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October 11, 2022

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

Re: Third 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 *Third 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 July, August, and September 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 *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-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.

THIRD QUARTER 2022 ACTIVITIES

During the third 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 third 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 June 17 and September 21, 2022, SVE Skid 1 operated for 2,288 hours with a runtime efficiency of 99 percent (%). Between June 17 and September 21, 2022, SVE Skid 2 operated for 2,302 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 third 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). A third quarter 2022 emissions sample was collected from SVE Skid 2 on September 8, 2022. The emission sample was collected directly into two 1-Liter Tedlar® bags and analyzed by Pace Analytical for analysis of total volatile petroleum hydrocarbons (TVPH – also known as total petroleum hydrocarbons – gasoline range organics (TPH-GRO)) and volatile organic compounds (VOCs) following Environmental Protection Agency (EPA) Method TO-15, as well as fixed gas analysis of oxygen and carbon dioxide following American Society for Testing and Materials (ASTM) Method D-1946.

Of note, the emissions sample collected by Hilcorp from SVE Skid 2 during the third quarter 2022 sampling event was incidentally analyzed for TVPH and VOCs by EPA Method TO-15 instead of EPA Methods 8015D and 8260B, respectively. As presented in the document titled *A Comparison between EPA Compendium Method TO-15 and EPA Method 8260B for VOC Determination in Soil Gas* (Hayes, Benton, Grewal, and Khan, 2005), EPA Methods TO-15 and 8260B generate comparable results for the compounds studied. Additionally, the document concluded that EPA Method TO-15 analysis generally outperforms EPA Method 8260 analysis when comparing recovery rates, reporting limits, and calibration results. As such, the use of EPA Method TO-15 for analysis of TVPH and VOCs is acceptable for the purposes of assessing quarterly air concentrations and calculating emissions generated from the SVE system at the Site.

An emissions sample was not collected from SVE Skid 1 during the September 8, 2022 field visit. As such, Hilcorp collected a sample from SVE Skid 1 on September 22, 2022. The emission sample was collected directly into two 1-Liter Tedlar® bags and submitted to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for analysis of TVPH following EPA Method 8015D, 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 702,507 pounds (351 tons) of TVPH have been removed by the systems to date.

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, the fourth quarter 2022 emissions samples will be collected from both systems during the same field visit and analyzed by EPA Methods 8015D and 8260B for TVPH and VOCs, respectively, in order to be consistent with historical sampling events.

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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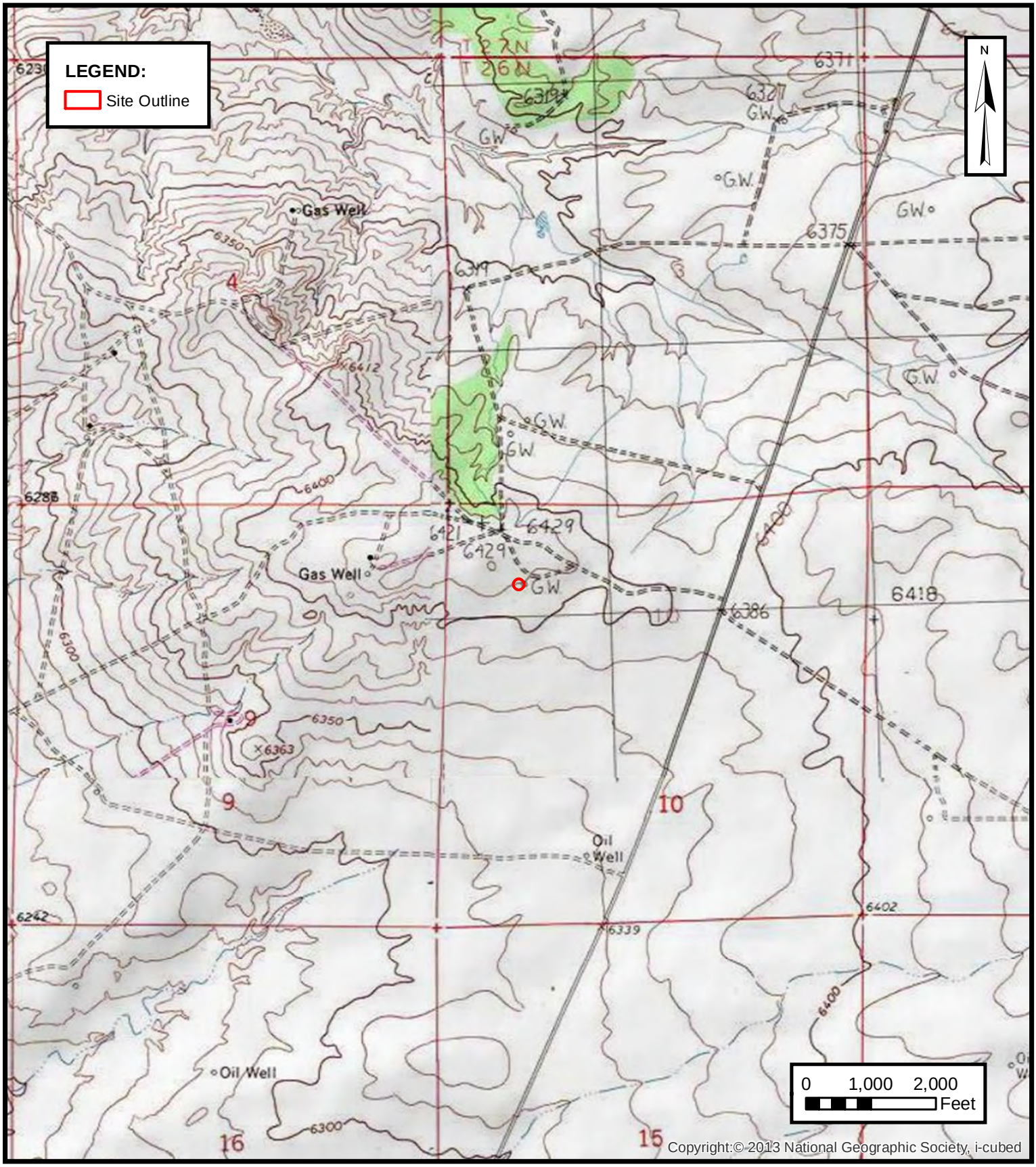
FIGURES



