1. Continue O&M & sampling as stated in report. 2. Submit next quarterly report by July 15, 2025.

ENSOLUM

April 15, 2025

**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 2025 – 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 2025 – 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 January, February, and March of 2025.

## 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 2025 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 2025 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 17, 2024 and March 30, 2025, the SVE system operated for 2,101.1 hours for a runtime efficiency of 97.0 percent (%). Appendix B presents photographs of the runtime meter for calculating the first quarter 2025 runtime efficiency. Table 1 presents the SVE system operational hours and calculated percentage runtime.

Based on the November 2022 COAs, vapor samples are required to be collected quarterly following the first year of operation. A vapor sample was collected on February 11, 2025. Prior to collection, the vapor sample was field screened with a PID for organic vapor monitoring (OVM). The vapor sample was 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. A summary of field measurements and analytical data collected at the Site are presented in Tables 2 and 3, respectively. The full laboratory analytical report is attached as Appendix C. Oxygen and Carbon dioxide levels over time are presented in Graphs 1 and 2, respectively. Vapor samples will continue to be collected on a quarterly basis for the remainder of system operation.

Vapor 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, 41,328 pounds (20.7 tons) of TVPH have been removed by the system to date.

## DISCUSSION AND RECOMMENDATIONS

The SVE system continues to effectively remove hydrocarbon mass from the subsurface in the current configuration. Bi-weekly visits and quarterly 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:**

| | |
|---|---|
| Figure 1 | Site Location Map |
| Figure 2 | Radius of Influence and Effect |
| Table 1 | Soil Vapor Extraction System Runtime Calculations |
| Table 2 | Soil Vapor Extraction System Field Measurements |
| Table 3 | Soil Vapor Extraction System Air Analytical Results |
| Table 4 | Soil Vapor Extraction System Mass Removal and Emissions |
| Graph 1 | Oxygen vs Time |
| Graph 2 | Carbon Dioxide vs Time |
| Appendix A | Field Notes |
| Appendix B | Project Photographs |
| Appendix C | Laboratory Analytical Reports |

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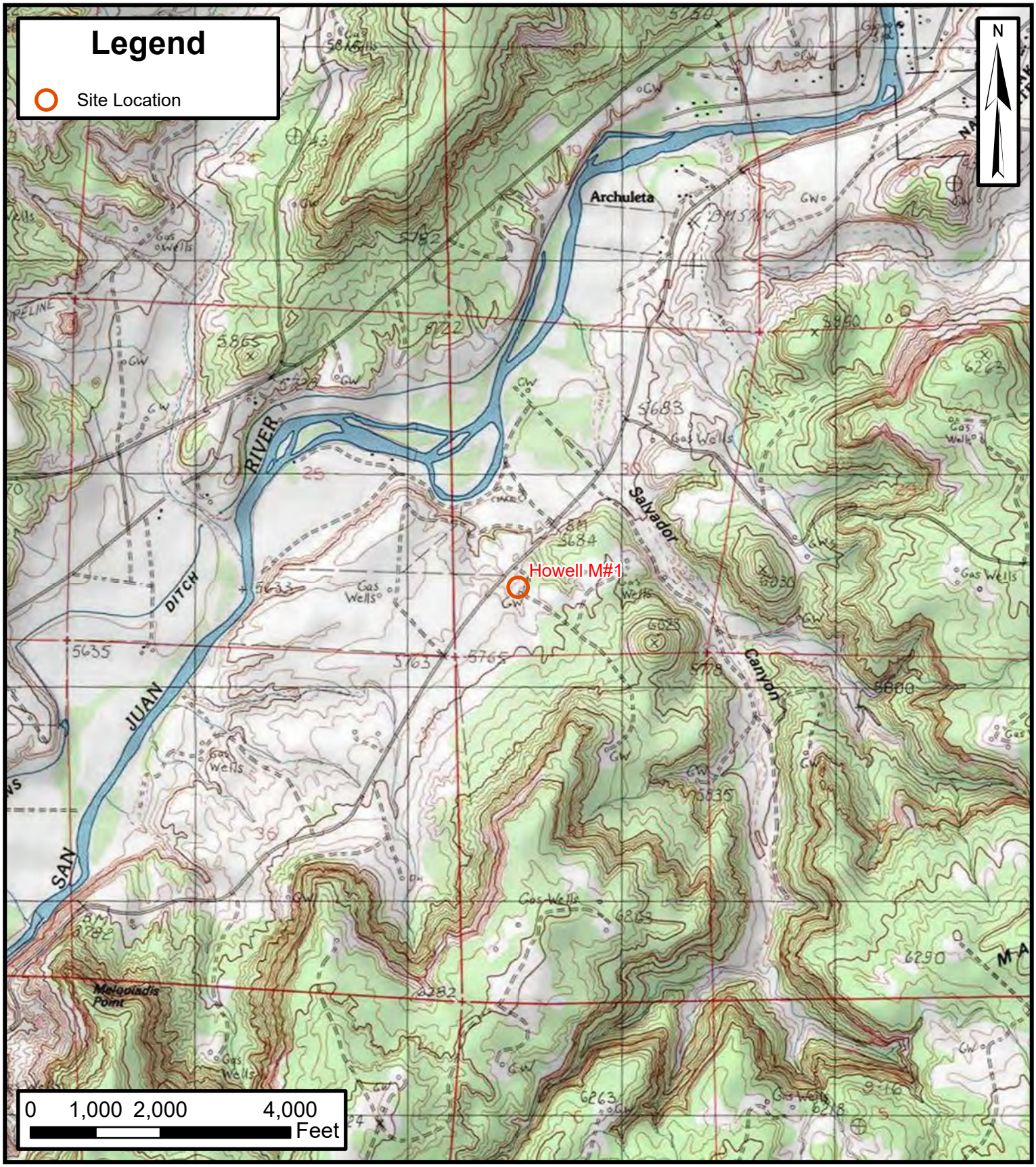
# Figures

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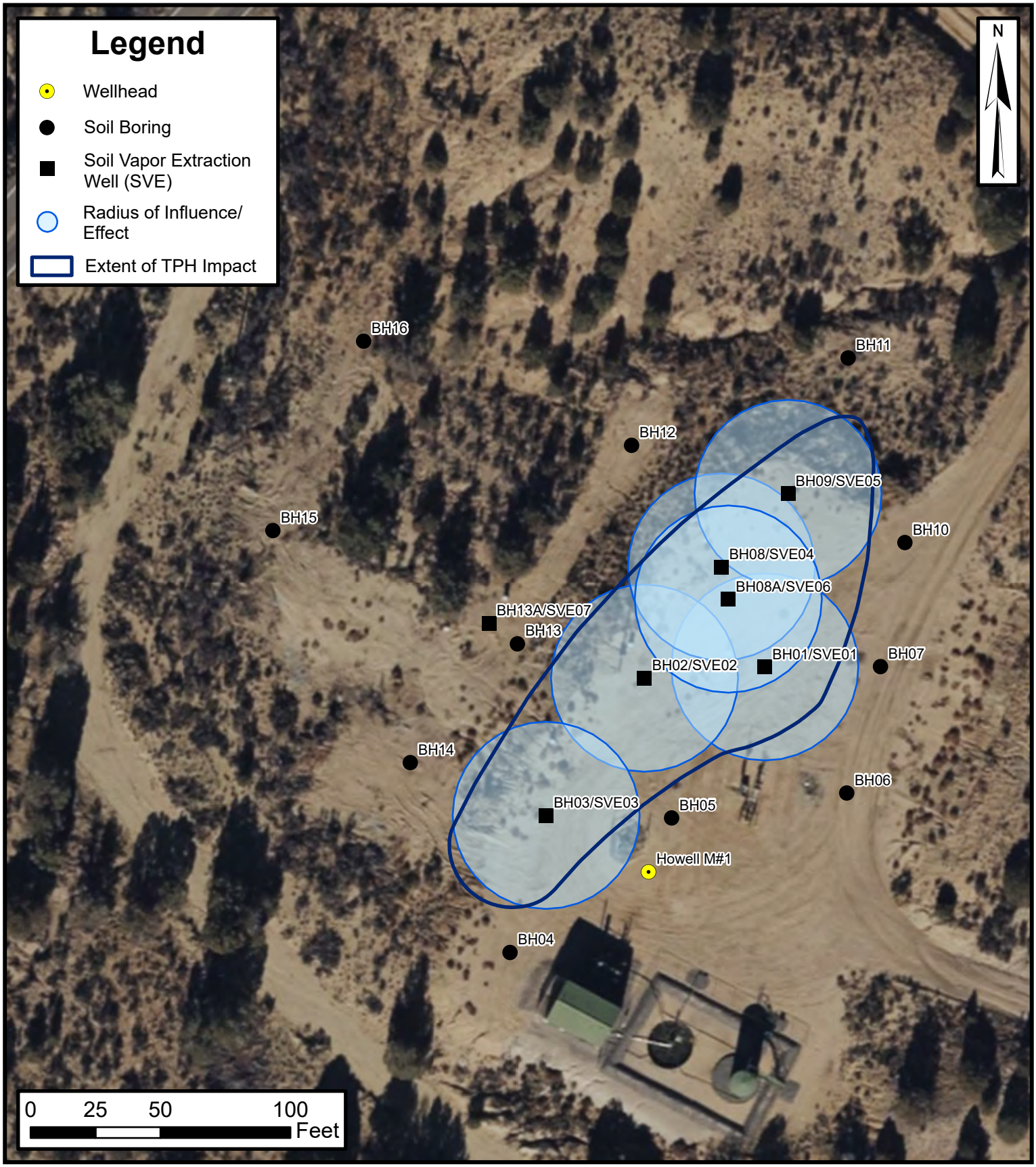
# Site Location Map

