REVIEWED
By Mike Buchanan at 11:47 am, May 31, 2024

Review of the 2023 Annual Groundwater Monitoring Report for Mangum #1: Content Satisfactory 1. Proceed to install upgradient monitoriing well as proposed at (MW-8) location and upload permit obtained from OSE as applicable. 2. Sample upgradient well for background concentrations of TDS, sulfate, manganese as recommended, as well as iron. 3. Continue quarterly sampling events for site wells as prescribed, for BTEX, dissolved manganese, sulfate, and TDS. 4. Submit the 2024 Annual Groundwater Report by April 1, 2025.

ENSOLUM

March 29, 2024

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

Re: 2023 Annual Groundwater Monitoring Report
Mangum #1
San Juan County, New Mexico
NMOCD Incident Number: NCS1602631162
NMOCD Administrative Order: 3RP-1038

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *2023 Annual Groundwater Monitoring Report* to the New Mexico Oil Conservation Division (NMOCD). This report documents quarterly groundwater monitoring activities conducted at the Mangum #1 natural gas production well (Site) in 2023. The Site is located approximately 1-mile south of the City of Bloomfield, New Mexico and is situated on surface managed by the Bureau of Land Management (BLM) within Unit L, Section 27, Township 29 North and Range 11 West, San Juan County, New Mexico (Figure 1).

SITE BACKGROUND

In April of 2015, ConocoPhillips Company (well owner/operator at that time) conducted a Site assessment as part of internal due diligence activities. Seven potholes were advanced to depths of approximately 7.5 feet to 8 feet below ground surface (bgs) using a backhoe. Following the Site assessment, ConocoPhillips Company excavated impacted soil in February 2016. The final excavation measured approximately 100 feet by 38 feet laterally by 9 feet to 17 feet vertically. Approximately 1,400 cubic yards of impacted soil were transported for off-site disposal at Industrial Ecosystems, Inc in Aztec, New Mexico. Groundwater was encountered in the bottom of the excavation at a depth of 16 feet bgs. A total of 1 foot of groundwater-saturated soil was removed from the excavation in the deepest extents. Approximately 275 barrels (bbl) of impacted groundwater was then removed from the bottom of the excavation and transported for off-site disposal to Industrial Ecosystems, Inc. Five-point composite soil samples were collected from the sidewalls and shallow floor area (area excavated to 9 feet bgs). In total, five sidewall samples and one floor sample were collected to confirm the removal of impacted soil. All soil analytical results were below the Site closure standards for total petroleum hydrocarbons (TPH), chloride, and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The NMOCD approved backfill of the excavation via email communications on February 22, 2016.

Four groundwater monitoring wells (MW-1 through MW-4) were subsequently installed in May 2016 to assess and monitor groundwater conditions at the Site (Figure 2). Based on initial analysis, the following contaminants of concern (COCs) were identified for groundwater at the Site: benzene, xylenes, dissolved iron, dissolved manganese, sulfate, and total dissolved solids

(TDS). Quarterly sampling has been performed since June 2016 from wells MW-1 through MW- 4.

GHD Services, Inc. (GHD) prepared the *2018 Annual Groundwater Monitoring Report* (dated January 2019) summarizing groundwater sampling activities performed in 2018. Based on their review of the report, the NMOCD required Hilcorp to "fully delineate the groundwater plume" at the Site. In response, Hilcorp/GHD installed three new groundwater monitoring wells (MW-5, MW-6, and MW-7) in locations downgradient of the release in June 2019 (Figure 2). The installation of one additional well (MW-8) was attempted in an upgradient location (Figure 2) but encountered shallow refusal in two separate locations and was finally abandoned. The newly installed wells were incorporated into the quarterly sampling program starting in the third quarter of 2019. Historical quarterly sampling results indicate BTEX constituents, dissolved manganese, sulfate, and/or TDS were present in the Site groundwater at concentrations above New Mexico Water Quality Control Commission (NMWQCC) standards. In addition, dissolved iron concentrations were sporadically detected at concentrations exceeding the NMWQCC standard during past events and has been historically included in quarterly sampling events.

SITE GROUNDWATER CLEANUP STANDARDS

The NMOCD requires groundwater-quality standards be met as presented by the NMWQCC and listed in Title 20, Chapter 6, Part 2, Section 3103 (20.6.2.3103) of the New Mexico Administrative Code (NMAC). The following standards are presented for the COCs at the Site in milligrams per liter (mg/L).

- Benzene: 0.005 mg/L
- Toluene: 1.0 mg/L
- Ethylbenzene: 0.70 mg/L
- Total Xylenes: 0.62 mg/L
- Dissolved Iron: 1.0 mg/L
- Dissolved Manganese: 0.20 mg/L
- Sulfate: 600 mg/L
- Total Dissolved Solids: 1,000 mg/L

GROUNDWATER SAMPLING ACTIVITIES AND RESULTS

Groundwater level measurements and samples were collected in March, June, September, and December 2023 from wells MW-1 through MW-7. Of note, groundwater was not sampled from well MW-7 during the September 2023 sampling event due to a thin film of Phase Separated Hydrocarbons (PSH) that was observed in the bailer during sampling. Static groundwater level monitoring included recording depth-to-groundwater measurements of each monitoring well using a Keck oil/water interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with distilled water prior to each measurement to prevent cross-contamination. Groundwater elevations measured in monitoring wells during the 2023 sampling events are presented in Table 1 and were used to develop groundwater potentiometric surface maps (Figures 3 through 6). The inferred groundwater flow direction is to the north.

GROUNDWATER SAMPLING

Groundwater from each monitoring well was purged and sampled using a disposable bailer. Purging was accomplished by removing stagnant groundwater from the monitoring well prior to collecting a sample. Field measurements of groundwater quality parameters, including

temperature, pH, TDS, electrical conductivity, dissolved oxygen, and oxidation-reduction potential, were collected during the purging process, and are presented in Table 2.

Following well purging, groundwater samples were placed directly into laboratory-provided containers and labeled with the date and time of collection, well designation, project name, sample collector's name, and parameters to be analyzed. Samples were immediately sealed with zero headspace and packed on ice to preserve samples. Samples were submitted to Hall Environmental Analysis Laboratory (Hall) and subsequently Eurofins Environment Testing (formerly Hall) in Albuquerque, New Mexico, for analysis of BTEX following United States Environmental Protection Agency (EPA) Method 8260B, dissolved manganese following EPA Method 200.7, sulfate following EPA Method 300.0, and TDS following Method SM2540C MOD. Proper chain-of-custody procedures were followed documenting the date and time sampled, sample number, type of sample, sample collector's name, preservative used, analyses required, and sample collector's signature.

GROUNDWATER ANALYTICAL RESULTS

In general, data collected in 2023 were consistent with historical Site results. Benzene was detected in groundwater during one or more quarters at concentrations above the NMWQCC standard in wells MW-2, MW-3, MW-4, and MW-6. Ethylbenzene, toluene, and total xylenes were not detected above the NMWQCC standards in any of the wells during 2023 sampling events.

Dissolved manganese and TDS were detected at concentrations above the NMWQCC standards in all wells during one or more quarterly sampling events in 2023. Sulfate was detected at concentrations above the NMWQCC standard during one or more 2023 quarterly sampling events in wells MW-1, MW-4, MW-5, and MW-7. Iron was incidentally not sampled from well MW-2 in 2023. However, samples collected from well MW-2 during 2024 will again be sampled for dissolved iron moving forward. A summary of analytical results is presented in Table 3 and depicted on Figure 7, with complete laboratory analytical reports attached as Appendix A.

CONCLUSIONS AND RECOMMENDATIONS

Based on the groundwater analytical data collected since 2016, overall groundwater conditions have improved over time, with BTEX concentrations decreasing in all wells between 2016 and 2023. Based on analytical results from past and the most recent sampling events from all wells, the presence PSH in well MW-7 during the September 2023 sampling event appears to be an anomalous sampling error and not related to the historical Site release and/or indicative of a new release. Furthermore, results from the fourth quarter 2023 sampling event did not indicate the presence of PSH and/or dissolved phase petroleum hydrocarbons in well MW-7 or an increase in petroleum hydrocarbon constituents in other Site wells.

Additionally, natural attenuation through biodegradation processes appears to be occurring in all wells based on historical data and active remediation is not currently recommended at the Site. Dissolved manganese, sulfate, and TDS concentrations have largely remained consistent since they were first analyzed in 2016. Dissolved manganese and TDS concentrations have also consistently exceeded the NMWQCC standards since initial sampling efforts began in 2016. Although concentrations of manganese, sulfate, and TDS could be elevated as a biproduct of petroleum degradation, these constituents are often naturally occurring at elevated concentrations in areas with shallow, perched groundwater.

Lastly, dissolved iron was not sampled during the 2023 sampling events based on the recommendation presented in the *2021 Annual Groundwater Monitoring Report* submitted by WSP and dated February 28, 2022. Based on the lack of response or approval of those

recommendations from the NMOCD, Hilcorp will again analyze groundwater for dissolved iron during upcoming sampling events.

Based on current and historical data gathered at the Site, Ensolum/Hilcorp recommend the following actions:

- Remove dissolved iron as a constituent of concern for the Site and discontinue analysis during future sampling events.
- Continue quarterly monitoring of all Site wells for BTEX constituents, dissolved manganese, sulfate, and TDS.
- Install an upgradient groundwater monitoring well in the location previously attempted in 2019 (location MW-8). This well would be used to assess upgradient groundwater conditions and background concentrations of dissolved manganese, sulfate, and TDS. The continued sampling of these constituents will be reassessed once background samples have been collected and analyzed.

Ensolum appreciates the opportunity to provide these environmental services to Hilcorp. Please contact either of the undersigned with any questions.

Sincerely,

Ensolum, LLC

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Senior Managing Geologist
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Attachments:

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Q1 Groundwater Elevation Map
Figure 4	Q2 Groundwater Elevation Map
Figure 5	Q3 Groundwater Elevation Map
Figure 6	Q4 Groundwater Elevation Map
Figure 7	Groundwater Analytical Results
Table 1	Groundwater Elevations
Table 2	Groundwater Quality Measurements
Table 3	Groundwater Analytical Results
Appendix A	Laboratory Analytical Reports

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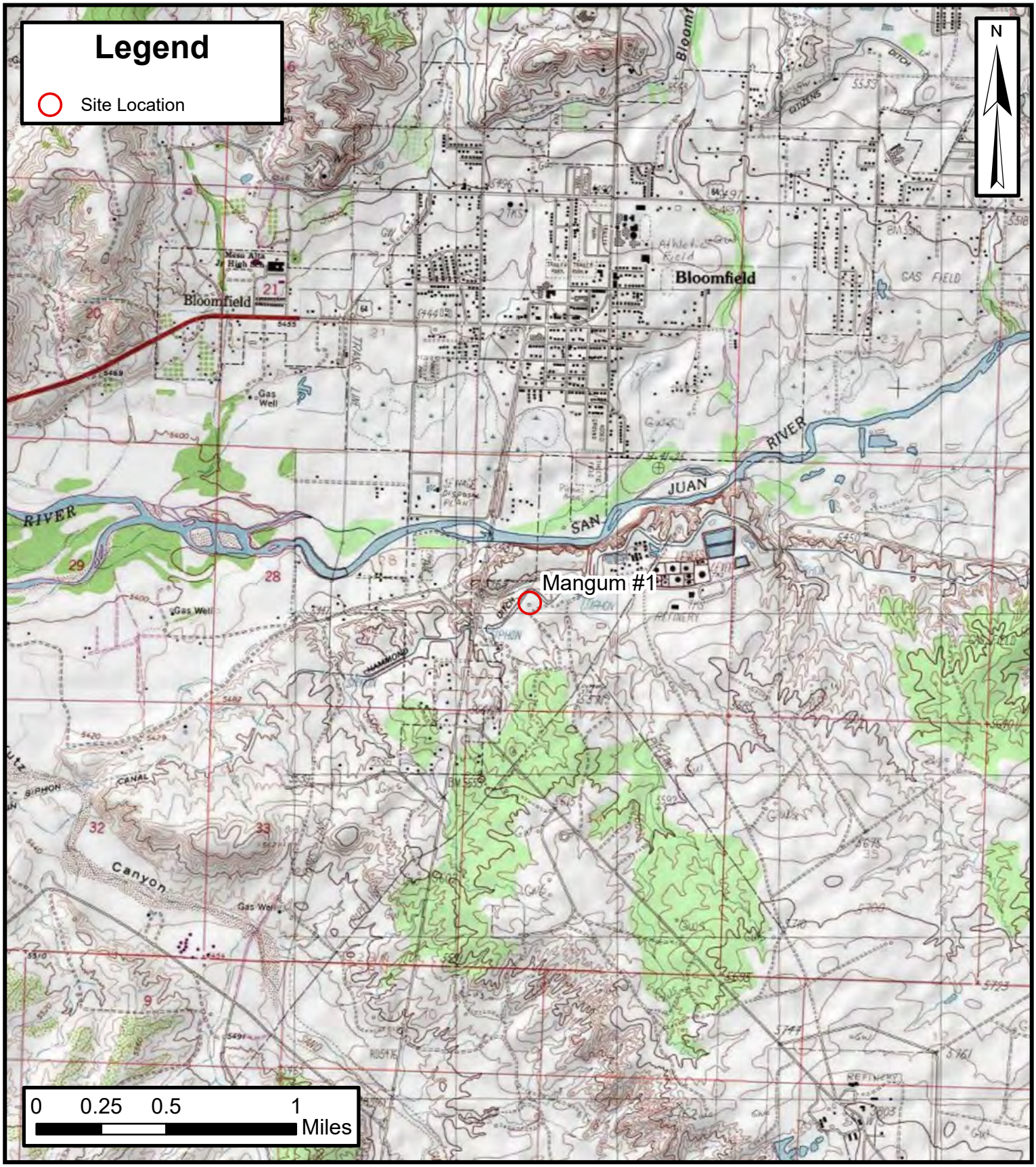
FIGURES



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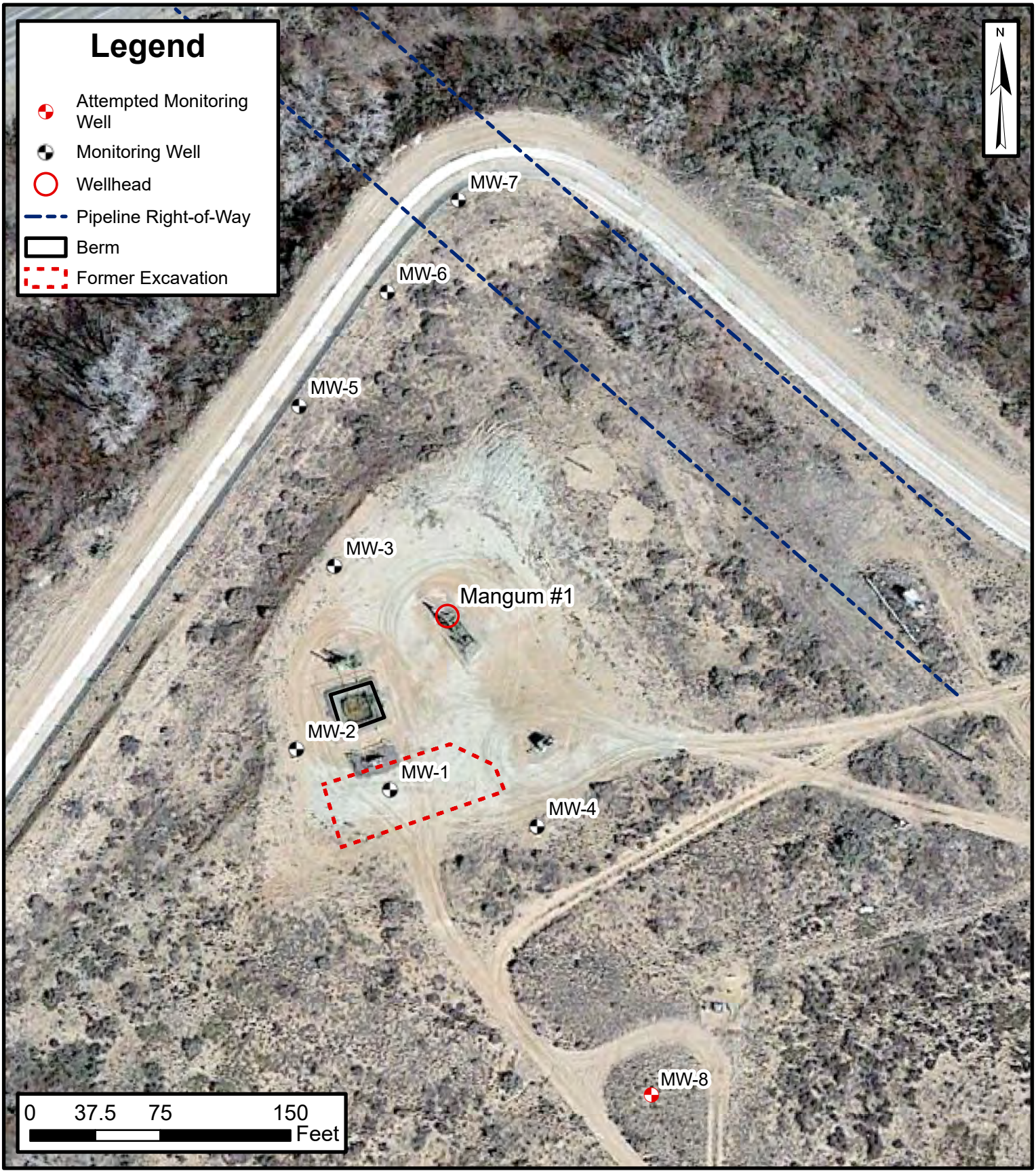
Environmental, Engineering and Hydrogeologic Consultants