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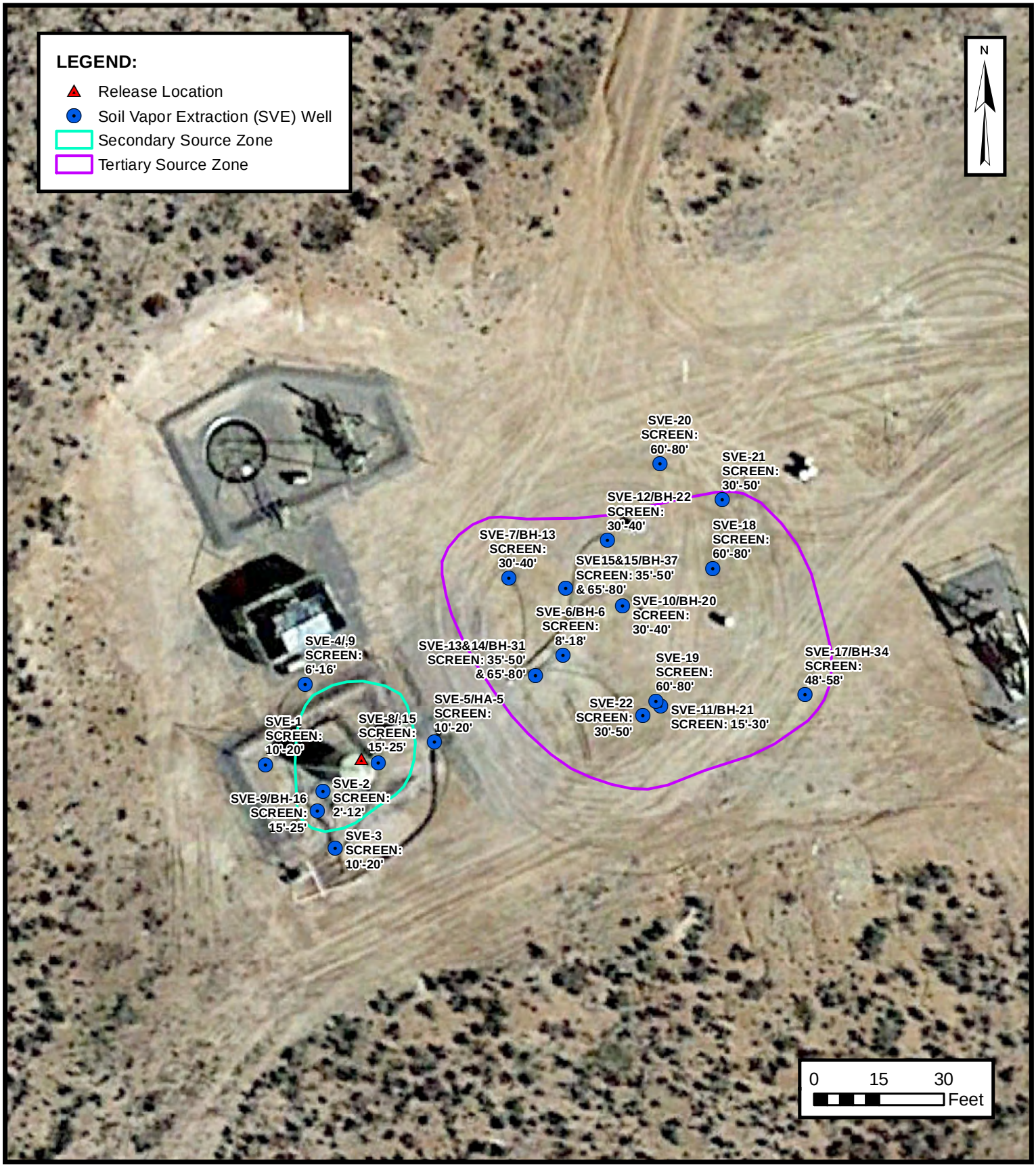
Environmental & Hydrogeologic Consultants

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
6/17/2022	34,457	--	--	--
9/21/2022	36,745	2,288	96	99%

SVE Skid 2 - New System Runtime Operation

Date	Total Operational Hours	Delta Hours	Days	Percent Runtime
6/17/2022	2,351	--	--	--
9/21/2022	4,653	2,302	96	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%

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%

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

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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
Average	1,091	564	1,336	37	298	52,438

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
			Average	0.18	0.46	0.012	0.10	17

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
		Total Mass Recovery to Date	6,767	17,887	469	3,872	671,029	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
Average	1,223	330	703	16	409	33,300

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	0.116	6.8
			Average	0.070	0.135	0.003	0.056	7.9

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	8.51
9/8/2022	4,316	1,966	140	329	7.4	228	13,361	6.68
		Total Mass Recovery to Date	277	576	14	278	31,478	16

Notes:

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

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APPENDIX A

Field Notes

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 7/5/22 O&M PERSONNEL: Reece Hanson
TIME ONSITE: 1215 TIME OFFSITE: 1310

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: — KO TANK HIGH LEVEL —

SVE SYSTEM	#1 READING	#2	TIME
Blower Hours (take photo)	37889.6	2783.5	1220
Inlet Vacuum (IWC)	52	54	
Inlet Thermal Anemometer Flow SCFM ~~(fpm)~~	70	58	
Exhaust Thermal Anemometer Flow (fpm)			
Inlet PID	142	2185	
Exhaust PID	199	3000	
K/O Tank Liquid Level	~~Empty~~	—	
K/O Liquid Drained (gallons)	NA	NA	

