

REVIEWED

By Mike Buchanan at 8:34 am, May 31, 2024



ENSOLUM

March 26, 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
Charles et al #1
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NRMD0928136813
NMOCD Administrative Order: 3R-432

The 2023 Annual Groundwater Monitoring Report for Charles et al #1 has been received for the record.

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 groundwater monitoring activities conducted at the former Charles et al #1 natural gas production well (Site) during 2023. The Site is located on Navajo Nation Tribal land in Section 12 within Township 27 North and Range 9 West, San Juan County, New Mexico (Figure 1).

SITE BACKGROUND

Impacted groundwater at the Site was discovered by ConocoPhillips (previous Site owner) in 2008 while investigating a pipeline release approximately 0.25 miles from the Site. ConocoPhillips further investigated the release and subsequently installed seven groundwater monitoring wells (MW-1 through MW-7). A solar-powered fan was additionally installed on groundwater monitoring well MW-1 in August 2008 to remediate soil and groundwater impacts using soil-vapor extraction technology. After seven years of monitoring, groundwater impacts in wells MW-2 through MW-7 had attenuated to below Navajo Nation Environmental Protection Agency (NNEPA) standards. As such, shallow groundwater monitoring wells MW-2 through MW-7 were removed using a backhoe in June 2016.

Because petroleum hydrocarbon contaminants were still present in soil and groundwater in the vicinity of monitoring well MW-1, impacted soil was removed by excavation in June 2016 to mitigate further migration of contaminants. Approximately 30 cubic yards of impacted soil were removed and disposed off-Site; however, the excavation was limited in extent due to the location of two pipelines in the area. Once the excavation was backfilled, replacement well MW-1R was installed in the same general location as former monitoring well MW-1 for continued monitoring. Hilcorp acquired the Site from ConocoPhillips in August 2017 and has continued to monitor groundwater conditions in well MW-1R. Current and former well locations and Site features are depicted on Figure 2.

SITE GROUNDWATER CLEANUP STANDARDS

The Site is located on Navajo Nation Tribal land and is regulated by both the NMOCD and NNEPA. Specifically, groundwater cleanup standards have been presented in the NNEPA document titled *The Navajo Nation Leaking Storage Tank Soil and Water Cleanup Standards*, dated 2012. Additionally, NMOCD requires groundwater-quality standards be met as presented by the New Mexico Water Quality Control Commission (NMWQCC) and listed in Title 20, Chapter 6, Part 2, Section 3103 (20.6.2.3103) of the New Mexico Administrative Code (NMAC).

Because there are two regulatory groundwater standards applicable for this Site, the most conservative cleanup standards developed by the NNEPA and NMWQCC have been used to compare groundwater analytical results obtained at the Site. Manganese, sulfate and total dissolved solids (TDS) were removed from the biannual sampling criteria per approval from the NMOCD dated April 12, 2022. The groundwater standards for the Site are presented in milligrams per liter (mg/L) and are as follows:

- Benzene: 0.005 mg/L
- Toluene: 1.0 mg/L
- Ethylbenzene: 0.7 mg/L
- Total Xylenes: 0.62 mg/L

GROUNDWATER SAMPLING ACTIVITIES AND RESULTS

As approved by the NMOCD, groundwater gauging and sampling was performed on a biannual basis at the Site, which occurred on March 29 and September 29, 2023. Static groundwater level monitoring included recording depth-to-water in monitoring well MW-1R using a Keck oil/water interface probe. Depth-to-groundwater during the March and September 2023 events were measured at 4.85 feet and 7.11 feet below top of well casing, respectively. Well construction and depth-to-groundwater information is presented in Table 1. Based on historical well gauging information (prior to plugging and abandoning wells MW-2 through MW-7), groundwater flow direction was consistently to the east-northeast.

GROUNDWATER SAMPLING

Groundwater from well MW-1R was purged and sampled using a disposable bailer. Purging was accomplished by removing stagnant groundwater from the monitoring well prior to collecting a sample. Due to insufficient recharge, approximately 0.1 gallons of groundwater was purged prior to sampling during the March 2023 sampling event. During the September 2023 sampling event, an insufficient volume of water was present in the well to collect a sample. Field measurements of groundwater quality parameters, including temperature, pH, and electrical conductivity, were collected while purging the well during the March 2023 sampling event. Groundwater quality measurements 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. Containers were immediately sealed, packed on ice, and submitted to Hall Environmental Analysis Laboratory (Hall) for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) following Environmental Protection Agency (EPA) Method 8260B. 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 March 2023 groundwater sampling event, the concentration of total xylenes exceeded the applicable NNEPA/NMWQCC cleanup standard. Benzene, toluene, and ethylbenzene concentrations were in compliance with the cleanup standards during the March 2023 sampling event. A summary of analytical results is presented in Table 3 and depicted on Figure 2, with complete laboratory analytical reports attached as Appendix A.