Site Location Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
1

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



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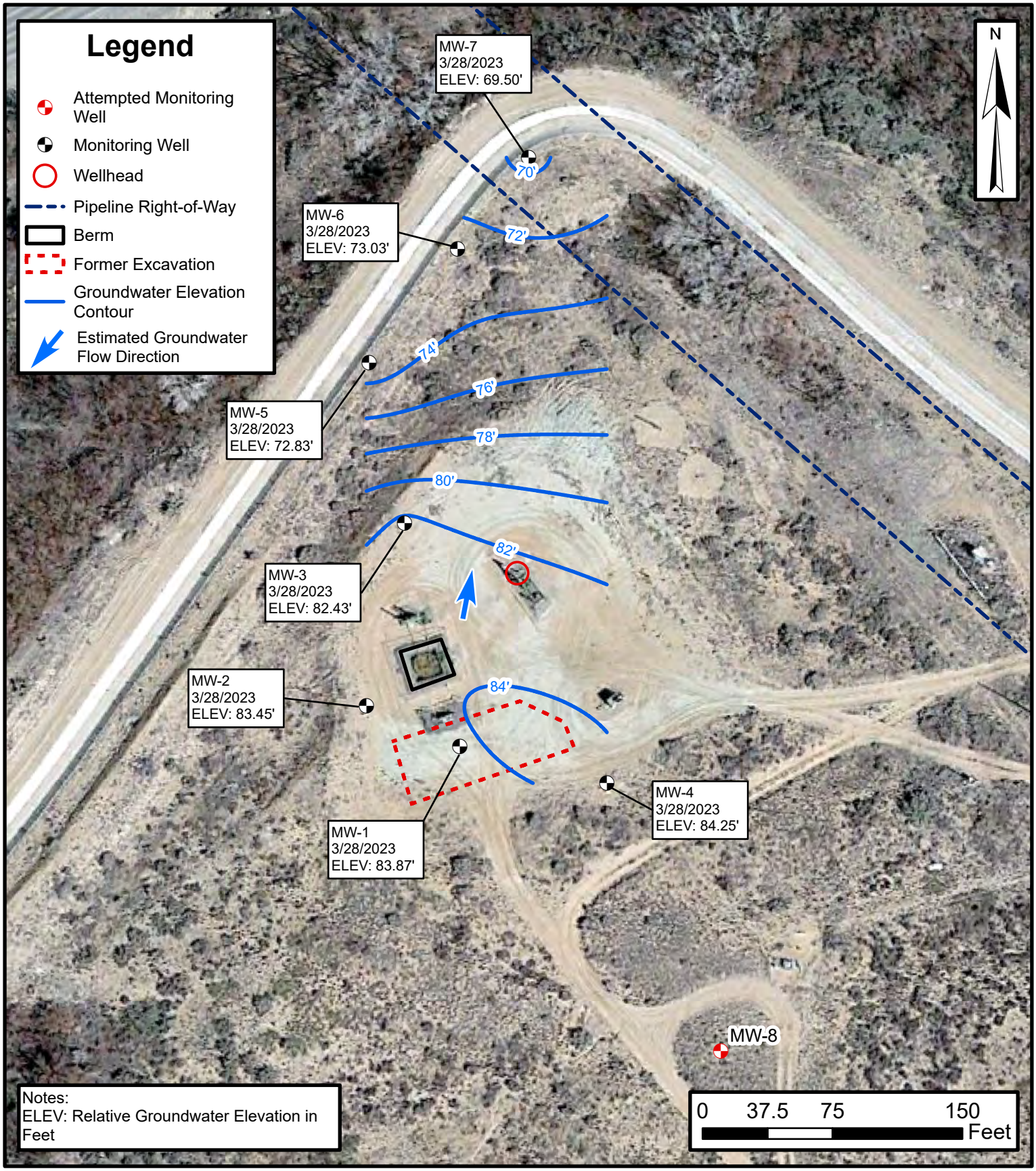
Site Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
2

Sources: Google Earth



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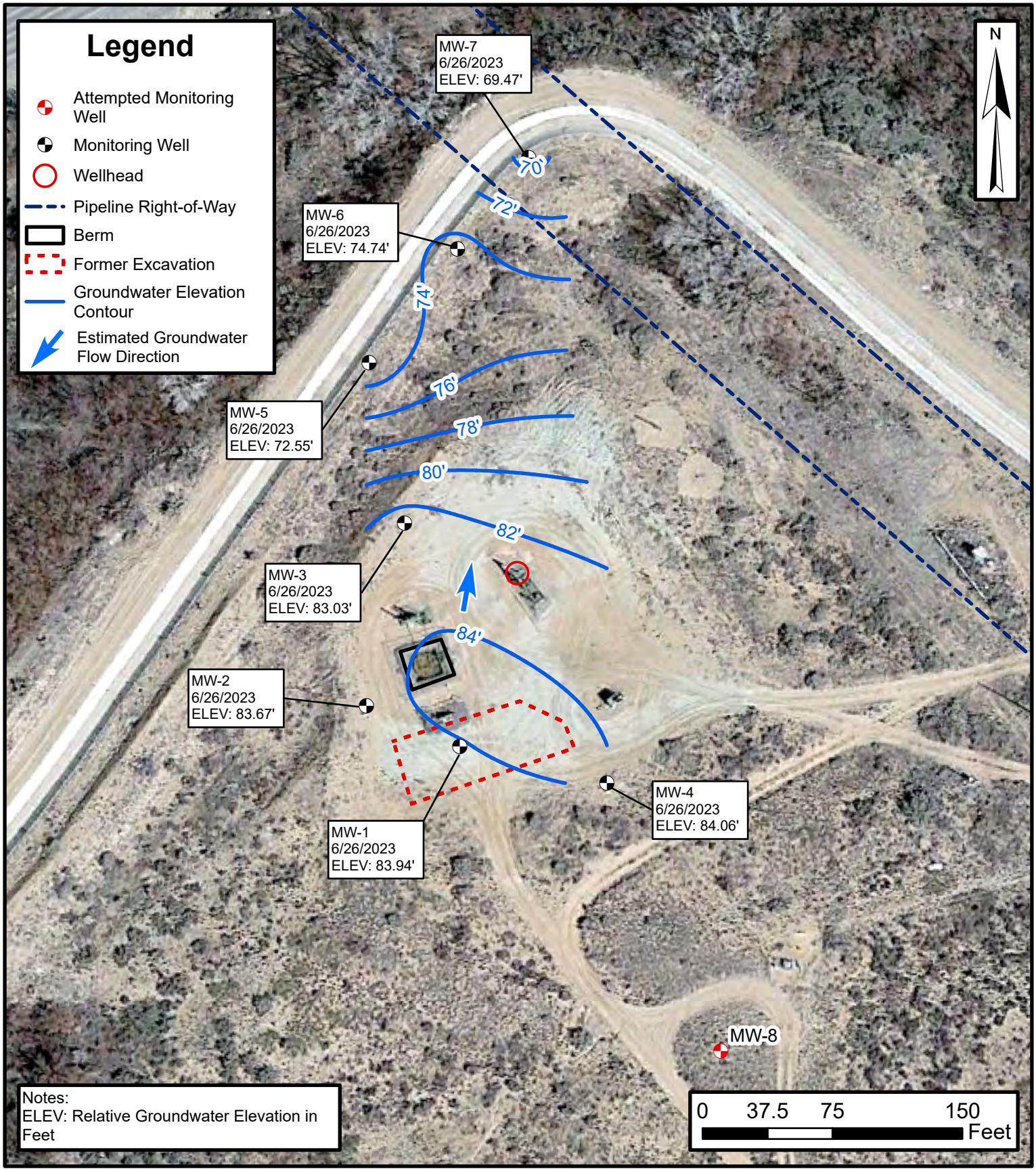
Q1 Groundwater Elevation Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
3

Sources: Google Earth



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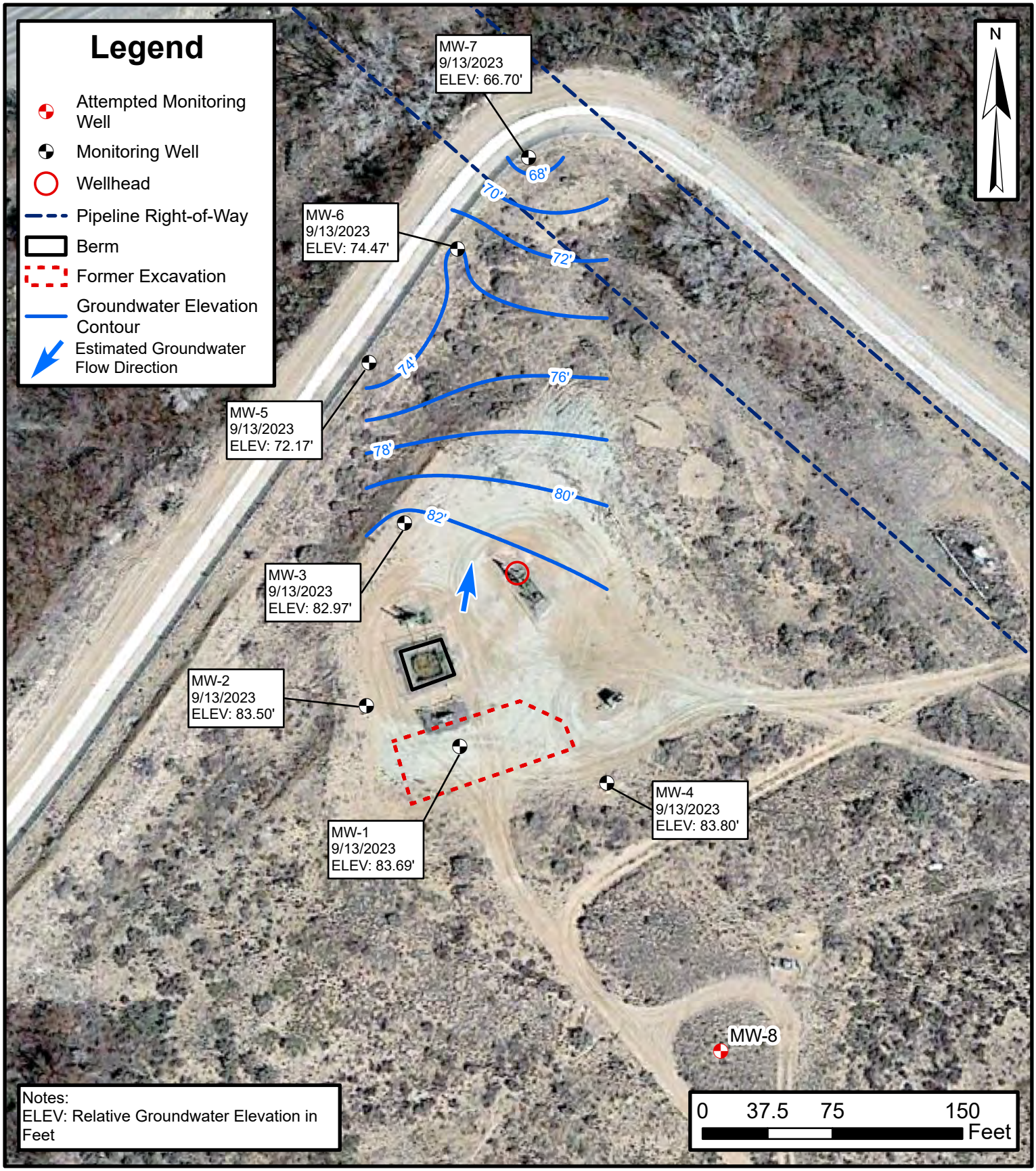
Q2 Groundwater Elevation Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
4

Sources: Google Earth



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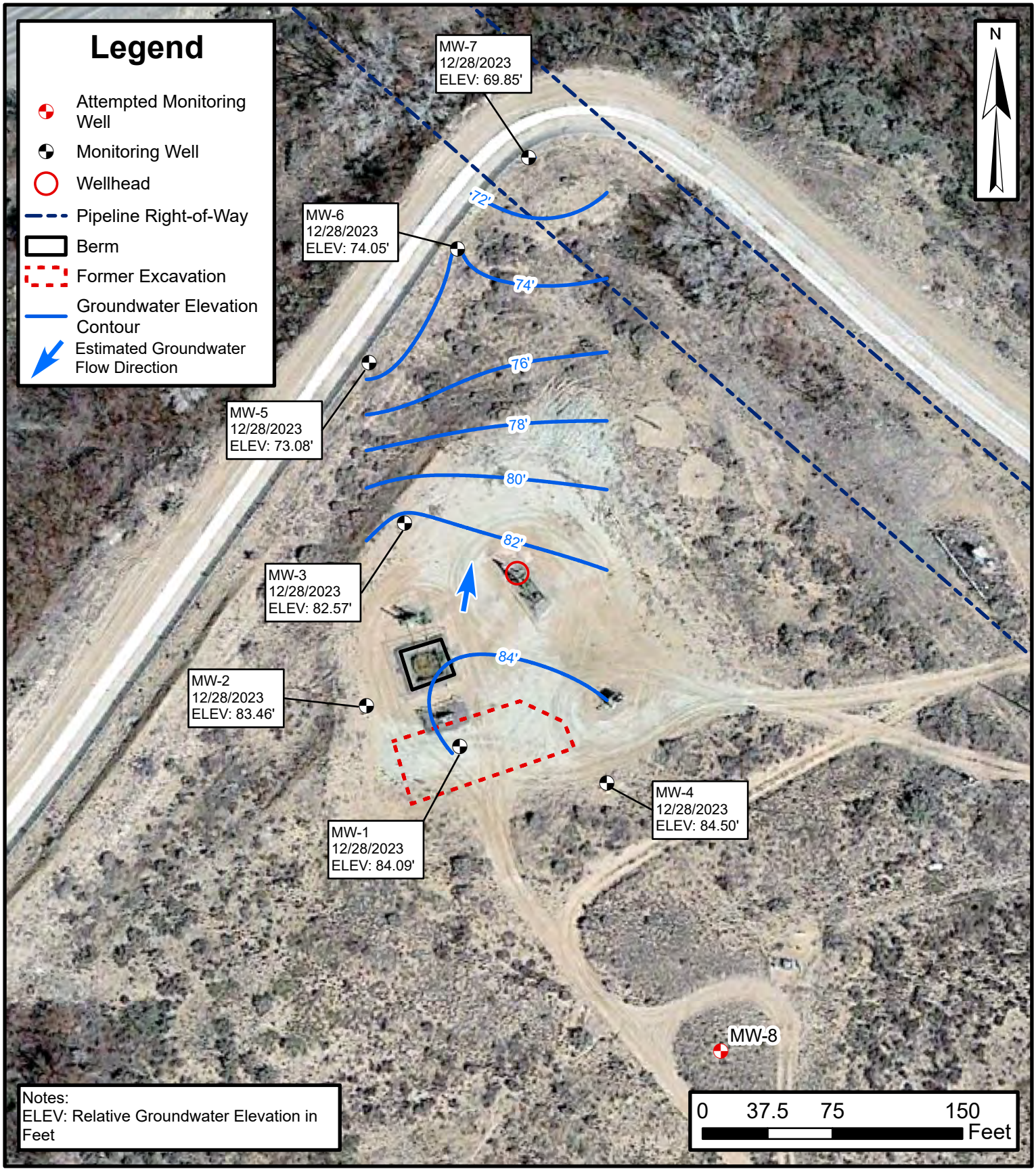
Q3 Groundwater Elevation Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
5

