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April 15, 2024

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

Re: First Quarter 2024 – SVE System Update
Howell M#1
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NRM2022755502

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *First Quarter 2024 – SVE System Update* report summarizing the soil vapor extraction (SVE) system performance at the Howell M#1 natural gas production well (Site), located in Unit N of Section 30, Township 30 North, Range 8 West, San Juan County, New Mexico (Figure 1). The SVE system was put into operation on June 6, 2023, to remediate subsurface soil impacts resulting from historical impacts discovered at the Site. This report summarizes Site activities performed in December 2023 and January, February, and March 2024.

SVE SYSTEM SPECIFICATIONS

The SVE system at the Site consists of a 3-phase, 3.5 horsepower Atlantic Blower AB-500 regenerative blower capable of producing 230 cubic feet per minute (cfm) flow and 88 inches of water column (IWC) vacuum. The system is powered by a permanent power drop and is intended to run 24 hours per day. Six SVE wells, SVE01 through SVE06, are currently in operation and are shown on Figure 2.

FIRST QUARTER 2024 ACTIVITIES

The SVE system began operation on June 6, 2023. Based on the New Mexico Oil Conservation Division (NMOCD) Conditions of Approval (COAs), dated November 7, 2022, field data measurements were collected bi-weekly from the system during the first quarter of 2024 and included the following parameters: flow, vacuum, photoionization detector (PID) measurements of volatile organic compounds (VOCs) from each SVE well and the total system influent, and oxygen/carbon dioxide measurements via hand-held analyzers from each SVE well. Field notes taken during operations and maintenance (O&M) visits are presented in Appendix A.

Since startup, vacuum extraction has been performed on all Site SVE wells in order to induce flow in impacted soil zones. Between December 1, 2023, and March 25, 2024, the SVE system operated for 2,694.9 hours for a runtime efficiency of 98 percent (%). Appendix B presents photographs of the runtime meter for calculating the first quarter 2024 runtime efficiency. Table 1 presents the SVE system operational hours and calculated percentage runtime.

Based on the November 2022 COAs, air emission samples were required to be collected every other month during the second through fourth quarters of the first year of operation. Emission samples were collected on January 9 and March 6, 2024. Prior to collection, the emission samples were field screened with a PID for organic vapor monitoring (OVM). The emission samples were collected directly into two 1-Liter Tedlar® bags and submitted to Eurofins Environment Testing (Eurofins) 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, VOCs following EPA Method 8260B, and fixed gas analysis of oxygen and carbon dioxide following Gas Processors Association (GPA) Method 2261. The March 6th emission sample was analyzed for TVPH outside of the required sample hold time and, therefore, should be considered an approximation. A summary of field measurements and analytical data collected at the Site are presented in Tables 2 and 3, respectively. Full laboratory analytical reports are attached as Appendix C. Oxygen and Carbon dioxide levels over time are presented in Graphs 1 and 2, respectively.

Air emission sample data and measured stack flow rates are used to estimate total mass recovered and total emissions generated by the SVE system (Table 4). Based on these estimates, 33,776 pounds (16.9 tons) of TVPH have been removed by the system to date.

DISCUSSION AND RECOMMENDATIONS

Bi-weekly visits and bi-monthly (every other month) sampling events will continue to be performed by Ensolum and/or Hilcorp personnel to ensure the SVE system is operating within normal working ranges (i.e., temperature, pressure, and vacuum). Deviations from regular operations will be noted on field logs and included in the following quarterly report.

We appreciate the opportunity to provide this report to the NMOCD. If you should have any questions or comments regarding this report, please contact the undersigned.

Sincerely,

Ensolum, LLC

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Attachments:

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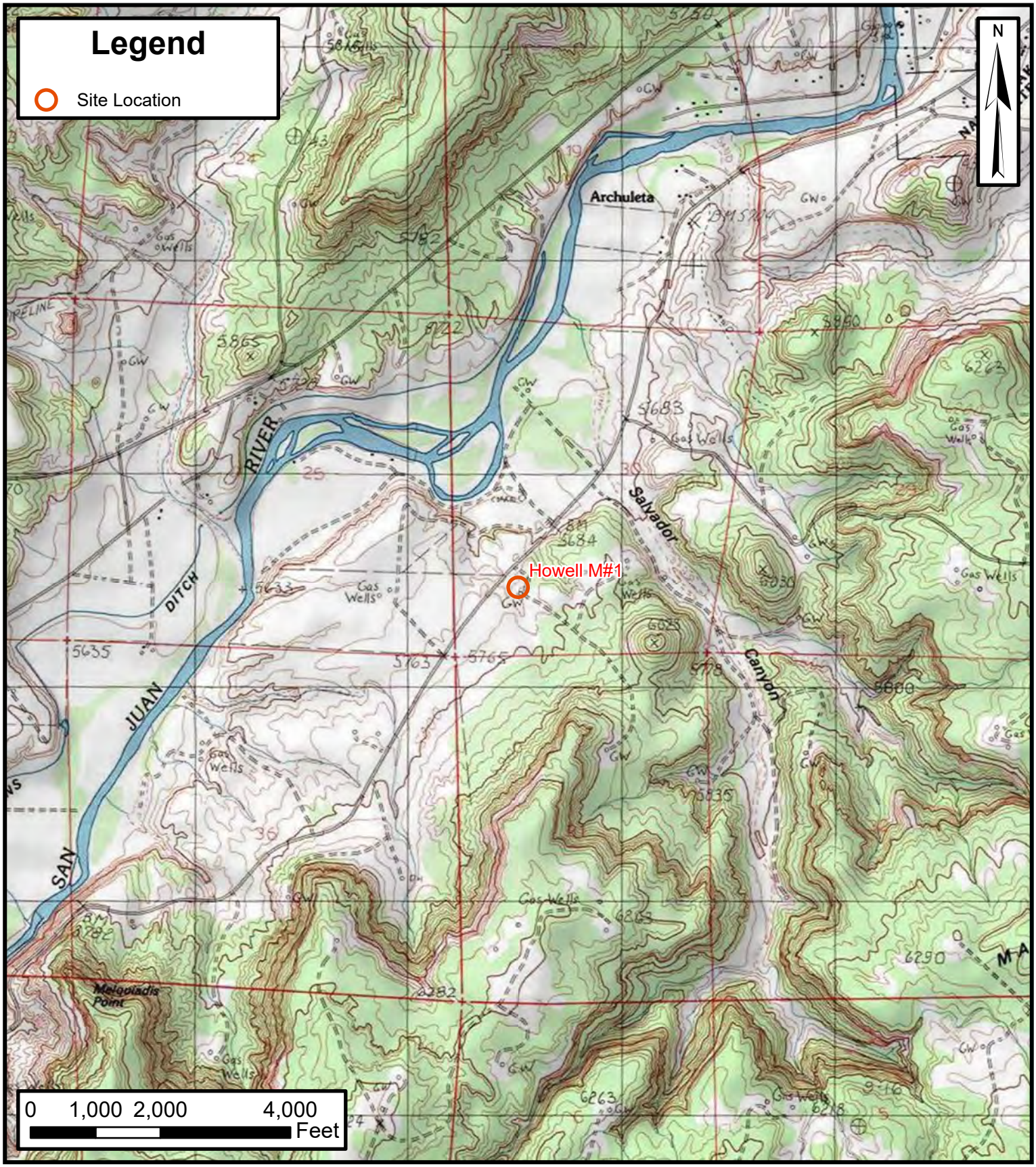
Figures



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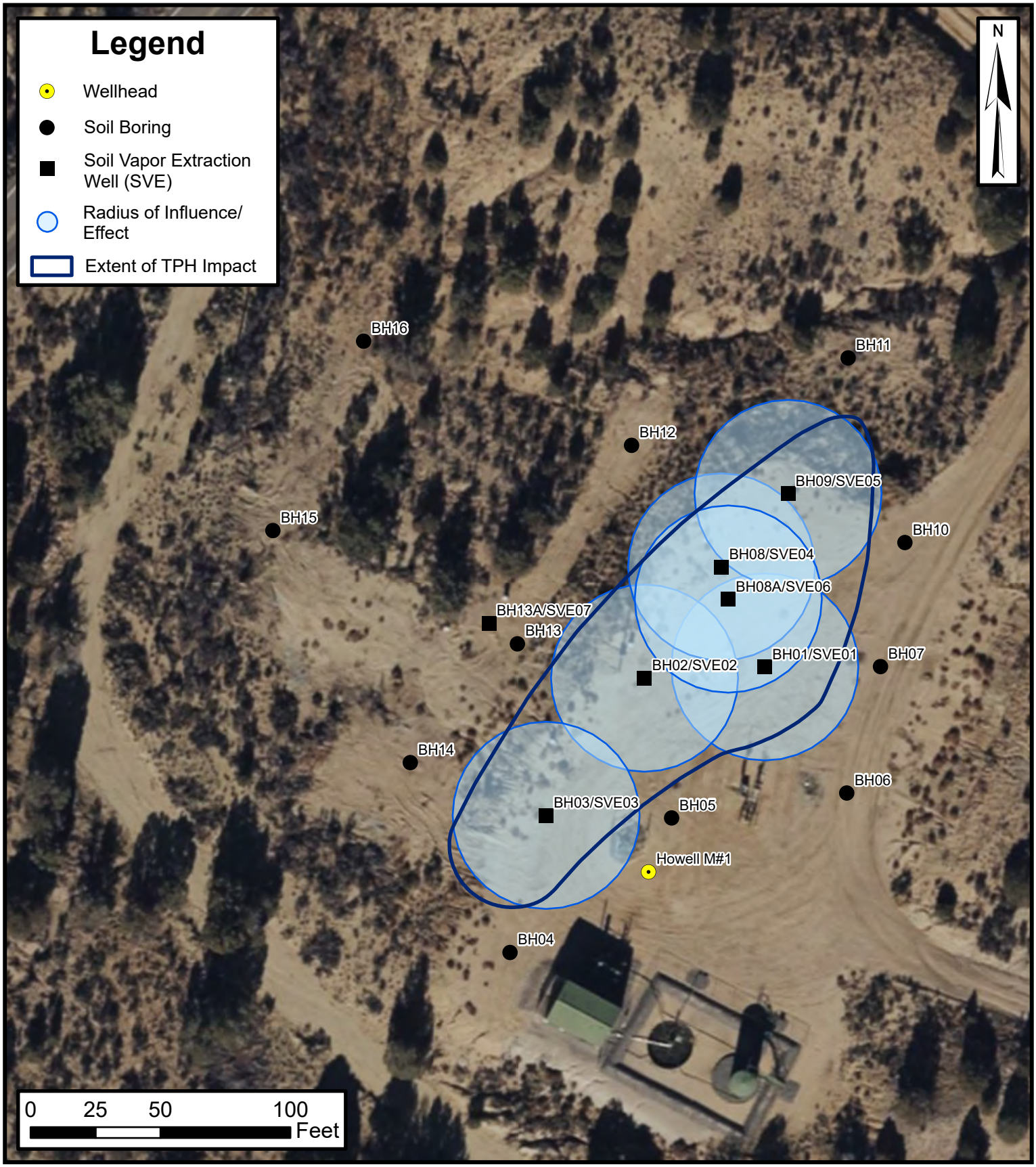
Site Location Map

