REVIEWED
By Mike Buchanan at 9:11 am, Jun 03, 2024

ENSOLUM

March 28, 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
San Juan 29-7 Unit 37
Rio Arriba, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NCS1904241144
NMOCD Administrative Order: 3RP-425

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) to document groundwater monitoring activities conducted at the San Juan 29-7 Unit 37 natural gas production well (Site) during 2023. The Site is located on private land within Unit Letter N Section 12 within Township 29 North and Range 7 West, in Rio Arriba County, New Mexico (Figure 1).

Review of the 2023 Annual Groundwater Monitoring Report for San Juan 29-7 Unit 37: Content Satisfactory
1. Continue with conducting groundwater monitoring for MW-1, MW-3, MW-8R on an annual basis until dissolved manganese concentration are at allowable concentrations in Title 20 of the NMAC.
2. Resume sampling on a quarterly basis once concentrations convey below the human health standards of the WQCC for Mn.
3. Submit the next Annual Report no later than April 1, 2025.

SITE BACKGROUND

A leaking inspection plate gasket on the aboveground condensate tank was discovered by ConocoPhillips (previous well owner) on August 26, 2010. Approximately 23 barrels of condensate were released and fully contained within the berm; however, no liquids were recovered. The release was reported by ConocoPhillips on September 10, 2010, to the NMOCD on a Form C-141 *Release Notification and Corrective Action* form.

After the discovery, delineation activities were conducted at the Site in 2010 and 2011 to characterize soil and groundwater impacted by the release. Site characterization indicated petroleum hydrocarbon impacts from the release exceeded NMOCD Table I Closure Criteria for soils (Title 19, Chapter 15, Part 29, Section 12 [19.15.29.12] of the New Mexico Administrative Code [NMAC]) and New Mexico Water Quality Control Commission (NMWQCC) standards for groundwater. Based on the nature of the release, the original contaminants of concern (COCs) at the Site included benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) in vadose zone soil and benzene, toluene, total xylenes, dissolved manganese, selenium, sulfate, and total dissolved solids (TDS) in groundwater.

Between September 24, 2010 and January 3, 2011, approximately 5,100cubic yards of impacted soil were excavated from the release area and transported off-Site for disposal. The excavation measured approximately 70 feet by 120 feet by 30 feet deep. Previous reports stated that more than 3,000 cubic feet of impacted soil were excavated, however review of the *Subsurface*

Characterization Work Plan, dated August 31, 2011, confirmed that M&M Trucking removed 5,100 cubic yards of impacted soil. Impacted groundwater was present in the immediate area of the release and extended approximately 60 feet downgradient. Eight groundwater monitoring wells (MW-1 through MW-8) were installed to monitor groundwater conditions at the Site. Residual soil and groundwater impacts were additionally treated between December 2011 through February 2012 with the injection of the chemical oxidant CoolOx® in attempts to remediate residual impacts by chemical oxidation and enhanced bioremediation. Cool-Ox™ Technology is a patented in-situ process that uses a solution of calcium peroxide that generates hydrogen peroxide slowly and facilitates the oxidation of petroleum hydrocarbons.

Hilcorp acquired the Site from ConocoPhillips in April 2017 and has continued to monitor groundwater conditions at the Site. GHD Services Inc. (GHD) prepared the *2018 Annual Groundwater Monitoring Report* (dated January 2019) on behalf of Hilcorp. Based on that report, the NMOCD concurred with the conclusions that sulfate and TDS were attributed to naturally occurring background concentrations at the Site and these constituents could be removed as COCs. In addition, NMOCD agreed BTEX constituents could be removed as COCs for all onsite wells with at least eight consecutive quarters with concentrations below NMWQCC standards (which included all wells except replacement well MW-8R). At that time, well MW-8R had achieved seven quarters with results below NMWQCC standards.

During sampling events in 2019, BTEX concentrations remained below NMWQCC standards in groundwater collected from MW-8R, therefore BTEX as a COC for groundwater in all wells at the Site was removed. Based on WSP's *2020 Annual Groundwater Monitoring Report,* dated March 8, 2021, the NMOCD approved the elimination of selenium as a COC from all wells at the Site. Additionally, based on historical sampling data, dissolved manganese had been below NMWQCC standards for eight or more consecutive quarters in wells MW-2, MW-4, MW-5, MW-6, and MW-7. Therefore, the NMOCD approved the discontinuation of sampling these monitoring wells for all future sampling events (NMOCD approval email dated December 28, 2021). These wells were abandoned and have continued to be gauged for the development of potentiometric surface maps.

Based on historical sampling results and prior agreements with NMOCD, dissolved manganese is considered the only COC for groundwater in wells MW-1, MW-3, and MW-8R at the Site (as presented below) and continue to be sampled on a semi-annual basis. Well locations and Site features are shown on Figure 2.

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 NMAC. The following NMWQCC standard is presented for the COC at the Site in milligrams per liter (mg/L).

- Dissolved Manganese: 0.2 mg/L

GROUNDWATER SAMPLING ACTIVITIES AND RESULTS

Semi-annual groundwater sampling events were conducted at the Site in March and October 2023. Prior to collection of groundwater samples in selected monitoring wells, depth to groundwater was measured 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 and 4). The inferred groundwater flow direction is to the south.

GROUNDWATER SAMPLING

Groundwater from monitoring wells MW-1, MW-3 and MW-8R 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 from actively sampled wells, including temperature, pH, TDS, and electrical conductivity, were collected during the purging process, and are presented in Table 2.

Following well purging, groundwater samples were collected and placed directly into laboratory-provided bottles and labeled with the date and time of collection, well designation, project name, sample collector's name, and parameters to be analyzed. Sample bottles were immediately sealed, packed on ice, and submitted to Hall Environmental Analysis Laboratory for analysis of dissolved manganese following United States Environmental Protection Agency (EPA) Method 200.7. 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

During the 2023 groundwater sampling events, dissolved manganese concentrations exceeded the NMWQCC standard during all sampling events collected from wells MW-1, MW-3 and MW-8R. Dissolved manganese concentrations ranged from 0.24 mg/L in well MW-1 to 1.8 mg/L in well MW-3. A summary of manganese analytical results for actively sampled wells is presented in Table 3 and depicted on Figure 5, with complete laboratory reports attached as Appendix A.

CONCLUSIONS AND RECOMMENDATIONS

Groundwater samples collected from wells MW-1, MW-3, and MW-8R continue to contain dissolved manganese concentrations exceeding the NMWQCC groundwater quality standard. Elevated dissolved manganese concentrations appear to be a result of low-oxygen and reducing groundwater conditions in these wells. Average dissolved oxygen concentrations in wells MW-1, MW-3, and MW-8R (from data collected between 2015 and 2021) range from 1.68 mg/L to 2.02 mg/L, whereas average dissolved oxygen concentrations in all other on-Site wells range from 2.97 mg/L to 6.06 mg/L. Additionally, the oxidation-reduction potential (ORP) in wells MW-1, MW-3, and MW-8R range from -17.3 millivolts (mV) to -84.3 mV, suggesting continued reducing groundwater conditions in these wells leading to the dissolution of manganese and increased dissolved manganese concentrations. Conversely, the remaining wells at the Site have ORP values ranging from 18.0 mV to 35.8 mV, suggesting oxidizing conditions conducive to the precipitation of manganese, resulting in lower dissolved manganese concentrations.

As groundwater conditions at the Site continue to equilibrate and dissolved oxygen increases, groundwater conditions will become increasingly aerobic. As this happens, dissolved manganese has the ability to precipitate out of solution leading to decreased concentrations in groundwater. This trend has already been documented in wells MW-2, MW-4, MW-5, MW-6, and MW-7. Because there are no potential receptors downgradient of the Site (closest water well SJ-03390, is located 1,900 feet southeast and cross gradient from the Site and is screened in a hydrogeologically separate water-bearing zone), Ensolum and Hilcorp recommend conducting annual sampling of wells MW-1, MW-3, MW-8R until dissolved manganese concentrations achieve the NMWQCC standard. At that time, Hilcorp will begin quarterly sampling until eight consecutive quarters indicate that manganese concentrations are below NMWQCC standards.