Sources: Google Earth



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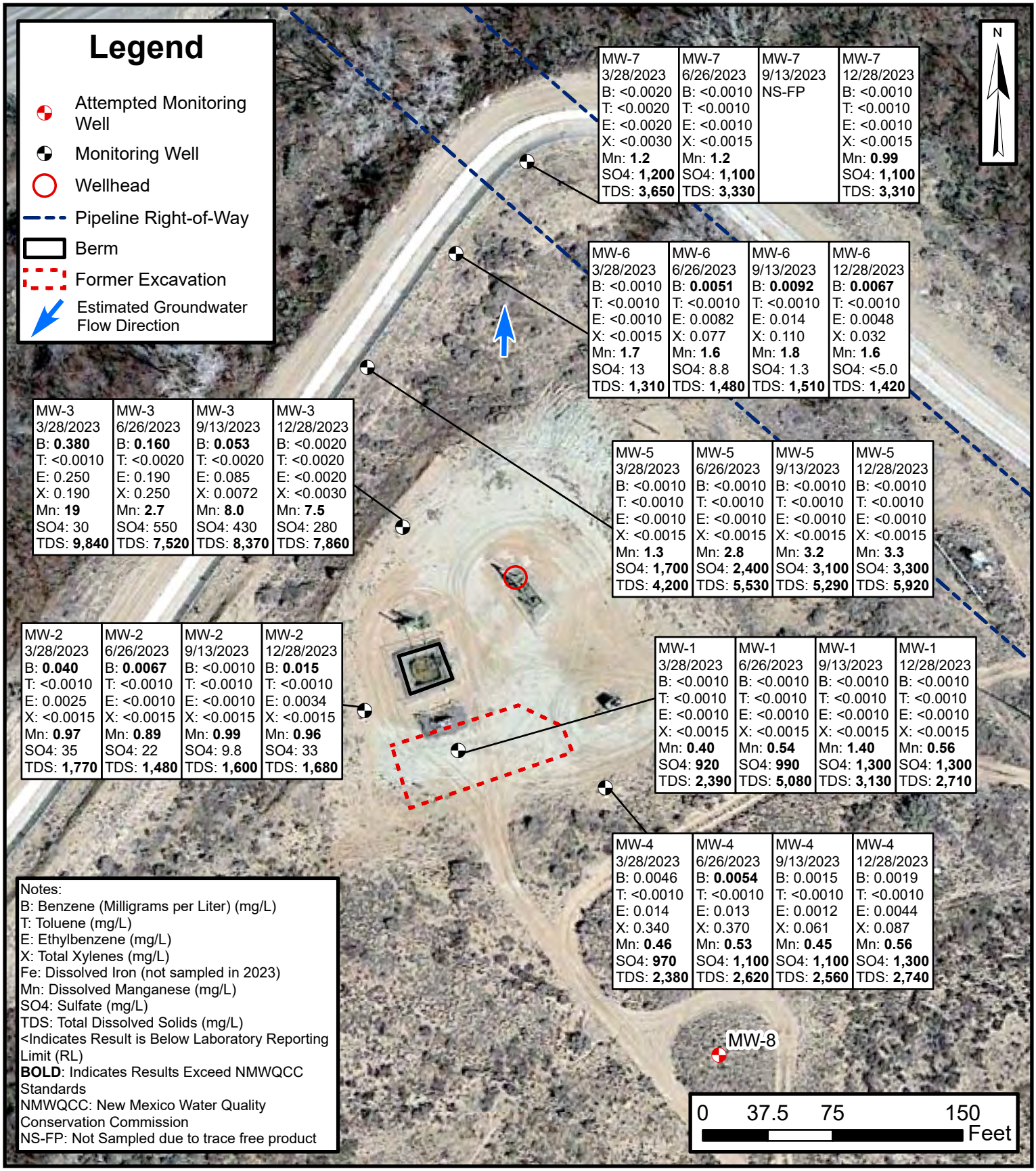
Q4 Groundwater Elevation Map

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
6

Sources: Google Earth



Notes:
B: Benzene (Milligrams per Liter) (mg/L)
T: Toluene (mg/L)
E: Ethylbenzene (mg/L)
X: Total Xylenes (mg/L)
Fe: Dissolved Iron (not sampled in 2023)
Mn: Dissolved Manganese (mg/L)
SO4: Sulfate (mg/L)
TDS: Total Dissolved Solids (mg/L)
<Indicates Result is Below Laboratory Reporting Limit (RL)
BOLD: Indicates Results Exceed NMWQCC Standards
NMWQCC: New Mexico Water Quality Conservation Commission
NS-FP: Not Sampled due to trace free product

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Groundwater Analytical Results

Mangum #1
Hilcorp Energy Company
36.69579, -107.98402
San Juan County, New Mexico

FIGURE
7

Sources: Google Earth

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TABLES

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TABLE 1
GROUNDWATER ELEVATIONS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Top of Casing Elevation (1)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (1)
MW-1	98.97	6/8/2016	15.12	83.85
		9/12/2016	14.75	84.22
		11/29/2016	15.06	83.91
		3/6/2017	14.91	84.06
		6/12/2017	14.96	84.01
		10/26/2017	15.00	83.97
		12/4/2017	15.08	83.89
		3/13/2018	15.22	83.75
		6/25/2018	15.23	83.74
		9/4/2018	15.39	83.58
		12/10/2018	15.12	83.85
		3/12/2019	15.04	83.93
		5/22/2019	14.93	84.04
		8/22/2019	15.19	83.78
		12/2/2019	15.21	83.76
		2/3/2020	15.19	83.78
		4/24/2020	15.22	83.75
		7/24/2020	15.00	83.97
		10/8/2020	15.21	83.76
		1/11/2021	15.29	83.68
		4/12/2021	15.26	83.71
		8/2/2021	14.88	84.09
		10/7/2021	15.09	83.88
		1/10/2022	15.19	83.78
		6/23/2022	14.96	84.01
		9/28/2022	15.23	83.74
		12/29/2022	15.18	83.79
		3/28/2023	15.10	83.87
		6/26/2023	15.03	83.94
		9/13/2023	15.28	83.69
		12/28/2023	14.88	84.09
MW-2	101.05	6/8/2016	17.49	83.56
		9/12/2016	17.28	83.77
		11/29/2016	17.62	83.43
		3/6/2017	17.49	83.56

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TABLE 1
GROUNDWATER ELEVATIONS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Top of Casing Elevation (1)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (1)
MW-2	101.05	6/12/2017	17.40	83.65
		10/26/2017	17.49	83.56
		12/4/2017	17.57	83.48
		3/13/2018	17.74	83.31
		6/25/2018	17.32	83.73
		9/5/2018	17.64	83.41
		12/10/2018	17.58	83.47
		3/12/2019	17.56	83.49
		5/22/2019	17.18	83.87
		8/22/2019	17.30	83.75
		12/2/2019	17.65	83.40
		2/3/2020	18.74	82.31
		4/24/2020	17.71	83.34
		7/24/2020	17.08	83.97
		10/8/2020	17.22	83.83
		1/11/2021	17.8	83.25
		4/12/2021	17.8	83.25
		8/2/2021	16.64	84.41
		10/7/2021	17.23	83.82
		1/10/2022	17.73	83.32
		6/23/2022	16.91	84.14
		9/28/2022	17.53	83.52
		12/29/2022	17.78	83.27
		3/28/2023	17.60	83.45
		6/26/2023	17.38	83.67
		9/13/2023	17.55	83.50
		12/28/2023	17.59	83.46
MW-3	101.35	6/8/2016	18.47	82.88
		9/12/2016	18.41	82.94
		11/29/2016	18.84	82.51
		3/6/2017	19.01	82.34
		6/12/2017	18.32	83.03
		10/26/2017	18.50	82.85
		12/4/2017	18.87	82.48
		3/13/2018	19.13	82.22
		6/25/2018	18.14	83.21
		9/5/2018	18.54	82.81

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TABLE 1
GROUNDWATER ELEVATIONS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Top of Casing Elevation (1)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (1)
MW-3	101.35	12/10/2018	18.71	82.64
		3/11/2019	18.69	82.66
		5/22/2019	18.19	83.16
		8/22/2019	18.28	83.07
		12/22/2019	18.62	82.73
		2/3/2020	18.84	82.51
		4/24/2020	18.84	82.51
		7/23/2020	18.05	83.30
		10/5/2020	18.12	83.23
		1/8/2021	18.87	82.48
		4/12/2021	18.94	82.41
		8/2/2021	17.62	83.73
		10/6/2021	18.08	83.27
		1/10/2022	18.84	82.51
		6/23/2022	17.83	83.52
		9/28/2022	18.44	82.91
		12/29/2022	18.87	82.48
		3/28/2023	18.92	82.43
		6/26/2023	18.32	83.03
		9/13/2023	18.38	82.97
		12/28/2023	18.78	82.57
MW-4	103.76	6/8/2016	19.72	84.04
		9/12/2016	19.43	84.33
		11/29/2016	19.62	84.14
		3/6/2017	19.50	84.26
		6/21/2017	19.76	84.00
		10/26/2017	19.59	84.17
		12/4/2017	19.62	84.14
		3/13/2018	19.76	84.00
		6/25/2018	19.89	83.87
		9/4/2018	19.03	84.73
		12/10/2018	19.69	84.07
		3/12/2019	19.63	84.13
		5/22/2019	19.57	84.19
		8/22/2019	19.92	83.84
		12/2/2019	19.81	83.95
		2/3/2020	19.79	83.97

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TABLE 1
GROUNDWATER ELEVATIONS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Top of Casing Elevation (1)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (1)
MW-4	103.76	4/24/2020	19.78	83.98
		7/23/2020	19.66	84.10
		10/8/2020	19.94	83.82
		1/11/2021	19.88	83.88
		4/12/2021	19.84	83.92
		8/2/2021	19.88	83.88
		10/6/2021	19.78	83.98
		1/11/2022	19.78	83.98
		6/23/2022	19.69	84.07
		9/28/2022	19.92	83.84
		12/29/2022	19.73	84.03
		3/28/2023	19.51	84.25
		6/26/2023	19.70	84.06
		9/13/2023	19.96	83.80
		12/28/2023	19.26	84.50
MW-5	95.77	8/23/2019	23.32	72.45
		9/19/2019	23.13	72.64
		12/4/2019	22.51	73.26
		2/4/2020	22.42	73.35
		4/27/2020	22.63	73.14
		7/24/2020	23.05	72.72
		10/5/2020	22.85	72.92
		1/8/2021	22.58	73.19
		4/13/2021	22.61	73.16
		8/2/2021	22.86	72.91
		10/8/2021	22.44	73.33
		1/11/2022	22.65	73.12
		6/23/2022	22.92	72.85
		9/28/2022	23.29	72.48
		12/29/2022	22.72	73.05
		3/28/2023	22.94	72.83
		6/26/2023	23.22	72.55
		9/13/2023	23.60	72.17
		12/28/2023	22.69	73.08

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TABLE 1
GROUNDWATER ELEVATIONS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Top of Casing Elevation (1)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (1)
MW-6	94.70	8/23/2019	19.98	74.72
		9/19/2019	18.63	76.07
		12/4/2019	19.09	75.61
		2/4/2020	20.22	74.48
		4/27/2020	20.53	74.17
		7/24/2020	17.53	77.17
		10/5/2020	18.82	75.88
		1/8/2021	20.59	74.11
		4/13/2021	21.19	73.51
		8/2/2021	19.24	75.46
		10/8/2021	19.02	75.68
		1/11/2022	20.95	73.75
		6/23/2022	19.81	74.89
		9/28/2022	20.22	74.48
		12/29/2022	21.53	73.17
		3/28/2023	21.67	73.03
		6/26/2023	19.96	74.74
		9/13/2023	20.23	74.47
		12/28/2023	20.65	74.05
MW-7	94.49	8/23/2019	24.04	70.45
		9/19/2019	23.66	70.83
		12/4/2019	23.69	70.80
		2/4/2020	23.62	70.87
		4/27/2020	23.24	71.25
		7/24/2020	24.01	70.48
		10/5/2020	24.35	70.14
		1/11/2021	24.34	70.15
		4/13/2021	24.54	69.95
		8/2/2021	24.94	69.55
		10/7/2021	24.62	69.87
		1/11/2022	24.82	69.67
		6/23/2022	24.79	69.70
		9/28/2022	25.29	69.20
		12/29/2022	24.93	69.56
		3/28/2023	24.99	69.50
		6/26/2023	25.02	69.47
		9/13/2023	27.79	66.70
		12/28/2023	24.64	69.85

Notes:

(1): surface elevation based on an arbitrary datum of 100 feet

BTOC: below top of casing

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TABLE 2
GROUNDWATER QUALITY MEASUREMENTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)
MW-1	11/29/2016	16.54	7.42	--	2,607	1.52	-155.3
	3/6/2017	13.37	7.37	1.99	3,057	1.48	-262.6
	6/12/2017	14.35	7.14	1.82	2,800	0.89	-197.6
	10/26/2017	18.00	7.19	--	2,600	1.85	-156
	12/4/2017	15.47	7.07	1.79	2,748	1.30	-209.9
	3/13/2018	19.94	7.31	--	2,502	--	-203.6
	6/25/2018	15.81	7.22	--	2,110	0.51	-198.3
	3/12/2019	13.10	7.57	1.37	2,720	--	-24.9
	5/22/2019	16.80	7.29	1.45	2,920	0.00	-27.5
	8/22/2019	21.10	7.20	2.01	4,030	--	-16.1
	12/2/2019	13.60	6.80	1.53	3,050	--	-26.5
	2/3/2020	15.30	6.81	1.51	3,020	7.30	-28.5
	4/24/2020	16.00	6.98	1.36	2,710	3.47	-34.5
	7/24/2020	19.10	7.04	1.41	2,810	2.15	-32.7
	10/8/2020	18.30	6.99	1.63	3,260	3.57	-20.4
	1/11/2021	12.50	7.16	1.29	2,570	1.80	-24.7
	4/12/2021	17.00	7.26	1.25	2,490	8.89	-22.7
	8/2/2021	17.30	8.36	--	2,330	--	--
	10/7/2021	16.50	7.06	--	2,740	--	--
	1/10/2022	12.40	7.1	--	2,350	--	--
	6/23/2022	18.20	7.22	1.14	2,260	--	--
	9/28/2022	19.30	7.12	1.26	2,520	--	--
	12/29/2022	11.20	7.44	1.20	2,460	--	--
	3/28/2023	12.90	7.59	1.16	2,330	--	--
	6/26/2023	28.31	7.68	2.39	3,941	3.57	-132.9
	9/13/2023	30.99	7.74	3.08	4,732	2.24	-202.1
	12/28/2023	22.82	8.18	1.78	2,749	2.04	-173.4
MW-2	11/29/2016	16.04	7.20	--	2,299	2.21	-109.3
	3/6/2017	12.74	7.15	1.74	2,683	2.05	-171.7
	6/12/2017	13.50	6.95	1.56	2,396	1.61	-155.8
	10/26/2017	18.70	7.01	--	2,264	1.74	-92.8
	12/4/2017	15.41	7.00	1.52	2,333	1.11	-178.0
	3/13/2018	14.67	7.21	--	2,334	--	-180.7
	6/25/2018	17.63	6.62	--	1,905	0.94	-187.2
	3/12/2019	13.70	7.57	9.50	1,886	NA	7.3
	5/22/2019	13.70	6.67	9.54	1,907	--	5.0
	8/22/2019	23.00	6.49	8.63	1,727	--	10.0
	12/2/2019	16.20	5.84	10.00	2,000	--	9.2
	2/3/2020	12.80	5.93	9.71	18,320	6.22	-0.1
	4/24/2020	16.50	6.25	5.81	11,630	2.28	0.9
	7/24/2020	21.40	6.55	2.79	5,580	1.73	-8.6
	10/8/2020	21.00	6.61	2.81	5,600	2.69	6.0
	1/11/2021	14.10	6.77	3.30	6,620	1.56	0.9
	4/12/2021	18.40	6.95	2.09	4,250	6.48	-11.2
	8/2/2021	17.35	7.25	--	4,808	--	--
	10/7/2021	20.10	6.38	--	3,100	--	--
	1/10/2022	14.00	6.94	--	3,080	--	--
	6/23/2022	19.30	6.74	1.16	2,330	--	--
	9/28/2022	19.80	6.83	1.15	2,300	--	--
	12/29/2022	13.30	7.2	1.04	2,090	--	--
	3/28/2023	13.90	7.18	0.99	1,990	--	--
	6/26/2023	29.66	7.48	1.73	2,750	2.41	-205.3
	9/13/2023	29.45	7.61	1.81	2,781	1.91	-141.4
	12/28/2023	22.36	7.93	0.05	74*	11.25*	-9.0