Howell M#1
Hilcorp Energy Company
36.777808, -107.717657
San Juan County, New Mexico

FIGURE
1

Sources: Environmental Systems Research Institute (ESRI), National Geographic Society, i-cubed



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HOWELL M #1
Howell M#1
Hilcorp Energy Company
36.777808, -107.717657
San Juan County, New Mexico

FIGURE
2

Sources: Environmental Systems Research Institute (ESRI), National Geographic Society, i-cubed

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Tables & Graphs

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TABLE 1
SOIL VAPOR EXTRACTION SYSTEM RUNTIME CALCULATIONS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Date	Total Operational Hours	Delta Hours	Days	Quarterly Percent Runtime	Cumulative Percent Runtime
9/29/2023	2,687.4	Startup			
12/1/2023	4,145.0	1,457.6	63	96%	96%
3/25/2024	6,839.9	2,694.9	115	98%	97%

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
Influent, All Wells	6/6/2023	1,910	--	--	60	28	1.0	--	--
	6/7/2023	1,953	--	--	60	28	1.0	--	--
	6/13/2023	1,878	--	--	55	28	1.0	--	--
	6/22/2023	1,625	--	--	60	28	1.0	--	--
	6/29/2023	1,877	--	--	60	28	1.0	--	--
	7/13/2023	2,280	--	--	60	28	1.0	--	--
	7/27/2023	1,942	--	--	70	37	1.3	--	--
	8/9/2023	1,553	--	--	62	28	1.0	--	--
	8/24/2023	1,858	--	--	60	38	1.4	--	--
	9/8/2023	1,652	--	--	60	28	1.0	--	--
	9/21/2023	1,274	--	--	60	28	1.0	--	--
	10/30/2023	1,574	3.80	170	124	29	1.0	--	--
	11/2/2023	--	4.00	175	128	28	1.0	--	--
	12/1/2023	935	3.92	173	126	30	1.1	--	--
	12/19/2023	1,021	4.00	175	127	30	1.1	--	--
	1/9/2024	759	3.85	172	124	31	1.1	--	--
	1/23/2024	687	3.40	161	117	30	1.1	--	--
	1/29/2024	423	3.80	170	124	30	1.1	--	--
	2/6/2024	374	3.80	170	123	32	1.2	20.9	0.26
	2/22/2024	923	3.80	170	124	30	1.1	--	--
	3/6/2024	857	3.80	170	124	30	1.1	--	--
	3/25/2024	802	3.80	170	124	31	1.1	--	--
SVE01	6/6/2023	2,152	--	--	10.0	--	--	--	--
	6/7/2023	2,650	--	--	10.0	7.8	0.3	0.50	0.05
	6/13/2023	2,315	--	--	9.2	10	0.4	15.3	>5.0
	6/22/2023	1,953	--	--	10.0	9.6	0.3	19.6	3.99
	6/29/2023	1,935	--	--	10.0	9.9	0.4	21.4	1.52
	7/13/2023	1,515	--	--	10.0	--	--	21.9	0.64
	7/27/2023	2,265	--	--	11.7	9.6	0.3	21.1	1.48
	8/9/2023	1,384	--	--	10.3	10.1	0.4	21.9	0.92
	8/24/2023	541	--	--	10.00	10.3	0.4	22.4	0.02
	9/8/2023	1,333	--	--	10.0	--	--	20.9	0.56
	9/21/2023	1,015	--	--	10.0	9.3	0.3	20.9	0.64
	10/30/2023	589	--	--	21.3	29	--	20.9	0.06
	11/2/2023	--	--	--	--	28	1.0	--	--
	12/1/2023	416	0.00	0	0.0	30	1.1	20.9	0.01
	12/19/2023	186	0.19	38	27.7	30	1.1	19.5	0.12
	1/9/2024	486	0.02	12	9.0	31	1.1	20.9	0.11
	1/23/2024	244	0.05	20	14.2	30	1.1	20.9	0.02
	1/29/2024	509	0.04	17	13.3	12	0.4	20.9	0.38
	2/6/2024	529	0.00	0	0.0	12	0.4	20.9	0.08
	2/22/2024	306	0.00	0	0.0	12	0.4	20.9	0.04
	3/6/2024	314	0.01	9	6.7	12	0.4	20.9	0.04
	3/25/2024	632	0.01	9	6.7	12	0.5	20.8	0.10
SVE02	6/6/2023	2,201	--	--	10.0	--	--	--	--
	6/7/2023	2,216	--	--	10.0	8.3	0.3	3.30	0.05
	6/13/2023	2,243	--	--	9.2	9.4	0.3	20.9	2.22
	6/22/2023	1,820	--	--	10.0	8.8	0.3	21.7	0.90
	6/29/2023	2,395	--	--	10.0	8.8	0.3	21.7	0.84
	7/13/2023	264	--	--	10.0	--	--	22.5	0.02
	7/27/2023	2,205	--	--	11.7	9.1	0.3	22.9	0.54
	8/9/2023	1,520	--	--	10.3	9.3	0.3	22.4	0.42
	8/24/2023	146	--	--	10.0	9.5	0.3	22.4	0.04
	9/8/2023	1,086	--	--	10.0	--	--	20.9	0.14
	9/21/2023	1,189	--	--	10.0	8.8	0.3	20.9	0.24
	10/30/2023	404	--	--	20.7	29	1.0	20.9	0.09
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	1,302	0.23	42	30.5	30	1.1	20.9	0.15
	12/19/2023	293	0.36	52	38.1	30	1.1	19.5	0.08
	1/9/2024	540	0.21	40	29.1	31	1.1	20.9	0.04
	1/23/2024	696	0.25	44	33.4	11	0.4	20.9	0.08
	1/29/2024	1,010	0.12	30	23.1	12	0.4	20.9	0.22
	2/6/2024	341	0.19	38	29.1	12	0.4	20.9	0.03
	2/22/2024	748	0.19	38	29.1	11	0.4	20.9	0.09
	3/6/2024	244	0.20	39	29.9	11	0.4	20.9	0.02
	3/25/2024	638	0.23	42	32.0	12	0.4	20.9	0.06

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
SVE03	6/6/2023	1,694	--	--	10.0	--	--	--	--
	6/7/2023	1,895	--	--	10.0	7.20	0.3	1.00	0.05
	6/13/2023	1,804	--	--	9.2	9.00	0.3	17.2	4.34
	6/22/2023	1,530	--	--	10.0	8.50	0.3	20.5	2.36
	6/29/2023	1,782	--	--	10.0	8.40	0.3	20.9	1.92
	7/13/2023	2,025	--	--	10.0	--	--	20.9	1.34
	7/27/2023	1,795	--	--	11.7	8.90	0.3	21.7	1.28
	8/9/2023	1,402	--	--	10.3	9.30	0.3	21.9	0.96
	8/24/2023	1,785	--	--	10.0	9.20	0.3	21.2	0.88
	9/8/2023	1,527	--	--	10.0	--	--	20.9	0.77
	9/21/2023	1,467	--	--	10.0	8.80	0.3	20.9	0.70
	10/30/2023	1,200	--	--	20.7	29	1.0	20.9	0.44
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	803	0.07	23	16.8	30	1.1	20.9	0.28
	12/19/2023	334	0.27	45	33.0	30	1.1	19.3	0.24
	1/9/2024	766	0.12	30	22.0	31	1.1	20.9	0.15
	1/23/2024	767	0.10	28	21.1	11	0.4	20.9	0.15
	1/29/2024	577	0.11	29	22.1	12	0.4	20.9	0.38
	2/6/2024	729	0.08	25	18.9	11	0.4	20.9	0.12
	2/22/2024	984	0.09	26	20.0	11	0.4	20.9	0.20
	3/6/2024	821	0.09	26	20.0	11	0.4	20.9	0.17
	3/25/2024	1,009	0.12	30	23.1	11	0.4	20.6	0.20
SVE04	6/6/2023	1,859	--	--	10.0	--	--	--	--
	6/7/2023	2,260	--	--	10.0	8.60	0.3	7.40	0.05
	6/13/2023	1,944	--	--	9.20	9.00	0.3	20.9	2.26
	6/22/2023	1,650	--	--	10.0	8.90	0.3	21.9	0.94
	6/29/2023	609	--	--	10.0	8.30	0.3	23.2	0.12
	7/13/2023	2,375	--	--	10.0	--	--	21.9	0.68
	7/27/2023	1,844	--	--	11.7	8.80	0.3	22.8	0.56
	8/9/2023	1,340	--	--	10.3	9.20	0.3	22.4	0.42
	8/24/2023	325	--	--	10.0	9.30	0.3	22.4	0.08
	9/8/2023	791	--	--	10.0	--	--	21.1	0.20
	9/21/2023	192	--	--	10.0	9.20	0.3	21.1	0.00
	10/30/2023	675	--	--	20.7	29	1.0	20.9	0.12
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	803	0.51	62	45.4	30	1.1	20.9	0.12
	12/19/2023	249	0.63	69	50.5	30	1.1	19.5	0.14
	1/9/2024	716	0.18	37	26.9	31	1.1	20.9	0.08
	1/23/2024	721	0.53	64	48.6	11	0.4	20.9	0.08
	1/29/2024	943	0.66	71	54.0	13	0.5	20.9	0.24
	2/6/2024	644	0.51	62	47.6	11	0.4	20.9	0.06
	2/22/2024	902	0.09	26	20.0	11	0.4	20.9	0.11
	3/6/2024	637	0.52	63	48.2	11	0.4	20.9	0.07
	3/25/2024	810	0.54	64	49.0	11	0.4	20.9	0.09
SVE05	6/6/2023	1,922	--	--	10.0	--	--	--	--
	6/7/2023	2,110	--	--	10.0	10.0	0.4	16.8	0.05
	6/13/2023	1,265	--	--	9.20	10.2	0.4	22.4	1.96
	6/22/2023	950	--	--	10.0	9.70	0.4	22.8	0.90
	6/29/2023	1,043	--	--	10.0	9.40	0.3	22.8	0.72
	7/13/2023	1,205	--	--	10.0	--	--	22.5	0.58
	7/27/2023	875	--	--	11.7	9.80	0.4	23.4	0.42
	8/9/2023	795	--	--	10.3	10.0	0.4	22.5	0.38
	8/24/2023	475	--	--	10.0	10.5	0.4	22.5	0.28
	9/8/2023	398	--	--	10.0	--	--	20.9	0.28
	9/21/2023	219	--	--	10.0	10.2	0.4	21.2	0.06
	10/30/2023	404	--	--	20.7	29	1.0	20.9	0.14
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	387	0.14	33	23.8	30	1.1	20.9	0.09
	12/19/2023	327	0.23	42	30.5	30	1.1	19.5	0.08
	1/9/2024	361	0.18	37	26.9	31	1.1	20.9	0.05
	1/23/2024	355	0.16	35	26.7	12	0.4	20.9	0.10
	1/29/2024	471	0.18	37	28.2	12	0.4	20.9	0.24
	2/6/2024	300	0.13	32	24.0	12	0.4	20.9	0.07
	2/22/2024	362	0.16	35	26.7	12	0.4	20.9	0.10
	3/6/2024	381	0.18	37	28.3	12	0.4	20.9	0.07
	3/25/2024	598	0.15	34	25.8	12	0.4	20.9	0.09