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 Geologist
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Attachments:

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	March 2023 Groundwater Elevation Map
Figure 4	October 2023 Groundwater Elevation Map
Figure 5	2023 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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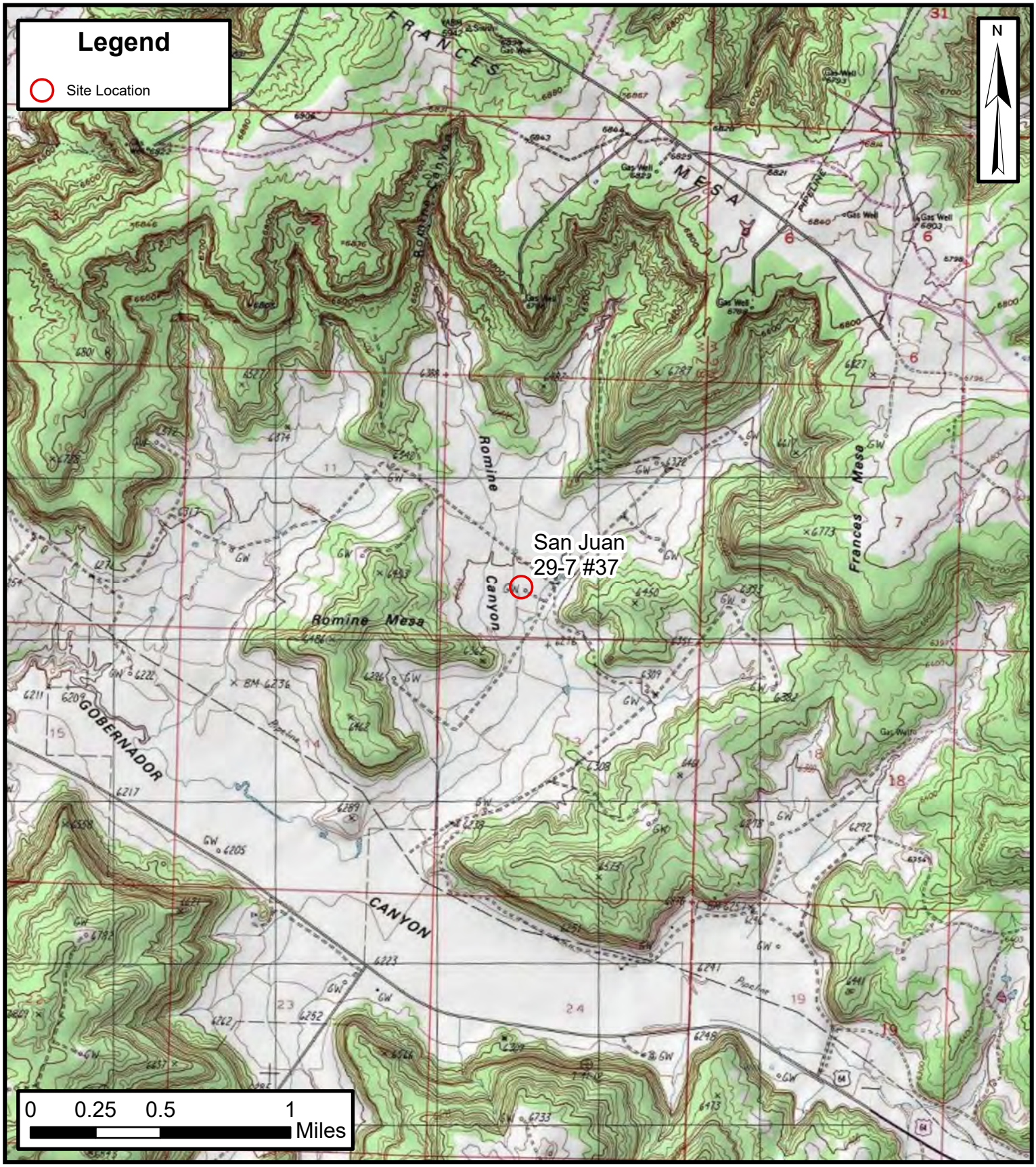
FIGURES



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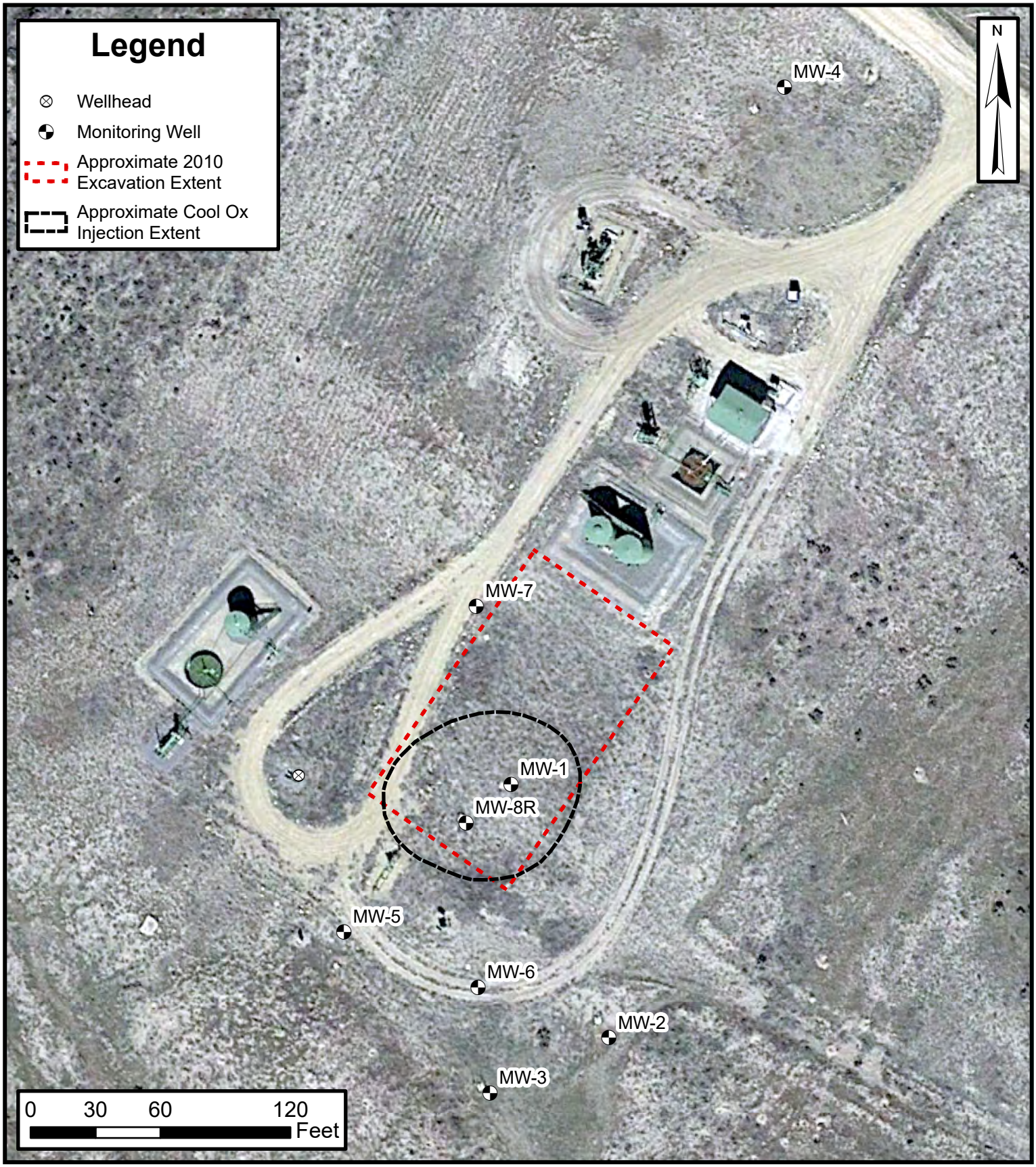
Site Location Map