ENSOLUM

TABLE 2
GROUNDWATER QUALITY MEASUREMENTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)
MW-3	11/29/2016	15.01	7.09	--	3,091	2.52	-91
	3/6/2017	12.74	7.05	2.19	3,376	4.17	-151.6
	6/12/2017	15.40	7.18	2.19	3,360	6.70	-136.0
	10/26/2017	17.71	7.06	--	2,653	1.80	-177.4
	12/4/2017	14.19	7.04	1.84	2,835	3.05	-153.5
	3/13/2018	14.84	7.18	--	2,641	0.17	-167.0
	6/25/2018	Sample volume insufficient to analyze field parameters					
	3/11/2019	14.30	7.24	1.41	2,830	--	-31.5
	5/22/2019	13.30	7.11	1.36	2,730	5.80	-35.6
	8/22/2019	20.80	7.19	1.43	2,860	--	-25.2
	12/2/2019	15.20	6.55	1.49	2,960	--	-25.4
	2/3/2020	13.30	6.44	1.42	2,930	--	-16.5
	4/24/2020	19.60	6.71	1.44	2,890	2.80	-27.0
	7/23/2020	24.00	6.36	2.57	5,090	1.26	-12.5
	10/5/2020	16.50	6.49	3.03	6,070	3.76	-2.9
	1/8/2021	12.60	6.80	2.75	5,510	1.59	-3.1
	4/12/2021	14.50	6.55	4.00	8,030	9.65	-17.7
	8/2/2021	17.10	7.96	--	7,920	--	--
	10/6/2021	18.80	6.43	--	6,400	--	--
	1/10/2022	16.60	5.60	--	9,470	--	--
	6/23/2022	19.10	6.20	4.28	8,540	--	--
	9/28/2022	18.60	6.49	3.05	6,110	--	--
	12/29/2022	11.70	6.58	3.96	7,910	--	--
	3/28/2023	14.10	6.51	4.39	8,810	--	--
	6/26/2023	26.35	6.74	8.00	11,397	2.85	-86.3
	9/13/2023	26.64	7.02	7.99	12,284	1.97	-72.5
	12/28/2023	19.67	7.29	2.72	4,183	2.38	-65.1
MW-4	6/23/2016	15.10	7.29	--	2,950	1.04	-148.5
	11/29/2016	16.01	7.40	--	2,396	1.59	-127.5
	3/6/2017	13.01	7.39	2.34	3,608	2.01	-237.2
	6/21/2017	14.49	7.08	1.92	2,955	1.36	-188.7
	10/26/2017	17.37	7.29	--	2,830	1.74	-193.2
	12/4/2017	15.26	3.33	2.06	3,161	0.66	-244.2
	3/13/2018	15.08	7.41	--	3,437	--	-214.9
	6/25/2018	15.85	7.33	--	2,580	0.97	-224.9
	3/12/2019	14.10	7.49	1.48	2,960	--	-31.5
	5/22/2019	15.40	7.35	1.67	3,300	1.44	-33.6
	8/22/2019	19.50	7.35	1.55	3,090	6.90	-22.4
	12/2/2019	15.30	6.65	1.69	3,310	--	-32.7
	2/3/2020	15.00	6.81	1.57	3,140	6.51	-37.4
	4/24/2020	13.90	6.84	1.64	3,270	1.59	-47.4
	7/23/2020	24.50	6.67	1.47	2,910	0.87	-33.4
	10/8/2020	15.90	7.00	1.32	2,630	3.78	-43.2
	1/11/2021	8.40	7.50	1.23	2,420	2.73	-60.1
	4/12/2021	16.40	7.06	1.35	2,710	7.11	-43.3
	8/2/2021	16.91	7.41	--	3,845	1.84	-312.6
	10/6/2021	20.20	6.67	--	2,510	--	--
	1/10/2022	11.30	7.19	--	2,540	--	--
	6/23/2022	19.40	7.12	1.32	2,630	--	--
	9/28/2022	18.80	7.19	1.25	2,500	--	--
	12/29/2022	9.40	7.45	1.25	2,490	--	--
	3/28/2023	12.50	7.56	1.24	2,480	--	--
	6/26/2023	21.42	7.79	2.19	3,138	2.61	-288.7
	9/13/2023	26.91	7.87	2.36	3,637	1.55	-198.4
	12/28/2023	23.45	8.19	1.38	2,153	0.94	-179.1

ENSOLUM

TABLE 2
GROUNDWATER QUALITY MEASUREMENTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)
MW-5	8/23/2019	18.20	6.79	3.54	7,100	--	6.6
	12/4/2019	12.60	6.11	3.28	6,540	--	-1.1
	2/4/2020	8.50	6.25	3.24	6,520	--	-5.1
	4/27/2020	21.20	6.01	3.25	6,550	3.81	8.0
	7/24/2020	20.20	6.15	3.02	5,980	1.78	6.2
	10/5/2020	20.30	6.35	2.91	5,810	2.36	12.4
	1/8/2021	12.90	6.67	2.78	5,570	2.39	1.7
	4/13/2021	14.60	6.62	2.64	5,280	0.47	8.7
	8/2/2021	14.50	7.38	--	8,082	--	--
	10/8/2021	16.70	6.27	--	5,300	--	--
	1/11/2022	11.50	6.80	--	5,020	--	--
	6/23/2022	20.50	6.34	2.43	4,870	--	--
	9/28/2022	18.20	6.36	1.98	3,940	--	--
	12/29/2022	9.40	6.90	2.22	4,440	--	--
	3/28/2023	14.10	6.90	2.07	4,130	--	--
	6/26/2023	29.72	7.13	4.76	7,046	2.14	0.9
	9/13/2023	26.66	7.35	4.92	7,569	1.72	-48.5
	12/28/2023	21.41	7.50	4.09	6,295	1.98	-71.3
MW-6	8/23/2019	21.10	6.96	1.29	2,590	--	0.7
	12/4/2019	12.70	6.29	1.21	2,430	--	-5.0
	2/4/2020	8.50	6.52	1.27	2,540	--	-3.1
	4/27/2020	18.30	6.04	1.36	2,700	3.85	7.3
	7/24/2020	20.00	6.47	1.15	2,290	1.54	4.2
	10/5/2020	20.20	6.30	1.07	2,140	2.80	10.1
	1/8/2021	13.60	6.36	1.04	2,070	1.30	11.6
	4/13/2021	13.90	6.57	1.12	2,230	0.68	10.0
	8/2/2021	15.50	7.90	--	1,780	--	--
	10/8/2021	16.20	5.81	--	1,960	--	--
	1/11/2022	13.50	6.22	--	2,030	--	--
	6/23/2022	18.60	6.10	0.94	1,880	--	--
	9/28/2022	17.00	6.39	0.89	1,790	--	--
	12/29/2022	8.40	6.92	0.95	1,900	--	--
	3/28/2023	16.20	6.76	0.95	1,940	--	--
	6/26/2023	20.92	7.20	1.66	2,377	2.23	-82.6
	9/13/2023	27.47	7.24	1.75	2,691	1.78	-99.7
	12/28/2023	21.68	7.45	0.39	593	2.46	-117.6
MW-7	8/23/2019	21.80	6.95	2.63	5,240	--	-12.2
	12/4/2019	12.80	6.11	2.40	4,800	--	-8.0
	2/4/2020	11.00	6.39	2.26	4,390	--	-17.5
	4/27/2020	17.20	6.34	1.96	3,950	4.56	-11.7
	7/24/2020	20.70	6.43	1.37	2,760	2.94	-8.9
	10/5/2020	18.50	6.55	1.26	2,530	4.23	-6.1
	1/11/2021	13.50	6.85	1.28	2,550	1.44	-0.7
	4/13/2021	16.50	6.62	1.53	3,060	9.22	-1.7
	8/2/2021	14.96	7.33	--	4,259	--	--
	10/7/2021	18.60	6.23	--	2,910	--	--
	1/11/2022	12.98	6.56	--	2,910	--	--
	6/23/2022	17.00	6.25	1.13	1,720	--	--
	9/28/2022	17.20	6.42	1.34	2,670	--	--
	12/29/2022	10.20	6.63	1.44	2,890	--	--
	3/28/2023	15.80	6.55	1.51	3,040	--	--
	6/26/2023	20.93	7.14	2.98	4,222	3.31	-51.7
	9/13/2023	--	--	--	--	--	--
	12/28/2023	15.79	7.48	2.02	3,102	4.35	-33.1

Notes:

°C: degrees Celcius
DO: dissolved oxygen
g/L: grams per liter
uS/cm: microsiemens per centimeter
mg/L: milligrams per liter
mV: millivolts
ORP: oxidation-reduction potential
TDS: total dissolved solids
--: data not collected
**: anomalous data*

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Standards		0.005	1.00	0.70	0.62	1.0	0.20	600	1,000
MW-1	6/8/2016	0.0388	<0.020	0.358	4.01	--	1.69	1,170	2,590
	9/12/2016	0.0111	< 0.001	0.0946	0.382	--	0.925	577	--
	11/29/2016	0.0132	< 0.001	0.119	0.445	--	0.99	240	--
	3/6/2017	0.0041	< 0.001	0.0481	0.167	--	0.876	387	1,920
	6/12/2017	0.002	< 0.001	0.0265	0.12	--	0.80	312	1,830
	10/26/2017	< 0.001	< 0.001	0.0081	0.0307	0.256	0.71	424	1,940
	12/4/2017	<0.005	< 0.005	0.021	0.0814	--	0.674	321	1,710
	3/13/2018	< 0.001	< 0.001	0.008	0.0353	--	0.68	319	1,410
	6/25/2018	< 0.001	< 0.001	0.0067	0.0229	--	0.705	349	1,820
	9/4/2018	<0.005	<0.005	0.0154	0.0499	--	0.694	481	2,000
	12/10/2018	<0.001	<0.001	<0.001	<0.003	<0.10	0.712	343	1,980
	3/12/2019	<0.001	<0.001	<0.001	<.300	0.143	0.89	578	2,040
	5/22/2019	<0.001	<0.001	0.00619	0.0119	<0.100	0.732	598	2,210
	8/22/2019	<0.001	<0.001	0.0053	0.0095	<0.100	1.59	1,260	3,010
	12/2/2019	<0.001	<0.001	0.0029	0.0045	<0.100	0.940	697	1,930
	2/3/2020	<0.001	<0.001	0.00714	0.0107	0.119	0.824	735	1,820
	4/24/2020	<0.001	<0.001	0.00337	0.00599	<0.100	0.623	568	1,910
	7/24/2020	<0.001	<0.001	<0.001	<0.003	<0.100	0.613	570	2,230
	10/8/2020	<0.001	<0.001	<0.001	<0.003	<0.100	1.06	1,060	2,960
	1/11/2021	<0.001	<0.001	0.00325	0.00452	<0.100	0.712	642	2,190
	4/12/2021	<0.001	<0.001	0.0021	0.0025	<0.020	0.59	450	1,990
	8/2/2021	0.0046	<0.001	<0.001	<0.0015	0.20	0.52	160	2,040
	10/7/2021	0.0078	<0.001	<0.001	<0.0015	<0.020	0.70	490	2,400
	1/10/2022	<0.001	<0.001	0.0018	<0.0015	--	0.54	480	2,040
	6/23/2022	<0.001	<0.001	<0.001	<0.0015	<0.020	0.42	540	2,070
	9/28/2022	<0.001	<0.001	<0.001	<0.0015	--	0.74	800	2,660
	12/29/2022	<0.001	<0.001	<0.001	<0.0015	--	0.44	810	2,420
	3/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	0.40	920	2,390
	6/26/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	0.54	990	5,080
	9/13/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	1.40	1,300	3,130
	12/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	0.56	1,300	2,710
MW-2	6/8/2016	0.103	< 0.001	0.0072	0.0448	--	1.06	3.00	1,580
	9/12/2016	0.0647	< 0.001	0.0021	0.00320	--	1.73	2.80	--
	11/29/2016	0.0257	< 0.001	0.0021	< 0.003	--	1.41	2.60	--
	3/6/2017	0.0347	< 0.001	0.0022	< 0.003	--	1.45	7.90	1,510
	6/12/2017	0.009	< 0.001	0.0011	< 0.003	--	1.39	3.10	1,550
	10/26/2017	0.0013	< 0.001	< 0.001	< 0.003	5.1	1.26	4.50	1,560
	12/4/2017	0.0039	< 0.001	0.0011	< 0.003	--	1.23	14.3	1,470
	3/13/2018	0.0036	< 0.001	0.0011	< 0.003	--	1.25	154	1,450
	6/25/2018	0.0079	< 0.001	< 0.001	< 0.003	--	1.37	31.3	1,600
	9/4/2018	< 0.001	< 0.001	< 0.001	< 0.003	--	1.13	87.0	1,730
	12/10/2018	0.0543	< 0.001	0.0015	< 0.003	<0.10	1.15	27.7	1,470
	3/12/2019	0.779	< 0.001	0.0317	0.0519	1.59	11.4	64.7	15,300
	5/22/2019	0.435	< 0.005	0.0245	0.0533	4.30	7.77	29.6	15,300
	8/22/2019	0.170	< 0.001	0.0265	0.0153	0.426	7.27	8.01	12,700
	12/2/2019	0.130	< 0.001	0.0304	0.00870	<0.100	10.2	<5.00	15,700
	2/3/2020	0.147	<0.001	0.0312	0.00841	0.174	8.19	<5.00	14,400
	4/24/2020	0.054	<0.001	0.0106	<0.003	<0.100	3.63	6.08	7,800
	7/24/2020	<0.001	<0.001	0.00902	<0.003	<0.100	2.21	10.7	3,680
	10/8/2020	<0.001	<0.001	0.00646	<0.003	0.195	2.31	<5.00	4,290
	1/11/2021	0.014	<0.001	0.00183	<0.003	<0.100	2.55	<5.00	5,150
	4/12/2021	0.019	<0.001	0.0015	<0.0015	0.073	0.92	120	3,060
	8/2/2021	<0.001	<0.001	<0.001	<0.0015	0.91	4.1	570	2,790
	10/7/2021	<0.001	<0.001	<0.001	<0.0015	0.085	2.0	200	2,280
	1/10/2022	0.0074	<0.001	<0.001	<0.0015	0.32	0.98	43	2,510