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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**RADIUS OF INFLUENCE AND EFFECT**
**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 | 96.4% | 96.4% |
| 3/25/2024 | 6,839.9 | 2,694.9 | 115 | 97.6% | 97.2% |
| 6/27/2024 | 9,035.4 | 2,195.5 | 94 | 97.3% | 97.2% |
| 9/19/2024 | 11,017.5 | 1,982.1 | 84 | 98.3% | 97.5% |
| 12/17/2024 | 13,118.6 | 2,101.1 | 89 | 98.4% | 97.7% |
| 3/30/2025 | 15,515.9 | 2,397.3 | 103 | 97.0% | 97.5% |

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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 | -- | -- |
| | 4/8/2024 | 1,016 | 3.80 | 170 | 124 | 30 | 1.1 | -- | -- |
| | 4/17/2024 | 345 | 3.90 | 173 | 126 | 30 | 1.1 | -- | -- |
| | 5/14/2024 | 755 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 5/23/2024 | 456 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 6/4/2024 | 535 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 6/27/2024 | 1,243 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 7/10/2024 | 585 | 3.50 | 164 | 119 | 30 | 1.1 | -- | -- |
| | 7/26/2024 | 418 | 3.60 | 166 | 121 | 29 | 1.0 | -- | -- |
| | 8/8/2024 | 402 | 3.50 | 164 | 119 | 30 | 1.1 | -- | -- |
| | 8/21/2024 | 400 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 9/6/2024 | 388 | 3.70 | 168 | 122 | 30 | 1.1 | -- | -- |
| | 9/19/2024 | 408 | 3.70 | 168 | 122 | 30 | 1.1 | -- | -- |
| | 10/14/2024 | 385 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 10/29/2024 | 360 | 3.60 | 166 | 121 | 29 | 1.0 | -- | -- |
| | 11/6/2024 | 391 | 3.60 | 166 | 121 | 30 | 1.1 | -- | -- |
| | 11/19/2024 | 442 | 3.70 | 168 | 122 | 30 | 1.1 | -- | -- |
| | 12/3/2024 | 393 | 3.80 | 170 | 124 | 30 | 1.1 | -- | -- |
| | 12/17/2024 | 423 | 3.80 | 170 | 124 | 30 | 1.1 | -- | -- |
| | 1/8/2025 | 586 | 3.70 | 168 | 122 | 32 | 1.2 | -- | -- |
| | 1/22/2025 | 673 | 3.70 | 168 | 122 | 32 | 1.2 | -- | -- |
| | 2/11/2025 | 651 | 4.00 | 175 | 127 | 30 | 1.1 | -- | -- |
| | 2/27/2025 | 696 | 4.00 | 175 | 126 | 32 | 1.2 | -- | -- |
| | 3/17/2025 | 393 | 3.90 | 173 | 125 | 32 | 1.2 | -- | -- |
| | 3/30/2025 | 589 | 3.80 | 170 | 123 | 32 | 1.2 | -- | -- |
| 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 |
| | 4/8/2024 | 603 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.04 |
| | 4/17/2024 | 257 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.8 | 0.03 |
| | 5/14/2024 | 336 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.7 | 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 (%) |
|---|---|---|---|---|---|---|---|---|---|
| SVE01 | 5/23/2024 | 155 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.6 | 0.02 |
| | 6/4/2024 | 271 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.05 |
| | 6/27/2024 | 173 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.03 |
| | 7/10/2024 | 259 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.04 |
| | 7/26/2024 | 310 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.04 |
| | 8/8/2024 | 101 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.05 |
| | 8/21/2024 | 233 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.06 |
| | 9/6/2024 | 219 | 0.02 | 12 | 9.4 | 11 | 0.4 | 20.9 | 0.09 |
| | 9/19/2024 | 153 | 0.01 | 9 | 6.7 | 11 | 0.4 | 20.9 | 0.06 |
| | 10/14/2024 | 183 | 0.01 | 9 | 6.7 | 11 | 0.4 | 20.9 | 0.11 |
| | 10/29/2024 | 234 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.17 |
| | 11/6/2024 | 201 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.15 |
| | 11/19/2024 | 197 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.06 |
| | 12/3/2024 | 163 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.05 |
| | 12/17/2024 | 174 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.06 |
| | 1/8/2025 | 180 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.03 |
| | 1/22/2025 | 197 | 0.01 | 9 | 6.7 | 13 | 0.5 | 20.9 | 0.01 |
| | 2/11/2025 | 188 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.02 |
| | 2/27/2025 | 242 | 0.01 | 9 | 6.6 | 13 | 0.5 | -- | -- |
| | 3/17/2025 | 210 | 0.01 | 9 | 6.6 | 13 | 0.5 | -- | -- |
| | 3/30/2025 | 211 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.20 |
| 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 |
| | 4/8/2024 | 417 | 0.24 | 43 | 32.7 | 12 | 0.4 | 20.9 | 0.04 |
| | 4/17/2024 | 82 | 0.23 | 42 | 32.0 | 11 | 0.4 | 20.9 | 0.01 |
| | 5/14/2024 | 337 | 0.19 | 38 | 29.1 | 11 | 0.4 | 20.9 | 0.03 |
| | 5/22/2024 | 189 | 0.18 | 37 | 28.3 | 11 | 0.4 | 20.8 | 0.05 |
| | 6/4/2024 | 517 | 0.18 | 37 | 28.4 | 11 | 0.4 | 20.9 | 0.08 |
| | 6/27/2024 | 243 | 0.18 | 37 | 28.3 | 11 | 0.4 | 20.8 | 0.07 |
| | 7/10/2024 | 452 | 0.18 | 37 | 28.4 | 11 | 0.4 | 20.8 | 0.08 |
| | 7/26/2024 | 525 | 0.21 | 40 | 30.6 | 10 | 0.4 | 20.9 | 0.07 |
| | 8/8/2024 | 259 | 0.21 | 40 | 30.7 | 10 | 0.4 | 20.9 | 0.05 |
| | 8/21/2024 | 432 | 0.22 | 41 | 31.4 | 10 | 0.4 | 20.9 | 0.08 |
| | 9/6/2024 | 413 | 0.21 | 40 | 30.6 | 10 | 0.4 | 20.9 | 0.08 |
| | 9/19/2024 | 208 | 0.21 | 40 | 30.6 | 10 | 0.4 | 20.9 | 0.06 |
| | 10/14/2024 | 368 | 0.21 | 40 | 30.6 | 10 | 0.4 | 20.9 | 0.15 |
| | 10/29/2024 | 324 | 0.21 | 40 | 30.6 | 11 | 0.4 | 20.9 | 0.11 |
| | 11/6/2024 | 333 | 0.21 | 40 | 30.6 | 11 | 0.4 | 20.9 | 0.13 |
| | 11/19/2024 | 321 | 0.22 | 41 | 31.3 | 11 | 0.4 | 20.9 | 0.11 |
| | 12/3/2024 | 395 | 0.22 | 41 | 31.3 | 11 | 0.4 | 20.9 | 0.07 |
| | 12/17/2024 | 403 | 0.26 | 45 | 34.0 | 11 | 0.4 | 20.9 | 0.09 |
| | 1/8/2025 | 390 | 0.25 | 44 | 33.3 | 12 | 0.4 | 20.9 | 0.06 |
| | 1/22/2025 | 385 | 0.24 | 43 | 32.6 | 12 | 0.4 | 20.9 | 0.06 |
| | 2/11/2025 | 398 | 0.25 | 44 | 33.3 | 12 | 0.4 | 20.9 | 0.05 |
| | 2/27/2025 | 248 | 0.22 | 41 | 31.2 | 12 | 0.4 | -- | -- |
| | 3/17/2025 | 588 | 0.21 | 40 | 30.5 | 12 | 0.4 | -- | -- |
| | 3/30/2025 | 160 | 0.22 | 41 | 31.2 | 12 | 0.4 | 20.9 | 0.20 |