San Juan 29-7 #37
Hilcorp Energy Company
36.73580, -107.52562
Rio Arriba County, New Mexico

FIGURE
1

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



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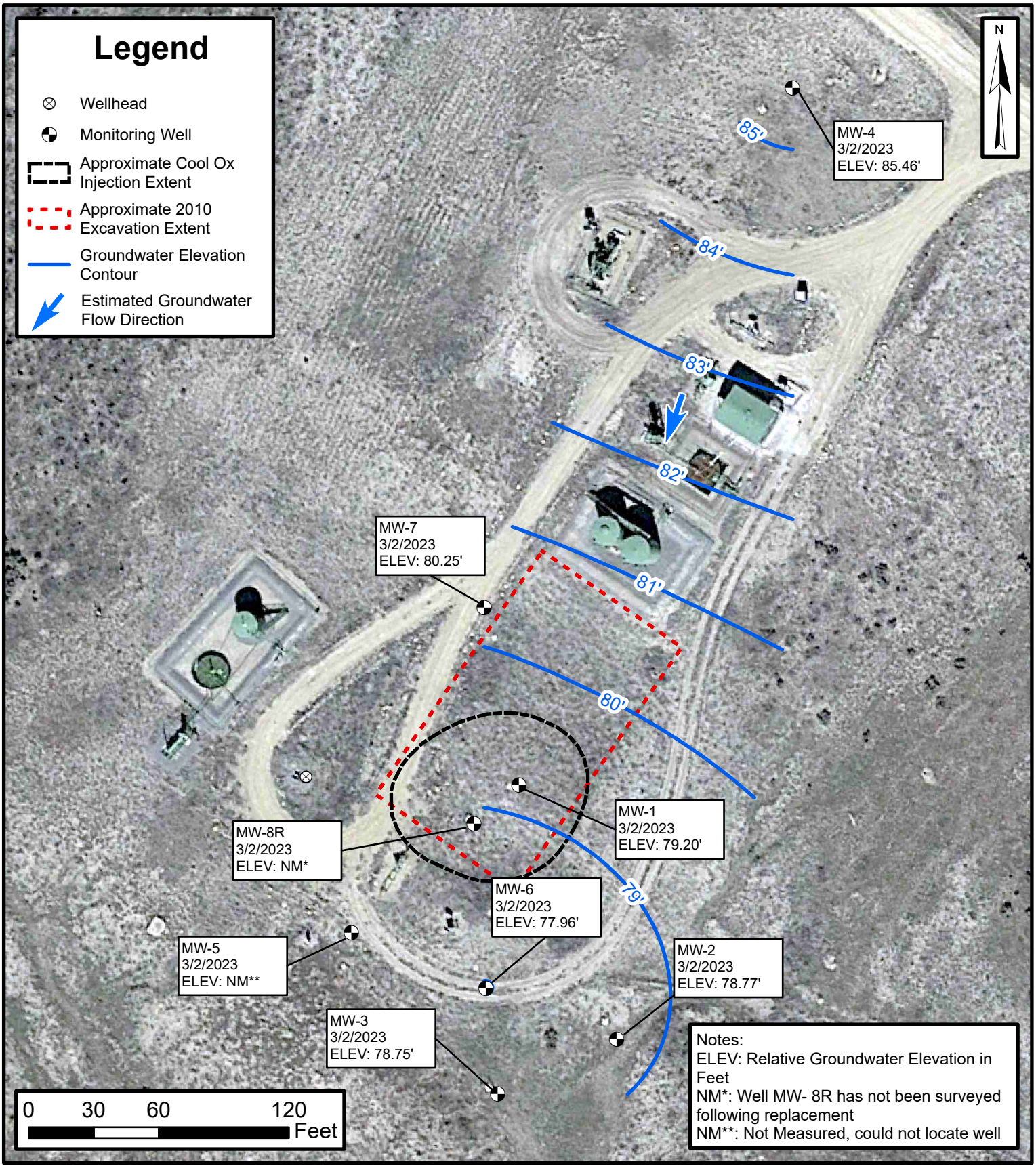
Site Map

San Juan 29-7 #37
Hilcorp Energy Company
36.73580, -107.52562
Rio Arriba County, New Mexico

FIGURE
2

Sources: Google Earth (2016)



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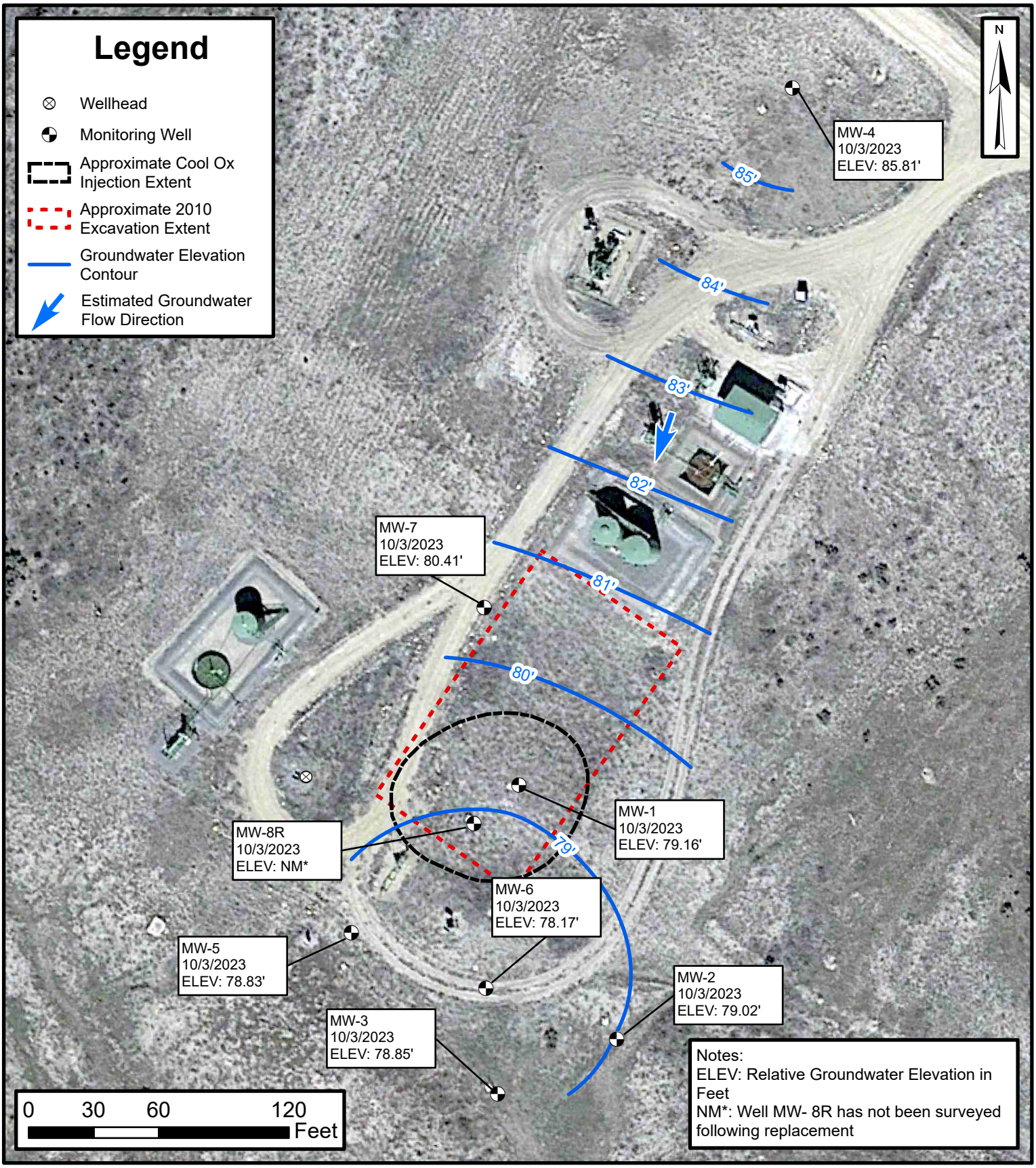
March 2023 Groundwater Elevation Map