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			
SVE-8			

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		1705	
SVE-10		518	
SVE-11			
SVE-12		298	
SVE-13		335	
SVE-14		2440	
SVE-15		1040	
SVE-16		1835	
SVE-17		815	
SVE-18		~~715~~	
SVE-19		3940	
SVE-20		265	
SVE-21		115	
SVE-22		1784	
SVE-5		675	

COMMENTS/OTHER MAINTENANCE:

SVE-9 4/17

Check filter on skid # 2 dry but lots of rust powder

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 7-21
TIME ONSITE: _____

O&M PERSONNEL: _____
TIME OFFSITE: _____

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: | KO TANK HIGH LEVEL

SVE SYSTEM	Skid 1	Skid 2
Blower Hours (take photo)	35279.02	3172.9
Inlet Vacuum (IWC)	50	54
Inlet Flow from Rotameter (SCFM)	70	58
Exhaust Vacuum (IWC)	-53	-60
Inlet PID	151.7	781.4
Exhaust PID	87.18	1109
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		27.22	
SVE-8		46.15	
SVE-9		412.8	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6		—	
SVE-7		1556	
SVE-10		167	
SVE-11		—	
SVE-12		1731	
SVE-13		1204	
SVE-14		1271	
SVE-15		734.2	
SVE-16		1024	
SVE-17		437.6	
SVE-18		1518	
SVE-19		1559	
SVE-20		1127	
SVE-21		99.46	
SVE-22		919.8	

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 8-2-22
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)**	35559.81	3453.37
Inlet Vacuum (IWC)	51	55
Inlet Flow from Rotameter (SCFM)	68	56
Exhaust Vacuum (IWC)	-42	-60
Inlet PID	76.5	1170
Exhaust PID	101	1246
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		37.9	
SVE-8		251	
SVE-9		987	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		1863	
SVE-10		73.9	
SVE-11			
SVE-12		784	
SVE-13		1516	
SVE-14		1544	
SVE-15		932	
SVE-16		1309	
SVE-17			
SVE-18		1350	
SVE-19		1876	
SVE-20		1347	
SVE-21		112	
SVE-22		353	

COMMENTS/OTHER MAINTENANCE:

- Replaced SVE 12 well cap
  SVE 10

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 8-16
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)**	35894.79	3788.6
Inlet Vacuum (IWC)	52	55
Inlet Flow from Rotameter (SCFM)	66	55
Exhaust Vacuum (IWC)	-27	-61
Inlet PID	28.3	1228
Exhaust PID	89.6	1392
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		15.8	
SVE-8		179	
SVE-9		686	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		1699	
SVE-10		197	
SVE-11			
SVE-12		1386	
SVE-13		1365	
SVE-14		1010	
SVE-15		1017	
SVE-16		1509	
SVE-17		828	
SVE-18		1888	
SVE-19		1483	
SVE-20		1487	
SVE-21		124	
SVE-22		776	

COMMENTS/OTHER MAINTENANCE:

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 9-7-22
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)**	36408.71	4316.4
Inlet Vacuum (IWC)	53	56
Inlet Flow from Rotameter (SCFM)	64	56
Exhaust Vacuum (IWC)	-56	-62
Inlet PID	34.1	258
Exhaust PID	66	383
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		6.4	
SVE-8		339	
SVE-9		469	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		1320	
SVE-10		117	
SVE-11			
SVE-12		1595	
SVE-13		1777	
SVE-14		1464	
SVE-15		825	
SVE-16		745	
SVE-17		534	
SVE-18		1850	
SVE-19		1998	
SVE-20		1534	
SVE-21		130	
SVE-22		492	

COMMENTS/OTHER MAINTENANCE:

Replaced SVE-8 well cap

OH RANDEL #5 SVE SYSTEM
BIWEEKLY O&M FORM

DATE: 9-21
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)**	36745.19	4652.8
Inlet Vacuum (IWC)	54	57
Inlet Flow from Rotameter (SCFM)	65	50
Exhaust Vacuum (IWC)	-57	-62
Inlet PID	55.4	1152
Exhaust PID	64	1285
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		48.6	
SVE-8		526	
SVE-9		152	

Zone B - Tertiary Impacts

LOCATION	VACUUM (IWC)	PID HEADSPACE (PPM)	ADJUSTMENTS
SVE-6			
SVE-7		669	
SVE-10		68.5	
SVE-11			
SVE-12		228	
SVE-13		1370	
SVE-14		973	
SVE-15		724	
SVE-16		1222	
SVE-17		538	
SVE-18		1204	
SVE-19		1507	
SVE-20		1251	
SVE-21		97.9	
SVE-22		453	

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

APPENDIX B

Project Photographs

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

Photograph 1 Runtime meter taken on June 17, 2022 from SVE Skid 1 (original SVE system) at 11:30 AM Hours = 34456.79	
Photograph 2 Runtime meter taken on June 17, 2022 from SVE Skid 2 (new SVE system) at 11:30 AM Hours = 2350.6	

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 September 21, 2022 from SVE Skid 1 (original SVE system) at 9:40 AM Hours = 36745.10		
Photograph 4 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

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

October 07, 2022

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

RE: O H Randel 005 OrderNo.: 2209C63

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 2 sample(s) on 9/23/2022 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued September 29, 2022.

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. 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. All samples are reported as received unless otherwise indicated.