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
SVE06	6/6/2023	1,713	--	--	10.0	--	--	--	--
	6/7/2023	1,701	--	--	10.0	9.20	0.3	0.80	0.05
	6/13/2023	1,262	--	--	9.20	10.4	0.4	12.1	>5.0
	6/22/2023	1,715	--	--	10.0	9.90	0.4	19.1	2.40
	6/29/2023	1,829	--	--	10.0	9.30	0.3	17.9	3.48
	7/13/2023	2,560	--	--	10.0	--	--	21.1	0.72
	7/27/2023	2,142	--	--	11.7	9.80	0.4	19.9	2.26
	8/9/2023	1,775	--	--	10.3	10.4	0.4	21.9	0.66
	8/24/2023	3,131	--	--	10.0	10.2	0.4	20.9	1.48
	9/8/2023	2,396	--	--	10.0	--	--	20.9	1.43
	9/21/2023	2,470	--	--	10.0	9.90	0.4	20.5	1.26
	10/30/2023	83	--	--	20.7	29	1.0	20.9	0.04
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	1,567	0.02	12	9.0	30	1.1	20.9	0.08
	12/19/2023	970	0.17	36	27.5	12	0.4	19.5	0.08
	1/9/2024	1,390	0.02	12	9.0	30	1.1	20.9	0.10
	1/23/2024	864	0.04	17	13.3	12	0.4	20.9	0.02
	1/29/2024	2,533	0.08	25	18.8	12	0.4	20.9	0.78
	2/6/2024	798	0.00	0	0.0	13	0.5	20.9	0.04
	2/22/2024	1,128	0.00	0	0.0	12	0.4	20.9	0.07
	3/6/2024	483	0.04	17	13.3	12	0.4	20.9	0.05
	3/25/2024	1,082	0.01	9	6.7	13	0.5	20.9	0.09

Notes:

(1): flow rates in scfm estimated based on total flow for total system rotometer field measurements collected between 6/6/2023 and 9/21/2023

(2): flow rates in scfm after 9/21/2023 are calculated based on total system pitot tube differential pressure measurements

(3): flow rates in scfm after 9/21/2023 based on an assumed temperature of 70F

IWC: inches of water column

PID: photoionization detector

ppm: parts per million

acfm: actual cubic feet per minute

scfm: standard cubic feet per minute

%: percent

--: not measured

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TABLE 3
SOIL VAPOR EXTRACTION SYSTEM EMISSIONS ANALYTICAL RESULTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH/GRO (µg/L)	Oxygen (%)	Carbon Dioxide (%)
6/6/2023	1,910	330	1,100	48	540	100,000	3.83%	10.23%
6/7/2023	1,953	190	730	31	320	93,000	8.07%	8.12%
6/13/2023	1,878	87	430	31	360	39,000	19.30%	2.47%
6/22/2023	1,625	42	200	12	120	26,000	20.33%	1.31%
6/29/2023	1,877	46	270	19	210	25,000	20.70%	0.98%
7/13/2023	2,280	51	360	28	320	25,000	21.38%	0.49%
7/27/2023	1,942	49	340	27	310	24,000	20.97%	0.72%
8/9/2023	1,553	34	230	16	180	17,000	21.35%	0.60%
8/24/2023	1,858	32	230	19	220	16,000	21.40%	0.55%
9/8/2023	1,652	23	250	25	290	18,000	21.48%	0.46%
9/21/2023	1,274	25	240	22	260	18,000	21.48%	0.48%
12/1/2023	935	13	160	11	120	9,400	21.43%	0.42%
1/9/2024	759	5.8	72	4.7	47	5,400	21.74%	0.31%
3/6/2024	857	<5.0	69	5.8	66	4,900 H	19.89%	0.25%

Notes:

GRO: gasoline range organics

µg/L: microgram per liter

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

%: percent

Gray: less than laboratory reporting limit

H: sample analyzed outside of hold time

ENSOLUM

TABLE 4
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Laboratory Analysis

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
6/6/2023	1,910	330	1,100	48	540	100,000
6/7/2023	1,953	190	730	31	320	93,000
6/13/2023	1,878	87	430	31	360	39,000
6/22/2023	1,625	42	200	12	120	26,000
6/29/2023	1,877	46	270	19	210	25,000
7/13/2023	2,280	51	360	28	320	25,000
7/27/2023	1,942	49	340	27	310	24,000
8/9/2023	1,553	34	230	16	180	17,000
8/24/2023	1,858	32	230	19	220	16,000
9/8/2023	1,652	23	250	25	290	18,000
9/21/2023	1,274	25	240	22	260	18,000
12/1/2023	935	13	160	11	120	9,400
1/9/2024	759	5.8	72	4.7	47	5,400
3/6/2024 (1)	857	*5.0*	69	5.8	66	4,900
Average	1,597	67	334	21	240	30,050

Vapor Extraction Summary

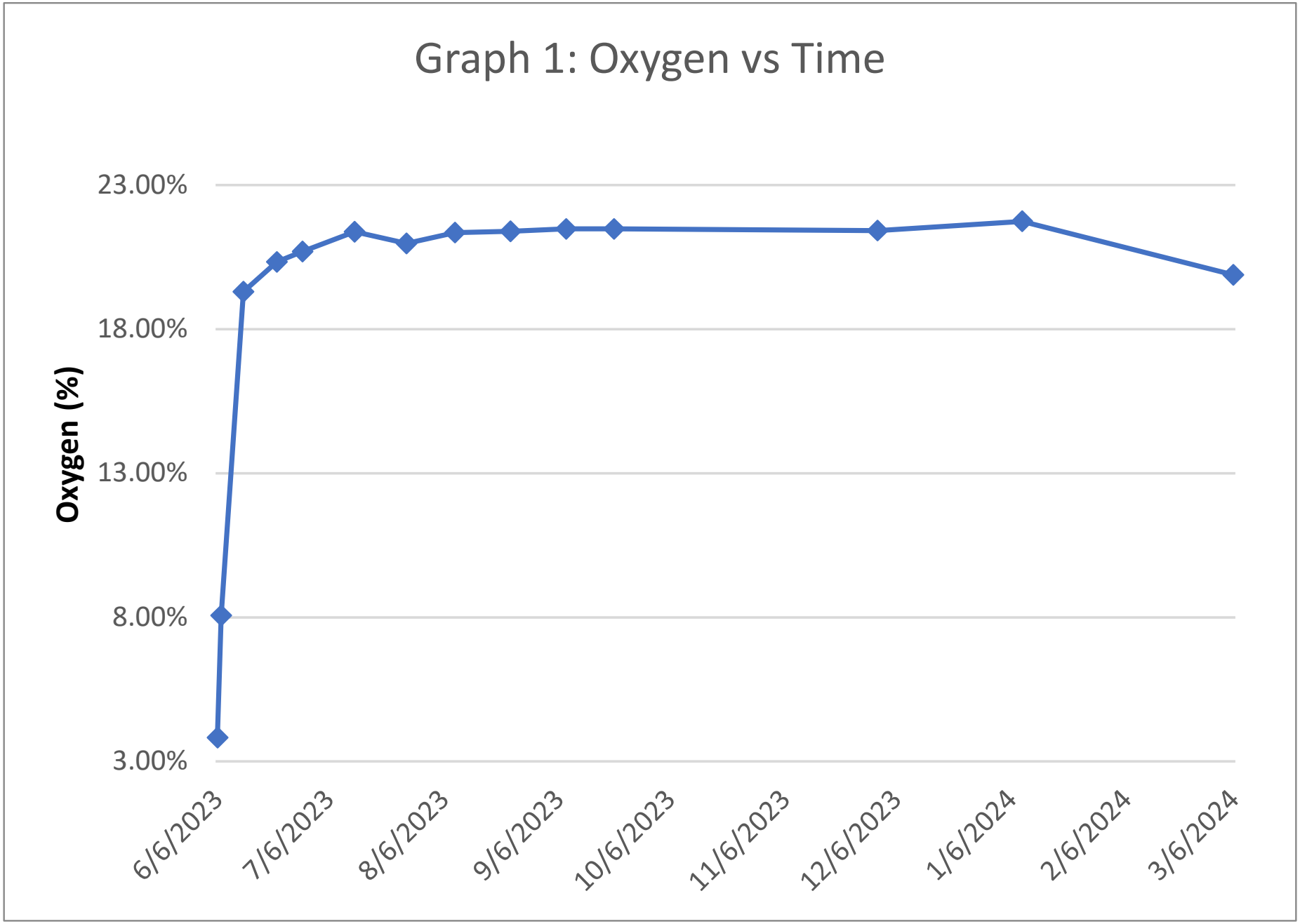
Date	Flow Rate (scfm)	Total System Flow (cf)	Delta Flow (cf)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Total Xylenes (lb/hr)	TVPH (lb/hr)
6/6/2023	--	System Startup						
6/7/2023	60	100,440	100,440	0.058	0.21	0.0089	0.096	22
6/13/2023	55	564,420	463,980	0.030	0.12	0.0067	0.073	14
6/23/2023	60	1,427,340	862,920	0.014	0.068	0.0046	0.052	7.0
6/29/2023	60	1,950,420	523,080	0.0099	0.053	0.0035	0.037	5.7
7/13/2023	60	3,166,860	1,216,440	0.011	0.071	0.0053	0.059	5.6
7/27/2023	70	4,566,300	1,399,440	0.012	0.085	0.0067	0.077	6.0
8/9/2023	62	5,735,124	1,168,824	0.010	0.070	0.0053	0.060	5.1
8/24/2023	60	7,034,364	1,299,240	0.0075	0.052	0.0040	0.046	3.8
9/8/2023	60	8,323,164	1,288,800	0.0062	0.054	0.0049	0.057	3.8
9/21/2023	60	9,455,364	1,132,200	0.0054	0.055	0.0053	0.062	4.0
12/1/2023	126	19,141,992	9,686,628	0.0066	0.070	0.0057	0.066	4.8
1/9/2024	124	25,704,072	6,562,080	0.0030	0.037	0.0026	0.028	2.2
3/6/2024	124	35,805,360	10,101,288	0.0168	0.094	0.0061	0.067	8.2
			Average	0.015	0.080	0.0053	0.060	7.1