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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 |
| | 4/8/2024 | 849 | 0.12 | 30 | 23.1 | 11 | 0.4 | 20.9 | 0.15 |
| | 4/17/2024 | 693 | 0.11 | 29 | 22.2 | 11 | 0.4 | 20.7 | 0.11 |
| | 5/14/2024 | 822 | 0.09 | 26 | 20.1 | 11 | 0.4 | 20.6 | 0.18 |
| | 5/23/2024 | 697 | 0.09 | 26 | 20.1 | 10 | 0.4 | 20.7 | 0.10 |
| | 6/4/2024 | 746 | 0.08 | 25 | 18.9 | 10 | 0.4 | 20.8 | 0.15 |
| | 6/27/2024 | 704 | 0.09 | 26 | 20.1 | 10 | 0.4 | 20.7 | 0.10 |
| | 7/10/2024 | 801 | 0.08 | 25 | 18.9 | 10 | 0.4 | 20.9 | 0.14 |
| | 7/26/2024 | 787 | 0.12 | 30 | 23.2 | 10 | 0.4 | 20.9 | 0.13 |
| | 8/8/2024 | 579 | 0.11 | 29 | 22.2 | 10 | 0.4 | 20.9 | 0.12 |
| | 8/21/2024 | 465 | 0.08 | 25 | 18.9 | 10 | 0.4 | 20.9 | 0.10 |
| | 9/6/2024 | 442 | 0.10 | 28 | 21.2 | 10 | 0.4 | 20.9 | 0.14 |
| | 9/19/2024 | 616 | 0.08 | 25 | 18.9 | 10 | 0.4 | 20.9 | 0.16 |
| | 10/14/2024 | 349 | 0.08 | 25 | 18.9 | 10 | 0.4 | 20.7 | 0.19 |
| | 10/29/2024 | 503 | 0.22 | 41 | 31.3 | 11 | 0.4 | 20.9 | 0.17 |
| | 11/6/2024 | 456 | 0.19 | 38 | 29.2 | 10 | 0.4 | 20.9 | 0.18 |
| | 11/19/2024 | 613 | 0.18 | 37 | 28.4 | 11 | 0.4 | 20.9 | 0.12 |
| | 12/3/2024 | 568 | 0.19 | 38 | 29.1 | 11 | 0.4 | 20.9 | 0.10 |
| | 12/17/2024 | 594 | 0.18 | 37 | 28.3 | 11 | 0.4 | 20.9 | 0.11 |
| | 1/8/2025 | 596 | 0.18 | 37 | 28.3 | 11 | 0.4 | 20.9 | 0.12 |
| | 1/22/2025 | 615 | 0.17 | 36 | 27.5 | 11 | 0.4 | 20.9 | 0.17 |
| | 2/11/2025 | 654 | 0.17 | 36 | 27.5 | 11 | 0.4 | 20.9 | 0.11 |
| | 2/27/2025 | 644 | 0.11 | 29 | 22.1 | 11 | 0.4 | -- | -- |
| | 3/17/2025 | 588 | 0.15 | 34 | 25.8 | 12 | 0.4 | -- | -- |
| | 3/30/2025 | 613 | 0.17 | 36 | 27.5 | 12 | 0.4 | 20.9 | 0.30 |
| 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 |
| | 4/8/2024 | 865 | 0.53 | 64 | 48.6 | 11 | 0.4 | 20.9 | 0.09 |
| | 4/17/2024 | 716 | 0.53 | 64 | 48.7 | 11 | 0.4 | 20.7 | 0.10 |

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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 (%) |
|---|---|---|---|---|---|---|---|---|---|
| SVE04 | 5/14/2024 | 757 | 0.46 | 59 | 45.4 | 10 | 0.4 | 20.8 | 0.12 |
| | 5/23/2024 | 751 | 0.48 | 61 | 46.3 | 10 | 0.4 | 20.3 | 0.12 |
| | 6/4/2024 | 574 | 0.48 | 61 | 46.4 | 10 | 0.4 | 20.9 | 0.12 |
| | 6/27/2024 | 622 | 0.40 | 55 | 42.3 | 10 | 0.4 | 20.8 | 0.11 |
| | 7/10/2024 | 586 | 0.42 | 57 | 43.4 | 10 | 0.4 | 20.8 | 0.12 |
| | 7/26/2024 | 550 | 0.46 | 59 | 45.4 | 10 | 0.4 | 20.9 | 0.12 |
| | 8/8/2024 | 322 | 0.47 | 60 | 45.9 | 10 | 0.4 | 20.9 | 0.09 |
| | 8/21/2024 | 457 | 0.45 | 59 | 44.9 | 10 | 0.4 | 20.9 | 0.09 |
| | 9/6/2024 | 293 | 0.44 | 58 | 44.4 | 10 | 0.4 | 20.9 | 0.10 |
| | 9/19/2024 | 647 | 0.42 | 57 | 43.4 | 10 | 0.4 | 20.9 | 0.16 |
| | 10/14/2024 | 510 | 0.43 | 57 | 43.9 | 10 | 0.4 | 20.9 | 0.17 |
| | 10/29/2024 | 438 | 0.39 | 55 | 41.7 | 11 | 0.4 | 20.9 | 0.13 |
| | 11/6/2024 | 482 | 0.41 | 56 | 42.8 | 11 | 0.4 | 20.9 | 0.15 |
| | 11/19/2024 | 537 | 0.43 | 57 | 43.8 | 11 | 0.4 | 20.9 | 0.09 |
| | 12/3/2024 | 389 | 0.39 | 55 | 41.7 | 11 | 0.4 | 20.9 | 0.09 |
| | 12/17/2024 | 442 | 0.41 | 56 | 42.8 | 11 | 0.4 | 20.9 | 0.04 |
| | 1/8/2025 | 481 | 0.43 | 57 | 43.8 | 11 | 0.4 | 20.9 | 0.05 |
| | 1/22/2025 | 520 | 0.39 | 55 | 41.7 | 11 | 0.4 | 20.9 | 0.08 |
| | 2/11/2025 | 504 | 0.40 | 55 | 42.2 | 11 | 0.4 | 20.9 | 0.04 |
| | 2/27/2025 | 652 | 0.53 | 64 | 48.6 | 11 | 0.4 | -- | -- |
| | 3/17/2025 | 296 | 0.38 | 54 | 41.1 | 11 | 0.4 | -- | -- |
| | 3/30/2025 | 508 | 0.41 | 56 | 42.7 | 11 | 0.4 | 20.9 | 0.20 |
| 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 |
| | 4/8/2024 | 631 | 0.14 | 33 | 24.9 | 12 | 0.4 | 20.9 | 0.09 |
| | 4/17/2024 | 344 | 0.15 | 34 | 25.8 | 12 | 0.4 | 20.8 | 0.10 |
| | 5/14/2024 | 321 | 0.12 | 30 | 23.1 | 12 | 0.4 | 20.9 | 0.08 |
| | 5/23/2024 | 369 | 0.12 | 30 | 23.1 | 12 | 0.4 | 20.8 | 0.06 |
| | 6/4/2024 | 392 | 0.13 | 32 | 24.0 | 12 | 0.4 | 20.9 | 0.09 |
| | 6/27/2024 | 419 | 0.10 | 28 | 21.1 | 11 | 0.4 | 20.8 | 0.07 |
| | 7/10/2024 | 406 | 0.13 | 32 | 24.0 | 12 | 0.4 | 20.9 | 0.08 |
| | 7/26/2024 | 295 | 0.14 | 33 | 25.0 | 11 | 0.4 | 20.9 | 0.08 |
| | 8/8/2024 | 186 | 0.13 | 32 | 24.1 | 11 | 0.4 | 20.9 | 0.08 |
| | 8/21/2024 | 202 | 0.14 | 33 | 25.0 | 11 | 0.4 | 20.9 | 0.07 |
| | 9/6/2024 | 182 | 0.15 | 34 | 25.8 | 11 | 0.4 | 20.9 | 0.12 |
| | 9/19/2024 | 296 | 0.13 | 32 | 24.0 | 12 | 0.4 | 20.9 | 0.13 |
| | 10/14/2024 | 210 | 0.13 | 32 | 24.0 | 12 | 0.4 | 20.9 | 0.11 |
| | 10/29/2024 | 292 | 0.13 | 32 | 24.0 | 12 | 0.4 | 20.9 | 0.13 |
| | 11/6/2024 | 290 | 0.12 | 30 | 23.1 | 12 | 0.4 | 20.9 | 0.12 |
| | 11/19/2024 | 298 | 0.18 | 37 | 28.2 | 12 | 0.4 | 20.9 | 0.09 |
| | 12/3/2024 | 324 | 0.11 | 29 | 22.1 | 12 | 0.4 | 20.9 | 0.07 |
| | 12/17/2024 | 326 | 0.15 | 34 | 25.8 | 12 | 0.4 | 20.9 | 0.07 |
| | 1/8/2025 | 323 | 0.14 | 33 | 24.9 | 12 | 0.4 | 20.9 | 0.07 |
| | 1/22/2025 | 298 | 0.17 | 36 | 27.4 | 12 | 0.4 | 20.9 | 0.08 |
| | 2/11/2025 | 309 | 0.15 | 34 | 25.8 | 12 | 0.4 | 20.9 | 0.07 |
| | 2/27/2025 | 335 | 0.08 | 25 | 18.8 | 13 | 0.5 | -- | -- |
| | 3/17/2025 | 207 | 0.14 | 33 | 24.9 | 13 | 0.5 | -- | -- |
| | 3/30/2025 | 312 | 0.11 | 29 | 22.1 | 12 | 0.4 | 20.9 | 0.30 |