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 **2209C63**
Date Reported: **10/7/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: Skid 1
Project: O H Randel 005
Collection Date: 9/22/2022 12:15:00 PM
Lab ID: 2209C63-001 **Matrix:** AIR
Received Date: 9/23/2022 7:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	9.0	1.0		µg/L	10	9/26/2022 3:09:00 PM
Toluene	42	1.0		µg/L	10	9/26/2022 3:09:00 PM
Ethylbenzene	1.9	1.0		µg/L	10	9/26/2022 3:09:00 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2,4-Trimethylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Naphthalene	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
1-Methylnaphthalene	ND	4.0		µg/L	10	9/26/2022 3:09:00 PM
2-Methylnaphthalene	ND	4.0		µg/L	10	9/26/2022 3:09:00 PM
Acetone	ND	10		µg/L	10	9/26/2022 3:09:00 PM
Bromobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Bromodichloromethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Bromoform	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Bromomethane	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
2-Butanone	ND	10		µg/L	10	9/26/2022 3:09:00 PM
Carbon disulfide	ND	10		µg/L	10	9/26/2022 3:09:00 PM
Carbon tetrachloride	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Chlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Chloroethane	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
Chloroform	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Chloromethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
2-Chlorotoluene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
4-Chlorotoluene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
cis-1,2-DCE	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
cis-1,3-Dichloropropene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
Dibromochloromethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Dibromomethane	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
1,2-Dichlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,4-Dichlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Dichlorodifluoromethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1-Dichloroethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1-Dichloroethene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2-Dichloropropane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,3-Dichloropropane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
2,2-Dichloropropane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	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 range due to dilution or matrix interference

Analytical Report
Lab Order **2209C63**
Date Reported: **10/7/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: Skid 1
Project: O H Randel 005
Collection Date: 9/22/2022 12:15:00 PM
Lab ID: 2209C63-001 **Matrix:** AIR **Received Date:** 9/23/2022 7:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
1,1-Dichloropropene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Hexachlorobutadiene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
2-Hexanone	ND	10		µg/L	10	9/26/2022 3:09:00 PM
Isopropylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
4-Isopropyltoluene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	10	9/26/2022 3:09:00 PM
Methylene chloride	ND	3.0		µg/L	10	9/26/2022 3:09:00 PM
n-Butylbenzene	ND	3.0		µg/L	10	9/26/2022 3:09:00 PM
n-Propylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
sec-Butylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Styrene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
tert-Butylbenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
trans-1,2-DCE	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Trichloroethene (TCE)	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Trichlorofluoromethane	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	10	9/26/2022 3:09:00 PM
Vinyl chloride	ND	1.0		µg/L	10	9/26/2022 3:09:00 PM
Xylenes, Total	20	1.5		µg/L	10	9/26/2022 3:09:00 PM
Surr: Dibromofluoromethane	95.7	70-130		%Rec	10	9/26/2022 3:09:00 PM
Surr: 1,2-Dichloroethane-d4	88.8	70-130		%Rec	10	9/26/2022 3:09:00 PM
Surr: Toluene-d8	94.5	70-130		%Rec	10	9/26/2022 3:09:00 PM
Surr: 4-Bromofluorobenzene	94.6	70-130		%Rec	10	9/26/2022 3:09:00 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **CCM**
Gasoline Range Organics (GRO)	670	50		µg/L	10	9/26/2022 3:09:00 PM
Surr: BFB	89.5	70-130		%Rec	10	9/26/2022 3:09:00 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

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ANALYTICAL SUMMARY REPORT

September 28, 2022

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

Work Order: B22092356 Quote ID: B15626

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 2 samples for Hall Environmental on 9/27/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B22092356-001	2209C63-001B, Skid 1	09/22/22 12:15	09/27/22	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60
B22092356-002	2209C63-002B, Skid 2	09/22/22 12:00	09/27/22	Air	Same As Abov

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: William T Brown Director

Digitally signed by
Bill Brown
Date: 2022.09.28 16:40:31 -06:00

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Not Indicated
Lab ID: B22092356-001
Client Sample ID: 2209C63-001B, Skid 1

Report Date: 09/28/22
Collection Date: 09/22/22 12:15
DateReceived: 09/27/22
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.84	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Nitrogen	78.06	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Carbon Dioxide	0.10	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Methane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Hexanes plus	<0.01	Mol %		0.01		GPA 2261-95	09/28/22 14:34 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
Hexanes plus	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
GPM Total	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
GPM Pentanes plus	< 0.001	gpm		0.001		GPA 2261-95	09/28/22 14:34 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	ND			1		GPA 2261-95	09/28/22 14:34 / jrj
Net BTU per cu ft @ std cond. (LHV)	ND			1		GPA 2261-95	09/28/22 14:34 / jrj
Pseudo-critical Pressure, psia	545			1		GPA 2261-95	09/28/22 14:34 / jrj
Pseudo-critical Temperature, deg R	239			1		GPA 2261-95	09/28/22 14:34 / jrj
Specific Gravity @ 60/60F	0.998			0.001		D3588-81	09/28/22 14:34 / jrj
Air, %	99.77			0.01		GPA 2261-95	09/28/22 14:34 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	09/28/22 14:34 / 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 drybasis.

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:** B22092356 **Report Date:** 09/28/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **GPA 2261-95**										Batch: R388695
Lab ID: **B22092354-001ADUP**	12	Sample Duplicate				Run: GCNGA-B_220928A				09/28/22 12:39
Oxygen		20.6	Mol %	0.01				0	20	
Nitrogen		78.2	Mol %	0.01				0.0	20	
Carbon Dioxide		1.00	Mol %	0.01				0.0	20	
Hydrogen Sulfide		<0.01	Mol %	0.01					20	
Methane		0.20	Mol %	0.01				4.9	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: **LCS092822**	11	Laboratory Control Sample				Run: GCNGA-B_220928A				09/28/22 15:29
Oxygen		0.61	Mol %	0.01	122	70	130			
Nitrogen		6.08	Mol %	0.01	101	70	130			
Carbon Dioxide		1.00	Mol %	0.01	101	70	130			
Methane		74.4	Mol %	0.01	100	70	130			
Ethane		6.04	Mol %	0.01	101	70	130			
Propane		5.07	Mol %	0.01	103	70	130			
Isobutane		1.99	Mol %	0.01	99	70	130			
n-Butane		1.98	Mol %	0.01	99	70	130			
Isopentane		1.00	Mol %	0.01	100	70	130			
n-Pentane		1.01	Mol %	0.01	101	70	130			
Hexanes plus		0.79	Mol %	0.01	99	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