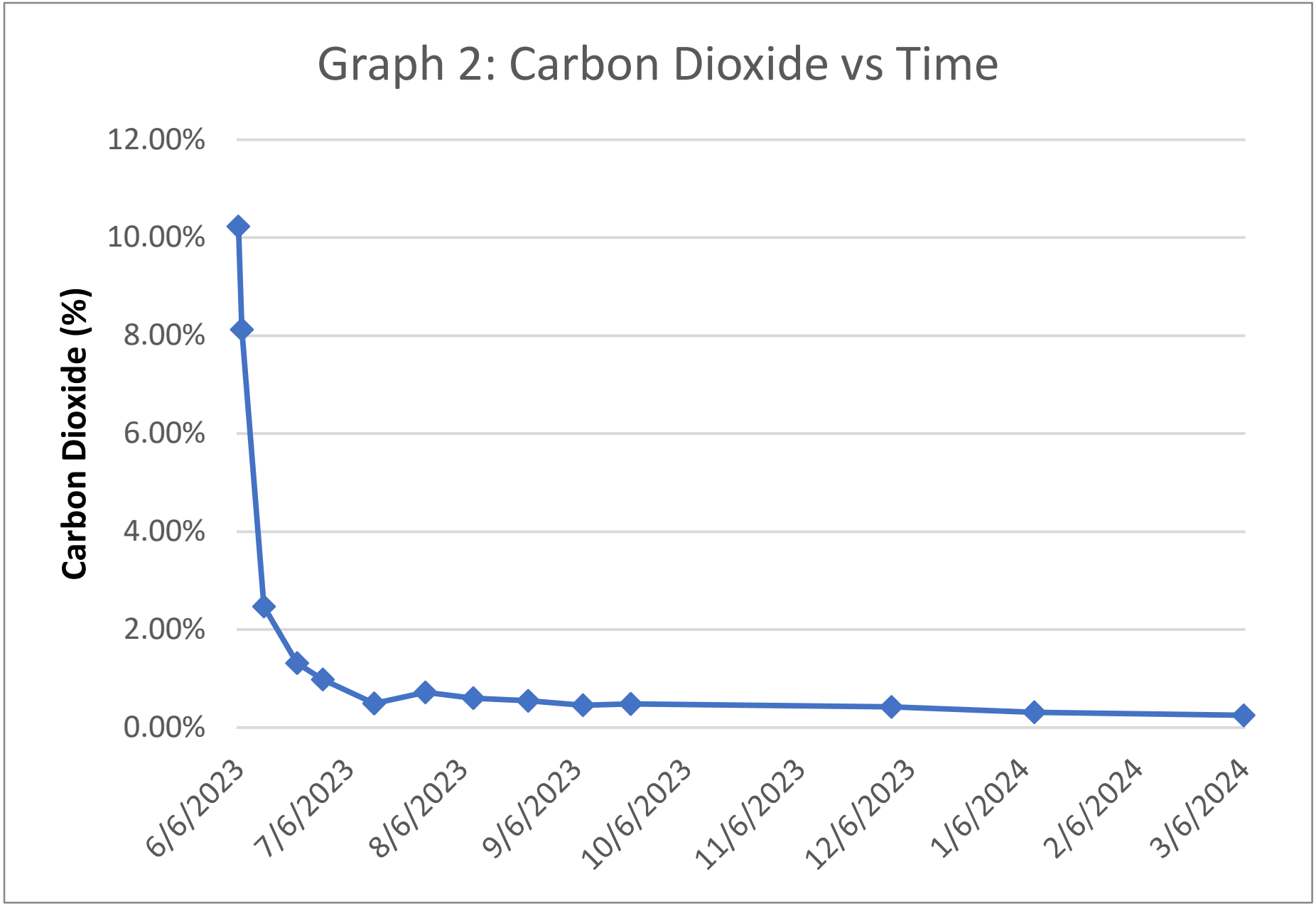
Mass Recovery

Date	Total Operational Hours	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
6/6/2023	292	System Startup						
6/7/2023	319	28	1.6	5.7	0.25	2.7	604	0.30
6/13/2023	460	141	4.2	18	0.94	10	1,996	1.00
6/23/2023	700	240	3.3	16	1.1	12	1,675	0.84
6/29/2023	845	145	1.4	7.7	0.51	5.4	831	0.42
7/13/2023	1,183	338	3.7	24	1.8	20.1	1,896	0.95
7/27/2023	1,516	333	4.1	28	2.2	26	1,985	0.99
8/9/2023	1,830	314	3.2	22	1.7	19	1,590	0.79
8/24/2023	2,191	361	2.7	19	1.4	16	1,359	0.68
9/8/2023	2,549	358	2.2	19	1.8	20	1,366	0.68
9/21/2023	2,864	315	1.7	17	1.7	19	1,270	0.64
12/1/2023	4,145	1,281	8.5	89	7.4	85	6,106	3.05
1/9/2024	5,027	882	2.7	33	2.3	25	1,938	0.97
3/6/2024	6,385	1,358	22.8	128	8.2	90	11,161	5.58
		Total Mass Recovery to Date	62	427	31	352	33,776	16.9

Notes:

(1) TVPH analyzed outside of hold time
cf: cubic feet
scfm: 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
--: not measured
gray: laboratory reporting limit used for calculating emissions





ENSOLUM

APPENDIX A

Field Notes

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 1-9
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS:	KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	5027.2	1227
Total Flow (scfm)	70	
Inlet Vacuum (IWC)	31	
Differential Pressure	3.87	
Inlet PID	758.9	
Exhaust PID	1523	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM - QUARTERLY SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS Diff pressure

WELL ID	~~VACUUM (IWC)~~	PID HEADSPACE (PPM)	OXYGEN	CARBON DIOXIDE
SVE01	0.02	485.9	20.9	1140
SVE02	0.21	540.4	20.9	400
SVE03	0.12	765.9	20.9	1480
SVE04	0.18	716.1	20.9	780
SVE05	0.18	361.4	20.9	480
SVE06	0.02	1390	20.9	1000

COMMENTS/OTHER MAINTENANCE:

Conducted sampling @ 12:45

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 1-23
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	5362.0	1233
Inlet Vacuum (IWC)	30	
Differential Pressure	3.4	
Inlet PID	686.5	
Exhaust PID	1217	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	5	

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.86	0.05	344.3	20.9	220
SVE02	11.16	0.25	695.6	20.9	840
SVE03	10.76	0.10	766.8	20.9	1460
SVE04	10.78	0.53	720.7	20.9	760
SVE05	11.67	0.16	355.4	20.9	1000
SVE06	11.98	0.04	863.7	20.9	220

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 1-29-24 O&M PERSONNEL: D Burns
TIME ONSITE: 1130 TIME OFFSITE: 1345

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: None. KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	5,505.7	1215
Inlet Vacuum (IWC)	30	
Differential Pressure	3.8	
Inlet PID	423	
Exhaust PID	1,063	
K/O Tank Liquid Level	~7.5 in.	
K/O Liquid Drained (gallons)	13	

* Carry over observed in air filter element + housing.
>5,000 hours, do we need blower motor bearings or re-lube?
Rotameter ~ 70 SCFM
- cleaned out KO sight glass

SVE SYSTEM SAMPLING

SAMPLE ID:	SAMPLE TIME:
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation: None.