San Juan 29-7 #37
Hilcorp Energy Company
36.73580, -107.52562
Rio Arriba County, New Mexico

FIGURE
3

Sources: Google Earth



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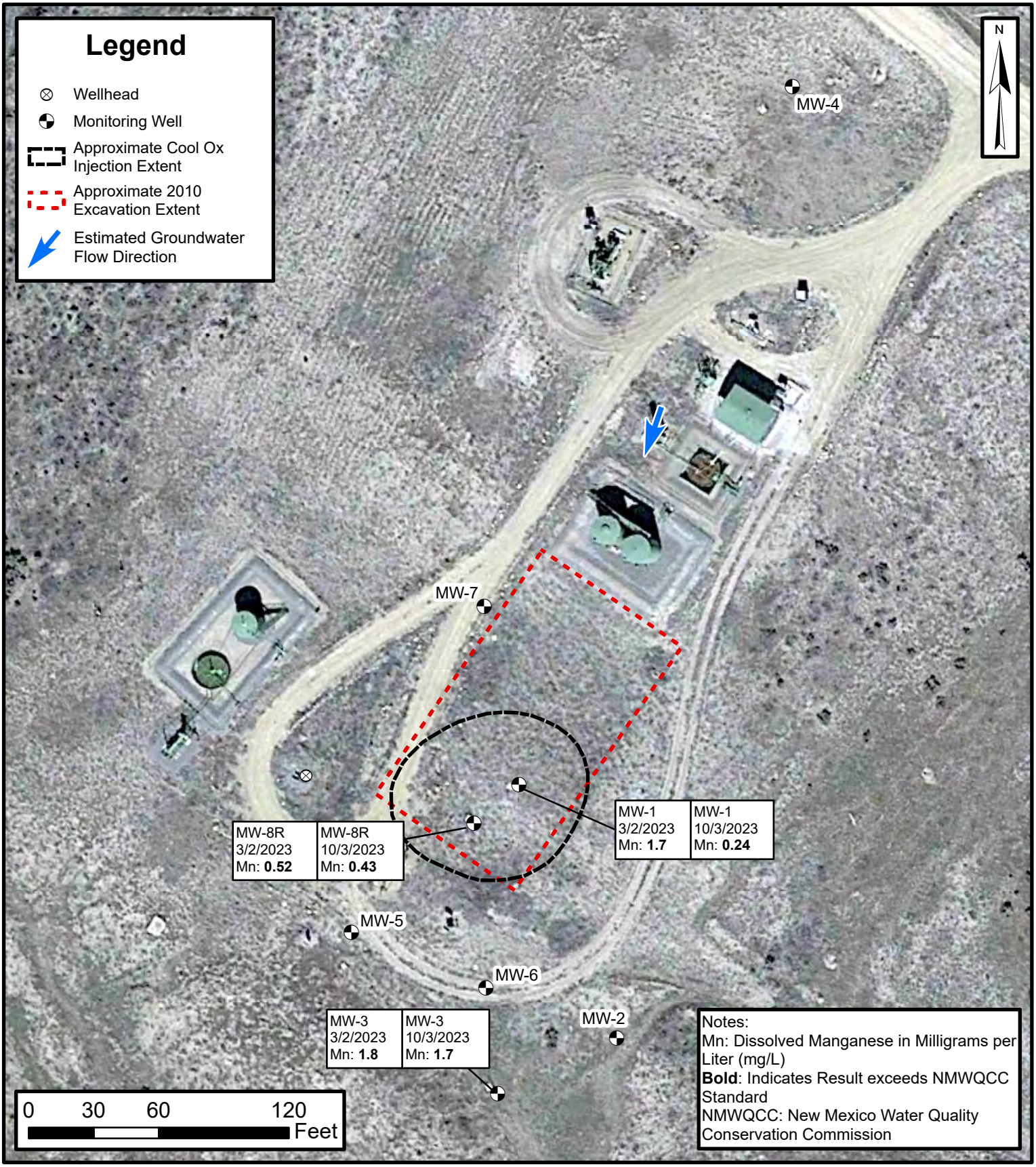
October 2023 Groundwater Elevation Map

San Juan 29-7 #37
Hilcorp Energy Company
36.73580, -107.52562
Rio Arriba County, New Mexico

FIGURE
4

Sources: Google Earth



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2023 Groundwater Analytical Results

San Juan 29-7 #37
Hilcorp Energy Company
36.73580, -107.52562
Rio Arriba County, New Mexico

FIGURE
5

Sources: Google Earth

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TABLES

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TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-1	189.24	3/17/2011	108.91	80.33
		8/17/2011	108.81	80.43
		10/18/2011	108.87	80.37
		2/23/2012	108.74	80.50
		6/5/2012	108.75	80.49
		9/18/2012	108.68	80.56
		1/8/2013	108.62	80.62
		3/26/2013	108.69	80.55
		6/11/2013	108.81	80.43
		9/10/2013	109.04	80.20
		1/7/2014	109.26	79.98
		3/18/2014	109.10	80.14
		6/16/2014	109.31	79.93
		9/25/2014	109.54	79.70
		12/16/2014	109.59	79.65
		3/17/2015	109.61	79.63
		6/16/2015	109.68	79.56
		9/15/2015	109.62	79.62
		12/1/2015	109.78	79.46
		3/29/2016	109.61	79.63
		6/21/2016	109.89	79.35
		9/7/2016	109.87	79.37
		11/30/2016	109.89	79.35
		3/7/2017	109.92	79.32
		6/13/2017	110.06	79.18
		9/26/2017	110.00	79.24
		12/19/2017	109.99	79.25
		3/14/2018	109.93	79.31
		6/26/2018	110.02	79.22
		9/5/2018	110.06	79.18
		12/14/2018	110.04	79.20
		3/29/2019	109.95	79.29
		6/24/2019	110.44	78.80
		9/13/2019	110.12	79.12
		11/6/2019	110.05	79.19
		3/5/2020	110.16	79.08
		5/6/2020	110.13	79.11
		8/20/2020	110.04	79.20
		10/21/2020	110.01	79.23
		3/2/2021	110.16	79.08
		9/24/2021	110.50	78.74
		3/3/2022	110.16	79.08
		9/20/2022	110.19	79.05
		3/2/2023	110.04	79.20
		10/3/2023	110.08	79.16