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Standards		0.005	1.00	0.70	0.62	1.0	0.20	600	1,000
MW-2	6/23/2022	0.0021	<0.002	<0.002	<0.003	0.19	1.5	170	2,000
	9/28/2022	<0.002	<0.002	<0.002	<0.003	--	0.99	29	1,970
	12/29/2022	0.0054	<0.001	<0.001	<0.0015	--	0.64	76	1,800
	3/28/2023	0.040	<0.0010	0.0025	<0.0015	--	0.97	35	1,770
	6/26/2023	0.0067	<0.0010	<0.0010	<0.0015	--	0.89	22	1,480
	9/13/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	0.99	9.8	1,600
	12/28/2023	0.015	<0.0010	0.0034	<0.0015	--	0.96	33	1,680
MW-3	6/8/2016	2.95	< 0.020	0.813	7.78	--	2.65	110	2,190
	9/12/2016	2.27	< 0.001	0.44	2.49	--	3.62	112	--
	11/29/2016	2.97	< 0.001	0.845	5.44	--	3.12	22.5	--
	3/6/2017	1.89	< 0.02	0.259	3.06	--	2.52	14.7	1,880
	6/12/2017	1.68	< 0.02	0.329	1.93	--	3.09	372	2,280
	10/26/2017	1.88	< 0.001	0.417	2.91	3.58	2.15	65.6	2,000
	12/4/2017	2.00	< 0.025	0.346	2.43	--	2.36	35.5	1,750
	3/13/2018	1.43	< 0.025	0.107	1.93	--	2.34	24.6	1,530
	6/26/2018	2.02	< 0.025	0.287	2.69	--	3.52	606	2,560
	9/5/2018	1.82	<0.005	0.160	1.40	--	2.08	241	2,300
	12/10/2018	1.49	<0.10	0.133	0.639	0.142	1.94	170	2,050
	3/11/2019	1.45	<0.001	0.015	0.655	<0.100	2.01	95.6	1,940
	5/22/2019	1.84	<0.001	0.120	1.17	0.278	1.03	23.7	2,540
	8/22/2019	0.623	<0.001	0.0193	0.387	<0.100	1.62	119	1,860
	12/2/2019	0.114	<0.001	0.006	0.184	<0.100	1.55	129	1,800
	2/3/2020	1.24	<0.010	0.0224	1.05	<0.100	1.94	36.1	1,590
	4/24/2020	1.08	<0.010	<0.010	<0.010	0.610	1.93	21.3	1,610
	7/23/2020	0.00663	<0.001	0.00191	0.0147	0.118	5.19	1,400	4,280
	10/5/2020	0.0112	<0.001	0.00204	0.00608	<0.100	6.49	1,140	4,520
	1/8/2021	0.455	<0.001	0.0618	0.300	0.656	3.5	162	4,120
	4/12/2021	0.72	<0.01	0.035	0.260	0.16	11	37	7,190
	8/2/2021	0.0034	<0.001	<0.001	<0.0015	10*	23	2,100	7,940
	10/6/2021	0.0030	<0.001	0.0012	0.0035	0.054	15	2,200	6,620
	1/10/2022	0.0250	<0.001	0.0036	0.0024	--	17	570	10,100
	6/23/2022	0.0052	<0.001	0.092	0.056	5.2*	17	1,300	8,920
	9/28/2022	0.0056	<0.001	0.0029	0.12	--	9.6	1,300	6,940
	12/29/2022	0.042	<0.001	0.022	0.0018	--	16	190	10,300
	3/28/2023	0.380	<0.0010	0.250	0.190	--	19	30	9,840
	6/26/2023	0.160	<0.0020	0.250	0.190	--	2.7	550	7,520
	9/13/2023	0.053	<0.0020	0.085	0.0072	--	8.0	430	8,370
	12/28/2023	<0.0020	<0.0020	<0.0020	<0.0030	--	7.5	280	7,860
MW-4	6/23/2016	0.118	< 0.001	0.186	1.06	--	0.983	838	--
	9/12/2016	0.0742	< 0.001	0.114	0.803	--	1.32	735	--
	11/29/2016	0.0853	< 0.001	0.0929	0.967	--	1.26	382	--
	3/6/2017	0.0886	< 0.02	0.0804	1.23	--	1.22	814	2,260
	6/12/2017	0.100	< 0.005	0.0747	1.44	--	1.01	738	2,140
	10/26/2017	0.0462	< 0.001	0.0226	0.849	0.507	0.73	1,120	2,370
	12/4/2017	0.0632	<0 .020	0.0386	1.45	--	0.893	993	2,150
	12/4/2017	0.064	<0.020	0.0421	1.7	--	--	--	--
	3/13/2018	0.0467	<0.10	0.0292	1.33	--	0.827	1,370	2,350
	6/25/2018	0.0561	<0.020	<0.020	1.74	--	0.888	1,230	2,540
	9/4/2018	0.0257	< 0.005	< 0.005	0.848	--	0.889	1,450	2,410
	12/10/2018	0.108	<0.020	0.0484	2.93	0.209	0.801	439	1,900
	3/12/2019	0.0488	<0.0100	0.0265	1.85	<0.100	0.843	1,240	2,390
	5/22/2019	0.0496	<0.0100	0.0309	1.84	<0.100	0.867	1,090	2,700
	8/22/2019	0.0336	0.0013	0.0113	1.05	<0.100	0.737	1,270	2,290
	12/2/2019	0.0172	<0.0100	<0.0100	0.937	<0.100	0.752	1,390	2,480
	2/3/2020	0.0249	<0.0100	0.0224	1.66	<0.100	0.756	1,300	2,180

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Standards		0.005	1.00	0.70	0.62	1.0	0.20	600	1,000
MW-4	4/24/2020	**0.0170**	<0.0100	0.0120	**0.694**	<0.100	**0.744**	**1,330**	**2,640**
	7/23/2020	**0.0150**	<0.0100	0.0132	**0.975**	<0.100	**0.549**	**1,180**	**2,620**
	10/8/2020	**0.0137**	<0.0100	<0.0100	**0.657**	<0.100	**0.569**	**843**	**2,340**
	1/11/2021	**0.0148**	<0.001	0.0156	**0.717**	<0.100	**0.523**	**1,190**	**2,560**
	4/12/2021	**0.012**	<0.005	0.015	0.600	0.022	**0.53**	**1,000**	**2,530**
	8/2/2021	0.0022	<0.001	<0.001	0.071	0.19	**0.79**	**1,600**	**3,010**
	10/6/2021	**0.0058**	<0.001	0.0026	0.370	<0.020	**0.62**	**1,100**	**2,470**
	1/10/2022	**0.0089**	<0.002	0.0072	0.570	--	**0.55**	**1,100**	**2,600**
	6/23/2022	0.0026	<0.002	0.0024	0.110	0.067	**0.40**	**850**	**2,530**
	9/28/2022	0.0018	<0.002	<0.002	0.086	--	**0.46**	**900**	**2,390**
	12/29/2022	0.0022	<0.001	0.0017	0.094	--	**0.41**	**1,000**	**2,560**
	3/28/2023	0.0046	<0.0010	0.014	0.340	--	**0.46**	**970**	**2,380**
	6/26/2023	**0.0054**	<0.0010	0.013	0.370	--	**0.53**	**1,100**	**2,620**
	9/13/2023	0.0015	<0.0010	0.0012	0.061	--	**0.45**	**1,100**	**2,560**
	12/28/2023	0.0019	<0.0010	0.0044	0.087	--	**0.56**	**1,300**	**2,740**
MW-5	8/23/2019	<0.001	<0.001	<0.001	0.0067	<0.100	**3.33**	**3,660**	**6,620**
	12/2/2019	<0.001	<0.001	<0.0010	<0.0030	0.185	**3.26**	**3,730**	**6,350**
	2/4/2020	<0.001	<0.001	<0.0010	<0.0030	<0.100	**3.45**	**3,660**	**5,940**
	4/24/2020	<0.001	<0.001	<0.0010	<0.0030	<0.100	**3.39**	**3,440**	**6,450**
	7/24/2020	<0.001	<0.001	<0.0010	<0.0030	<0.100	**3.13**	**2,410**	**5,260**
	10/5/2020	<0.001	<0.001	<0.0010	<0.0030	<0.100	**3.33**	**3,430**	**4,010**
	1/8/2021	<0.001	<0.001	<0.001	<0.003	<0.100	**3.37**	**3,530**	**6,150**
	4/13/2021	<0.001	<0.001	<0.001	<0.0015	0.063	**3.3**	**3,500**	**6,500**
	8/2/2021	<0.001	<0.001	<0.001	<0.0015	0.33	**3.1**	**3,300**	**5,920**
	10/8/2021	<0.001	<0.001	<0.001	<0.0015	0.023	**3.4**	**3,400**	**6,120**
	1/11/2022	<0.001	<0.001	<0.001	<0.0015	--	**2.5**	**2,800**	**5,520**
	6/23/2022	<0.001	<0.001	<0.001	<0.0015	0.068	**2.7**	**2,600**	**5,280**
	9/28/2022	<0.001	<0.001	<0.001	<0.0015	--	**2.3**	**1,800**	**4,870**
	12/29/2022	<0.001	<0.001	<0.001	<0.0015	--	**2.6**	**2,400**	**5,460**
	3/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**1.3**	**1,700**	**4,200**
	6/26/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**2.8**	**2,400**	**5,530**
	9/13/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**3.2**	**3,100**	**5,920**
	12/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**3.3**	**3,300**	**5,920**
MW-6	8/23/2019	**0.213**	<0.001	0.145	**0.806**	<0.100	**2.51**	168	**1,750**
	12/2/2019	**0.0741**	<0.001	0.168	0.170	<0.100	**3.11**	86.1	**1,630**
	2/4/2020	**0.0284**	<0.001	0.0184	0.0720	<0.100	**5.05**	150	**1,570**
	4/24/2020	0.00348	<0.001	<0.0010	<0.0030	<0.100	**4.59**	121	**1,550**
	7/24/2020	**0.0977**	<0.001	0.0705	0.510	<0.100	**2.54**	47.0	**1,650**
	10/5/2020	**0.0787**	<0.0100	0.114	0.025	<0.100	**3.33**	24.7	**1,550**
	1/8/2021	**0.00794**	<0.001	0.00891	0.0368	<0.100	**3.85**	30.4	**1,580**
	4/13/2021	<0.001	<0.001	<0.001	<0.0015	0.22	**3.3**	71	**1,450**
	8/2/2021	**0.016**	<0.001	0.013	0.072	**7.0***	**2.6**	25	**1,500**
	10/8/2021	0.0035	<0.001	0.0018	0.0097	0.052	**2.9**	18	**1,310**
	1/11/2022	0.0021	<0.001	0.0013	0.0058	--	**2.9**	32	**1,550**
	6/23/2022	**0.013**	<0.001	0.020	0.170	**4.4***	**2.0**	<5.0	**1,510**
	9/28/2022	**0.013**	<0.001	0.017	0.170	--	**1.7**	<5.0	**1,390**
	12/29/2022	<0.001	<0.001	<0.001	<0.0015	--	**1.7**	12	**1,500**
	3/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**1.7**	13	**1,310**
	6/26/2023	**0.0051**	<0.0010	0.0082	0.077	--	**1.6**	8.8	**1,480**
	9/13/2023	**0.0092**	<0.0010	0.014	0.110	--	**1.8**	1.3	**1,510**
	12/28/2023	**0.0067**	<0.0010	0.0048	0.032	--	**1.6**	<5.0	**1,420**

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
Mangum #1
Hilcorp Energy Company
San Juan County, New Mexico

Well Identification	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Standards		0.005	1.00	0.70	0.62	1.0	0.20	600	1,000
MW-7	8/23/2019	<0.001	<0.001	<0.001	0.004	<0.100	**1.75**	**2,950**	**4,930**
	12/2/2019	<0.001	<0.001	<0.001	<0.003	<0.100	**1.98**	**2,830**	**3,990**
	2/4/2020	<0.001	<0.001	<0.001	<0.003	<0.100	**2.01**	**2,580**	**3,860**
	4/24/2020	<0.001	<0.001	<0.001	<0.003	<0.100	**2.00**	**1,550**	**4,400**
	7/24/2020	<0.001	<0.001	<0.001	<0.003	<0.100	**1.04**	**808**	**2,300**
	10/5/2020	<0.001	<0.001	<0.001	<0.003	<0.100	**1.06**	**887**	**2,100**
	1/11/2021	<0.001	<0.001	<0.001	<0.003	<0.100	**1.03**	**873**	**2,280**
	4/13/2021	<0.001	<0.001	<0.001	<0.0015	0.14	**1.3**	**910**	**2,710**
	8/2/2021	<0.001	<0.001	<0.001	<0.0015	0.28	**1.4**	**870**	517
	10/7/2021	<0.001	<0.001	<0.001	<0.0015	<0.020	**1.1**	**880**	**2,110**
	1/11/2022	<0.001	<0.001	<0.001	<0.0015	--	**1.1**	**810**	**2,560**
	6/23/2022	<0.001	<0.001	<0.001	<0.0015	<0.020	**1.1**	**880**	**2,890**
	9/28/2022	<0.001	<0.001	<0.001	<0.0015	--	**1.1**	**820**	**2,880**
	12/29/2022	<0.001	<0.001	<0.001	<0.0015	--	**1.2**	**1,000**	**3,020**
	3/28/2023	<0.0020	<0.0020	<0.0020	<0.0030	--	**1.2**	**1,200**	**3,650**
	6/26/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**1.2**	**1,100**	**3,330**
	9/13/2023	**Not Sampled - PSH Present***							
	12/28/2023	<0.0010	<0.0010	<0.0010	<0.0015	--	**0.99**	**1,100**	**3,310**

Notes:

mg/L: milligrams per liter

ND: not detected, practical quantitation limit unknown

NMWQCC: New Mexico Water Quality Control Commission

PSH: phase separated hydrocarbons

-- : not analyzed

**: anomalous data*

< : indicates result less than the stated laboratory reporting limit (RL)

*Concentrations in **bold** and shaded exceed the New Mexico Water Quality Control Commission Standards, 20.6.2.3103 of the New Mexico Administrative Code.*

ENSOLUM

APPENDIX A

Laboratory Analytical Reports

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

April 12, 2023

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

RE: Mangum 1 OrderNo.: 2303E04

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 7 sample(s) on 3/29/2023 for the analyses presented in the following report.