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC)	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	12.0	0.04	509	20.9	0.38 ~~0.38~~ 0
SVE02	12.0	0.12	1,010	20.9	0.22
SVE03	11.9	0.11	577	20.9	0.38
SVE04	13.1	0.66	443	20.9	0.24
SVE05	12.1	0.18	471	20.9	0.24
SVE06	12.1	0.08	2,533	20.3	0.78

COMMENTS/OTHER MAINTENANCE:

VFD set @ 3,070 RPM
5.9 A
51.1 Hz
- Ask Bryan Hall if we can set to 60 Hz.

	Influent	01	02	03	04	05	06
CH_4 ppm	3,500 ~~6~~	1,300	3,800	4,300	3,400	1,300	16,000
Oxy vol%	20.9	20.9	20.9	20.9	20.9	20.9	20.3
H_2S ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO ppm	0	0	0	0	0	0	0
CO_2 vol%	0.26	0.38	0.22	0.38	0.24	0.24	0.78
CH_4 %LEL	7	4	9	10	9	5	65

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 2-6
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	5695.9	1115
Inlet Vacuum (IWC)	32	
Differential Pressure	3.8	
Inlet PID	373.6	
Exhaust PID	1046	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	12.26	0.00	528.8	20.9	780
SVE02	11.59	0.19	340.9	20.9	300
SVE03	11.32	0.08	729	20.9	1220
SVE04	11.33	0.51	643.7	20.9	620
SVE05	11.52	0.13	300.3	20.9	680
SVE06	12.78	0.00	798	20.9	360

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 2-22 O&M PERSONNEL: B Sinclair
TIME ONSITE: _____ TIME OFFSITE: _____

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	6077	1334
Inlet Vacuum (IWC)	30	
Differential Pressure	3.8	
Inlet PID	923.4	
Exhaust PID	1122	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.98	0.00	306.4	20.9	400
SVE02	11.36	0.19	747.5	20.9	960
SVE03	10.93	0.09	984	20.9	1980
SVE04	10.85	0.45	902.3	20.9	1140
SVE05	11.53	0.16	362.1	20.9	1000
SVE06	12.06	0.00	1128	20.9	700

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 4/16/24 O&M PERSONNEL: Reece Hansen
TIME ONSITE: 10:15 TIME OFFSITE: 11:30

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	6382.7	1027
Inlet Vacuum (IWC)	30	
Differential Pressure	3.8	in H2O
Inlet PID	1,009	
Exhaust PID	1,070	
K/O Tank Liquid Level	Inch n Site tube	
K/O Liquid Drained (gallons)	—	

water (condensation) in meter

Flow SCFM 65

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	All wells open

Change in Well Operation: —

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.5	---	617	20.9	0.36
SVE02	10.8	—	420	20.9	0.02 0.04
SVE03	10.6	—	664	20.9	0.32
SVE04	10.7	0.5	785	20.9	0.18
SVE05	11.3	2.8	416	20.9	0.20
SVE06	11.5	0	1305	20.9	0.24
Inlet	—	—	1009	20.9	0.22

COMMENTS/OTHER MAINTENANCE:

Diff pressure readings off - pedo tube 1/8" tubing too stiff to fit over Dwyer vac gauge nipples, tried using silicon tubing but not getting good seal

Check / valve lines for SVE01 + SVE06, No noticeable blockage or water in lines

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HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 3-6
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	6384.7	1227
Inlet Vacuum (IWC)	30	
Differential Pressure	3.8	
Inlet PID	856.7	
Exhaust PID	1321	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	6.5	

SVE SYSTEM SAMPLING

SAMPLE ID: SVE-1 **SAMPLE TIME:** 1230
Analytes: Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.66	0.01	313.5	20.9	400
SVE02	11.11	0.20	244.4	20.9	240
SVE03	10.76	0.09	820.5	20.9	1660
SVE04	10.53	0.52	636.5	20.9	680
SVE05	11.79	0.18	381.3	20.9	680
SVE06	11.82	0.04	483.1	20.9	460

COMMENTS/OTHER MAINTENANCE:

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HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 3-25
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	6834.9	1246
Inlet Vacuum (IWC)	31	
Differential Pressure	3.8	
Inlet PID	801.8	
Exhaust PID	1042	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING	
SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	12.49	0.01	631.6	20.8	980
SVE02	11.88	0.23	637.8	20.9	580
SVE03	11.36	0.12	1009	20.6	1980
SVE04	11.22	0.54	809.6	20.9	900
SVE05	11.61	0.15	597.8	20.9	940
SVE06	12.54	0.01	1082	20.9	940

COMMENTS/OTHER MAINTENANCE:

rotameter 68 SCFM

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APPENDIX B

Project Photographs

PROJECT PHOTOGRAPHS
Howell M#1
San Juan County, New Mexico
Hilcorp Energy Company

Photograph 1 Runtime meter taken on December 1, 2023 at 11:15 AM Hours = 4,145.0		
Photograph 2 Runtime meter taken on March 25, 2024 at 12:46 PM Hours = 6,839.9		

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

ENSOLUM

APPENDIX C

Laboratory Analytical Reports

eurofins | Environment Testing

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

February 01, 2024

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

RE: Howell M1 OrderNo.: 2401594

Dear Mitch Killough:

Eurofins Environment Testing South Central, LLC received 1 sample(s) on 1/16/2024 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please do not hesitate to contact Eurofins Albuquerque for any additional information or clarifications.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2401594**
Date Reported: **2/1/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: SVE-1
Project: Howell M1
Collection Date: 1/9/2024 12:45:00 PM
Lab ID: 2401594-001 **Matrix:** AIR **Received Date:** 1/16/2024 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **CCM**
Gasoline Range Organics (GRO)	5400	250		µg/L	50	1/16/2024 3:54:00 PM
Surr: BFB	149	15-412		%Rec	50	1/16/2024 3:54:00 PM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	5.8	2.0		µg/L	20	1/22/2024 5:45:00 PM
Toluene	72	2.0		µg/L	20	1/22/2024 5:45:00 PM
Ethylbenzene	4.7	2.0		µg/L	20	1/22/2024 5:45:00 PM
Methyl tert-butyl ether (MTBE)	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2,4-Trimethylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,3,5-Trimethylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2-Dichloroethane (EDC)	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2-Dibromoethane (EDB)	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Naphthalene	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
1-Methylnaphthalene	ND	8.0		µg/L	20	1/22/2024 5:45:00 PM
2-Methylnaphthalene	ND	8.0		µg/L	20	1/22/2024 5:45:00 PM
Acetone	ND	20		µg/L	20	1/22/2024 5:45:00 PM
Bromobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Bromodichloromethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Bromoform	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Bromomethane	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
2-Butanone	ND	20		µg/L	20	1/22/2024 5:45:00 PM
Carbon disulfide	ND	20		µg/L	20	1/22/2024 5:45:00 PM
Carbon tetrachloride	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Chlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Chloroethane	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
Chloroform	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Chloromethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
2-Chlorotoluene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
4-Chlorotoluene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
cis-1,2-DCE	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
cis-1,3-Dichloropropene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2-Dibromo-3-chloropropane	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
Dibromochloromethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Dibromomethane	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
1,2-Dichlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,3-Dichlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,4-Dichlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Dichlorodifluoromethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1-Dichloroethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1-Dichloroethene	ND	2.0		µg/L	20	1/22/2024 5:45:00 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	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 **2401594**
Date Reported: **2/1/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: SVE-1
Project: Howell M1
Collection Date: 1/9/2024 12:45:00 PM
Lab ID: 2401594-001 **Matrix:** AIR **Received Date:** 1/16/2024 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
1,2-Dichloropropane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,3-Dichloropropane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
2,2-Dichloropropane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1-Dichloropropene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Hexachlorobutadiene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
2-Hexanone	ND	20		µg/L	20	1/22/2024 5:45:00 PM
Isopropylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
4-Isopropyltoluene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
4-Methyl-2-pentanone	ND	20		µg/L	20	1/22/2024 5:45:00 PM
Methylene chloride	ND	6.0		µg/L	20	1/22/2024 5:45:00 PM
n-Butylbenzene	ND	6.0		µg/L	20	1/22/2024 5:45:00 PM
n-Propylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
sec-Butylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Styrene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
tert-Butylbenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1,1,2-Tetrachloroethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Tetrachloroethene (PCE)	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
trans-1,2-DCE	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
trans-1,3-Dichloropropene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2,3-Trichlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2,4-Trichlorobenzene	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1,1-Trichloroethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,1,2-Trichloroethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Trichloroethene (TCE)	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Trichlorofluoromethane	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
1,2,3-Trichloropropane	ND	4.0		µg/L	20	1/22/2024 5:45:00 PM
Vinyl chloride	ND	2.0		µg/L	20	1/22/2024 5:45:00 PM
Xylenes, Total	47	3.0		µg/L	20	1/22/2024 5:45:00 PM
Surr: Dibromofluoromethane	95.4	70-130		%Rec	20	1/22/2024 5:45:00 PM
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	20	1/22/2024 5:45:00 PM
Surr: Toluene-d8	120	70-130		%Rec	20	1/22/2024 5:45:00 PM
Surr: 4-Bromofluorobenzene	118	70-130		%Rec	20	1/22/2024 5:45:00 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	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

January 30, 2024

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

Work Order: B24010994 Quote ID: B15626

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 1 sample for Hall Environmental on 1/22/2024 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B24010994-001	2401594-001B, SVE-1	01/09/24 12:45	01/22/24	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60

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

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

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

Report Approved By:

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Not Indicated
Lab ID: B24010994-001
Client Sample ID: 2401594-001B, SVE-1

Report Date: 01/30/24
Collection Date: 01/09/24 12:45
DateReceived: 01/22/24
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.74	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Nitrogen	77.87	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Carbon Dioxide	0.31	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Methane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Hexanes plus	0.08	Mol %		0.01		GPA 2261-95	01/26/24 09:50 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
Hexanes plus	0.034	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
GPM Total	0.034	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
GPM Pentanes plus	0.034	gpm		0.001		GPA 2261-95	01/26/24 09:50 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	4			1		GPA 2261-95	01/26/24 09:50 / jrj
Net BTU per cu ft @ std cond. (LHV)	4			1		GPA 2261-95	01/26/24 09:50 / jrj
Pseudo-critical Pressure, psia	546			1		GPA 2261-95	01/26/24 09:50 / jrj
Pseudo-critical Temperature, deg R	240			1		GPA 2261-95	01/26/24 09:50 / jrj
Specific Gravity @ 60/60F	1.00			0.001		D3588-81	01/26/24 09:50 / jrj
Air, %	99.31			0.01		GPA 2261-95	01/26/24 09:50 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	01/26/24 09:50 / 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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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Hall Environmental **Work Order:** B24010994 **Report Date:** 01/30/24