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TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-2	189.60	3/17/2011	109.20	80.40
		8/17/2011	109.10	80.50
		10/18/2011	109.13	80.47
		2/23/2012	109.05	80.55
		6/5/2012	109.10	80.50
		9/18/2012	109.28	80.32
		1/8/2013	109.07	80.53
		3/26/2013	109.12	80.48
		6/11/2013	109.32	80.28
		9/10/2013	109.32	80.28
		1/7/2014	109.71	79.89
		3/18/2014	109.71	79.89
		6/16/2014	109.83	79.77
		9/16/2014	109.94	79.66
		12/16/2014	110.04	79.56
		3/17/2015	110.09	79.51
		6/16/2015	110.17	79.43
		9/15/2015	110.14	79.46
		12/1/2015	110.23	79.37
		3/29/2016	110.26	79.34
		6/21/2016	110.31	79.29
		9/7/2016	110.33	79.27
		11/30/2016	110.39	79.21
		3/7/2017	110.37	79.23
		6/13/2017	110.35	79.25
		9/26/2017	110.54	79.06
		12/19/2017	110.50	79.10
		3/14/2018	110.54	79.06
		6/26/2018	110.55	79.05
		9/5/2018	110.60	79.00
		12/14/2018	110.51	79.09
		3/27/2019	110.57	79.03
		6/18/2019	110.55	79.05
		9/11/2019	110.57	79.03
		11/5/2019	110.56	79.04
		3/4/2020	110.61	78.99
		5/6/2020	110.63	78.97
		8/21/2020	110.60	79.00
		10/22/2020	110.62	78.98
		3/1/2021	110.63	78.97
		9/24/2021	111.10	78.50
		3/3/2022	110.71	78.89
		9/20/2022	--	--
		3/2/2023	110.83	78.77
		10/3/2023	110.58	79.02

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TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-3	189.13	3/17/2011	109.42	79.71
		8/17/2011	109.35	79.78
		10/18/2011	109.37	79.76
		2/23/2012	109.26	79.87
		6/5/2012	109.28	79.85
		9/18/2012	109.30	79.83
		1/8/2013	109.28	79.85
		3/26/2013	109.33	79.80
		6/11/2013	109.41	79.72
		9/10/2013	109.58	79.55
		1/7/2014	109.70	79.43
		3/18/2014	109.68	79.45
		6/16/2014	109.84	79.29
		9/16/2014	109.97	79.16
		12/16/2014	110.08	79.05
		3/17/2015	110.03	79.10
		6/16/2015	110.08	79.05
		9/15/2015	110.08	79.05
		12/1/2015	110.24	78.89
		3/29/2016	110.04	79.09
		6/21/2016	110.15	78.98
		9/7/2016	110.27	78.86
		11/30/2016	110.26	78.87
		3/7/2017	110.25	78.88
		6/13/2017	110.36	78.77
		9/26/2017	110.48	78.65
		12/19/2017	110.39	78.74
		3/14/2018	110.35	78.78
		6/26/2018	110.40	78.73
		9/5/2018	110.55	78.58
		12/14/2018	110.30	78.83
		3/26/2019	110.35	78.78
		6/17/2019	110.31	78.82
		9/10/2019	110.37	78.76
		11/4/2019	110.38	78.75
		3/3/2020	110.32	78.81
		5/4/2020	110.43	78.70
		8/19/2020	110.41	78.72
		10/21/2020	110.46	78.67
		3/1/2021	110.59	78.54
		9/24/2021	110.70	78.43
		3/3/2022	110.53	78.60
		9/20/2022	110.54	78.59
		3/2/2023	110.38	78.75
		10/3/2023	110.28	78.85

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TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-4	197.60	3/17/2011	111.11	86.49
		8/17/2011	111.10	86.50
		10/18/2011	111.16	86.44
		2/23/2012	111.14	86.46
		6/5/2012	111.20	86.40
		9/18/2012	111.12	86.48
		1/8/2013	111.14	86.46
		3/26/2013	111.23	86.37
		6/11/2013	111.41	86.19
		9/10/2013	111.47	86.13
		1/7/2014	111.66	85.94
		3/18/2014	111.60	86.00
		6/16/2014	111.68	85.92
		9/25/2014	111.77	85.83
		12/16/2014	111.80	85.80
		3/17/2015	111.77	85.83
		6/16/2015	111.78	85.82
		9/15/2015	111.76	85.84
		12/1/2015	111.89	85.71
		3/29/2016	111.92	85.68
		6/21/2016	111.95	85.65
		9/7/2016	111.33	86.27
		11/30/2016	112.03	85.57
		3/7/2017	111.90	85.70
		6/13/2017	111.92	85.68
		9/26/2017	112.01	85.59
		12/19/2017	112.05	85.55
		3/15/2018	112.02	85.58
		6/26/2018	112.02	85.58
		9/5/2018	112.05	85.55
		12/14/2018	112.02	85.58
		3/25/2019	112.04	85.56
		6/14/2019	112.03	85.57
		9/9/2019	110.57	87.03
		11/1/2019	112.07	85.53
		3/2/2020	112.05	85.55
		5/1/2020	112.05	85.55
		8/18/2020	112.01	85.59
		10/19/2020	112.02	85.58
		3/1/2021	112.08	85.52
		9/24/2021	112.70	84.90
		3/3/2022	112.06	85.54
		9/20/2022	--	--
		3/2/2023	112.14	85.46
		10/3/2023	111.79	85.81

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TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-5	188.70	10/18/2011	108.05	80.65
		2/23/2012	108.44	80.26
		6/5/2012	108.38	80.32
		9/18/2012	108.11	80.59
		1/8/2013	108.36	80.34
		3/26/2013	108.72	79.98
		6/11/2013	108.56	80.14
		9/10/2013	108.77	79.93
		1/7/2014	108.91	79.79
		3/18/2014	108.91	79.79
		6/16/2014	109.01	79.69
		9/16/2014	109.20	79.50
		12/16/2014	109.22	79.48
		3/17/2015	109.25	79.45
		6/16/2015	109.33	79.37
		9/15/2015	109.37	79.33
		12/1/2015	109.37	79.33
		3/29/2016	109.38	79.32
		6/21/2016	109.63	79.07
		9/7/2016	109.58	79.12
		11/30/2016	109.54	79.16
		3/7/2017	109.63	79.07
		6/13/2017	109.65	79.05
		9/26/2017	109.72	78.98
		12/19/2017	110.64	78.06
		3/14/2018	109.72	78.98
		6/26/2018	109.73	78.97
		9/5/2018	109.74	78.96
		12/14/2018	109.72	78.98
		3/26/2019	109.65	79.05
		6/14/2019	109.80	78.90
		9/10/2019	109.75	78.95
		11/4/2019	109.88	78.82
		3/3/2020	109.73	78.97
		5/4/2020	109.82	78.88
		8/19/2020	109.93	78.77
		10/20/2020	109.84	78.86
		3/1/2021	109.89	78.81
		9/24/2021	109.40	79.30
		3/3/2022	109.93	78.77
		9/20/2022	--	--
		3/2/2023	--	--
		10/3/2023	109.87	78.83

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Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-6	188.03	10/18/2011	109.55	78.48
		2/23/2012	108.01	80.02
		6/5/2012	108.05	79.98
		9/18/2012	108.06	79.97
		1/8/2013	108.07	79.96
		3/26/2013	108.09	79.94
		6/11/2013	108.25	79.78
		9/10/2013	108.43	79.60
		1/7/2014	108.70	79.33
		3/18/2014	108.70	79.33
		6/16/2014	108.85	79.18
		9/16/2014	108.99	79.04
		12/16/2014	109.10	78.93
		3/17/2015	109.14	78.89
		6/16/2015	109.23	78.80
		9/15/2015	109.20	78.83
		12/1/2015	109.30	78.73
		3/29/2016	109.34	78.69
		6/21/2016	108.58	79.45
		9/7/2016	109.47	78.56
		11/30/2016	109.51	78.52
		3/7/2017	109.47	78.56
		6/13/2017	109.48	78.55
		9/26/2017	109.64	78.39
		12/19/2017	109.64	78.39
		3/15/2018	109.66	78.37
		6/26/2018	109.99	78.04
		9/5/2018	109.75	78.28
		12/14/2018	109.64	78.39
		3/26/2019	109.65	78.38
		6/18/2019	109.73	78.30
		9/11/2019	109.75	78.28
		11/5/2019	109.76	78.27
		3/4/2020	109.81	78.22
		5/6/2020	109.53	78.50
		8/20/2020	109.82	78.21
		10/20/2020	109.83	78.20
		3/1/2021	109.87	78.16
		9/27/2021	110.40	77.63
		3/3/2022	109.94	78.09
		9/20/2022	--	--
		3/2/2023	110.07	77.96
		10/3/2023	109.86	78.17