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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 |
| | 4/8/2024 | 1,188 | 0.01 | 9 | 6.7 | 13 | 0.5 | 20.9 | 0.12 |
| | 4/17/2024 | 644 | 0.01 | 9 | 6.7 | 12 | 0.4 | 20.9 | 0.10 |
| | 5/14/2024 | 606 | 0.00 | 0 | 0.0 | 12 | 0.4 | 20.8 | 0.08 |
| | 5/23/2024 | 581 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.5 | 0.09 |
| | 6/4/2024 | 499 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.09 |
| | 6/27/2024 | 397 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.08 |
| | 7/10/2024 | 528 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.08 |
| | 7/26/2024 | 408 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.08 |
| | 8/8/2024 | 240 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.05 |
| | 8/21/2024 | 194 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.06 |
| | 9/6/2024 | 295 | 0.00 | 0 | 0.0 | 11 | 0.4 | 20.9 | 0.06 |
| | 9/19/2024 | 731 | 0.04 | 17 | 13.3 | 11 | 0.4 | 20.7 | 0.19 |
| | 10/14/2024 | 245 | 0.03 | 15 | 11.6 | 11 | 0.4 | 20.9 | 0.09 |
| | 10/29/2024 | 364 | 0.02 | 12 | 9.4 | 12 | 0.4 | 20.9 | 0.09 |
| | 11/6/2024 | 357 | 0.03 | 15 | 11.6 | 11 | 0.4 | 20.9 | 0.09 |
| | 11/19/2024 | 388 | 0.02 | 12 | 9.4 | 13 | 0.5 | 20.9 | 0.08 |
| | 12/3/2024 | 367 | 0.02 | 12 | 9.4 | 12 | 0.4 | 20.9 | 0.10 |
| | 12/17/2024 | 392 | 0.02 | 12 | 9.4 | 12 | 0.4 | 20.9 | 0.08 |
| | 1/8/2025 | 601 | 0.01 | 9 | 6.7 | 12 | 0.5 | 20.9 | 0.06 |
| | 1/22/2025 | 730 | 0.02 | 12 | 9.4 | 13 | 0.5 | 20.9 | 0.06 |
| | 2/11/2025 | 745 | 0.01 | 9 | 6.6 | 13 | 0.5 | 20.9 | 0.06 |
| | 2/27/2025 | 677 | 0.02 | 12 | 9.4 | 13 | 0.5 | -- | -- |
| | 3/17/2025 | 254 | 0.02 | 12 | 9.4 | 13 | 0.5 | -- | -- |
| | 3/30/2025 | 242 | 0.00 | 0 | 0.0 | 13 | 0.5 | 20.9 | 0.20 |

***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% |
| 5/14/2024 | 755 | 2.1 | 84 | 8.2 | 93 | 6,000 | 21.60% | 0.24% |
| 7/26/2024 | 418 | <2.0 | 59 | 5.7 | 66 | 4,800 | 19.27% | 0.29% |
| 9/6/2024 | 388 | <5.0 | 34 | <5.0 | 36 | 2,800 | 22.07% | 0.21% |
| 11/19/2024 | 442 | <5.0 | 37 | <5.0 | 43 | 2,600 | 21.89% | 0.29% |
| 2/11/2025 | 651 | <5.0 | 26 | <5.0 | 25 | 2,300 | 21.90% | 0.24% |

***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 |
| 5/14/2024 | 755 | 2.1 | 84 | 8.2 | 93 | 6,000 |
| 7/26/2024 | 418 | *2.0* | 59 | 5.7 | 66 | 4,800 |
| 9/6/2024 | 388 | *5.0* | 34 | *5.0* | 36 | 2,800 |
| 11/19/2024 | 442 | *5.0* | 37 | *5.0* | 43 | 2,600 |
| 2/11/2025 | 651 | *5.0* | 26 | *5.0* | 25 | 2,300 |
| **Average** | 1,316 | 50 | 259 | 17 | 191 | 23,116 |

**Vapor Extraction Summary**

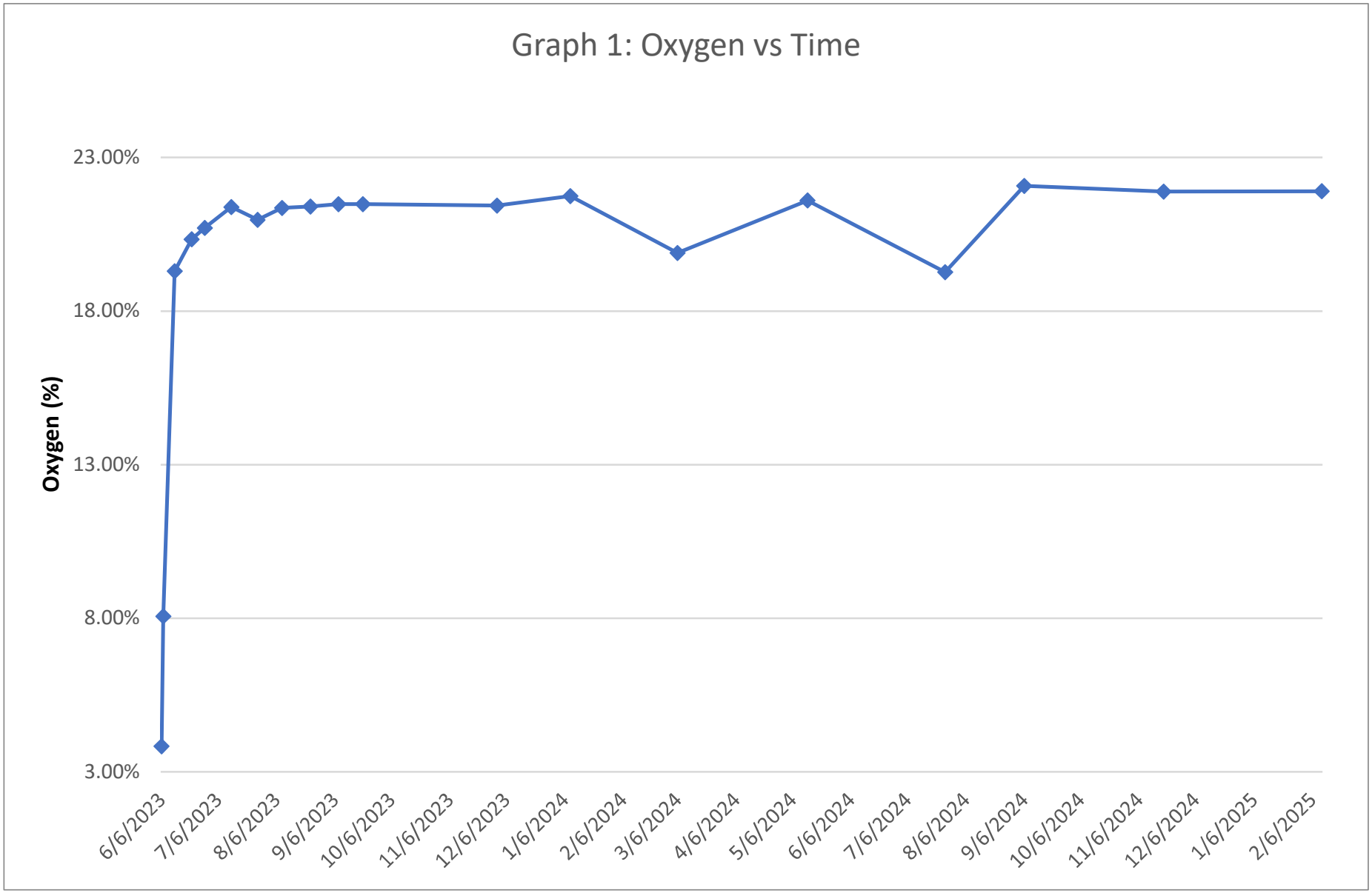
| Date | Flow Rate (scfm) | Total System Flow (cf) | Delta Flow (cf) | Benzene (lb/hr) | Toluene (lb/hr) | Ethylbenzene (lb/hr) | Total Xylenes (lb/hr) | TVPH (lb/hr) |
|---|---|---|---|---|---|---|---|---|
| 6/6/2023 | -- | System Startup | | | | | | |
| 6/7/2023 | 60 | 100,440 | 100,440 | 0.058 | 0.21 | 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 | 0.0044 | 0.054 | 0.0037 | 0.039 | 3.5 |
| 3/6/2024 | 124 | 35,805,360 | 10,101,288 | 0.0025 | 0.033 | 0.0024 | 0.026 | 2.4 |
| 5/14/2024 | 121 | 47,793,072 | 11,987,712 | 0.0016 | 0.035 | 0.0032 | 0.036 | 2.5 |
| 7/26/2024 | 121 | 59,961,558 | 12,168,486 | 0.0009 | 0.032 | 0.0031 | 0.036 | 2.4 |
| 9/6/2024 | 122 | 67,214,946 | 7,253,388 | 0.0016 | 0.021 | 0.0024 | 0.023 | 1.7 |
| 11/19/2024 | 122 | 79,997,130 | 12,782,184 | 0.0023 | 0.016 | 0.0023 | 0.018 | 1.2 |
| 2/11/2025 | 127 | 95,197,506 | 15,200,376 | 0.0023 | 0.015 | 0.0023 | 0.016 | 1.1 |
| | | | **Average** | 0.010 | 0.062 | 0.0045 | 0.049 | 5.4 |