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261-95										Batch: R415720
Lab ID: LCS012624	11	Laboratory Control Sample				Run: GCNGA-B_240126A				01/26/24 02:28
Oxygen		0.64	Mol %	0.01	128	70	130			
Nitrogen		6.37	Mol %	0.01	106	70	130			
Carbon Dioxide		0.99	Mol %	0.01	100	70	130			
Methane		75.2	Mol %	0.01	101	70	130			
Ethane		6.08	Mol %	0.01	101	70	130			
Propane		4.48	Mol %	0.01	91	70	130			
Isobutane		1.60	Mol %	0.01	80	70	130			
n-Butane		2.03	Mol %	0.01	101	70	130			
Isopentane		0.97	Mol %	0.01	97	70	130			
n-Pentane		0.85	Mol %	0.01	85	70	130			
Hexanes plus		0.81	Mol %	0.01	101	70	130			
Lab ID: B24011070-001ADUP	12	Sample Duplicate				Run: GCNGA-B_240126A				01/26/24 01:16
Oxygen		21.8	Mol %	0.01				0.1	20	
Nitrogen		78.0	Mol %	0.01				0	20	
Carbon Dioxide		0.17	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				0.0	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

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Work Order Receipt Checklist

Hall Environmental

B24010994

Login completed by: Danielle N. Harris
Date Received: 1/22/2024
Reviewed by: lleprowse
Received by: CMJ
Reviewed Date: 1/22/2024
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	13.6°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.

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

Contact and Corrective Action Comments:

None

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CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

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

B24010994

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	2401594-001B	SVE-1	TEDLAR	Air	1/9/2024 12:45:00 PM	1	Natural Gas Analysis. 02 + CO2.

SPECIAL INSTRUCTIONS / COMMENTS:

Include the LAB ID and CLIENT SAMPLE ID on final reports. Email results to Hall.Lab@et.eurofinsus.com. For Questions email Hall.samplecontrol@et.eurofinsus.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 1/16/2024	Time: 7:52 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: Crystal Jones	Date: 1/22/24	Time: 0845

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: ____

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Eurofins Environment Testing South Central, LLC
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: 2401594 RcptNo: 1

Received By: Tracy Casarrubias 1/16/2024 7:05:00 AM

Completed By: Tracy Casarrubias 1/16/2024 7:48:51 AM

Reviewed By: JA 1/16/24

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 1-16-24

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: Mailing address and phone number are missing on COC- TMC 1/16/24

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	N/A	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: Howell M 1

Project #:

Project Manager: Mitch Killough

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2401594	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 gas O_2 & CO_2				
1-9	1245	air	SVE-1	2 Tedlar		001								✓			✓	✓				

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
1-15	1345			courier		
					1/16/24	7:05
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

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.

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ANALYTICAL REPORT

PREPARED FOR

Attn: Mitch Killough
Hilcorp Energy
PO BOX 4700
Farmington, New Mexico 87499

Generated 3/26/2024 5:12:48 PM

JOB DESCRIPTION

Howell M 1

JOB NUMBER

885-967-1

Eurofins Albuquerque
4901 Hawkins NE
Albuquerque NM 87109

See page two for job notes and contact information.

Eurofins Albuquerque

Job Notes

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing South Central, LLC Project Manager.

Authorization

Generated
3/26/2024 5:12:48 PM

Authorized for release by
Andy Freeman, Business Unit Manager
andy.freeman@et.eurofinsus.com
(505)345-3975

Client: Hilcorp Energy
Project/Site: Howell M 1

Laboratory Job ID: 885-967-1

Table of Contents

Definitions/Glossary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Hilcorp Energy
Project: Howell M 1

Job ID: 885-967-1

Job ID: 885-967-1 Eurofins Albuquerque

Job Narrative
885-967-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The sample was received on 3/12/2024 7:15 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 21.1°C.

Subcontract Work
Method Fixed Gases: This method was subcontracted to Energy Laboratories, Inc. The subcontract laboratory certification is different from that of the facility issuing the final report. The subcontract report is appended in its entirety.

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample Results

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Client Sample ID: SVE-1
Date Collected: 03/06/24 12:30
Date Received: 03/12/24 07:15
Sample Container: Tedlar Bag 1L

Lab Sample ID: 885-967-1
Matrix: Air

Method: SW846 8015D - Nonhalogenated Organics using GC/MS -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	4900	H	250		ug/L			03/20/24 15:55	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*70 - 130*		*03/20/24 15:55*	*50*

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		5.0		ug/L			03/20/24 15:55	50
1,1,1-Trichloroethane	ND		5.0		ug/L			03/20/24 15:55	50
1,1,2,2-Tetrachloroethane	ND		10		ug/L			03/20/24 15:55	50
1,1,2-Trichloroethane	ND		5.0		ug/L			03/20/24 15:55	50
1,1-Dichloroethane	ND		5.0		ug/L			03/20/24 15:55	50
1,1-Dichloroethene	ND		5.0		ug/L			03/20/24 15:55	50
1,1-Dichloropropene	ND		5.0		ug/L			03/20/24 15:55	50
1,2,3-Trichlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,2,3-Trichloropropane	ND		10		ug/L			03/20/24 15:55	50
1,2,4-Trichlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,2,4-Trimethylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,2-Dibromo-3-Chloropropane	ND		10		ug/L			03/20/24 15:55	50
1,2-Dibromoethane (EDB)	ND		5.0		ug/L			03/20/24 15:55	50
1,2-Dichlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,2-Dichloroethane (EDC)	ND		5.0		ug/L			03/20/24 15:55	50
1,2-Dichloropropane	ND		5.0		ug/L			03/20/24 15:55	50
1,3,5-Trimethylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,3-Dichlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
1,3-Dichloropropane	ND		5.0		ug/L			03/20/24 15:55	50
1,4-Dichlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
1-Methylnaphthalene	ND		20		ug/L			03/20/24 15:55	50
2,2-Dichloropropane	ND		10		ug/L			03/20/24 15:55	50
2-Butanone	ND		50		ug/L			03/20/24 15:55	50
2-Chlorotoluene	ND		5.0		ug/L			03/20/24 15:55	50
2-Hexanone	ND		50		ug/L			03/20/24 15:55	50
2-Methylnaphthalene	ND		20		ug/L			03/20/24 15:55	50
4-Chlorotoluene	ND		5.0		ug/L			03/20/24 15:55	50
4-Isopropyltoluene	ND		5.0		ug/L			03/20/24 15:55	50
4-Methyl-2-pentanone	ND		50		ug/L			03/20/24 15:55	50
Acetone	ND		50		ug/L			03/20/24 15:55	50
Benzene	ND		5.0		ug/L			03/20/24 15:55	50
Bromobenzene	ND		5.0		ug/L			03/20/24 15:55	50
Bromodichloromethane	ND		5.0		ug/L			03/20/24 15:55	50
Dibromochloromethane	ND		5.0		ug/L			03/20/24 15:55	50
Bromoform	ND		5.0		ug/L			03/20/24 15:55	50
Bromomethane	ND		15		ug/L			03/20/24 15:55	50
Carbon disulfide	ND		50		ug/L			03/20/24 15:55	50
Carbon tetrachloride	ND		5.0		ug/L			03/20/24 15:55	50
Chlorobenzene	ND		5.0		ug/L			03/20/24 15:55	50
Chloroethane	ND		10		ug/L			03/20/24 15:55	50
Chloroform	ND		5.0		ug/L			03/20/24 15:55	50

Client Sample Results

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Client Sample ID: SVE-1
Date Collected: 03/06/24 12:30
Date Received: 03/12/24 07:15
Sample Container: Tedlar Bag 1L

Lab Sample ID: 885-967-1
Matrix: Air

Method: SW846 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		15		ug/L			03/20/24 15:55	50
cis-1,2-Dichloroethene	ND		5.0		ug/L			03/20/24 15:55	50
cis-1,3-Dichloropropene	ND		5.0		ug/L			03/20/24 15:55	50
Dibromomethane	ND		5.0		ug/L			03/20/24 15:55	50
Dichlorodifluoromethane	ND		5.0		ug/L			03/20/24 15:55	50
Ethylbenzene	**5.8**		5.0		ug/L			03/20/24 15:55	50
Hexachlorobutadiene	ND		5.0		ug/L			03/20/24 15:55	50
Isopropylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
Methyl-tert-butyl Ether (MTBE)	ND		5.0		ug/L			03/20/24 15:55	50
Methylene Chloride	ND		15		ug/L			03/20/24 15:55	50
n-Butylbenzene	ND		15		ug/L			03/20/24 15:55	50
N-Propylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
Naphthalene	ND		10		ug/L			03/20/24 15:55	50
sec-Butylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
Styrene	ND		5.0		ug/L			03/20/24 15:55	50
tert-Butylbenzene	ND		5.0		ug/L			03/20/24 15:55	50
Tetrachloroethene (PCE)	ND		5.0		ug/L			03/20/24 15:55	50
Toluene	**69**		5.0		ug/L			03/20/24 15:55	50
trans-1,2-Dichloroethene	ND		5.0		ug/L			03/20/24 15:55	50
trans-1,3-Dichloropropene	ND		5.0		ug/L			03/20/24 15:55	50
Trichloroethene (TCE)	ND		5.0		ug/L			03/20/24 15:55	50
Trichlorofluoromethane	ND		5.0		ug/L			03/20/24 15:55	50
Vinyl chloride	ND		5.0		ug/L			03/20/24 15:55	50
Xylenes, Total	**66**		7.5		ug/L			03/20/24 15:55	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*70 - 130*		*03/20/24 15:55*	*50*
Toluene-d8 (Surr)	*113*		*70 - 130*		*03/20/24 15:55*	*50*
4-Bromofluorobenzene (Surr)	*108*		*70 - 130*		*03/20/24 15:55*	*50*
Dibromofluoromethane (Surr)	*91*		*70 - 130*		*03/20/24 15:55*	*50*