ENSOLUM

TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-7	189.93	10/18/2011	109.70	80.23
		2/23/2012	106.58	83.35
		6/5/2012	107.95	81.98
		9/18/2012	108.10	81.83
		1/8/2013	108.13	81.80
		3/26/2013	108.24	81.69
		6/11/2013	108.45	81.48
		9/10/2013	108.64	81.29
		1/7/2014	108.80	81.13
		3/18/2014	108.83	81.10
		6/16/2014	108.96	80.97
		9/25/2014	109.10	80.83
		12/16/2014	109.13	80.80
		3/17/2015	109.12	80.81
		6/16/2015	109.14	80.79
		9/15/2015	109.07	80.86
		12/1/2015	109.15	80.78
		3/29/2016	109.23	80.70
		6/21/2016	109.39	80.54
		9/7/2016	109.42	80.51
		11/30/2016	109.51	80.42
		3/7/2017	109.44	80.49
		6/13/2017	109.38	80.55
		9/26/2017	109.52	80.41
		12/19/2017	109.52	80.41
		3/14/2018	109.49	80.44
		6/26/2018	109.57	80.36
		9/5/2018	109.55	80.38
		12/14/2018	109.50	80.43
		3/25/2019	109.48	80.45
		6/14/2019	109.50	80.43
		9/9/2019	109.48	80.45
		11/1/2019	109.53	80.40
		3/2/2020	109.53	80.40
		5/1/2020	109.53	80.40
		8/18/2020	109.52	80.41
		10/19/2020	109.51	80.42
		3/1/2021	109.60	80.33
		9/24/2021	109.90	80.03
		3/3/2022	109.63	80.30
		9/20/2022	--	--
		3/2/2023	109.68	80.25
		10/3/2023	109.52	80.41

ENSOLUM

TABLE 1
GROUNDWATER ELEVATIONS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Top of Casing Elevation (feet**)	Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet**)
MW-8	189.86	10/19/2011	--	--
		2/23/2012	108.71	81.15
		6/5/2012	108.65	81.21
		9/20/2012	108.64	81.22
		1/8/2013	108.56	81.30
		3/26/2013	108.63	81.23
		6/11/2013	108.85	81.01
		7/13/2013	**Plugged and Abandoned**	
MW-8R	Replacement Well Not Surveyed for Elevation	9/10/2013	108.39	--
		1/7/2014	108.65	--
		3/18/2014	108.62	--
		6/16/2014	108.77	--
		9/25/2014	108.91	--
		12/16/2014	108.95	--
		3/17/2015	109.00	--
		6/16/2015	109.12	--
		9/15/2015	109.01	--
		12/1/2015	109.18	--
		3/29/2016	109.12	--
		6/21/2016	109.32	--
		9/7/2016	109.31	--
		11/30/2016	109.26	--
		3/7/2017	109.31	--
		6/13/2017	109.27	--
		9/26/2017	109.40	--
		12/19/2017	109.39	--
		3/14/2018	109.34	--
		6/26/2018	109.42	--
		9/5/2018	109.48	--
		12/14/2018	109.37	--
		3/28/2019	109.38	--
		6/24/2019	109.38	--
		9/13/2019	109.91	--
		11/6/2019	109.86	--
		3/5/2020	109.52	--
		5/7/2020	109.62	--
		8/21/2020	109.63	--
		10/22/2020	109.43	--
		3/2/2021	109.63	--
		9/24/2021	110.00	--
		3/3/2022	109.71	--
		9/20/2022	109.59	--
		3/2/2023	109.48	--
		10/3/2023	109.73	--

Notes:

***: elevations based on an arbitrary datum of 200 feet*

BTOC: below top of casing

--: indicates no GWEL measured

ENSOLUM

TABLE 2
GROUNDWATER QUALITY MEASUREMENTS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Date	Temperature (°C)	pH	TDS (mg/L)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)
MW-1	3/17/2015	18.10	7.28	2,200	3,380	--	53.0
	6/16/2015	17.70	7.30	1,970	3,030	1.39	-12.4
	9/15/2015	16.12	7.13	2,212	3,403	1.09	50.2
	12/1/2015	16.63	7.72	2,361	3,632	1.08	-100.5
	3/29/2016	16.64	7.22	3,100	3,350	4.20	126.0
	6/21/2016	17.10	7.44	--	3,320	0.46	6.5
	9/7/2016	16.31	7.34	2,139	3,290	0.56	-66.0
	12/1/2016	12.71	7.55	--	2,989	5.29	23.5
	3/7/2017	15.36	7.55	2,377	3,657	1.25	-108.8
	6/13/2017	18.42	7.38	2,109	3,245	1.67	-103.7
	9/26/2017	21.00	7.05	--	2,844	--	--
	12/19/2017	13.89	7.37	--	3,232	--	--
	3/14/2018	17.90	7.41	--	3,141	0.28	3.5
	6/26/2018	21.15	7.37	--	3,101	0.29	23.1
	9/5/2018	20.93	7.64	--	2,913	0.03	44.9
	3/29/2019	12.10	7.75	1,520	3,040	--	-34.7
	6/24/2019	20.40	7.28	1,580	3,130	26.60*	-38.0
	9/13/2019	17.80	6.28	1,550	3,100	25.30*	-45.5
	11/6/2019	15.50	6.90	1,540	3,090	100.60*	-45.6
	3/5/2020	14.90	6.73	1,530	3,060	5.99	-37.5
	5/6/2020	19.80	6.63	1,560	3,130	2.33	-30.4
	8/20/2020	21.30	6.95	1,520	3,030	1.21	-31.6
	10/21/2020	17.90	6.75	1,380	2,770	2.59	-30.3
	3/2/2021	16.60	6.94	1,400	2,810	0.58	-27.4
	9/24/2021	19.40	7.06	--	7,480*	--	--
	3/3/2022	16.90	6.96	--	2,590	--	--
	9/20/2022	18.00	7.06	1,230	2,460	--	--
	3/2/2023	14.00	7.39	1,150	2,370	--	--
	10/3/2023	17.88	7.74	2,290	3,523	1.80	113.1
MW-3	3/17/2015	15.10	7.45	1,900	3,040	--	-94.0
	6/16/2015	15.09	7.31	1,717	2,641	1.23	-123.5
	9/15/2015	15.03	7.30	1,912	2,941	1.39	-125.0
	12/1/2015	13.73	7.78	2,044	3,144	1.48	-164.2
	3/29/2016	15.82	7.34	1,900	2,940	5.66	-103.0
	6/21/2016	14.70	7.00	--	3,230	4.62	56.2
	9/7/2016	14.55	7.10	1,816	2,794	1.50	-102.7
	12/1/2016	14.91	7.74	--	2,556	1.97	-116.2
	3/7/2017	12.81	7.63	2,044	3,144	0.39	-192.6
	6/13/2017	14.77	7.58	1,819	2,801	0.42	-123.9
	9/26/2017	15.05	7.25	--	2,425	--	--
	12/19/2017	12.36	7.48	--	2,776	--	--
	3/14/2018	15.72	7.63	--	2,208	0.00	-139.6
	6/26/2018	18.48	7.63	--	2,589	0.22	-146.3
	9/5/2018	17.28	7.87	--	2,500	-0.07*	-124.3
	3/26/2019	15.80	7.35	1,320	2,640	0.00	-32.6
	6/17/2019	18.70	7.35	1,350	2,740	17.00*	-48.3
	9/10/2019	19.50	6.31	1,350	2,700	15.20*	-57.6
	11/4/2019	15.90	6.70	1,340	2,660	54.20*	-44.6
	3/3/2020	16.30	6.61	1,360	2,710	6.66	-33.6
	5/4/2020	18.30	6.72	1,330	2,620	1.92	-38.6
	8/19/2020	20.30	6.82	1,330	2,700	0.88	-34.4
	10/21/2020	15.80	6.73	1,170	2,340	3.47	-31.8
	3/1/2021	15.00	6.95	1,190	2,390	0.56	-33.6
	9/24/2021	19.30	6.85	--	6,570	--	--
	3/3/2022	17.10	6.70	--	2,250	--	--
	9/20/2022	18.20	6.59	1,050	2,290	--	--
	3/2/2023	11.90	7.52	1,040	2,080	--	--
	10/3/2023	27.96	8.09	1,980	3,050	1.63	-83.4