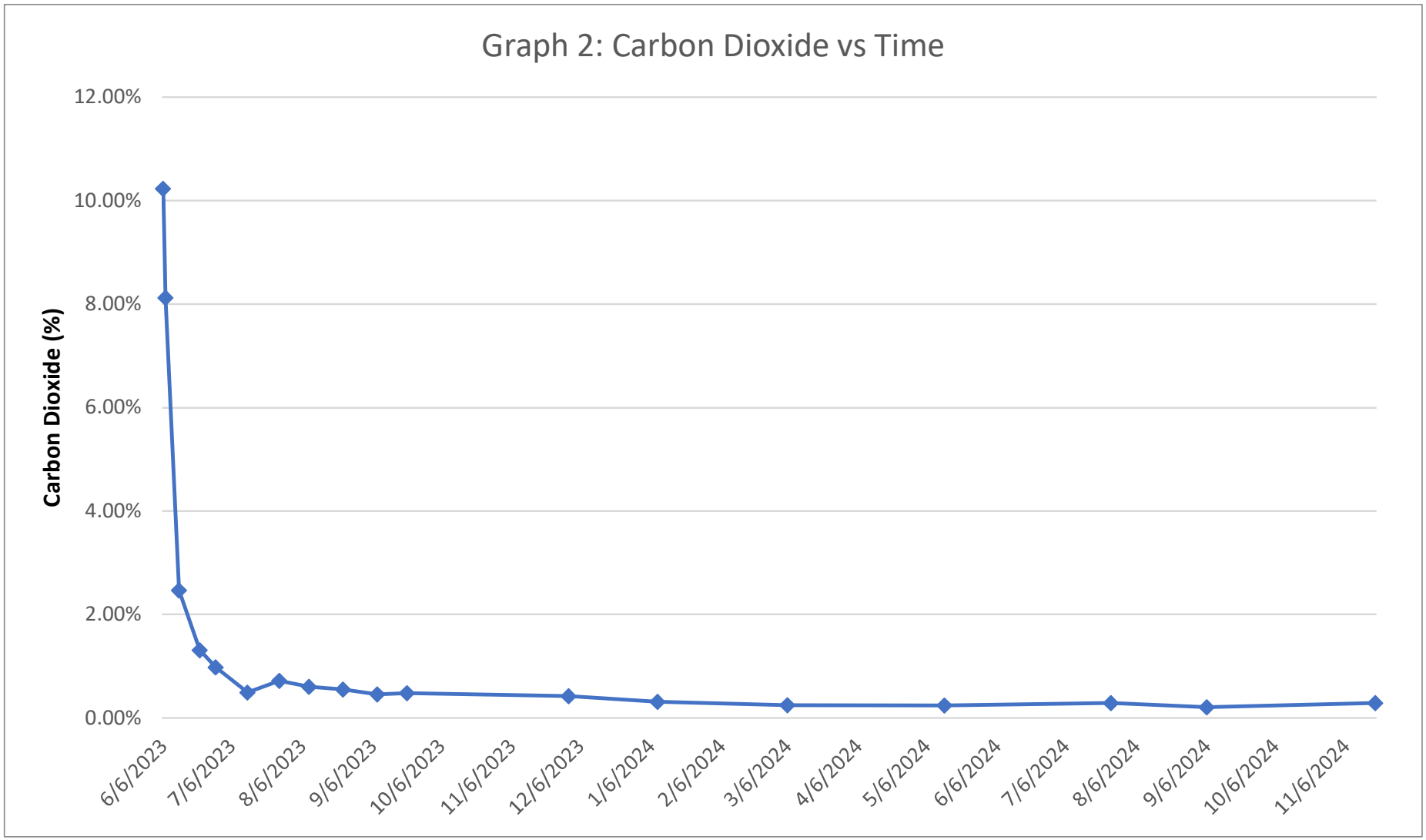
**Mass Recovery**

| 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 | 3.9 | 48 | 3.2 | 34 | 3,051 | 1.53 |
| 3/6/2024 | 6,385 | 1,358 | 3.4 | 44 | 3.3 | 36 | 3,243 | 1.62 |
| 5/14/2024 | 8,036 | 1,651 | 2.7 | 58 | 5.3 | 60 | 4,123 | 2.06 |
| 7/26/2024 | 9,712 | 1,676 | 1.6 | 54 | 5.3 | 60 | 4,096 | 2.05 |
| 9/6/2024 | 10,703 | 991 | 1.6 | 21 | 2.4 | 23 | 1,711 | 0.86 |
| 11/19/2024 | 12,449 | 1,746 | 4.0 | 28 | 4.0 | 31 | 2,151 | 1.08 |
| 2/11/2025 | 14,444 | 1,995 | 4.6 | 29 | 4.6 | 32 | 2,276 | 1.14 |
| | | **Total Mass Recovery to Date** | 58 | 549 | 49 | 513 | 41,328 | 20.7 |

***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

ENSOLUM

# HOWELL M#1 SVE SYSTEM
# O&M FORM

DATE: 1-8
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)** | 13698.9 | 1425 |
| Inlet Vacuum (IWC) | 35 | |
| Differential Pressure | 3.7 | |
| Inlet PID | 586.3 | |
| Exhaust PID | 596.1 | |
| K/O Tank Liquid Level | | |
| K/O Liquid Drained (gallons) | 10 | |

| 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 (%) ppm |
|---|---|---|---|---|---|
| SVE01 | 12.13 | 0.01 | 180.0 | 20.9 | 340 |
| SVE02 | 11.74 | 0.25 | 389.6 | 20.9 | 600 |
| SVE03 | 11.05 | 0.18 | 595.9 | 20.9 | 1220 |
| SVE04 | 11.21 | 0.43 | 481.2 | 20.9 | 520 |
| SVE05 | 12.17 | 0.14 | 323.4 | 20.9 | 680 |
| SVE06 | 12.47 | 0.01 | 601.1 | 20.9 | 640 |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

**HOWELL M#1 SVE SYSTEM**
**O&M FORM**

DATE: 1-22
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)** | 13983.4 | 1308 |
| Inlet Vacuum (IWC) | 32 | |
| Differential Pressure | 3.7 | |
| Inlet PID | 673.1 | |
| Exhaust PID | 664.2 | |
| K/O Tank Liquid Level | | |
| K/O Liquid Drained (gallons) | 19 | |

| 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 (%) ppm |
|---|---|---|---|---|---|
| SVE01 | 12.52 | 0.01 | 197.0 | 20.9 | 100 |
| SVE02 | 11.94 | 0.24 | 385.1 | 20.9 | 560 |
| SVE03 | 11.48 | 0.17 | 614.7 | 20.9 | 1660 |
| SVE04 | 11.43 | 0.39 | 519.7 | 20.9 | 760 |
| SVE05 | 12.40 | 0.17 | 298.2 | 20.9 | 760 |
| SVE06 | 12.75 | 0.02 | 729.7 | 20.9 | 620 |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