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Method: 8015D - Nonhalogenated Organics using GC/MS -Modified (Gasoline Range Organics)

Lab Sample ID: MB 885-2088/3
Matrix: Air
Analysis Batch: 2088

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		50		ug/L			03/20/24 13:04	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*70 - 130*		*03/20/24 13:04*	*1*

Lab Sample ID: LCS 885-2088/2
Matrix: Air
Analysis Batch: 2088

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Gasoline Range Organics [C6 - C10]			500	521		ug/L		104			

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*107*		*70 - 130*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 885-2090/3
Matrix: Air
Analysis Batch: 2090

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		1.0		ug/L			03/20/24 13:04	1
1,1,1-Trichloroethane	ND		1.0		ug/L			03/20/24 13:04	1
1,1,2,2-Tetrachloroethane	ND		2.0		ug/L			03/20/24 13:04	1
1,1,2-Trichloroethane	ND		1.0		ug/L			03/20/24 13:04	1
1,1-Dichloroethane	ND		1.0		ug/L			03/20/24 13:04	1
1,1-Dichloroethene	ND		1.0		ug/L			03/20/24 13:04	1
1,1-Dichloropropene	ND		1.0		ug/L			03/20/24 13:04	1
1,2,3-Trichlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,2,3-Trichloropropane	ND		2.0		ug/L			03/20/24 13:04	1
1,2,4-Trichlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,2,4-Trimethylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			03/20/24 13:04	1
1,2-Dibromoethane (EDB)	ND		1.0		ug/L			03/20/24 13:04	1
1,2-Dichlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,2-Dichloroethane (EDC)	ND		1.0		ug/L			03/20/24 13:04	1
1,2-Dichloropropane	ND		1.0		ug/L			03/20/24 13:04	1
1,3,5-Trimethylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,3-Dichlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
1,3-Dichloropropane	ND		1.0		ug/L			03/20/24 13:04	1
1,4-Dichlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
1-Methylnaphthalene	ND		4.0		ug/L			03/20/24 13:04	1
2,2-Dichloropropane	ND		2.0		ug/L			03/20/24 13:04	1
2-Butanone	ND		10		ug/L			03/20/24 13:04	1
2-Chlorotoluene	ND		1.0		ug/L			03/20/24 13:04	1
2-Hexanone	ND		10		ug/L			03/20/24 13:04	1

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 885-2090/3
Matrix: Air
Analysis Batch: 2090

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		4.0		ug/L			03/20/24 13:04	1
4-Chlorotoluene	ND		1.0		ug/L			03/20/24 13:04	1
4-Isopropyltoluene	ND		1.0		ug/L			03/20/24 13:04	1
4-Methyl-2-pentanone	ND		10		ug/L			03/20/24 13:04	1
Acetone	ND		10		ug/L			03/20/24 13:04	1
Benzene	ND		1.0		ug/L			03/20/24 13:04	1
Bromobenzene	ND		1.0		ug/L			03/20/24 13:04	1
Bromodichloromethane	ND		1.0		ug/L			03/20/24 13:04	1
Dibromochloromethane	ND		1.0		ug/L			03/20/24 13:04	1
Bromoform	ND		1.0		ug/L			03/20/24 13:04	1
Bromomethane	ND		3.0		ug/L			03/20/24 13:04	1
Carbon disulfide	ND		10		ug/L			03/20/24 13:04	1
Carbon tetrachloride	ND		1.0		ug/L			03/20/24 13:04	1
Chlorobenzene	ND		1.0		ug/L			03/20/24 13:04	1
Chloroethane	ND		2.0		ug/L			03/20/24 13:04	1
Chloroform	ND		1.0		ug/L			03/20/24 13:04	1
Chloromethane	ND		3.0		ug/L			03/20/24 13:04	1
cis-1,2-Dichloroethene	ND		1.0		ug/L			03/20/24 13:04	1
cis-1,3-Dichloropropene	ND		1.0		ug/L			03/20/24 13:04	1
Dibromomethane	ND		1.0		ug/L			03/20/24 13:04	1
Dichlorodifluoromethane	ND		1.0		ug/L			03/20/24 13:04	1
Ethylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
Hexachlorobutadiene	ND		1.0		ug/L			03/20/24 13:04	1
Isopropylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
Methyl-tert-butyl Ether (MTBE)	ND		1.0		ug/L			03/20/24 13:04	1
Methylene Chloride	ND		3.0		ug/L			03/20/24 13:04	1
n-Butylbenzene	ND		3.0		ug/L			03/20/24 13:04	1
N-Propylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
Naphthalene	ND		2.0		ug/L			03/20/24 13:04	1
sec-Butylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
Styrene	ND		1.0		ug/L			03/20/24 13:04	1
tert-Butylbenzene	ND		1.0		ug/L			03/20/24 13:04	1
Tetrachloroethene (PCE)	ND		1.0		ug/L			03/20/24 13:04	1
Toluene	ND		1.0		ug/L			03/20/24 13:04	1
trans-1,2-Dichloroethene	ND		1.0		ug/L			03/20/24 13:04	1
trans-1,3-Dichloropropene	ND		1.0		ug/L			03/20/24 13:04	1
Trichloroethene (TCE)	ND		1.0		ug/L			03/20/24 13:04	1
Trichlorofluoromethane	ND		1.0		ug/L			03/20/24 13:04	1
Vinyl chloride	ND		1.0		ug/L			03/20/24 13:04	1
Xylenes, Total	ND		1.5		ug/L			03/20/24 13:04	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*03/20/24 13:04*	*1*
Toluene-d8 (Surr)	*89*		*70 - 130*		*03/20/24 13:04*	*1*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*03/20/24 13:04*	*1*
Dibromofluoromethane (Surr)	*100*		*70 - 130*		*03/20/24 13:04*	*1*

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 885-2090/2
Matrix: Air
Analysis Batch: 2090

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene			20.1	18.1		ug/L		90			
Benzene			20.1	19.7		ug/L		98			
Chlorobenzene			20.1	20.7		ug/L		103			
Toluene			20.2	19.5		ug/L		97			
Trichloroethene (TCE)			20.2	19.2		ug/L		95			

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*
Toluene-d8 (Surr)	*95*		*70 - 130*
4-Bromofluorobenzene (Surr)	*104*		*70 - 130*
Dibromofluoromethane (Surr)	*98*		*70 - 130*

QC Association Summary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

GC/MS VOA

Analysis Batch: 2088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-967-1	SVE-1	Total/NA	Air	8015D	
MB 885-2088/3	Method Blank	Total/NA	Air	8015D	
LCS 885-2088/2	Lab Control Sample	Total/NA	Air	8015D	

Analysis Batch: 2090

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-967-1	SVE-1	Total/NA	Air	8260B	
MB 885-2090/3	Method Blank	Total/NA	Air	8260B	
LCS 885-2090/2	Lab Control Sample	Total/NA	Air	8260B	

Lab Chronicle

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Client Sample ID: SVE-1
Date Collected: 03/06/24 12:30
Date Received: 03/12/24 07:15

Lab Sample ID: 885-967-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015D		50	2088	CM	EET ALB	03/20/24 15:55
Total/NA	Analysis	8260B		50	2090	CM	EET ALB	03/20/24 15:55

Laboratory References:

= , 1120 South 27th Street, Billings, MT 59107

EET ALB = Eurofins Albuquerque, 4901 Hawkins NE, Albuquerque, NM 87109, TEL (505)345-3975

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Laboratory: Eurofins Albuquerque

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New Mexico	State	NM9425, NM0901	02-26-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Air	Gasoline Range Organics [C6 - C10]
8260B		Air	1,1,1,2-Tetrachloroethane
8260B		Air	1,1,1-Trichloroethane
8260B		Air	1,1,2,2-Tetrachloroethane
8260B		Air	1,1,2-Trichloroethane
8260B		Air	1,1-Dichloroethane
8260B		Air	1,1-Dichloroethene
8260B		Air	1,1-Dichloropropene
8260B		Air	1,2,3-Trichlorobenzene
8260B		Air	1,2,3-Trichloropropane
8260B		Air	1,2,4-Trichlorobenzene
8260B		Air	1,2,4-Trimethylbenzene
8260B		Air	1,2-Dibromo-3-Chloropropane
8260B		Air	1,2-Dibromoethane (EDB)
8260B		Air	1,2-Dichlorobenzene
8260B		Air	1,2-Dichloroethane (EDC)
8260B		Air	1,2-Dichloropropane
8260B		Air	1,3,5-Trimethylbenzene
8260B		Air	1,3-Dichlorobenzene
8260B		Air	1,3-Dichloropropane
8260B		Air	1,4-Dichlorobenzene
8260B		Air	1-Methylnaphthalene
8260B		Air	2,2-Dichloropropane
8260B		Air	2-Butanone
8260B		Air	2-Chlorotoluene
8260B		Air	2-Hexanone
8260B		Air	2-Methylnaphthalene
8260B		Air	4-Chlorotoluene
8260B		Air	4-Isopropyltoluene
8260B		Air	4-Methyl-2-pentanone
8260B		Air	Acetone
8260B		Air	Benzene
8260B		Air	Bromobenzene
8260B		Air	Bromodichloromethane
8260B		Air	Bromoform
8260B		Air	Bromomethane
8260B		Air	Carbon disulfide
8260B		Air	Carbon tetrachloride
8260B		Air	Chlorobenzene
8260B		Air	Chloroethane
8260B		Air	Chloroform
8260B		Air	Chloromethane
8260B		Air	cis-1,2-Dichloroethene
8260B		Air	cis-1,3-Dichloropropene
8260B		Air	Dibromochloromethane