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

Please don't hesitate to contact HEAL for any additional information or clarifications.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-1
Project: Mangum 1 **Collection Date:** 3/28/2023 12:30:00 PM
Lab ID: 2303E04-001 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	920	50	*	mg/L	100	3/29/2023 12:40:20 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	0.40	0.0020	*	mg/L	1	3/31/2023 2:29:01 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	1.0		µg/L	1	4/7/2023 1:16:56 AM
Toluene	ND	1.0		µg/L	1	4/7/2023 1:16:56 AM
Ethylbenzene	ND	1.0		µg/L	1	4/7/2023 1:16:56 AM
Xylenes, Total	ND	1.5		µg/L	1	4/7/2023 1:16:56 AM
Surr: 1,2-Dichloroethane-d4	98.1	70-130		%Rec	1	4/7/2023 1:16:56 AM
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	4/7/2023 1:16:56 AM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	4/7/2023 1:16:56 AM
Surr: Toluene-d8	95.2	70-130		%Rec	1	4/7/2023 1:16:56 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	2390	500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-2
Project: Mangum 1
Collection Date: 3/28/2023 1:05:00 PM
Lab ID: 2303E04-002 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	35	5.0		mg/L	10	3/29/2023 12:53:12 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	0.97	0.0020	*	mg/L	1	3/31/2023 2:36:59 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	40	1.0		µg/L	1	4/7/2023 1:46:43 AM
Toluene	ND	1.0		µg/L	1	4/7/2023 1:46:43 AM
Ethylbenzene	2.5	1.0		µg/L	1	4/7/2023 1:46:43 AM
Xylenes, Total	ND	1.5		µg/L	1	4/7/2023 1:46:43 AM
Surr: 1,2-Dichloroethane-d4	95.0	70-130		%Rec	1	4/7/2023 1:46:43 AM
Surr: 4-Bromofluorobenzene	118	70-130		%Rec	1	4/7/2023 1:46:43 AM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	4/7/2023 1:46:43 AM
Surr: Toluene-d8	95.0	70-130		%Rec	1	4/7/2023 1:46:43 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	1770	500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-3
Project: Mangum 1
Collection Date: 3/28/2023 1:30:00 PM
Lab ID: 2303E04-003 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	30	5.0		mg/L	10	3/29/2023 1:18:56 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	19	0.040	*	mg/L	20	4/3/2023 2:17:50 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	380	10		µg/L	10	4/7/2023 1:54:34 PM
Toluene	ND	1.0		µg/L	1	4/7/2023 2:16:29 AM
Ethylbenzene	250	10		µg/L	10	4/7/2023 1:54:34 PM
Xylenes, Total	190	15		µg/L	10	4/7/2023 1:54:34 PM
Surr: 1,2-Dichloroethane-d4	94.1	70-130		%Rec	1	4/7/2023 2:16:29 AM
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	1	4/7/2023 2:16:29 AM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	4/7/2023 2:16:29 AM
Surr: Toluene-d8	94.6	70-130		%Rec	1	4/7/2023 2:16:29 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	9840	500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-4
Project: Mangum 1
Collection Date: 3/28/2023 11:55:00 AM
Lab ID: 2303E04-004 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	970	50	*	mg/L	100	3/29/2023 1:57:32 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	0.46	0.0020	*	mg/L	1	3/31/2023 2:50:49 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	4.6	1.0		µg/L	1	4/7/2023 2:46:19 AM
Toluene	ND	1.0		µg/L	1	4/7/2023 2:46:19 AM
Ethylbenzene	14	1.0		µg/L	1	4/7/2023 2:46:19 AM
Xylenes, Total	340	15		µg/L	10	4/7/2023 2:24:25 PM
Surr: 1,2-Dichloroethane-d4	117	70-130		%Rec	1	4/7/2023 2:46:19 AM
Surr: 4-Bromofluorobenzene	114	70-130		%Rec	1	4/7/2023 2:46:19 AM
Surr: Dibromofluoromethane	100	70-130		%Rec	1	4/7/2023 2:46:19 AM
Surr: Toluene-d8	83.6	70-130		%Rec	1	4/7/2023 2:46:19 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	2380	500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-5
Project: Mangum 1
Collection Date: 3/28/2023 2:30:00 PM
Lab ID: 2303E04-005 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	1700	50	*	mg/L	100	3/29/2023 2:23:16 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	1.3	0.020	*	mg/L	10	3/31/2023 2:57:09 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	1.0		µg/L	1	4/7/2023 3:16:04 AM
Toluene	ND	1.0		µg/L	1	4/7/2023 3:16:04 AM
Ethylbenzene	ND	1.0		µg/L	1	4/7/2023 3:16:04 AM
Xylenes, Total	ND	1.5		µg/L	1	4/7/2023 3:16:04 AM
Surr: 1,2-Dichloroethane-d4	94.8	70-130		%Rec	1	4/7/2023 3:16:04 AM
Surr: 4-Bromofluorobenzene	99.8	70-130		%Rec	1	4/7/2023 3:16:04 AM
Surr: Dibromofluoromethane	103	70-130		%Rec	1	4/7/2023 3:16:04 AM
Surr: Toluene-d8	94.8	70-130		%Rec	1	4/7/2023 3:16:04 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	4200	250	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-6
Project: Mangum 1 **Collection Date:** 3/28/2023 3:20:00 PM
Lab ID: 2303E04-006 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	13	5.0		mg/L	10	3/29/2023 3:01:52 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	1.7	0.020	*	mg/L	10	3/31/2023 3:01:09 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	1.0		µg/L	1	4/7/2023 3:45:50 AM
Toluene	ND	1.0		µg/L	1	4/7/2023 3:45:50 AM
Ethylbenzene	ND	1.0		µg/L	1	4/7/2023 3:45:50 AM
Xylenes, Total	ND	1.5		µg/L	1	4/7/2023 3:45:50 AM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	4/7/2023 3:45:50 AM
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	4/7/2023 3:45:50 AM
Surr: Dibromofluoromethane	106	70-130		%Rec	1	4/7/2023 3:45:50 AM
Surr: Toluene-d8	94.1	70-130		%Rec	1	4/7/2023 3:45:50 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	1310	500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2303E04**
Date Reported: **4/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-7
Project: Mangum 1
Collection Date: 3/28/2023 4:05:00 PM
Lab ID: 2303E04-007 **Matrix:** AQUEOUS **Received Date:** 3/29/2023 7:35:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Sulfate	1200	50	*	mg/L	100	3/29/2023 3:40:27 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	1.2	0.020	*	mg/L	10	3/31/2023 3:05:33 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	2.0		µg/L	2	4/7/2023 4:15:36 AM
Toluene	ND	2.0		µg/L	2	4/7/2023 4:15:36 AM
Ethylbenzene	ND	2.0		µg/L	2	4/7/2023 4:15:36 AM
Xylenes, Total	ND	3.0		µg/L	2	4/7/2023 4:15:36 AM
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	2	4/7/2023 4:15:36 AM
Surr: 4-Bromofluorobenzene	97.5	70-130		%Rec	2	4/7/2023 4:15:36 AM
Surr: Dibromofluoromethane	111	70-130		%Rec	2	4/7/2023 4:15:36 AM
Surr: Toluene-d8	91.9	70-130		%Rec	2	4/7/2023 4:15:36 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	3650	2500	*D	mg/L	1	4/3/2023 3:06:00 PM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**

12-Apr-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464587** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCSLL-A**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464588** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0021	0.0020	0.002000	0	107	50	150			

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464589** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.49	0.0020	0.5000	0	97.3	85	115			

Sample ID: **MB-B**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464590** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCSLL-B**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **B95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464591** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0021	0.0020	0.002000	0	105	50	150			

Sample ID: **LCS-B**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464592** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.47	0.0020	0.5000	0	94.9	85	115			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**

12-Apr-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **2303E04-001CMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-1**	Batch ID: **B95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464640** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.87	0.0020	0.5000	0.3974	94.0	70	130			

Sample ID: **2303E04-001CMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-1**	Batch ID: **B95728**	RunNo: **95728**
Prep Date:	Analysis Date: **3/31/2023**	SeqNo: **3464641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.86	0.0020	0.5000	0.3974	93.5	70	130	0.270	20	

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A95752**	RunNo: **95752**
Prep Date:	Analysis Date: **4/3/2023**	SeqNo: **3465699** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCSLL-A**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A95752**	RunNo: **95752**
Prep Date:	Analysis Date: **4/3/2023**	SeqNo: **3465700** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0021	0.0020	0.002000	0	107	50	150			

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A95752**	RunNo: **95752**
Prep Date:	Analysis Date: **4/3/2023**	SeqNo: **3465701** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.49	0.0020	0.5000	0	98.4	85	115			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**

12-Apr-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R95659**	RunNo: **95659**
Prep Date:	Analysis Date: **3/29/2023**	SeqNo: **3461653** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R95659**	RunNo: **95659**
Prep Date:	Analysis Date: **3/29/2023**	SeqNo: **3461654** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.9	0.50	10.00	0	98.6	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**

12-Apr-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **B95859**	RunNo: **95859**
Prep Date:	Analysis Date: **4/6/2023**	SeqNo: **3470598** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	105	70	130			
Toluene	19	1.0	20.00	0	92.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.3	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.1	70	130			
Surr: Dibromofluoromethane	11		10.00		109	70	130			
Surr: Toluene-d8	9.1		10.00		91.5	70	130			

Sample ID: **mb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **B95859**	RunNo: **95859**
Prep Date:	Analysis Date: **4/6/2023**	SeqNo: **3470637** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.4	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		96.9	70	130			
Surr: Dibromofluoromethane	11		10.00		105	70	130			
Surr: Toluene-d8	9.5		10.00		94.5	70	130			

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R95902**	RunNo: **95902**
Prep Date:	Analysis Date: **4/7/2023**	SeqNo: **3472497** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	98.6	70	130			
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.7	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		96.2	70	130			
Surr: Dibromofluoromethane	11		10.00		107	70	130			
Surr: Toluene-d8	9.1		10.00		91.5	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R95902**	RunNo: **95902**
Prep Date:	Analysis Date: **4/7/2023**	SeqNo: **3472521** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**
12-Apr-23

Client: HILCORP ENERGY
Project: Mangum 1

Sample ID: **mb** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **R95902** RunNo: **95902**
Prep Date: Analysis Date: **4/7/2023** SeqNo: **3472521** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.1	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		97.2	70	130			
Surr: Dibromofluoromethane	11		10.00		110	70	130			
Surr: Toluene-d8	9.5		10.00		94.7	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2303E04**

12-Apr-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-74044**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **74044**	RunNo: **95745**
Prep Date: **3/31/2023**	Analysis Date: **4/3/2023**	SeqNo: **3465355** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	50.0								

Sample ID: **LCS-74044**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **74044**	RunNo: **95745**
Prep Date: **3/31/2023**	Analysis Date: **4/3/2023**	SeqNo: **3465356** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	998	50.0	1000	0	99.8	80	120			

Sample ID: **2303E04-001BDUP**	SampType: **DUP**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **MW-1**	Batch ID: **74044**	RunNo: **95745**
Prep Date: **3/31/2023**	Analysis Date: **4/3/2023**	SeqNo: **3465361** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	2390	500						)0000974	10	*D

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: Hilcorp Energy | Work Order Number: 2303E04 | RcptNo: 1

Received By: Tracy Casarrubias 3/29/2023 7:35:00 AM

Completed By: Tracy Casarrubias 3/29/2023 9:00:35 AM

Reviewed By: SGC 3/29/23

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☑	No ☐	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	HNO3 NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 7 (<2 or >12 unless noted)

Adjusted? Yes

Checked by: MB 3/29/23

Special Handling (if applicable)

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

Person Notified: | Date:

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

Regarding:

Client Instructions:

16. Additional remarks:

Poured off 125mL from the original unpreserved volume provided for samples 001 - 007. Filtered and proceeded to add ~0.4mL of HNO3 (CHEM # 7143) for proper pH - Samples -001 — -004 filter lot # FJ9623; Sample -005 filter lot # FL9638; Samples -006 and -007 filter lot # FG5854. MB 3/29/23

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good	Yes	Morty		

Chain-of-Custody Record

Client: Hilcorp Farmington NM

Mailing Address: 382 Road 3100 Aztec, NM 87410

Billing Address: PO Box 61529 Houston, TX 77208

Phone #: 505-486-9543

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:

X Standard ☐ Rush_____

Project Name:

Mangum 1

Project #:

Project Manager:

Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☒ Yes ☐ No marty

# of Coolers: 1

Cooler Temp(including CF): 1.3-0.2=1.1°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2303E04	Dissolved Mn	BTEX 8260	Sulfate / TDS
3-28	1230	Water	MW-1	(3) 40ml VOA (1) Liter Plastic	HCl Cool	001	X	X	X
	1305	Water	MW-2	(3) 40ml VOA (1) Liter Plastic	HCl Cool	002	X	X	X
	1330	Water	MW-3	(3) 40ml VOA (1) Liter Plastic	HCl Cool	003	X	X	X
	1155	Water	MW-4	(3) 40ml VOA (1) Liter Plastic	HCl Cool	004	X	X	X
	1430	Water	MW-5	(3) 40ml VOA (1) Liter Plastic	HCl Cool	005	X	X	X
	1520	Water	MW-6	(3) 40ml VOA (1) Liter Plastic	HCl Cool	006	X	X	X
	1605	Water	MW-7	(3) 40ml VOA (1) Liter Plastic	HCl Cool	007	X	X	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3-28	1637				3/28/23	1637
3/28/23	1812			Courier	3/29/23	7:35

Remarks: *Dissolved Mn is to be filterd and preserved in the lab. Special pricing see Andy.

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

July 12, 2023

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

RE: Mangum 1 OrderNo.: 2306F15

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 7 sample(s) on 6/29/2023 for the analyses presented in the following report.

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

Please don't hesitate to contact HEAL for any additional information or clarifications.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-1
Project: Mangum 1
Collection Date: 6/26/2023 3:50:00 PM
Lab ID: 2306F15-001 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	990	25	*	mg/L	50	7/5/2023 12:46:16 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.54	0.0020	*	mg/L	1	6/30/2023 12:39:17 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	6/30/2023 7:17:19 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 7:17:19 PM
Ethylbenzene	ND	1.0		µg/L	1	6/30/2023 7:17:19 PM
Xylenes, Total	ND	1.5		µg/L	1	6/30/2023 7:17:19 PM
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	6/30/2023 7:17:19 PM
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	6/30/2023 7:17:19 PM
Surr: Dibromofluoromethane	109	70-130		%Rec	1	6/30/2023 7:17:19 PM
Surr: Toluene-d8	98.3	70-130		%Rec	1	6/30/2023 7:17:19 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JAG**
Total Dissolved Solids	5080	250	*D	mg/L	1	7/5/2023 2:00:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-2
Project: Mangum 1
Collection Date: 6/26/2023 4:20:00 PM
Lab ID: 2306F15-002 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Sulfate	22	2.5		mg/L	5	6/29/2023 7:21:32 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.89	0.0020	*	mg/L	1	6/30/2023 12:43:50 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	6.7	1.0		µg/L	1	6/30/2023 7:47:28 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 7:47:28 PM
Ethylbenzene	ND	1.0		µg/L	1	6/30/2023 7:47:28 PM
Xylenes, Total	ND	1.5		µg/L	1	6/30/2023 7:47:28 PM
Surr: 1,2-Dichloroethane-d4	97.8	70-130		%Rec	1	6/30/2023 7:47:28 PM
Surr: 4-Bromofluorobenzene	129	70-130		%Rec	1	6/30/2023 7:47:28 PM
Surr: Dibromofluoromethane	101	70-130		%Rec	1	6/30/2023 7:47:28 PM
Surr: Toluene-d8	94.9	70-130		%Rec	1	6/30/2023 7:47:28 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JAG**
Total Dissolved Solids	1480	500	*D	mg/L	1	7/5/2023 2:00:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-3
Project: Mangum 1
Collection Date: 6/26/2023 4:45:00 PM
Lab ID: 2306F15-003 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Sulfate	550	10	*	mg/L	20	6/29/2023 8:00:07 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	2.7	0.020	*	mg/L	10	6/30/2023 3:18:37 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	160	2.0		µg/L	2	6/30/2023 8:47:33 PM
Toluene	ND	2.0		µg/L	2	6/30/2023 8:47:33 PM
Ethylbenzene	190	2.0		µg/L	2	6/30/2023 8:47:33 PM
Xylenes, Total	250	3.0		µg/L	2	6/30/2023 8:47:33 PM
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	2	6/30/2023 8:47:33 PM
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	2	6/30/2023 8:47:33 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	2	6/30/2023 8:47:33 PM
Surr: Toluene-d8	103	70-130		%Rec	2	6/30/2023 8:47:33 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JAG**
Total Dissolved Solids	7520	500	*D	mg/L	1	7/5/2023 2:00:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-4
Project: Mangum 1
Collection Date: 6/26/2023 2:45:00 PM
Lab ID: 2306F15-004 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1100	25	*	mg/L	50	7/5/2023 12:58:38 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.53	0.0020	*	mg/L	1	6/30/2023 12:52:46 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	5.4	1.0		µg/L	1	6/30/2023 9:17:32 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 9:17:32 PM
Ethylbenzene	13	1.0		µg/L	1	6/30/2023 9:17:32 PM
Xylenes, Total	370	15		µg/L	10	7/3/2023 2:00:05 PM
Surr: 1,2-Dichloroethane-d4	132	70-130	S	%Rec	1	6/30/2023 9:17:32 PM
Surr: 4-Bromofluorobenzene	146	70-130	S	%Rec	1	6/30/2023 9:17:32 PM
Surr: Dibromofluoromethane	102	70-130		%Rec	1	6/30/2023 9:17:32 PM
Surr: Toluene-d8	119	70-130		%Rec	1	6/30/2023 9:17:32 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JAG**
Total Dissolved Solids	2620	500	*D	mg/L	1	7/5/2023 2:00:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-5
Project: Mangum 1
Collection Date: 6/26/2023 5:35:00 PM
Lab ID: 2306F15-005 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	2400	50	*	mg/L	100	7/5/2023 1:50:06 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	2.8	0.010	*	mg/L	5	6/30/2023 12:59:41 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	6/30/2023 9:47:26 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 9:47:26 PM
Ethylbenzene	ND	1.0		µg/L	1	6/30/2023 9:47:26 PM
Xylenes, Total	ND	1.5		µg/L	1	6/30/2023 9:47:26 PM
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	6/30/2023 9:47:26 PM
Surr: 4-Bromofluorobenzene	99.2	70-130		%Rec	1	6/30/2023 9:47:26 PM
Surr: Dibromofluoromethane	109	70-130		%Rec	1	6/30/2023 9:47:26 PM
Surr: Toluene-d8	99.8	70-130		%Rec	1	6/30/2023 9:47:26 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	5530	250	*D	mg/L	1	7/5/2023 3:39:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-6
Project: Mangum 1
Collection Date: 6/26/2023 6:30:00 PM
Lab ID: 2306F15-006 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Sulfate	8.8	2.5		mg/L	5	6/29/2023 9:30:48 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	1.6	0.010	*	mg/L	5	6/30/2023 1:14:57 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	5.1	1.0		µg/L	1	6/30/2023 10:17:18 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 10:17:18 PM
Ethylbenzene	8.2	1.0		µg/L	1	6/30/2023 10:17:18 PM
Xylenes, Total	77	1.5		µg/L	1	6/30/2023 10:17:18 PM
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	6/30/2023 10:17:18 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	6/30/2023 10:17:18 PM
Surr: Dibromofluoromethane	100	70-130		%Rec	1	6/30/2023 10:17:18 PM
Surr: Toluene-d8	95.1	70-130		%Rec	1	6/30/2023 10:17:18 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	1480	250	*D	mg/L	1	7/5/2023 3:39:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2306F15**
Date Reported: **7/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-7
Project: Mangum 1
Collection Date: 6/26/2023 7:10:00 PM
Lab ID: 2306F15-007 **Matrix:** AQUEOUS **Received Date:** 6/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1100	25	*	mg/L	50	7/5/2023 1:11:30 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	1.2	0.020	*	mg/L	10	7/5/2023 3:53:56 PM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	6/30/2023 10:47:20 PM
Toluene	ND	1.0		µg/L	1	6/30/2023 10:47:20 PM
Ethylbenzene	ND	1.0		µg/L	1	6/30/2023 10:47:20 PM
Xylenes, Total	ND	1.5		µg/L	1	6/30/2023 10:47:20 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	6/30/2023 10:47:20 PM
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	6/30/2023 10:47:20 PM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	6/30/2023 10:47:20 PM
Surr: Toluene-d8	97.7	70-130		%Rec	1	6/30/2023 10:47:20 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **RBC**
Total Dissolved Solids	3330	250	*D	mg/L	1	7/5/2023 3:39:00 PM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2306F15**