B22092356

Login completed by: Leslie S. Cadreau
Date Received: 9/27/2022

Reviewed by:
Received by: lsc

Reviewed Date:
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes R	No £	Not Present £
Custody seals intact on all shipping container(s)/cooler(s)?	Yes R	No £	Not Present £
Custody seals intact on all sample bottles?	Yes £	No £	Not Present R
Chain of custody present?	Yes R	No £	
Chain of custody signed when relinquished and received?	Yes R	No £	
Chain of custody agrees with sample labels?	Yes R	No £	
Samples in proper container/bottle?	Yes R	No £	
Sample containers intact?	Yes R	No £	
Sufficient sample volume for indicated test?	Yes R	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 R	No £	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes £	No R	Not Applicable £
Container/Temp Blank temperature:	16.9°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes £	No £	No VOA vials submitted R
Water - pH acceptable upon receipt?	Yes £	No £	Not Applicable R

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

SUBCONTRACTOR: 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	2209C63-001B	Skid 1	TEDLAR	Air	9/22/2022 12:15:00 PM	1	Natural Gasses, O2, CO2, **3 Day TAT** B220923560
2	2209C63-002B	Skid 2	TEDLAR	Air	9/22/2022 12:00:00 PM	1	Natural Gasses, O2, CO2, **3 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: CMC	Date: 9/23/2022	Time: 8:01 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Josh Cochran	9/23/22	09:30

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: ____ °C 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: **2209C63** RcptNo: **1**

Received By: **Cheyenne Cason** **9/23/2022 7:10:00 AM**

Completed By: **Cheyenne Cason** **9/23/2022 7:57:43 AM**

Reviewed By: JN 9/23/22

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: KPA 9-23-22

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	Not Present			

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: 9/27
☐ Standard ☑ Rush

Project Name: O'Ht Randel #005

Project #:

Project Manager: Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☐ Yes ☑ No

# of Coolers: 1

Cooler Temp(including CF): NA (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2209C63	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				
9-22	1215	air	skid 1	2 Tedlar		001								✓			✓	✓				
9-22	1200	air	skid 2	2 Tedlar		002								✓			✓	✓				

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9-22	1648				9/22/22	1648
9/22/22	1827		Courier		9/23/22	0710

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.

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

September 19, 2022

Kate Kaufman

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

RE: OH Randel 005 OrderNo.: 2209430

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 1 sample(s) on 9/9/2022 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

Pace Analytical®

ANALYTICAL REPORT

September 16, 2022

Hall Environmental Analysis Laboratory

Sample Delivery Group:	L1534913
Samples Received:	09/13/2022
Project Number:	
Description:	

Report To: Andy Freeman
4901 Hawkins NE
Albuquerque, NM 87109

Entire Report Reviewed By: John V Hawkins

John Hawkins
Project Manager

Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

2209430-001A SVE-1 L1534913-01 Air

			Collected by	Collected date/time	Received date/time
				09/08/22 13:00	09/13/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG1925454	100	09/14/22 01:26	09/14/22 01:26	CEP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG1927061	10000	09/15/22 17:51	09/15/22 17:51	SDS	Mt. Juliet, TN
Organic Compounds (GC) by Method D1946	WG1926699	1	09/15/22 14:24	09/15/22 14:24	JAP	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Project Manager

Sample Delivery Group (SDG) Narrative

Sample received in tedlar bag.

Lab Sample ID	Project Sample ID	Method
L1534913-01	2209430-001A SVE-1	TO-15, D1946