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Laboratory: Eurofins Albuquerque (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260B		Air	Dibromomethane
8260B		Air	Dichlorodifluoromethane
8260B		Air	Ethylbenzene
8260B		Air	Hexachlorobutadiene
8260B		Air	Isopropylbenzene
8260B		Air	Methylene Chloride
8260B		Air	Methyl-tert-butyl Ether (MTBE)
8260B		Air	Naphthalene
8260B		Air	n-Butylbenzene
8260B		Air	N-Propylbenzene
8260B		Air	sec-Butylbenzene
8260B		Air	Styrene
8260B		Air	tert-Butylbenzene
8260B		Air	Tetrachloroethene (PCE)
8260B		Air	Toluene
8260B		Air	trans-1,2-Dichloroethene
8260B		Air	trans-1,3-Dichloropropene
8260B		Air	Trichloroethene (TCE)
8260B		Air	Trichlorofluoromethane
8260B		Air	Vinyl chloride
8260B		Air	Xylenes, Total

Oregon	NELAP	NM100001	02-26-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Air	Gasoline Range Organics [C6 - C10]
8260B		Air	1,1,1,2-Tetrachloroethane
8260B		Air	1,1,1-Trichloroethane
8260B		Air	1,1,2,2-Tetrachloroethane
8260B		Air	1,1,2-Trichloroethane
8260B		Air	1,1-Dichloroethane
8260B		Air	1,1-Dichloroethene
8260B		Air	1,1-Dichloropropene
8260B		Air	1,2,3-Trichlorobenzene
8260B		Air	1,2,3-Trichloropropane
8260B		Air	1,2,4-Trichlorobenzene
8260B		Air	1,2,4-Trimethylbenzene
8260B		Air	1,2-Dibromo-3-Chloropropane
8260B		Air	1,2-Dibromoethane (EDB)
8260B		Air	1,2-Dichlorobenzene
8260B		Air	1,2-Dichloroethane (EDC)
8260B		Air	1,2-Dichloropropane
8260B		Air	1,3,5-Trimethylbenzene
8260B		Air	1,3-Dichlorobenzene
8260B		Air	1,3-Dichloropropane
8260B		Air	1,4-Dichlorobenzene

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Laboratory: Eurofins Albuquerque (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260B		Air	1-Methylnaphthalene
8260B		Air	2,2-Dichloropropane
8260B		Air	2-Butanone
8260B		Air	2-Chlorotoluene
8260B		Air	2-Hexanone
8260B		Air	2-Methylnaphthalene
8260B		Air	4-Chlorotoluene
8260B		Air	4-Isopropyltoluene
8260B		Air	4-Methyl-2-pentanone
8260B		Air	Acetone
8260B		Air	Benzene
8260B		Air	Bromobenzene
8260B		Air	Bromodichloromethane
8260B		Air	Bromoform
8260B		Air	Bromomethane
8260B		Air	Carbon disulfide
8260B		Air	Carbon tetrachloride
8260B		Air	Chlorobenzene
8260B		Air	Chloroethane
8260B		Air	Chloroform
8260B		Air	Chloromethane
8260B		Air	cis-1,2-Dichloroethene
8260B		Air	cis-1,3-Dichloropropene
8260B		Air	Dibromochloromethane
8260B		Air	Dibromomethane
8260B		Air	Dichlorodifluoromethane
8260B		Air	Ethylbenzene
8260B		Air	Hexachlorobutadiene
8260B		Air	Isopropylbenzene
8260B		Air	Methylene Chloride
8260B		Air	Methyl-tert-butyl Ether (MTBE)
8260B		Air	Naphthalene
8260B		Air	n-Butylbenzene
8260B		Air	N-Propylbenzene
8260B		Air	sec-Butylbenzene
8260B		Air	Styrene
8260B		Air	tert-Butylbenzene
8260B		Air	Tetrachloroethene (PCE)
8260B		Air	Toluene
8260B		Air	trans-1,2-Dichloroethene
8260B		Air	trans-1,3-Dichloropropene
8260B		Air	Trichloroethene (TCE)
8260B		Air	Trichlorofluoromethane
8260B		Air	Vinyl chloride
8260B		Air	Xylenes, Total

Method Summary

Client: Hilcorp Energy
Project/Site: Howell M 1

Job ID: 885-967-1

Method	Method Description	Protocol	Laboratory
8015D	Nonhalogenated Organics using GC/MS -Modified (Gasoline Range Organics)	SW846	EET ALB
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ALB
Subcontract	Fixed Gases	None	
5030C	Collection/Prep Tedlar Bag (P&T)	SW846	EET ALB

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

= , 1120 South 27th Street, Billings, MT 59107

EET ALB = Eurofins Albuquerque, 4901 Hawkins NE, Albuquerque, NM 87109, TEL (505)345-3975

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ANALYTICAL SUMMARY REPORT

March 25, 2024

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

Work Order: B24030777 Quote ID: B15626

Project Name: Hilcorp Energy Howell M 1, 88500415

Energy Laboratories Inc Billings MT received the following 1 sample for Hall Environmental on 3/13/2024 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B24030777-001	SVE-1 (885-967-1)	03/06/24 12:30	03/13/24	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60

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

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

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

Report Approved By:

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Hilcorp Energy Howell M 1, 88500415
Lab ID: B24030777-001
Client Sample ID: SVE-1 (885-967-1)

Report Date: 03/25/24
Collection Date: 03/06/24 12:30
DateReceived: 03/13/24
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	19.89	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Nitrogen	79.77	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Carbon Dioxide	0.25	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Methane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Hexanes plus	0.09	Mol %		0.01		GPA 2261-95	03/14/24 02:08 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
Hexanes plus	0.038	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
GPM Total	0.038	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
GPM Pentanes plus	0.038	gpm		0.001		GPA 2261-95	03/14/24 02:08 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	4			1		GPA 2261-95	03/14/24 02:08 / jrj
Net BTU per cu ft @ std cond. (LHV)	4			1		GPA 2261-95	03/14/24 02:08 / jrj
Pseudo-critical Pressure, psia	541			1		GPA 2261-95	03/14/24 02:08 / jrj
Pseudo-critical Temperature, deg R	239			1		GPA 2261-95	03/14/24 02:08 / jrj
Specific Gravity @ 60/60F	0.998			0.001		D3588-81	03/14/24 02:08 / jrj
Air, %	90.88			0.01		GPA 2261-95	03/14/24 02:08 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	03/14/24 02:08 / 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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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Hall Environmental **Work Order:** B24030777 **Report Date:** 03/25/24

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **GPA 2261-95**										Batch: R418117
Lab ID: **B24030515-002ADUP**	12	Sample Duplicate				Run: GCNGA-B_240314A				03/14/24 11:36
Oxygen		21.7	Mol %	0.01				0.5	20	
Nitrogen		78.1	Mol %	0.01				0.1	20	
Carbon Dioxide		0.12	Mol %	0.01				8.7	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		0.08	Mol %	0.01				12	20	
Lab ID: **LCS031424**	11	Laboratory Control Sample				Run: GCNGA-B_240314A				03/14/24 02:59
Oxygen		0.64	Mol %	0.01	128	70	130			
Nitrogen		6.13	Mol %	0.01	102	70	130			
Carbon Dioxide		0.94	Mol %	0.01	95	70	130			
Methane		74.6	Mol %	0.01	100	70	130			
Ethane		6.09	Mol %	0.01	101	70	130			
Propane		5.00	Mol %	0.01	101	70	130			
Isobutane		1.69	Mol %	0.01	84	70	130			
n-Butane		2.00	Mol %	0.01	100	70	130			
Isopentane		0.99	Mol %	0.01	99	70	130			
n-Pentane		1.01	Mol %	0.01	101	70	130			
Hexanes plus		0.81	Mol %	0.01	101	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

B24030777

Login completed by: Danielle N. Harris
Date Received: 3/13/2024

Reviewed by: cjones
Received by: DNH

Reviewed Date: 3/15/2024
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	12.4°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

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

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

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

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

Contact and Corrective Action Comments:

None

Eurofins Albuquerque
4901 Hawkins NE
Albuquerque, NM 87109
Phone: 505-345-3975 Fax: 505-345-4107

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Freeman, Andy	Carrier Tracking No(s):	COC No: 885-118.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: andy.freeman@et.eurofinsus.com	State of Origin: New Mexico	Page: Page 1 of 1
Company: Energy Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon; State - New Mexico		Job #: 885-967-1
Address: 1120 South 27th Street, ,	Due Date Requested: 3/22/2024			
City: Billings	TAT Requested (days):			
State, Zip: MT, 59107				
Phone:	PO #:			
Email:	WO #:			
Project Name: Hilcorp Energy Howell M 1	Project #: 88500415			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Fixed Gases)/ Fixed Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SVE-1 (885-967-1)	3/6/24	12:30 Mountain		Air			X	1	B240307777

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks:		

3-12-24 15:54 (Relinquished by: Date/Time)
3/13/24 0910 (Received by: Date/Time)

Ver: 06/08/2021

ICOC No:
885-118

Containers

Count	Container Type	Preservative
1	Tedlar Bag 1L	None

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: Howell M 1

Project #:

Project Manager: Mitch Killough

Sampler: Brandon Sinclair

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp(including CF): N/A (°C)

HEAL No. 885-967 COC

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	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 gas O_2 & CO_2
3-6	1230	air	SVE-1	2 Tedlar									✓			✓	✓

Date	Time	Relinquished by	Received by	Via	Date	Time
3/11/24	1643				3/11/24	1643
3/11/24	1800			courier	3/12/24	7:15

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.

Login Sample Receipt Checklist

Client: Hilcorp Energy Job Number: 885-967-1

Login Number: 967 **List Source: Eurofins Albuquerque**
List Number: 1
Creator: Casarrubias, Tracy

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Refer to Job Narrative for details.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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 333281

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 333281
	Action Type: [REPORT] Alternative Remediation Report (C-141AR)

CONDITIONS

Created By	Condition	Condition Date
nvelez	1. Continue with O & M schedule. 2. Submit next quarterly report by July 15, 2024.	4/25/2024