ENSOLUM

TABLE 2
GROUNDWATER QUALITY MEASUREMENTS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Date	Temperature (°C)	pH	TDS (mg/L)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)
MW-8R	3/17/2015	19.30	6.96	2,100	3,310	--	30.0
	6/16/2015	17.82	7.07	1,970	3,033	0.48	-50.3
	9/15/2015	18.30	6.91	2,222	3,431	1.20	-10.7
	12/1/2015	16.75	7.41	2,341	3,595	1.08	-91.3
	3/29/2016	15.86	7.24	2,100	3,340	4.49	-56.0
	6/21/2016	18.20	7.15	--	3,230	0.18	-104.8
	9/7/2016	17.21	7.07	2,128	3,274	0.53	-81.1
	12/1/2016	13.01	7.10	--	2,930	2.36	39.6
	3/7/2017	14.89	7.40	2,368	3,644	2.40	-144.1
	6/13/2017	17.30	7.13	2,061	3,171	0.49	-103.0
	9/26/2017	19.77	6.97	--	2,860	--	--
	12/19/2017	14.97	7.11	--	3,176	--	--
	3/14/2018	19.03	7.09	--	3,127	0.04	-3.6
	6/26/2018	21.51	7.04	--	3,015	0.26	-13.9
	9/5/2018	21.78	7.32	--	2,872	0.05	8.3
	3/28/2019	17.00	7.32	1,560	3,070	--	-11.4
	6/24/2019	17.60	7.25	1,580	3,160	23.60*	-22.5
	9/13/2019	20.10	6.09	1,570	3,140	30.10*	-27.2
	11/6/2019	15.90	6.37	1,540	3,120	118.20*	-9.8
	3/5/2020	16.00	6.76	1,530	3,060	6.71	-32.1
	5/7/2020	20.04	6.51	1,610	3,240	--	-24.1
	8/21/2020	24.20	6.76	1,500	2,970	1.78	-14.3
	10/22/2020	15.90	6.76	1,430	2,840	4.04	-19.0
	3/2/2021	15.80	6.96	1,420	2,840	0.72	-13.3
	9/24/2021	18.40	7.12	--	7,760*	--	--
	3/2/2022	17.30	6.85	--	2,690	--	--
	9/20/2022	23.50	6.80	1,200	2,400	--	--
	3/2/2023	13.00	7.44	1,210	2,430	--	--
	10/3/2023	26.41	7.88	2,090	3,217	1.63	127.2

Notes:

Only data for actively sampled wells are presented on this table.

°C: degrees Celcius

DO: dissolved oxygen

µS/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
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Sample Date	Dissolved Manganese (mg/L)
NMWQCC Standards		0.2
MW-1	3/17/2011	**2.77**
	8/17/2011	**0.318**
	10/18/2011	--
	2/23/2012	**6.40**
	6/5/2012	**5.15**
	9/18/2012	**2.60**
	1/8/2013	**1.10**
	3/26/2013	**0.486**
	6/11/2013	**0.520**
	9/10/2013	0.164
	1/7/2014	0.132
	3/18/2014	**0.643**
	6/16/2014	**1.20**
	9/25/2014	**1.57**
	12/16/2014	**1.49**
	3/17/2015	**1.60**
	6/16/2015	**1.36**
	9/15/2015	**1.52**
	12/1/2015	**1.76**
	3/29/2016	**1.86**
	6/21/2016	**1.72**
	9/7/2016	**1.38**
	12/2/2016	--
	3/7/2017	**1.90**
	6/13/2017	**1.76**
	9/26/2017	**2.04**
	12/19/2017	**1.75**
	3/14/2018	**1.94**
	6/26/2018	**1.83**
	9/5/2018	**1.83**
	12/14/2018	**1.8**
	3/29/2019	**0.056**
	6/24/2019	**2.00**
	9/13/2019	**1.800**
	11/6/2019	**0.608**
	3/5/2020	**1.28**
	5/6/2020	**1.11**
	8/20/2020	**1.57**
	10/21/2020	**0.625**
	3/2/2021	**1.02**
	9/24/2021	**1.5**
	3/3/2022	**1.8**
	9/20/2022	**2.0**
	3/2/2023	**1.7**
	10/3/2023	**0.24**

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Sample Date	Dissolved Manganese (mg/L)
NMWQCC Standards		0.2
MW-3	3/17/2011	1.79
	8/17/2011	1.42
	10/18/2011	--
	2/23/2012	1.60
	6/5/2012	1.43
	9/18/2012	1.24
	1/8/2013	1.62
	3/26/2013	1.83
	6/11/2013	1.75
	9/10/2013	1.7
	1/7/2014	1.77
	3/18/2014	1.81
	6/16/2014	2
	9/16/2014	2.29
	12/16/2014	2.06
	3/17/2015	2.06
	6/16/2015	1.88
	9/15/2015	2.1
	12/1/2015	2.17
	3/29/2016	2.14
	6/21/2016	1.92
	9/7/2016	1.88
	12/2/2016	1.98
	3/7/2017	2.22
	6/13/2017	1.87
	9/26/2017	1.82
	12/19/2017	1.82
	3/14/2018	1.97
	6/26/2018	1.94
	9/5/2018	1.88
	12/14/2018	1.76
	3/29/2019	1.75
	6/17/2019	1.74
	9/10/2019	1.74
	11/4/2019	1.74
	3/3/2020	1.84
	5/4/2020	1.64
	8/19/2020	1.72
	10/21/2020	1.69
	3/1/2021	1.64
	9/24/2021	1.9
	3/2/2022	1.7
	9/20/2022	1.6
	3/2/2023	1.8
	10/3/2023	1.7

ENSOLUM

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
San Juan 29-7 Unit 37
Hilcorp Energy Company
Rio Arriba County, New Mexico

Well Identification	Sample Date	Dissolved Manganese (mg/L)
NMWQCC Standards		**0.2**
MW-8	10/19/2011	--
	2/23/2012	<0.005
	6/5/2012	0.022
	9/20/2012	--
	1/8/2013	--
	3/26/2013	--
	6/11/2013	--
	7/13/2013	--
MW-8R	9/10/2013	**0.395**
	1/7/2014	**0.255**
	3/18/2014	0.106
	6/16/2014	**1.5**
	9/25/2014	**1.38**
	12/16/2014	**1.01**
	3/17/2015	**0.323**
	6/16/2015	**0.707**
	9/15/2015	**0.7**
	12/1/2015	**0.84**
	3/29/2016	**1.16**
	6/21/2016	**0.431**
	9/7/2016	**0.758**
	12/2/2016	**0.488**
	3/7/2017	**0.437**
	6/13/2017	**0.396**
	9/26/2017	0.0218
	12/19/2017	**0.432**
	3/14/2018	**0.364**
	6/26/2018	**0.434**
	9/5/2018	**0.442**
	12/14/2018	**0.238**
	3/29/2019	0.172
	6/24/2019	**0.427**
	9/13/2019	**0.357**
	11/6/2019	0.0153
	3/5/2020	**1.98**
	5/7/2020	**0.775**
	8/21/2020	0.0524
	10/22/2020	**0.710**
	3/2/2021	**0.622**
	9/24/2021	**0.89**
	3/2/2022	**0.31**
	9/20/2022	**0.60**
	3/2/2023	**0.52**
	10/3/2023	**0.43**