# HOWELL M#1 SVE SYSTEM
# O&M FORM

DATE: 2-11
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)** | 14443.9 | 1438 |
| Inlet Vacuum (IWC) | 30 | |
| Differential Pressure | 4.0 | |
| Inlet PID | 651.3 | |
| Exhaust PID | 673.9 | |
| K/O Tank Liquid Level | | |
| K/O Liquid Drained (gallons) | 30 | |

## SVE SYSTEM SAMPLING

**SAMPLE ID:** SVE-1 **SAMPLE TIME:** 1445
**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 | 12.27 | 0.01 | 188.2 | 20.9 | 240 |
| SVE02 | 11.88 | 0.25 | 398.4 | 20.9 | 500 |
| SVE03 | 11.35 | 0.17 | 653.7 | 20.9 | 1100 |
| SVE04 | 11.22 | 0.40 | 503.6 | 20.9 | 420 |
| SVE05 | 12.21 | 0.15 | 309.4 | 20.9 | 660 |
| SVE06 | 12.62 | 0.01 | 744.6 | 20.9 | 580 |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

**HOWELL M#1 SVE SYSTEM**
**O&M FORM**

DATE: 2-27 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)** | 14827.4 | 1404 |
| Inlet Vacuum (IWC) | 32 | |
| Differential Pressure | 4.0 | |
| Inlet PID | 696.2 | |
| Exhaust PID | 635.6 | |
| 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 | 0.01 | 12.63 | 242.4 | | |
| SVE02 | 0.22 | 12.02 | 248.2 | | |
| SVE03 | 0.11 | 11.58 | 644.4 | | |
| SVE04 | 0.53 | 11.47 | 652.4 | | |
| SVE05 | 0.08 | 12.87 | 335.1 | | |
| SVE06 | -0.02 | 12.77 | 675.7 | | |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

**HOWELL M#1 SVE SYSTEM**
**O&M FORM**

DATE: 3-17 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)** | 15202.5 | 1337 |
| Inlet Vacuum (IWC) | 32 | |
| Differential Pressure | 3.9 | |
| Inlet PID | 392.8 | |
| Exhaust PID | 662.6 | |
| 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 | 12.64 | 0.01 | 209.6 | | |
| SVE02 | 11.99 | 0.21 | 145.5 | | |
| SVE03 | 11.50 | 0.15 | 587.7 | | |
| SVE04 | 11.29 | 0.38 | 295.7 | | |
| SVE05 | 12.69 | 0.14 | 207.1 | | |
| SVE06 | 12.75 | 0.02 | 254.3 | | |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

**HOWELL M#1 SVE SYSTEM**
**O&M FORM**

DATE: 3-30 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)** | 15515.9 | 1433 |
| Inlet Vacuum (IWC) | 32 | |
| Differential Pressure | 3.8 | |
| Inlet PID | 589.3 | |
| Exhaust PID | 626.7 | |
| 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 | 12.18 | 0.01 | 211.2 | 20.9 | 0.2 |
| SVE02 | 11.89 | 0.22 | 159.7 | 20.9 | 0.2 |
| SVE03 | 11.92 | 0.17 | 613.1 | 20.9 | 0.3 |
| SVE04 | 11.30 | 0.41 | 507.9 | 20.9 | 0.2 |
| SVE05 | 12.34 | 0.11 | 311.8 | 20.9 | 0.3 |
| SVE06 | 12.59 | 0 | 242.1 | 20.9 | 0.2 |

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

# APPENDIX B

# Project Photographs

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

| | |
|---|---|
| **Photograph 1**<br><br>Runtime meter taken on December 17, 2024 at 12:59 PM<br>Hours = 13,118.6 |  |
| **Photograph 2**<br><br>Runtime meter taken on March 30, 2025 at 2:33 PM<br>Hours = 15,515.9 |  |



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

ENSOLUM

# APPENDIX C

# Laboratory Analytical Reports

eurofins | Environment Testing



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 3/7/2025 3:13:49 PM

## JOB DESCRIPTION

Howell M1

## JOB NUMBER

885-19888-1

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
3/7/2025 3:13:49 PM

Authorized for release by
Michelle Garcia, Project Manager
michelle.garcia@et.eurofinsus.com
(505)345-3975

Client: Hilcorp Energy
Project/Site: Howell M1

Laboratory Job ID: 885-19888-1

# Table of Contents

# Definitions/Glossary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

## 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 M1

Job ID: 885-19888-1

## Job ID: 885-19888-1 Eurofins Albuquerque

**Job Narrative**
**885-19888-1**

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 and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided 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 2/13/2025 6:30 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 9.1°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.

**Gasoline Range Organics**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**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 M1

Job ID: 885-19888-1

## Client Sample ID: SVE-1

**Lab Sample ID: 885-19888-1**

**Date Collected: 02/11/25 14:45**
**Matrix: Air**
**Date Received: 02/13/25 06:30**
**Sample Container: Tedlar Bag 1L**

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

| Analyte | Result | Qualifier | RL | | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics [C6 - C10] | 2300 | | 250 | | ug/L | | | 02/21/25 14:33 | 50 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *94* | | *52 - 172* | | *02/21/25 14:33* | *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 | | | 02/21/25 14:33 | 50 |
| 1,1,1-Trichloroethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,1,2,2-Tetrachloroethane | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,1,2-Trichloroethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,1-Dichloroethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,1-Dichloroethene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,1-Dichloropropene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2,3-Trichlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2,3-Trichloropropane | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2,4-Trichlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2,4-Trimethylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2-Dibromo-3-Chloropropane | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2-Dibromoethane (EDB) | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2-Dichlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2-Dichloroethane (EDC) | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,2-Dichloropropane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,3,5-Trimethylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,3-Dichlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,3-Dichloropropane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1,4-Dichlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 1-Methylnaphthalene | ND | | 20 | | ug/L | | | 02/21/25 14:33 | 50 |
| 2,2-Dichloropropane | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| 2-Butanone | ND | | 50 | | ug/L | | | 02/21/25 14:33 | 50 |
| 2-Chlorotoluene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 2-Hexanone | ND | | 50 | | ug/L | | | 02/21/25 14:33 | 50 |
| 2-Methylnaphthalene | ND | | 20 | | ug/L | | | 02/21/25 14:33 | 50 |
| 4-Chlorotoluene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 4-Isopropyltoluene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| 4-Methyl-2-pentanone | ND | | 50 | | ug/L | | | 02/21/25 14:33 | 50 |
| Acetone | ND | | 50 | | ug/L | | | 02/21/25 14:33 | 50 |
| Benzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Bromobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Bromodichloromethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Dibromochloromethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Bromoform | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Bromomethane | ND | | 15 | | ug/L | | | 02/21/25 14:33 | 50 |
| Carbon disulfide | ND | | 50 | | ug/L | | | 02/21/25 14:33 | 50 |
| Carbon tetrachloride | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Chlorobenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Chloroethane | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| Chloroform | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |

# Client Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

## Client Sample ID: SVE-1

**Lab Sample ID: 885-19888-1**

**Date Collected: 02/11/25 14:45**
**Matrix: Air**
**Date Received: 02/13/25 06:30**
**Sample Container: Tedlar Bag 1L**

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

| Analyte | Result | Qualifier | RL | | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloromethane | ND | | 15 | | ug/L | | | 02/21/25 14:33 | 50 |
| cis-1,2-Dichloroethene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| cis-1,3-Dichloropropene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Dibromomethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Dichlorodifluoromethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Ethylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Hexachlorobutadiene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Isopropylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Methyl-tert-butyl Ether (MTBE) | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Methylene Chloride | ND | | 15 | | ug/L | | | 02/21/25 14:33 | 50 |
| n-Butylbenzene | ND | | 15 | | ug/L | | | 02/21/25 14:33 | 50 |
| N-Propylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Naphthalene | ND | | 10 | | ug/L | | | 02/21/25 14:33 | 50 |
| sec-Butylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Styrene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| tert-Butylbenzene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Tetrachloroethene (PCE) | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| **Toluene** | **26** | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| trans-1,2-Dichloroethene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| trans-1,3-Dichloropropene | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Trichloroethene (TCE) | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Trichlorofluoromethane | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| Vinyl chloride | ND | | 5.0 | | ug/L | | | 02/21/25 14:33 | 50 |
| **Xylenes, Total** | **25** | | 7.5 | | ug/L | | | 02/21/25 14:33 | 50 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *75* | | *70 - 130* | | *02/21/25 14:33* | *50* |
| *Toluene-d8 (Surr)* | *108* | | *70 - 130* | | *02/21/25 14:33* | *50* |
| *4-Bromofluorobenzene (Surr)* | *93* | | *70 - 130* | | *02/21/25 14:33* | *50* |
| *Dibromofluoromethane (Surr)* | *90* | | *70 - 130* | | *02/21/25 14:33* | *50* |

# QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

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

**Lab Sample ID: MB 885-21215/5**
**Matrix: Air**
**Analysis Batch: 21215**

**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 | | 5.0 | | ug/L | | | 02/21/25 12:06 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *98* | | *52 - 172* | | *02/21/25 12:06* | *1* |

**Lab Sample ID: LCS 885-21215/4**
**Matrix: Air**
**Analysis Batch: 21215**

**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 | 536 | | ug/L | | | | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | | | |

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

**Lab Sample ID: MB 885-21216/5**
**Matrix: Air**
**Analysis Batch: 21216**

**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 | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1-Dichloroethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1-Dichloroethene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,1-Dichloropropene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2,3-Trichlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2,3-Trichloropropane | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2-Dibromo-3-Chloropropane | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2-Dichloroethane (EDC) | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,2-Dichloropropane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,3-Dichloropropane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 1-Methylnaphthalene | ND | | 0.40 | | ug/L | | | 02/21/25 12:06 | 1 |
| 2,2-Dichloropropane | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| 2-Butanone | ND | | 1.0 | | ug/L | | | 02/21/25 12:06 | 1 |
| 2-Chlorotoluene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 2-Hexanone | ND | | 1.0 | | ug/L | | | 02/21/25 12:06 | 1 |

# QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

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

**Lab Sample ID: MB 885-21216/5**
**Matrix: Air**
**Analysis Batch: 21216**

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

| Analyte | MB Result | MB Qualifier | RL | | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ND | | 0.40 | | ug/L | | | 02/21/25 12:06 | 1 |
| 4-Chlorotoluene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 4-Isopropyltoluene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| 4-Methyl-2-pentanone | ND | | 1.0 | | ug/L | | | 02/21/25 12:06 | 1 |
| Acetone | ND | | 1.0 | | ug/L | | | 02/21/25 12:06 | 1 |
| Benzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Bromobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Bromodichloromethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Dibromochloromethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Bromoform | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Bromomethane | ND | | 0.30 | | ug/L | | | 02/21/25 12:06 | 1 |
| Carbon disulfide | ND | | 1.0 | | ug/L | | | 02/21/25 12:06 | 1 |
| Carbon tetrachloride | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Chlorobenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Chloroethane | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| Chloroform | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Chloromethane | ND | | 0.30 | | ug/L | | | 02/21/25 12:06 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Dibromomethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Dichlorodifluoromethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Ethylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Hexachlorobutadiene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Isopropylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Methyl-tert-butyl Ether (MTBE) | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Methylene Chloride | ND | | 0.30 | | ug/L | | | 02/21/25 12:06 | 1 |
| n-Butylbenzene | ND | | 0.30 | | ug/L | | | 02/21/25 12:06 | 1 |
| N-Propylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Naphthalene | ND | | 0.20 | | ug/L | | | 02/21/25 12:06 | 1 |
| sec-Butylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Styrene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| tert-Butylbenzene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Tetrachloroethene (PCE) | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Toluene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Trichloroethene (TCE) | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Trichlorofluoromethane | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Vinyl chloride | ND | | 0.10 | | ug/L | | | 02/21/25 12:06 | 1 |
| Xylenes, Total | ND | | 0.15 | | ug/L | | | 02/21/25 12:06 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *108* | | *70 - 130* | | *02/21/25 12:06* | *1* |
| *Toluene-d8 (Surr)* | *96* | | *70 - 130* | | *02/21/25 12:06* | *1* |
| *4-Bromofluorobenzene (Surr)* | *96* | | *70 - 130* | | *02/21/25 12:06* | *1* |
| *Dibromofluoromethane (Surr)* | *104* | | *70 - 130* | | *02/21/25 12:06* | *1* |

# QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

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

**Lab Sample ID: LCS 885-21216/4**
**Matrix: Air**
**Analysis Batch: 21216**

**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 | 18.5 | | ug/L | | 92 | 70 - 130 | | |
| Benzene | | | 20.1 | 20.3 | | ug/L | | 101 | 70 - 130 | | |
| Chlorobenzene | | | 20.1 | 19.1 | | ug/L | | 95 | 70 - 130 | | |
| Toluene | | | 20.2 | 19.2 | | ug/L | | 95 | 70 - 130 | | |
| Trichloroethene (TCE) | | | 20.2 | 19.3 | | ug/L | | 96 | 70 - 130 | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *108* | | *70 - 130* |
| *Toluene-d8 (Surr)* | *96* | | *70 - 130* |
| *4-Bromofluorobenzene (Surr)* | *96* | | *70 - 130* |
| *Dibromofluoromethane (Surr)* | *104* | | *70 - 130* |

# QC Association Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

## GC/MS VOA

### Analysis Batch: 21215

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 885-19888-1 | SVE-1 | Total/NA | Air | 8015M/D | |
| MB 885-21215/5 | Method Blank | Total/NA | Air | 8015M/D | |
| LCS 885-21215/4 | Lab Control Sample | Total/NA | Air | 8015M/D | |

### Analysis Batch: 21216

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 885-19888-1 | SVE-1 | Total/NA | Air | 8260B | |
| MB 885-21216/5 | Method Blank | Total/NA | Air | 8260B | |
| LCS 885-21216/4 | Lab Control Sample | Total/NA | Air | 8260B | |

# Lab Chronicle

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

## Client Sample ID: SVE-1

**Date Collected: 02/11/25 14:45**
**Date Received: 02/13/25 06:30**

## Lab Sample ID: 885-19888-1

**Matrix: Air**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | 8015M/D | | 50 | 21215 | CM | EET ALB | 02/21/25 14:33 |
| Total/NA | Analysis | 8260B | | 50 | 21216 | CM | EET ALB | 02/21/25 14:33 |

**Laboratory References:**

= , 1120 South 27th Street, Billings, MT 59101, TEL (406)252-6325

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

# Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-19888-1

## 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 |
|---|---|---|---|
| 8015M/D | | 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 M1

Job ID: 885-19888-1

## 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 | 02-25-25 |

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 |
|---|---|---|---|
| 8015M/D | | 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 M1

Job ID: 885-19888-1

## 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 |

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# ANALYTICAL SUMMARY REPORT

February 19, 2025

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

Work Order: B25020796 Quote ID: B15626
Project Name: Howell M1 88501698

Energy Laboratories Inc Billings MT received the following 1 sample for Eurofins TestAmerica - Albuquerque on 2/14/2025 for analysis.

| Lab ID | Client Sample ID | Collect Date | Receive Date | Matrix | Test |
|---|---|---|---|---|---|
| B25020796-001 | SVE-1 (885-19888-1) | 02/11/25 14:45 | 02/14/25 | Air | Air Correction Calculations<br>Appearance and Comments<br>Calculated Properties<br>GPM @ std cond,/1000 cu. ft., moist.<br>Free<br>Natural Gas Analysis<br>Specific Gravity @ 60/60 |

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 So. 27th Street, 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.

Energy Laboratories, Inc. verifies the reported results for the analysis has been technically reviewed and approved for release.