12-Jul-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-C**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **C97858**	RunNo: **97858**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3559565** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCSLL-C**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **C97858**	RunNo: **97858**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3559566** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020	0.002000	0	97.8	50	150			

Sample ID: **LCS-C**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **C97858**	RunNo: **97858**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3559572** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.46	0.0020	0.5000	0	91.6	85	115			

Sample ID: **2306F15-006CMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-6**	Batch ID: **C97858**	RunNo: **97858**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3559704** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.1	0.010	2.500	1.587	99.2	70	130			

Sample ID: **2306F15-006CMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-6**	Batch ID: **C97858**	RunNo: **97858**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3559705** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.1	0.010	2.500	1.587	99.4	70	130	0.105	20	

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A97929**	RunNo: **97929**
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3562786** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2306F15**

12-Jul-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **LCSLL-A**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A97929**	RunNo: **97929**
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3562787** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0022	0.0020	0.002000	0	109	50	150			

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A97929**	RunNo: **97929**
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3562788** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.52	0.0020	0.5000	0	105	85	115			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2306F15**

12-Jul-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R97845**	RunNo: **97845**							
Prep Date:	Analysis Date: **6/29/2023**	SeqNo: **3559059**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R97845**	RunNo: **97845**							
Prep Date:	Analysis Date: **6/29/2023**	SeqNo: **3559060**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.6	0.50	10.00	0	95.8	90	110			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R97963**	RunNo: **97963**							
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3564075**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R97963**	RunNo: **97963**							
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3564076**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.8	0.50	10.00	0	98.4	90	110			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R97963**	RunNo: **97963**							
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3564102**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R97963**	RunNo: **97963**							
Prep Date:	Analysis Date: **7/5/2023**	SeqNo: **3564103**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.8	0.50	10.00	0	97.7	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2306F15**

12-Jul-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R97873**	RunNo: **97873**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3560244** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	95.3	70	130			
Toluene	18	1.0	20.00	0	91.4	70	130			
Surr: 1,2-Dichloroethane-d4	9.9		10.00		99.0	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.5	70	130			
Surr: Toluene-d8	9.4		10.00		94.3	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R97873**	RunNo: **97873**
Prep Date:	Analysis Date: **6/30/2023**	SeqNo: **3560264** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.0	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		100	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	9.8		10.00		98.2	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2306F15**

12-Jul-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-75942**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **75942**	RunNo: **97920**
Prep Date: **6/30/2023**	Analysis Date: **7/5/2023**	SeqNo: **3562592** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	50.0								

Sample ID: **LCS-75942**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **75942**	RunNo: **97920**
Prep Date: **6/30/2023**	Analysis Date: **7/5/2023**	SeqNo: **3562593** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	50.0	1000	0	101	80	120			

Sample ID: **MB-75955**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **75955**	RunNo: **97927**
Prep Date: **7/3/2023**	Analysis Date: **7/5/2023**	SeqNo: **3562738** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	50.0								

Sample ID: **LCS-75955**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **75955**	RunNo: **97927**
Prep Date: **7/3/2023**	Analysis Date: **7/5/2023**	SeqNo: **3562739** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	50.0	1000	0	103	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2306F15 RcptNo: 1

Received By: Tracy Casarrubias 6/29/2023 7:00:00 AM

Completed By: Tracy Casarrubias 6/29/2023 9:55:47 AM

Reviewed By: MB 6/29/23

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐ JM 6/29/23
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☑ No ☐ NA ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no. notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 7 (<2 or >12 unless noted)

Adjusted? yes

Checked by: JM 6/29/23

Special Handling (if applicable)

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

Person Notified: Date:

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

Regarding:

Client Instructions:

16. Additional remarks:

Poured off ~125mL from original unpreserved volumes provided for samples 001B-007B to create 001C-007C. Proceeded to filter volume (Filter LOT# 0968) and added 0.40mL of HNO3 (Chem#7162) for proper pH- Used 11 Filters. JM 6/29/23.

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.2	Good	Yes	Yogi		

Chain-of-Custody Record

Client: Hilcorp Farmington NM

Mailing Address: 382 Road 3100 Aztec, NM 87410

Billing Address: PO Box 61529 Houston, TX 77208

Phone #: 505-486-9543

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:

X Standard ☐ Rush

Project Name:

Mangum 1

Project #:

Project Manager:

Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☒ Yes ☐ No 4oai

# of Coolers: 1

Cooler Temp(Including CF): 2.2-0=2.2°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2306F15	Dissolved Mn	BTEX 8260	Sulfate / TDS
6-26	1550	Water	MW-1	(3) 40ml VOA (1) Liter Plastic	HCl Cool	001	X	X	X
	1620	Water	MW-2	(3) 40ml VOA (1) Liter Plastic	HCl Cool	002	X	X	X
	1645	Water	MW-3	(3) 40ml VOA (1) Liter Plastic	HCl Cool	003	X	X	X
	1445	Water	MW-4	(3) 40ml VOA (1) Liter Plastic	HCl Cool	004	X	X	X
	1735	Water	MW-5	(3) 40ml VOA (1) Liter Plastic	HCl Cool	005	X	X	X
	1830	Water	MW-6	(3) 40ml VOA (1) Liter Plastic	HCl Cool	006	X	X	X
	1910	Water	MW-7	(3) 40ml VOA (1) Liter Plastic	HCl Cool	007	X	X	X

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
6-28	1639				4/28/23	1639
6/28/23	1807			courier	6/29/23	7:00

Remarks: *Dissolved Mn is to be filterd and preserved in the lab. Special pricing see Andy.

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 28, 2023

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

RE: Mangum 1 OrderNo.: 2309781

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 6 sample(s) on 9/14/2023 for the analyses presented in the following report.

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

Please don't hesitate to contact HEAL for any additional information or clarifications.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-1
Project: Mangum 1
Collection Date: 9/13/2023 11:20:00 AM
Lab ID: 2309781-001 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1300	50	*	mg/L	100	9/16/2023 1:13:44 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	1.4	0.010	*	mg/L	5	9/18/2023 9:22:36 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	9/18/2023 3:58:17 PM
Toluene	ND	1.0		µg/L	1	9/18/2023 3:58:17 PM
Ethylbenzene	ND	1.0		µg/L	1	9/18/2023 3:58:17 PM
Xylenes, Total	ND	1.5		µg/L	1	9/18/2023 3:58:17 PM
Surr: 1,2-Dichloroethane-d4	99.3	70-130		%Rec	1	9/18/2023 3:58:17 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	9/18/2023 3:58:17 PM
Surr: Dibromofluoromethane	95.3	70-130		%Rec	1	9/18/2023 3:58:17 PM
Surr: Toluene-d8	100	70-130		%Rec	1	9/18/2023 3:58:17 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	3130	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-2
Project: Mangum 1 **Collection Date:** 9/13/2023 11:40:00 AM
Lab ID: 2309781-002 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	9.8	5.0		mg/L	10	9/16/2023 1:50:58 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.99	0.0020	*	mg/L	1	9/18/2023 9:24:44 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	9/18/2023 4:26:27 PM
Toluene	ND	1.0		µg/L	1	9/18/2023 4:26:27 PM
Ethylbenzene	ND	1.0		µg/L	1	9/18/2023 4:26:27 PM
Xylenes, Total	ND	1.5		µg/L	1	9/18/2023 4:26:27 PM
Surr: 1,2-Dichloroethane-d4	97.8	70-130		%Rec	1	9/18/2023 4:26:27 PM
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	9/18/2023 4:26:27 PM
Surr: Dibromofluoromethane	91.0	70-130		%Rec	1	9/18/2023 4:26:27 PM
Surr: Toluene-d8	102	70-130		%Rec	1	9/18/2023 4:26:27 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	1600	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-3
Project: Mangum 1 **Collection Date:** 9/13/2023 12:00:00 PM
Lab ID: 2309781-003 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	430	5.0	*	mg/L	10	9/16/2023 2:15:47 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	8.0	0.020	*	mg/L	10	9/18/2023 9:44:51 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	53	2.0		µg/L	2	9/18/2023 4:54:38 PM
Toluene	ND	2.0		µg/L	2	9/18/2023 4:54:38 PM
Ethylbenzene	85	2.0		µg/L	2	9/18/2023 4:54:38 PM
Xylenes, Total	7.2	3.0		µg/L	2	9/18/2023 4:54:38 PM
Surr: 1,2-Dichloroethane-d4	97.6	70-130		%Rec	2	9/18/2023 4:54:38 PM
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	2	9/18/2023 4:54:38 PM
Surr: Dibromofluoromethane	91.7	70-130		%Rec	2	9/18/2023 4:54:38 PM
Surr: Toluene-d8	101	70-130		%Rec	2	9/18/2023 4:54:38 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	8370	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-4
Project: Mangum 1
Collection Date: 9/13/2023 10:55:00 AM
Lab ID: 2309781-004 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1100	50	*	mg/L	100	9/16/2023 2:53:00 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.45	0.0020	*	mg/L	1	9/18/2023 9:40:14 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	1.5	1.0		µg/L	1	9/18/2023 5:22:51 PM
Toluene	ND	1.0		µg/L	1	9/18/2023 5:22:51 PM
Ethylbenzene	1.2	1.0		µg/L	1	9/18/2023 5:22:51 PM
Xylenes, Total	61	1.5		µg/L	1	9/18/2023 5:22:51 PM
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	9/18/2023 5:22:51 PM
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	9/18/2023 5:22:51 PM
Surr: Dibromofluoromethane	94.5	70-130		%Rec	1	9/18/2023 5:22:51 PM
Surr: Toluene-d8	100	70-130		%Rec	1	9/18/2023 5:22:51 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	2560	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-5
Project: Mangum 1
Collection Date: 9/13/2023 12:30:00 PM
Lab ID: 2309781-005 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	3100	50	*	mg/L	100	9/16/2023 3:17:49 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	3.2	0.010	*	mg/L	5	9/18/2023 9:49:31 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	ND	1.0		µg/L	1	9/18/2023 5:51:05 PM
Toluene	ND	1.0		µg/L	1	9/18/2023 5:51:05 PM
Ethylbenzene	ND	1.0		µg/L	1	9/18/2023 5:51:05 PM
Xylenes, Total	ND	1.5		µg/L	1	9/18/2023 5:51:05 PM
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	9/18/2023 5:51:05 PM
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	9/18/2023 5:51:05 PM
Surr: Dibromofluoromethane	96.4	70-130		%Rec	1	9/18/2023 5:51:05 PM
Surr: Toluene-d8	99.7	70-130		%Rec	1	9/18/2023 5:51:05 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	5920	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2309781**
Date Reported: **9/28/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-6
Project: Mangum 1
Collection Date: 9/13/2023 1:00:00 PM
Lab ID: 2309781-006 **Matrix:** AQUEOUS **Received Date:** 9/14/2023 6:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1.3	0.50		mg/L	1	9/21/2023 3:38:19 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	1.8	0.010	*	mg/L	5	9/18/2023 9:53:42 AM
EPA METHOD 8260B: VOLATILES						Analyst: **JR**
Benzene	9.2	1.0		µg/L	1	9/18/2023 6:19:14 PM
Toluene	ND	1.0		µg/L	1	9/18/2023 6:19:14 PM
Ethylbenzene	14	1.0		µg/L	1	9/18/2023 6:19:14 PM
Xylenes, Total	110	1.5		µg/L	1	9/18/2023 6:19:14 PM
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	9/18/2023 6:19:14 PM
Surr: 4-Bromofluorobenzene	98.7	70-130		%Rec	1	9/18/2023 6:19:14 PM
Surr: Dibromofluoromethane	93.1	70-130		%Rec	1	9/18/2023 6:19:14 PM
Surr: Toluene-d8	97.7	70-130		%Rec	1	9/18/2023 6:19:14 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **MCA**
Total Dissolved Solids	1510	250	*D	mg/L	1	9/20/2023 4:43:00 PM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2309781**

28-Sep-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A99758**	RunNo: **99758**
Prep Date:	Analysis Date: **9/18/2023**	SeqNo: **3645935** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCSLL-A**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A99758**	RunNo: **99758**
Prep Date:	Analysis Date: **9/18/2023**	SeqNo: **3645936** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0020	0.0020	0.002000	0	101	50	150			

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A99758**	RunNo: **99758**
Prep Date:	Analysis Date: **9/18/2023**	SeqNo: **3645937** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.49	0.0020	0.5000	0	98.5	85	115			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2309781**

28-Sep-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R99759**	RunNo: **99759**
Prep Date:	Analysis Date: **9/16/2023**	SeqNo: **3646044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R99759**	RunNo: **99759**
Prep Date:	Analysis Date: **9/16/2023**	SeqNo: **3646045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.6	0.50	10.00	0	95.6	90	110			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R99912**	RunNo: **99912**
Prep Date:	Analysis Date: **9/21/2023**	SeqNo: **3653864** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R99912**	RunNo: **99912**
Prep Date:	Analysis Date: **9/21/2023**	SeqNo: **3653865** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.4	0.50	10.00	0	93.5	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2309781**