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	125	297	3800	9030		100	WG1925454
Allyl chloride	107-05-1	76.53	20.0	62.6	ND	ND		100	WG1925454
Benzene	71-43-2	78.10	2000	6390	150000	479000	Q	10000	WG1927061
Benzyl Chloride	100-44-7	127	20.0	104	ND	ND		100	WG1925454
Bromodichloromethane	75-27-4	164	20.0	134	ND	ND		100	WG1925454
Bromoform	75-25-2	253	60.0	621	ND	ND		100	WG1925454
Bromomethane	74-83-9	94.90	20.0	77.6	ND	ND		100	WG1925454
1,3-Butadiene	106-99-0	54.10	200	443	ND	ND		100	WG1925454
Carbon disulfide	75-15-0	76.10	20.0	62.2	ND	ND		100	WG1925454
Carbon tetrachloride	56-23-5	154	20.0	126	ND	ND		100	WG1925454
Chlorobenzene	108-90-7	113	20.0	92.4	ND	ND		100	WG1925454
Chloroethane	75-00-3	64.50	20.0	52.8	ND	ND		100	WG1925454
Chloroform	67-66-3	119	20.0	97.3	ND	ND		100	WG1925454
Chloromethane	74-87-3	50.50	20.0	41.3	ND	ND		100	WG1925454
2-Chlorotoluene	95-49-8	126	20.0	103	ND	ND		100	WG1925454
Cyclohexane	110-82-7	84.20	2000	6890	664000	2290000	Q	10000	WG1927061
Dibromochloromethane	124-48-1	208	20.0	170	ND	ND		100	WG1925454
1,2-Dibromoethane	106-93-4	188	20.0	154	ND	ND		100	WG1925454
1,2-Dichlorobenzene	95-50-1	147	20.0	120	ND	ND		100	WG1925454
1,3-Dichlorobenzene	541-73-1	147	20.0	120	ND	ND		100	WG1925454
1,4-Dichlorobenzene	106-46-7	147	20.0	120	ND	ND		100	WG1925454
1,2-Dichloroethane	107-06-2	99	20.0	81.0	ND	ND		100	WG1925454
1,1-Dichloroethane	75-34-3	98	20.0	80.2	ND	ND		100	WG1925454
1,1-Dichloroethene	75-35-4	96.90	20.0	79.3	ND	ND		100	WG1925454
cis-1,2-Dichloroethene	156-59-2	96.90	20.0	79.3	ND	ND		100	WG1925454
trans-1,2-Dichloroethene	156-60-5	96.90	20.0	79.3	ND	ND		100	WG1925454
1,2-Dichloropropane	78-87-5	113	20.0	92.4	ND	ND		100	WG1925454
cis-1,3-Dichloropropene	10061-01-5	111	20.0	90.8	ND	ND		100	WG1925454
trans-1,3-Dichloropropene	10061-02-6	111	20.0	90.8	ND	ND		100	WG1925454
1,4-Dioxane	123-91-1	88.10	20.0	72.1	ND	ND		100	WG1925454
Ethanol	64-17-5	46.10	125	236	1580	2980		100	WG1925454
Ethylbenzene	100-41-4	106	20.0	86.7	6000	26000		100	WG1925454
4-Ethyltoluene	622-96-8	120	20.0	98.2	1280	6280		100	WG1925454
Trichlorofluoromethane	75-69-4	137.40	20.0	112	ND	ND		100	WG1925454
Dichlorodifluoromethane	75-71-8	120.92	20.0	98.9	ND	ND		100	WG1925454
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	20.0	153	ND	ND		100	WG1925454
1,2-Dichlorotetrafluoroethane	76-14-2	171	20.0	140	ND	ND		100	WG1925454
Heptane	142-82-5	100	2000	8180	461000	1890000	Q	10000	WG1927061
Hexachloro-1,3-butadiene	87-68-3	261	63.0	673	ND	ND		100	WG1925454
n-Hexane	110-54-3	86.20	6300	22200	810000	2860000	Q	10000	WG1927061
Isopropylbenzene	98-82-8	120.20	20.0	98.3	477	2350		100	WG1925454
Methylene Chloride	75-09-2	84.90	20.0	69.4	ND	ND		100	WG1925454
Methyl Butyl Ketone	591-78-6	100	125	511	ND	ND		100	WG1925454
2-Butanone (MEK)	78-93-3	72.10	125	369	933	2750		100	WG1925454
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	125	512	ND	ND		100	WG1925454
Methyl methacrylate	80-62-6	100.12	20.0	81.9	ND	ND		100	WG1925454
MTBE	1634-04-4	88.10	20.0	72.1	ND	ND		100	WG1925454
Naphthalene	91-20-3	128	63.0	330	ND	ND		100	WG1925454
2-Propanol	67-63-0	60.10	125	307	10300	25300	E	100	WG1925454
Propene	115-07-1	42.10	125	215	ND	ND		100	WG1925454
Styrene	100-42-5	104	20.0	85.1	ND	ND		100	WG1925454
1,1,2,2-Tetrachloroethane	79-34-5	168	20.0	137	ND	ND		100	WG1925454
Tetrachloroethylene	127-18-4	166	20.0	136	ND	ND		100	WG1925454
Tetrahydrofuran	109-99-9	72.10	20.0	59.0	ND	ND		100	WG1925454
Toluene	108-88-3	92.10	5000	18800	315000	1190000	Q	10000	WG1927061
1,2,4-Trichlorobenzene	120-82-1	181	63.0	466	ND	ND		100	WG1925454

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	20.0	109	ND	ND		100	WG1925454
1,1,2-Trichloroethane	79-00-5	133	20.0	109	ND	ND		100	WG1925454
Trichloroethylene	79-01-6	131	20.0	107	ND	ND		100	WG1925454
1,2,4-Trimethylbenzene	95-63-6	120	20.0	98.2	769	3770		100	WG1925454
1,3,5-Trimethylbenzene	108-67-8	120	20.0	98.2	828	4060		100	WG1925454
2,2,4-Trimethylpentane	540-84-1	114.22	20.0	93.4	ND	ND		100	WG1925454
Vinyl chloride	75-01-4	62.50	20.0	51.1	ND	ND		100	WG1925454
Vinyl Bromide	593-60-2	106.95	20.0	87.5	ND	ND		100	WG1925454
Vinyl acetate	108-05-4	86.10	20.0	70.4	ND	ND		100	WG1925454
m&p-Xylene	1330-20-7	106	4000	17300	234000	1010000	Q	10000	WG1927061
o-Xylene	95-47-6	106	20.0	86.7	7250	31400		100	WG1925454
TPH (GC/MS) Low Fraction	8006-61-9	101	2000000	8260000	7720000	31900000	Q	10000	WG1927061
1,1-Difluoroethane	75-37-6	66.05	100	270	ND	ND		100	WG1925454
1,2,3-Trimethylbenzene	526-73-8	120.10	20.0	98.2	111	545		100	WG1925454
Chlorodifluoromethane	75-45-6	86.50	20.0	70.8	ND	ND		100	WG1925454
Ethyl acetate	141-78-6	88	20.0	72.0	ND	ND		100	WG1925454
Methyl Cyclohexane	108-87-2	98.1860	20.0	80.3	8370	33600		100	WG1925454
Tert-Amyl Ethyl Ether	919-94-8	116.20	20.0	95.1	ND	ND		100	WG1925454
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*141*		J1		WG1925454
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*100*				WG1927061

Sample Narrative:

L1534913-01 WG1925454: Surrogate failure due to matrix interference

Organic Compounds (GC) by Method D1946

Analyte	CAS #	Mol. Wt.	RDL %	Result %	Qualifier	Dilution	Batch
Oxygen	7782-44-7	32	5.00	20.1	T8	1	WG1926699
Carbon Monoxide	630-08-0	28	2.00	ND	T8	1	WG1926699
Carbon Dioxide	124-38-9	44.01	0.500	ND	T8	1	WG1926699
Methane	74-82-8	16	0.400	ND	T8	1	WG1926699

Method Blank (MB)

(MB) R3837020-3 09/13/22 09:59

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl Chloride	U		0.114	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.200
Ethanol	U		0.265	1.25
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.0814	1.25

Method Blank (MB)