Notes:

Only data for actively sampled wells are presented on this table.

mg/L: milligrams per liter

NMWQCC: New Mexico Water Quality Control Commission

--: not analyzed

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

Cells shaded in gray indicate groundwater samples collected prior to CoolOx™ treatment

*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

March 08, 2023

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

RE: San Juan 29 7 Unit 37 OrderNo.: 2303172

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 3 sample(s) on 3/3/2023 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 **2303172**
Date Reported: **3/8/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-1
Project: San Juan 29 7 Unit 37
Collection Date: 3/2/2023 10:40:00 AM
Lab ID: 2303172-001 **Matrix:** AQUEOUS **Received Date:** 3/3/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	1.7	0.010	*	mg/L	5	3/6/2023 5:43:53 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 **2303172**
Date Reported: **3/8/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-3
Project: San Juan 29 7 Unit 37
Collection Date: 3/2/2023 1:05:00 PM
Lab ID: 2303172-002 **Matrix:** AQUEOUS **Received Date:** 3/3/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	1.8	0.010	*	mg/L	5	3/6/2023 5:49:59 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 **2303172**
Date Reported: **3/8/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-8R
Project: San Juan 29 7 Unit 37
Collection Date: 3/2/2023 11:45:00 AM
Lab ID: 2303172-003 **Matrix:** AQUEOUS **Received Date:** 3/3/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JRR**
Manganese	0.52	0.0020	*	mg/L	1	3/6/2023 5:52:47 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#: **2303172**

08-Mar-23

Client: HILCORP ENERGY

Project: San Juan 29 7 Unit 37

Sample ID: **MB-B**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B95052**	RunNo: **95052**
Prep Date:	Analysis Date: **3/6/2023**	SeqNo: **3437195** 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: **B95052**	RunNo: **95052**
Prep Date:	Analysis Date: **3/6/2023**	SeqNo: **3437196** 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			

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: 2303172 RcptNo: 1

Received By: Tracy Casarrubias 3/3/2023 6:45:00 AM

Completed By: Tracy Casarrubias 3/3/2023 7:22:59 AM

Reviewed By: JH 3-3-23

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 ☑
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: 3 (<2 or >12 unless noted)

Adjusted? yes

Checked by: KPG 3.3.23

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 and filtered 125mL from original volume provided for samples 001 - 003 . Added 0.4 mL of HNO3 (Chem#7162) for pH- KPG 3.3.23

17. Cooler Information Filter Lot # FJ6168 x4

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.8	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:

San Juan 29-7 Unit 37

Project #:

Project Manager:

Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☒ Yes ☐ No morty

# of Coolers: 1

Cooler Temp(Including CF): 1.8 - 0 = 1.8°

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. 2303172	Analysis Request: Dissolved Mn (Filter and preserve in lab)
3-2-23	1040	Water	MW-1	(1) 500ml Plastic	Cool	001	X
	1305	Water	MW-3	(1) 500ml Plastic	Cool	002	X
	1145	Water	MW-8R	(1) 500ml Plastic	Cool	003	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3-2-23	1642		Christ Walt		3/2/23	1642
3/2/23	1806	Christ Walt		courier	3/3/23	0745

Remarks: 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

October 12, 2023

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

RE: San Juan 29 7 Unit 37 OrderNo.: 2310167

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 3 sample(s) on 10/4/2023 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 **2310167**
Date Reported: **10/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-1
Project: San Juan 29 7 Unit 37
Collection Date: 10/3/2023 11:15:00 AM
Lab ID: 2310167-001 **Matrix:** AQUEOUS **Received Date:** 10/4/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.24	0.0020	*	mg/L	1	10/5/2023 3:00:37 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 **2310167**
Date Reported: **10/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-3
Project: San Juan 29 7 Unit 37
Collection Date: 10/3/2023 2:30:00 PM
Lab ID: 2310167-002 **Matrix:** AQUEOUS **Received Date:** 10/4/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	1.7	0.010	*	mg/L	5	10/5/2023 3:11:28 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 **2310167**
Date Reported: **10/12/2023**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: MW-8R
Project: San Juan 29 7 Unit 37
Collection Date: 10/3/2023 12:10:00 PM
Lab ID: 2310167-003 **Matrix:** AQUEOUS **Received Date:** 10/4/2023 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **VP**
Manganese	0.43	0.0020	*	mg/L	1	10/5/2023 3:24:33 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#: **2310167**

12-Oct-23

Client: HILCORP ENERGY

Project: San Juan 29 7 Unit 37

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670589** 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: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670590** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020	0.002000	0	94.6	50	150			

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670591** 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	102	85	115			

Sample ID: **2310167-002AMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-3**	Batch ID: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670602** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.2	0.010	2.500	1.741	99.6	70	130			

Sample ID: **2310167-002AMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-3**	Batch ID: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670603** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.2	0.010	2.500	1.741	97.5	70	130	1.25	20	

Sample ID: **2310167-003AMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-8R**	Batch ID: **A100257**	RunNo: **100257**
Prep Date:	Analysis Date: **10/5/2023**	SeqNo: **3670605** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.89	0.0020	0.5000	0.4267	92.0	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#: **2310167**

12-Oct-23

Client: HILCORP ENERGY

Project: San Juan 29 7 Unit 37

Sample ID:	**2310167-003AMSD**	SampType:	**MSD**	TestCode:	**EPA Method 200.7: Dissolved Metals**
Client ID:	**MW-8R**	Batch ID:	**A100257**	RunNo:	**100257**
Prep Date:		Analysis Date:	**10/5/2023**	SeqNo:	**3670606** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.89	0.0020	0.5000	0.4267	92.9	70	130	0.485	20	

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: 2310167 RcptNo: 1

Received By: Tracy Casarrubias 10/4/2023 6:45:00 AM

Completed By: Tracy Casarrubias 10/4/2023 7:18:08 AM

Reviewed By: SCM 10/4/23

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 preserved 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 ☐ # of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐ Adjusted?
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:

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 volume provided for 001A-003A, ~125mL was poured off and filtered. (Filter Lot# 176500 x 3). Proceeded to add ~.40mL of HON3 (Chem#7281) for proper pH- JM 10/4/23

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.9	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:

San Juan 29-7 Unit 37

Project #:

Project Manager:

Kate Kaufman

Sampler: Brandon Sinclair

On Ice: ☒ Yes ☐ No yogi

# of Coolers: 1

Cooler Temp(including CF): 2.0-0.1=1.9°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. 2310167	Dissolved Mn (Filter and preserve in lab)
10-3	1115	Water	MW-1	(1) 500ml Plastic	Cool	001	X
"	1430	Water	MW-3	(1) 500ml Plastic	Cool	002	X
"	1210	Water	MW-8R	(1) 500ml Plastic	Cool	003	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
10-3	1720				10/3/23	1720
10/3/23	1814			Courier	10/4/23	6:45

Remarks: 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 328076

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 328076
	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 San Juan 29-7 Unit 37: Content Satisfactory 1. Continue with conducting groundwater monitoring for MW-1, MW-3, MW-8R on an annual basis until dissolved manganese concentration are at allowable concentrations in Title 20 of the NMAC. 2. Resume sampling on a quarterly basis once concentrations convey below the human health standards of the WQCC.for Mn. 3. Submit the next Annual Report no later than April 1, 2025.	6/3/2024