28-Sep-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R99779**	RunNo: **99779**
Prep Date:	Analysis Date: **9/18/2023**	SeqNo: **3647137** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	24	1.0	20.00	0	118	70	130			
Toluene	23	1.0	20.00	0	113	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.1	70	130			
Surr: Toluene-d8	10		10.00		101	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R99779**	RunNo: **99779**
Prep Date:	Analysis Date: **9/18/2023**	SeqNo: **3647153** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.5	70	130			
Surr: Toluene-d8	9.9		10.00		98.6	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2309781**

28-Sep-23

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-77596**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **77596**	RunNo: **99859**
Prep Date: **9/19/2023**	Analysis Date: **9/20/2023**	SeqNo: **3650763** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	50.0								

Sample ID: **LCS-77596**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **77596**	RunNo: **99859**
Prep Date: **9/19/2023**	Analysis Date: **9/20/2023**	SeqNo: **3650764** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	50.0	1000	0	102	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2309781 RcptNo: 1

Received By: Tracy Casarrubias 9/14/2023 6:30:00 AM

Completed By: Tracy Casarrubias 9/14/2023 11:25:30 AM

Reviewed By: SCM 9/15/23

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☑	No ☐	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	HNO3 NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 6 (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? Yes
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: JM 9/15/23

Special Handling (if applicable)

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

Person Notified: Date:

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

Regarding:

Client Instructions:

16. Additional remarks:

From original unpreserved volume provided for samples 001B-006B, ~125mL were poured off and filtered (Filter Lot# 17866106 x 7) to create 001C-006C. Procceeded to add ~.40mL of HNO3 (Chem#7281) to samples 001C-006C for proper pH- JM 9/15/23

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes	Morty		

Chain-of-Custody Record

Client: Hilcorp Farmington NM

Mailing Address: 382 Road 3100 Aztec, NM 87410

Billing Address: PO Box 61529 Houston, TX 77208

Phone #: 505-486-9543

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:

X Standard ☐ Rush_____

Project Name:

Mangum 1

Project #:

Project Manager:

Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☑ Yes ☐ No marty

# of Coolers: 1

Cooler Temp(including CF): 1.3-Ø=1.3°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2309781	Dissolved Mn	BTEX 8260	Sulfate / TDS
9-13	1120	Water	MW-1	(3) 40ml VOA (1) Liter Plastic	HCl Cool	001	X	X	X
	1140	Water	MW-2	(3) 40ml VOA (1) Liter Plastic	HCl Cool	002	X	X	X
	1200	Water	MW-3	(3) 40ml VOA (1) Liter Plastic	HCl Cool	003	X	X	X
	1055	Water	MW-4	(3) 40ml VOA (1) Liter Plastic	HCl Cool	004	X	X	X
	1230	Water	MW-5	(3) 40ml VOA (1) Liter Plastic	HCl Cool	005	X	X	X
	1300	Water	MW-6	(3) 40ml VOA (1) Liter Plastic	HCl Cool	006	X	X	X
		Water	~~MW-7~~	~~(3) 40ml VOA (1) Liter Plastic~~	HCl Cool		X	X	X

Analysis Request

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9-13	1553			Walk	9/13/23	1553
9/13/23	1807			courier	9/14/23	6:30

Remarks: *Dissolved Mn is to be filterd and preserved in the lab. Special pricing see Andy.

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.

eurofins | Environment Testing

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

January 15, 2024

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

RE: Mangum 1 OrderNo.: 2312F10

Dear Mitch Killough:

Eurofins Environment Testing South Central, LLC received 7 sample(s) on 12/29/2023 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-1
Project: Mangum 1 **Collection Date:** 12/28/2023 12:30:00 PM
Lab ID: 2312F10-001 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1300	50	*	mg/L	100	1/11/2024 3:25:14 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	0.56	0.0020		mg/L	1	1/3/2024 10:18:52 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	ND	1.0		µg/L	1	1/5/2024 9:15:00 PM
Toluene	ND	1.0		µg/L	1	1/5/2024 9:15:00 PM
Ethylbenzene	ND	1.0		µg/L	1	1/5/2024 9:15:00 PM
Xylenes, Total	ND	1.5		µg/L	1	1/5/2024 9:15:00 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	1/5/2024 9:15:00 PM
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/5/2024 9:15:00 PM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	1/5/2024 9:15:00 PM
Surr: Toluene-d8	101	70-130		%Rec	1	1/5/2024 9:15:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	2710	100	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-2
Project: Mangum 1 **Collection Date:** 12/28/2023 1:00:00 PM
Lab ID: 2312F10-002 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	33	5.0		mg/L	10	1/11/2024 3:38:07 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	0.96	0.010		mg/L	5	1/3/2024 10:59:21 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	15	1.0		µg/L	1	1/5/2024 9:39:00 PM
Toluene	ND	1.0		µg/L	1	1/5/2024 9:39:00 PM
Ethylbenzene	3.4	1.0		µg/L	1	1/5/2024 9:39:00 PM
Xylenes, Total	ND	1.5		µg/L	1	1/5/2024 9:39:00 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	1/5/2024 9:39:00 PM
Surr: 4-Bromofluorobenzene	130	70-130		%Rec	1	1/5/2024 9:39:00 PM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	1/5/2024 9:39:00 PM
Surr: Toluene-d8	105	70-130		%Rec	1	1/5/2024 9:39:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	1680	250	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-3
Project: Mangum 1 **Collection Date:** 12/28/2023 1:30:00 PM
Lab ID: 2312F10-003 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	280	5.0	*	mg/L	10	1/11/2024 4:03:55 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	7.5	0.020		mg/L	10	1/3/2024 11:10:43 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	ND	2.0	P	µg/L	2	1/5/2024 10:04:00 PM
Toluene	ND	2.0	P	µg/L	2	1/5/2024 10:04:00 PM
Ethylbenzene	ND	2.0	P	µg/L	2	1/5/2024 10:04:00 PM
Xylenes, Total	ND	3.0	P	µg/L	2	1/5/2024 10:04:00 PM
Surr: 1,2-Dichloroethane-d4	106	70-130	P	%Rec	2	1/5/2024 10:04:00 PM
Surr: 4-Bromofluorobenzene	103	70-130	P	%Rec	2	1/5/2024 10:04:00 PM
Surr: Dibromofluoromethane	105	70-130	P	%Rec	2	1/5/2024 10:04:00 PM
Surr: Toluene-d8	99.5	70-130	P	%Rec	2	1/5/2024 10:04:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	7860	250	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-4
Project: Mangum 1 **Collection Date:** 12/28/2023 12:00:00 PM
Lab ID: 2312F10-004 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1300	50	*	mg/L	100	1/11/2024 4:42:37 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	0.56	0.0020		mg/L	1	1/3/2024 10:29:26 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	1.9	1.0		µg/L	1	1/5/2024 10:28:00 PM
Toluene	ND	1.0		µg/L	1	1/5/2024 10:28:00 PM
Ethylbenzene	4.4	1.0		µg/L	1	1/5/2024 10:28:00 PM
Xylenes, Total	87	1.5		µg/L	1	1/5/2024 10:28:00 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	1/5/2024 10:28:00 PM
Surr: 4-Bromofluorobenzene	113	70-130		%Rec	1	1/5/2024 10:28:00 PM
Surr: Dibromofluoromethane	106	70-130		%Rec	1	1/5/2024 10:28:00 PM
Surr: Toluene-d8	122	70-130		%Rec	1	1/5/2024 10:28:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	2740	250	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-5
Project: Mangum 1
Collection Date: 12/28/2023 2:15:00 PM
Lab ID: 2312F10-005 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	3300	50	*	mg/L	100	1/11/2024 5:34:13 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	3.3	0.010		mg/L	5	1/3/2024 11:16:37 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	ND	1.0		µg/L	1	1/5/2024 10:53:00 PM
Toluene	ND	1.0		µg/L	1	1/5/2024 10:53:00 PM
Ethylbenzene	ND	1.0		µg/L	1	1/5/2024 10:53:00 PM
Xylenes, Total	ND	1.5		µg/L	1	1/5/2024 10:53:00 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	1/5/2024 10:53:00 PM
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	1	1/5/2024 10:53:00 PM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	1/5/2024 10:53:00 PM
Surr: Toluene-d8	100	70-130		%Rec	1	1/5/2024 10:53:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	5920	100	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-6
Project: Mangum 1 **Collection Date:** 12/28/2023 3:00:00 PM
Lab ID: 2312F10-006 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	ND	5.0		mg/L	10	1/11/2024 5:47:07 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	1.6	0.010		mg/L	5	1/3/2024 11:29:39 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	6.7	1.0		µg/L	1	1/5/2024 11:17:00 PM
Toluene	ND	1.0		µg/L	1	1/5/2024 11:17:00 PM
Ethylbenzene	4.8	1.0		µg/L	1	1/5/2024 11:17:00 PM
Xylenes, Total	32	1.5		µg/L	1	1/5/2024 11:17:00 PM
Surr: 1,2-Dichloroethane-d4	95.6	70-130		%Rec	1	1/5/2024 11:17:00 PM
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	1/5/2024 11:17:00 PM
Surr: Dibromofluoromethane	100	70-130		%Rec	1	1/5/2024 11:17:00 PM
Surr: Toluene-d8	106	70-130		%Rec	1	1/5/2024 11:17:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	1420	250	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2312F10**
Date Reported: **1/15/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** MW-7
Project: Mangum 1 **Collection Date:** 12/28/2023 3:45:00 PM
Lab ID: 2312F10-007 **Matrix:** AQUEOUS **Received Date:** 12/29/2023 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SNS**
Sulfate	1100	50	*	mg/L	100	1/11/2024 6:25:49 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **VP**
Manganese	0.99	0.0020		mg/L	1	1/3/2024 10:48:07 AM
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**
Benzene	ND	1.0	P	µg/L	1	1/5/2024 11:41:00 PM
Toluene	ND	1.0	P	µg/L	1	1/5/2024 11:41:00 PM
Ethylbenzene	ND	1.0	P	µg/L	1	1/5/2024 11:41:00 PM
Xylenes, Total	ND	1.5	P	µg/L	1	1/5/2024 11:41:00 PM
Surr: 1,2-Dichloroethane-d4	105	70-130	P	%Rec	1	1/5/2024 11:41:00 PM
Surr: 4-Bromofluorobenzene	103	70-130	P	%Rec	1	1/5/2024 11:41:00 PM
Surr: Dibromofluoromethane	108	70-130	P	%Rec	1	1/5/2024 11:41:00 PM
Surr: Toluene-d8	98.0	70-130	P	%Rec	1	1/5/2024 11:41:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	3310	500	*D	mg/L	1	1/7/2024 11:53:00 AM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312F10**

15-Jan-24

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R102395**	RunNo: **102395**
Prep Date:	Analysis Date: **1/11/2024**	SeqNo: **3781454** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R102395**	RunNo: **102395**
Prep Date:	Analysis Date: **1/11/2024**	SeqNo: **3781455** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.4	0.50	10.00	0	93.6	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312F10**

15-Jan-24

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R102269**	RunNo: **102269**
Prep Date:	Analysis Date: **1/5/2024**	SeqNo: **3775625** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	99.8	70	130			
Toluene	19	1.0	20.00	0	95.7	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		106	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		105	70	130			
Surr: Dibromofluoromethane	11		10.00		107	70	130			
Surr: Toluene-d8	9.9		10.00		99.5	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R102269**	RunNo: **102269**
Prep Date:	Analysis Date: **1/5/2024**	SeqNo: **3775626** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	11		10.00		107	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130			
Surr: Dibromofluoromethane	10		10.00		105	70	130			
Surr: Toluene-d8	9.7		10.00		97.0	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312F10**

15-Jan-24

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A102198**	RunNo: **102198**
Prep Date:	Analysis Date: **1/3/2024**	SeqNo: **3772839** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A102198**	RunNo: **102198**
Prep Date:	Analysis Date: **1/3/2024**	SeqNo: **3772841** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.51	0.0020	0.5000	0	103	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312F10**

15-Jan-24

Client: HILCORP ENERGY

Project: Mangum 1

Sample ID: **MB-79732**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **79732**	RunNo: **102280**
Prep Date: **1/4/2024**	Analysis Date: **1/7/2024**	SeqNo: **3776295** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	50.0								

Sample ID: **LCS-79732**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **79732**	RunNo: **102280**
Prep Date: **1/4/2024**	Analysis Date: **1/7/2024**	SeqNo: **3776296** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	996	50.0	1000	0	99.6	80	120			

Qualifiers:

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

eurofins | Environment Testing

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY** Work Order Number: **2312F10** RcptNo: **1**

Received By: **Tracy Casarrubias** **12/29/2023 7:00:00 AM**

Completed By: **Tracy Casarrubias** **12/29/2023 9:20:33 AM**

Reviewed By: JH 12-29-23

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐	
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐	
5. Sample(s) in proper container(s)?	Yes ☑	No ☐		
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐		
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐		
8. Was preservative added to bottles?	Yes ☑	No ☐	NA ☐	
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☑	No ☐	NA ☐	HNO3
10. Were any sample containers received broken?	Yes ☐	No ☑		
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐		
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐		
13. Is it clear what analyses were requested?	Yes ☑	No ☐		
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐		

# of preserved bottles checked for pH: 7
(<2 or >12 unless noted)
Adjusted? yes
Checked by: JH 12/29/23

Special Handling (if applicable)

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

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

16. Additional remarks:

From original unpreserved volume provided for samples 001B-007B, ~125mL was poured off and filtered (Lot# 178C6106 x 6) to create samples 001C-007C. Added ~.40mL of HNO3 (Chem#7342) for proper pH <2 - JH 12/29/23

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good	Yes	Morty		

Chain-of-Custody Record

Client: Hilcorp Farmington NM

Mailing Address: 382 Road 3100 Aztec, NM 87410

Billing Address: PO Box 61529 Houston, TX 77208

Phone #: 505-486-9543

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:
X Standard ☐ Rush_____

Project Name:
Mangum 1

Project #:

Project Manager:
Mitch Killough

Sampler: Brandon Sinclair

On Ice: ☒ Yes ☐ No mostly

# of Coolers: 1

Cooler Temp(including CF): 1.1 + 0 = 1.1 °C

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 7312F10	Dissolved Mn	BTEX 8260	Sulfate / TDS
12-28	1239	Water	MW-1	(3) 40ml VOA (1) Liter Plastic	HCl Cool	001	X	X	X
	1300	Water	MW-2	(3) 40ml VOA (1) Liter Plastic	HCl Cool	002	X	X	X
	1330	Water	MW-3	(3) 40ml VOA (1) Liter Plastic	HCl Cool	003	X	X	X
	1200	Water	MW-4	(3) 40ml VOA (1) Liter Plastic	HCl Cool	004	X	X	X
	1415	Water	MW-5	(3) 40ml VOA (1) Liter Plastic	HCl Cool	005	X	X	X
	1500	Water	MW-6	(3) 40ml VOA (1) Liter Plastic	HCl Cool	006	X	X	X
	1545	Water	MW-7	(3) 40ml VOA (1) Liter Plastic	HCl Cool	007	X	X	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-28	1633					
12/28/23	1746			courier	12/29/23	7:00

Remarks: *Dissolved Mn is to be filterd and preserved in the lab. Special pricing see Andy.

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

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

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

CONDITIONS

Action 328079

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 328079
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Review of the 2023 Annual Groundwater Monitoring Report for Mangum #1: Content Satisfactory 1. Proceed to install upgradient monitoriing well as proposed at (MW-8) location and upload permit obtained from OSE as applicable. 2. Sample upgradient well for background concentrations of TDS, sulfate, manganese as recommended, as well as iron. 3. Continue quarterly sampling events for site wells as prescribed, for BTEX, dissolved manganese, sulfate, and TDS. 4. Submit the 2024 Annual Groundwater Report by April 1, 2025.	5/31/2024