(MB) R3837020-3 09/13/22 09:59

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl Methacrylate	U		0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	0.144	J	0.0932	1.25
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0764	0.200
1,3,5-Trimethylbenzene	U		0.0779	0.200
2,2,4-Trimethylpentane	U		0.133	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.200
o-Xylene	U		0.0828	0.200
1,1-Difluoroethane	0.342	J	0.129	1.00
1,2,3-Trimethylbenzene	U		0.0805	0.200
Chlorodifluoromethane	U		0.131	0.200
Ethyl acetate	U		0.100	0.200
Methyl Cyclohexane	U		0.0813	0.200
Tert-Amyl Ethyl Ether	U		0.0778	0.200
(S) 1,4-Bromofluorobenzene	*94.3*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3837020-1 09/13/22 08:40 • (LCSD) R3837020-2 09/13/22 09:20

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.40	3.45	90.7	92.0	70.0-130			1.46	25
Allyl Chloride	3.75	3.72	3.41	99.2	90.9	70.0-130			8.70	25
Benzyl Chloride	3.75	4.05	4.05	108	108	70.0-152			0.000	25
Bromodichloromethane	3.75	3.79	3.90	101	104	70.0-130			2.86	25
Bromoform	3.75	4.00	4.12	107	110	70.0-130			2.96	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3837020-1 09/13/22 08:40 • (LCSD) R3837020-2 09/13/22 09:20

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromomethane	3.75	3.78	3.75	101	100	70.0-130			0.797	25
1,3-Butadiene	3.75	3.14	3.15	83.7	84.0	70.0-130			0.318	25
Carbon disulfide	3.75	4.03	4.11	107	110	70.0-130			1.97	25
Carbon tetrachloride	3.75	3.84	3.93	102	105	70.0-130			2.32	25
Chlorobenzene	3.75	3.85	3.97	103	106	70.0-130			3.07	25
Chloroethane	3.75	3.57	3.62	95.2	96.5	70.0-130			1.39	25
Chloroform	3.75	3.87	3.95	103	105	70.0-130			2.05	25
Chloromethane	3.75	3.33	3.40	88.8	90.7	70.0-130			2.08	25
2-Chlorotoluene	3.75	3.91	4.01	104	107	70.0-130			2.53	25
Dibromochloromethane	3.75	3.84	3.97	102	106	70.0-130			3.33	25
1,2-Dibromoethane	3.75	3.90	4.05	104	108	70.0-130			3.77	25
1,2-Dichlorobenzene	3.75	3.98	4.10	106	109	70.0-130			2.97	25
1,3-Dichlorobenzene	3.75	3.94	4.05	105	108	70.0-130			2.75	25
1,4-Dichlorobenzene	3.75	3.93	4.00	105	107	70.0-130			1.77	25
1,2-Dichloroethane	3.75	3.58	3.69	95.5	98.4	70.0-130			3.03	25
1,1-Dichloroethane	3.75	3.82	3.88	102	103	70.0-130			1.56	25
1,1-Dichloroethene	3.75	3.79	3.86	101	103	70.0-130			1.83	25
cis-1,2-Dichloroethene	3.75	3.74	3.85	99.7	103	70.0-130			2.90	25
trans-1,2-Dichloroethene	3.75	3.79	3.87	101	103	70.0-130			2.09	25
1,2-Dichloropropane	3.75	3.70	3.87	98.7	103	70.0-130			4.49	25
cis-1,3-Dichloropropene	3.75	3.95	4.05	105	108	70.0-130			2.50	25
trans-1,3-Dichloropropene	3.75	3.91	4.02	104	107	70.0-130			2.77	25
1,4-Dioxane	3.75	4.04	4.11	108	110	70.0-140			1.72	25
Ethanol	3.75	3.40	3.45	90.7	92.0	55.0-148			1.46	25
Ethylbenzene	3.75	4.00	4.04	107	108	70.0-130			0.995	25
4-Ethyltoluene	3.75	4.01	4.14	107	110	70.0-130			3.19	25
Trichlorofluoromethane	3.75	3.60	3.70	96.0	98.7	70.0-130			2.74	25
Dichlorodifluoromethane	3.75	3.82	3.86	102	103	64.0-139			1.04	25
1,1,2-Trichlorotrifluoroethane	3.75	3.98	4.03	106	107	70.0-130			1.25	25
1,2-Dichlorotetrafluoroethane	3.75	3.81	3.91	102	104	70.0-130			2.59	25
Hexachloro-1,3-butadiene	3.75	3.84	3.95	102	105	70.0-151			2.82	25
Isopropylbenzene	3.75	4.02	4.15	107	111	70.0-130			3.18	25
Methylene Chloride	3.75	3.33	3.41	88.8	90.9	70.0-130			2.37	25
Methyl Butyl Ketone	3.75	3.56	3.64	94.9	97.1	70.0-149			2.22	25
Methyl Ethyl Ketone	3.75	3.97	4.05	106	108	70.0-130			2.00	25
4-Methyl-2-pentanone (MIBK)	3.75	3.42	3.54	91.2	94.4	70.0-139			3.45	25
Methyl Methacrylate	3.75	3.94	4.07	105	109	70.0-130			3.25	25
MTBE	3.75	4.04	4.15	108	111	70.0-130			2.69	25
Naphthalene	3.75	3.70	3.71	98.7	98.9	70.0-159			0.270	25
2-Propanol	3.75	3.52	3.60	93.9	96.0	70.0-139			2.25	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3837020-1 09/13/22 08:40 • (LCSD) R3837020-2 09/13/22 09:20