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

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# LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Eurofins TestAmerica - Albuquerque
**Project:** Howell M1 88501698
**Lab ID:** B25020796-001
**Client Sample ID:** SVE-1 (885-19888-1)

**Report Date:** 02/19/25
**Collection Date:** 02/11/25 14:45
**DateReceived:** 02/14/25
**Matrix:** Air

| Analyses | Result | Units | Qualifiers | RL | MCL/ QCL | Method | Analysis Date / By |
|---|---|---|---|---|---|---|---|
| **GAS CHROMATOGRAPHY ANALYSIS REPORT** | | | | | | | |
| Oxygen | 21.90 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Nitrogen | 77.83 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Carbon Dioxide | 0.24 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Hydrogen Sulfide | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Methane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Ethane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Propane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Isobutane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| n-Butane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Isopentane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| n-Pentane | <0.01 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Hexanes plus | 0.03 | Mol % | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Propane | < 0.001 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Isobutane | < 0.001 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| n-Butane | < 0.001 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Isopentane | < 0.001 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| n-Pentane | < 0.001 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Hexanes plus | 0.013 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| GPM Total | 0.013 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| GPM Pentanes plus | 0.013 | gpm | | 0.001 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| **CALCULATED PROPERTIES** | | | | | | | |
| Gross BTU per cu ft @ Std Cond. (HHV) | 1 | | | 1 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Net BTU per cu ft @ std cond. (LHV) | 1 | | | 1 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Pseudo-critical Pressure, psia | 546 | | | 1 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Pseudo-critical Temperature, deg R | 240 | | | 1 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| Specific Gravity @ 60/60F | 1.00 | | | 0.001 | | D3588-81 | 02/18/25 11:17 / jrj |
| Air, % | 100.06 | | | 0.01 | | GPA 2261-13 | 02/18/25 11:17 / jrj |
| - The analysis was not corrected for air. | | | | | | | |
| **COMMENTS** | | | | | | | |
| - | | | | | | - | 02/18/25 11:17 / 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

**Work Order:** B25020796 **Report Date:** 02/19/25

| Analyte | Count | Result | Units | RL | %REC | Low Limit | High Limit | RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Method:** **GPA 2261-13** | | | | | | | | | | Batch: R436946 |
| **Lab ID:** **B25020797-001ADUP** | 12 | Sample Duplicate | | | | Run: GC7890_250218A | | | 02/18/25 12:54 | |
| Oxygen | | 21.1 | Mol % | 0.01 | | | | 2.1 | 20 | |
| Nitrogen | | 78.2 | Mol % | 0.01 | | | | 0.6 | 20 | |
| Carbon Dioxide | | 0.73 | Mol % | 0.01 | | | | 1.4 | 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 | | 0.04 | Mol % | 0.01 | | | | 0.0 | 20 | |
| **Lab ID:** **LCS021825** | 11 | Laboratory Control Sample | | | | Run: GC7890_250218A | | | 02/18/25 14:43 | |
| Oxygen | | 0.63 | Mol % | 0.01 | 126 | 70 | 130 | | | |
| Nitrogen | | 5.75 | Mol % | 0.01 | 96 | 70 | 130 | | | |
| Carbon Dioxide | | 1.03 | Mol % | 0.01 | 104 | 70 | 130 | | | |
| Methane | | 74.9 | Mol % | 0.01 | 100 | 70 | 130 | | | |
| Ethane | | 6.04 | Mol % | 0.01 | 101 | 70 | 130 | | | |
| Propane | | 5.01 | Mol % | 0.01 | 101 | 70 | 130 | | | |
| Isobutane | | 1.84 | Mol % | 0.01 | 92 | 70 | 130 | | | |
| n-Butane | | 2.00 | Mol % | 0.01 | 100 | 70 | 130 | | | |
| Isopentane | | 1.02 | Mol % | 0.01 | 102 | 70 | 130 | | | |
| n-Pentane | | 1.01 | Mol % | 0.01 | 101 | 70 | 130 | | | |
| Hexanes plus | | 0.80 | Mol % | 0.01 | 100 | 70 | 130 | | | |

**Qualifiers:**

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

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# Work Order Receipt Checklist

## Eurofins TestAmerica - Albuquerque B25020796

Login completed by: Kyelie L. Pflock
Date Received: 2/14/2025
Reviewed by: dharris
Received by: KLP
Reviewed Date: 2/18/2025
Carrier name: FedEx NDA

| | | | |
|---|---|---|---|
| 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: | 2.4°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.

Trip Blanks and/or Blind Duplicate samples are assigned the earliest collection time for the associated requested analysis in order to evaluate the holding time unless specifically indicated.

### Contact and Corrective Action Comments:

The cooler was received with a custody seal intact but was not signed or dated. KLP 02/14/25

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## *Laboratory Certifications and Accreditations*

Current certificates are available at [www.energylab.com](http://www.energylab.com) website:

| | Agency | Number |
|---|---|---|
| ***Billings, MT*** | Alaska | 17-023 |
| | California | 3087 |
| | Colorado | MT00005 |
| | Department of Defense (DoD)/ISO17025 | ADE-2588 |
| | Florida (Primary NELAP) | E87668 |
| | Idaho | MT00005 |
| | Louisiana | 05079 |
| | Montana | CERT0044 |
| | Nebraska | NE-OS-13-04 |
| | Nevada | NV-C24-00250 |
| | North Dakota | R-007 |
| | National Radon Proficiency | 109383-RMP |
| | Oregon | 4184 |
| | South Dakota | ARSD 74:04:07 |
| | Texas | TX-C24-00302 |
| | US EPA Region VIII | Reciprocal |
| | USDA Soil Permit | P330-20-00170 |
| | Washington | C1039 |
| ***Casper, WY*** | Alaska | 20-006 |
| | California | 3021 |
| | Colorado | WY00002 |
| | Florida (Primary NELAP) | E87641 |
| | Idaho | WY00002 |
| | Louisiana | 05083 |
| | Montana | CERT0002 |
| | Nebraska | NE-OS-08-04 |
| | Nevada | NV-C24-00245 |
| | North Dakota | R-125 |
| | Oregon | WY200001 |
| | South Dakota | WY00002 |
| | Texas | T104704181-23-21 |
| | US EPA Region VIII | WY00002 |
| | USNRC License | 49-26846-01 |
| | Washington | C1012 |
| ***Gillette, WY*** | US EPA Region VIII | WY00006 |
| ***Helena, MT*** | Colorado | MT00945 |
| | Montana | CERT0079 |
| | Nevada | NV-C24-00119 |
| | US EPA Region VIII | Reciprocal |
| | USDA Soil Permit | P330-20-00090 |

**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: N/A | Lab PM: Garcia, Michelle | Carrier Tracking No(s): N/A | COC No: 885-3884.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: N/A | E-Mail: michelle.garcia@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 #: 885-19888-1 |
| Address: 1120 South 27th Street, , | Due Date Requested: 2/20/2025 | | | |
| City: Billings | TAT Requested (days): N/A | | | |
| State, Zip: MT, 59101 | | | | |
| Phone: 406-252-6325(Tel) | PO #: N/A | | | |
| Email: N/A | WO #: N/A | | | |
| Project Name: Howell M1 | Project #: 88501698 | | | |
| Site: N/A | SSOW#: N/A | | | |

**Analysis Requested**

**Preservation Codes:** -

**Other:** N/A

| 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 (885-19888-1) | 2/11/25 | 14:45 Mountain | G | Air | | | X | 1 | See Attached Instructions B25020796 |

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*** *Unconfirmed* | ***Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*** ☐ *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: Steve McIlvain | Date/Time: 2/13/25 1350 | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: Kylie Pflock | Date/Time: 02-14-25 1100 | Company ELI |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: |
|---|---|---|

Ver: 10/10/2024

**ICOC No:**
885-3884

## Containers

| Count | Container Type | Preservative |
|---|---|---|
| 1 | Tedlar Bag 1L | None |

## Subcontract Method Instructions

| Sample IDs | Method | Method Description | Method Comments |
|---|---|---|---|
| 1 | SUBCONTRACT | SUB (Fixed Gases)/ Fixed Gases | Fixed Gases |

# 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 40g

# of Coolers: 1

Cooler Temp (including CF): 9.1+0=9.1 (°C)

HALL ENVIRONMENTAL ANALYSIS LABOR
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 8710[illegible]
Tel. 505-345-3975 Fax 505-345-4107

885-19888 COC

| Date | Time | Matrix | Sample Name | Container Type and # | Preservative Type | HEAL No. | 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 $O_2$ & $CO_2$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-11 | 1445 | air | SVE-1 | 2 Tedlar | | | | | | | | | | ✓ | | | ✓ | ✓ | | | |

Analysis Request

Remarks:

| Date | Time | Relinquished by | Received by | Via | Date | Time |
|---|---|---|---|---|---|---|
| 2/12/25 | 1644 | | | | 2/12/25 | 1644 |
| 2/12/25 | 1746 | | | Via: courier | 2/13/25 | 0:30 |

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: 885-19888-1

**Login Number: 19888** **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 | Thermal preservation not required. |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| 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"). | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
https://www.emnrd.nm.gov/ocd/contact-us

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

CONDITIONS

Action 452076

## CONDITIONS

| | |
|---|---|
| Operator:<br>HILCORP ENERGY COMPANY<br>1111 Travis Street<br>Houston, TX 77002 | OGRID:<br>372171 |
| | Action Number:<br>452076 |
| | Action Type:<br>[REPORT] Alternative Remediation Report (C-141AR) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| nvelez | 1. Continue O&M & sampling as stated in report. 2. Submit next quarterly report by July 15, 2025. | 4/17/2025 |