0.01				0.0	20	
Hydrogen Sulfide		<0.01	Mol %	0.01					20	
Methane		<0.01	Mol %	0.01					20	
Ethane		<0.01	Mol %	0.01					20	
Propane		<0.01	Mol %	0.01					20	
Isobutane		<0.01	Mol %	0.01					20	
n-Butane		<0.01	Mol %	0.01					20	
Isopentane		<0.01	Mol %	0.01					20	
n-Pentane		<0.01	Mol %	0.01					20	
Hexanes plus		<0.01	Mol %	0.01					20	
Lab ID: **LCS121422**	11	Laboratory Control Sample				Run: GCNGA-B_221214A				12/14/22 16:12
Oxygen		0.59	Mol %	0.01	118	70	130			
Nitrogen		5.97	Mol %	0.01	99	70	130			
Carbon Dioxide		1.00	Mol %	0.01	101	70	130			
Methane		74.6	Mol %	0.01	100	70	130			
Ethane		6.04	Mol %	0.01	101	70	130			
Propane		5.01	Mol %	0.01	101	70	130			
Isobutane		2.00	Mol %	0.01	100	70	130			
n-Butane		1.99	Mol %	0.01	99	70	130			
Isopentane		1.01	Mol %	0.01	101	70	130			
n-Pentane		1.01	Mol %	0.01	101	70	130			
Hexanes plus		0.83	Mol %	0.01	104	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

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Work Order Receipt Checklist

Hall Environmental

B22120988

Login completed by: Leslie S. Cadreau
Date Received: 12/13/2022

Reviewed by:
Received by: slm1

Reviewed Date:
Carrier name: UPS

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:	13.2°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

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

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

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

Contact and Corrective Action Comments:

None

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

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

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

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2212576-001B	Skid 1	TEDLAR	Air	12/7/2022 3:00:00 PM	1	Natural Gases 02 & CO2
2	2212576-002B	Skid 2	TEDLAR	Air	12/7/2022 ~~3:00:00 PM~~ 1530	1	Natural Gases 02 & CO2

B22120988

JD 12.9.22

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: 12/9/2022	Time: 8:26 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Sandra Michaelson	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Sandra Michaelson	Date: 12-13-22	Time: 9:25am

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

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

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: Hilcorp Energy | Work Order Number: 2212576 | RcptNo: 1

Received By: Tracy Casarrubias 12/9/2022 7:35:00 AM

Completed By: Tracy Casarrubias 12/9/2022 8:24:07 AM

Reviewed By: JA 12-9-22

Chain of Custody

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

Log In

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

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: ~~JA 12/9/22~~ 12/9/22

JA 12/9/22

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

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

Chain-of-Custody Record

Client: Hilcorp

Mailing Address:

Phone #:

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

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: OH Randel #5

Project #:

Project Manager: Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp(including CF): N/A (°C)

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

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2212576
12-7	1500	air	Skid 1	2 Tedlar		001
12-7	1530	air	Skid 2	2 Tedlar		002

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	8015 TVPH	Fixed gases O_2 & CO_2				
							✓			✓	✓				
							✓			✓	✓				

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-8	820				12/8/22	0820
12/8/22	1819			Courier	12/9/22	7:35

Remarks:

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

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

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

CONDITIONS

Action 175955

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 175955
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	1. Continue with O & M schedule. 2. Submit next quarterly report by May 1, 2023.	2/28/2023