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Propene	3.75	3.39	3.50	90.4	93.3	64.0-144			3.19	25
Styrene	3.75	4.08	4.20	109	112	70.0-130			2.90	25
1,1,2,2-Tetrachloroethane	3.75	3.89	3.96	104	106	70.0-130			1.78	25
Tetrachloroethylene	3.75	3.92	4.05	105	108	70.0-130			3.26	25
Tetrahydrofuran	3.75	3.38	3.47	90.1	92.5	70.0-137			2.63	25
1,2,4-Trichlorobenzene	3.75	3.56	3.59	94.9	95.7	70.0-160			0.839	25
1,1,1-Trichloroethane	3.75	3.85	3.91	103	104	70.0-130			1.55	25
1,1,2-Trichloroethane	3.75	3.82	3.97	102	106	70.0-130			3.85	25
Trichloroethylene	3.75	3.86	3.94	103	105	70.0-130			2.05	25
1,2,4-Trimethylbenzene	3.75	4.04	4.12	108	110	70.0-130			1.96	25
1,3,5-Trimethylbenzene	3.75	4.00	4.07	107	109	70.0-130			1.73	25
2,2,4-Trimethylpentane	3.75	3.77	3.83	101	102	70.0-130			1.58	25
Vinyl chloride	3.75	3.68	3.69	98.1	98.4	70.0-130			0.271	25
Vinyl Bromide	3.75	3.78	3.81	101	102	70.0-130			0.791	25
Vinyl acetate	3.75	3.60	3.58	96.0	95.5	70.0-130			0.557	25
o-Xylene	3.75	4.03	4.10	107	109	70.0-130			1.72	25
1,1-Difluoroethane	3.75	3.62	3.74	96.5	99.7	70.0-130			3.26	25
1,2,3-Trimethylbenzene	3.75	4.03	4.11	107	110	70.0-130			1.97	25
Chlorodifluoromethane	3.75	3.61	3.82	96.3	102	70.0-130			5.65	25
Ethyl acetate	3.75	3.44	3.46	91.7	92.3	70.0-130			0.580	25
Methyl Cyclohexane	3.75	3.98	4.05	106	108	70.0-130			1.74	25
Tert-Amyl Ethyl Ether	3.75	3.94	4.16	105	111	70.0-130			5.43	25
(S) 1,4-Bromofluorobenzene				*100*	*99.5*	*60.0-140*				

Method Blank (MB)

(MB) R3837925-3 09/15/22 13:38

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Benzene	U		0.0715	0.200
Cyclohexane	U		0.0753	0.200
Heptane	U		0.104	0.200
n-Hexane	U		0.206	0.630
Toluene	U		0.0870	0.500
m&p-Xylene	U		0.135	0.400
TPH (GC/MS) Low Fraction	61.6	J	39.7	200
(S) 1,4-Bromofluorobenzene	*96.1*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3837925-1 09/15/22 12:39 • (LCSD) R3837925-2 09/15/22 13:09

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	3.75	3.88	3.86	103	103	70.0-130			0.517	25
Cyclohexane	3.75	3.98	3.93	106	105	70.0-130			1.26	25
Heptane	3.75	4.16	4.16	111	111	70.0-130			0.000	25
n-Hexane	3.75	4.24	4.27	113	114	70.0-130			0.705	25
Toluene	3.75	4.02	4.00	107	107	70.0-130			0.499	25
m&p-Xylene	7.50	9.13	9.10	122	121	70.0-130			0.329	25
TPH (GC/MS) Low Fraction	203	256	254	126	125	70.0-130			0.784	25
(S) 1,4-Bromofluorobenzene				*102*	*101*	*60.0-140*				

Method Blank (MB)

(MB) R3837669-3 09/15/22 13:51

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Oxygen	0.286		0.225	5.00
Carbon Monoxide	U		0.665	2.00
Carbon Dioxide	U		0.121	0.500
Methane	U		0.0584	0.400

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3837669-1 09/15/22 13:45 • (LCSD) R3837669-2 09/15/22 13:48

Analyte	Spike Amount %	LCS Result %	LCSD Result %	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Oxygen	20.0	19.3	19.2	96.5	96.0	70.0-130			0.519	20
Carbon Monoxide	2.50	2.55	2.52	102	101	70.0-130			1.18	20
Carbon Dioxide	2.50	2.63	2.61	105	104	70.0-130			0.763	20
Methane	2.00	2.20	2.20	110	110	70.0-130			0.000	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
Q	Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values.
T8	Sample(s) received past/too close to holding time expiration.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

M222

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

SUB CONTRATOR: Pace TN	COMPANY: PACE TN		PHONE: (800) 767-5859	FAX: (615) 758-5859	
ADDRESS: 12065 Lebanon Rd			ACCOUNT #:	EMAIL:	
CITY, STATE, ZIP: Mt. Juliet, TN 37122					

L1534913

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2209430-001A	SVE-1	TEDLAR	Air	9/8/2022 1:00:00 PM	2	TO-15 . VOC. TPH. + O2 + CO2 D1946 -01

Sample Receipt Checklist

COC Seal Present/Intact:	Y	N	If Applicable		
COC Signed/Accurate:	✓	N	VOA Zero Headspace:	Y	N
Bottles arrive intact:	✓	N	Pres.Correct/Check:	Y	N
Correct bottles used:	✓	N			
Sufficient volume sent:	✓	N			
RAD Screen <0.5 mR/hr:	✓	N			

TRK 5755 8093 3271

TEMP N/A

Bottles Received 2

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: 9/9/2022	Time: 8:10 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Hayden Nuechterlein	Date: 10/13	Time: 09:00

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 _____ °C 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: 2209430 | RcptNo: 1

Received By: Sean Livingston 9/9/2022 7:30:00 AM S Livingston

Completed By: Tracy Casarrubias 9/9/2022 8:08:07 AM

Reviewed By: JN 9/9/22

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: KPG 9.09.22

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 #005

Project #:

Project Manager: Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): NA (°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. 2209430
9-8	1300	air	SVE-1	2 Tedlar		001

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)	TO-15 VOC	TO-15 TPH&GRO	O_2 & CO_2, 1946			
										✓	✓	✓			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9-8	1725				9/8/22	1725
9/8/22	1842				9/9/22	7:30

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 150542

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 150542
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See app ID 175955 for most updated status.	2/28/2023