CONCLUSIONS AND RECOMMENDATIONS

Since 2008, BTEX concentrations in groundwater have declined in well MW-1/MW-1R. Benzene concentrations have had minor fluctuations but are generally consistent. The decline in contaminant concentrations indicates natural attenuation is occurring through biodegradation at the Site. As such, Hilcorp will continue to monitor contaminant concentrations in well MW-1R on a biannual basis.

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

Sincerely,
Ensolum, LLC



Stuart Hyde, PG
Senior Geologist
(970) 903-1607
shyde@ensolum.com



Daniel R. Moir, PG
Senior Managing Geologist
(303) 887-2946
dmoir@ensolum.com

Attachments:

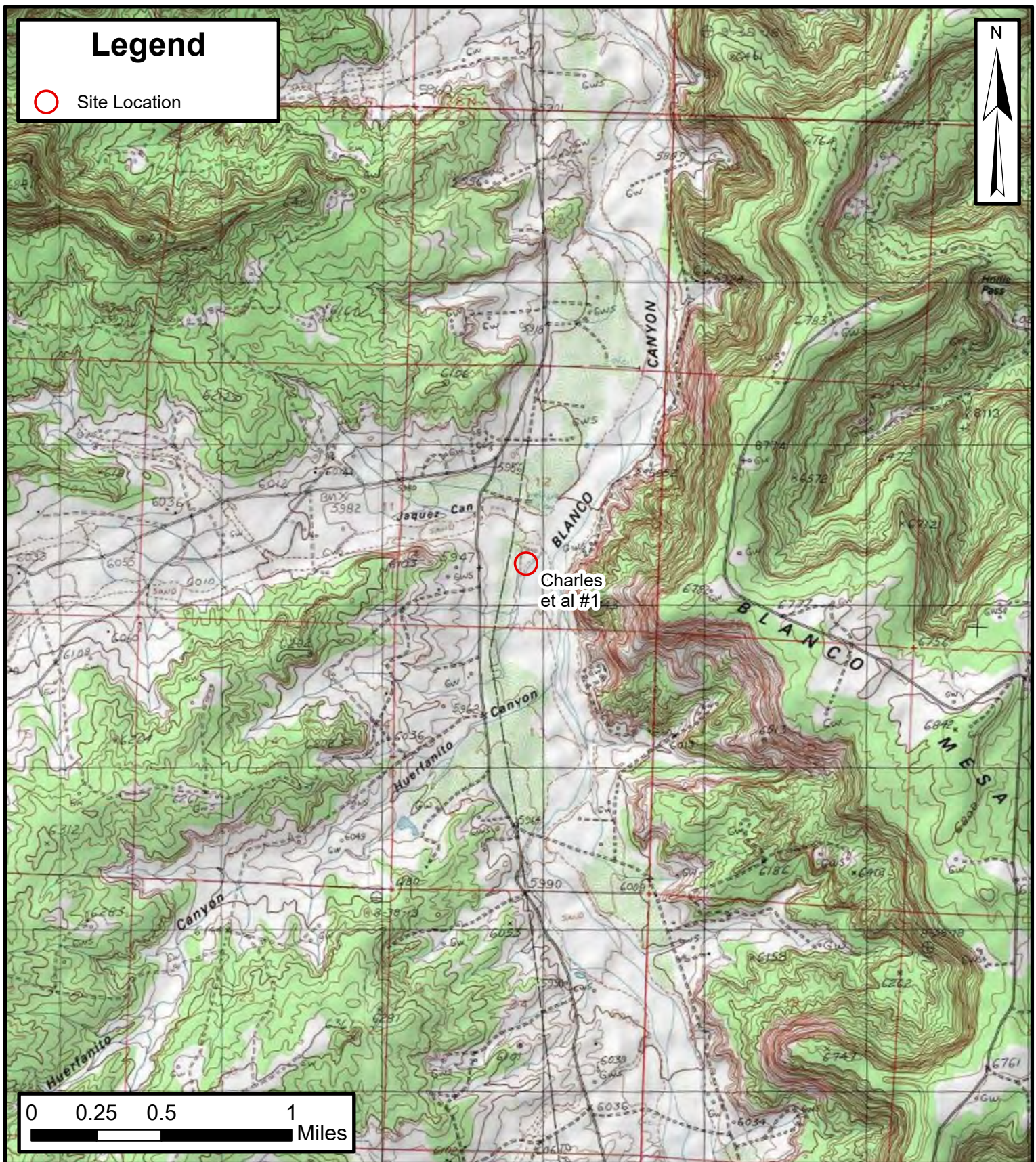
Figure 1: Site Location Map
Figure 2: 2023 Groundwater Analytical Results

Table 1: Groundwater Elevations
Table 2: Groundwater Quality Parameters
Table 3: Groundwater Analytical Results

Appendix A: Laboratory Analytical Reports



FIGURES

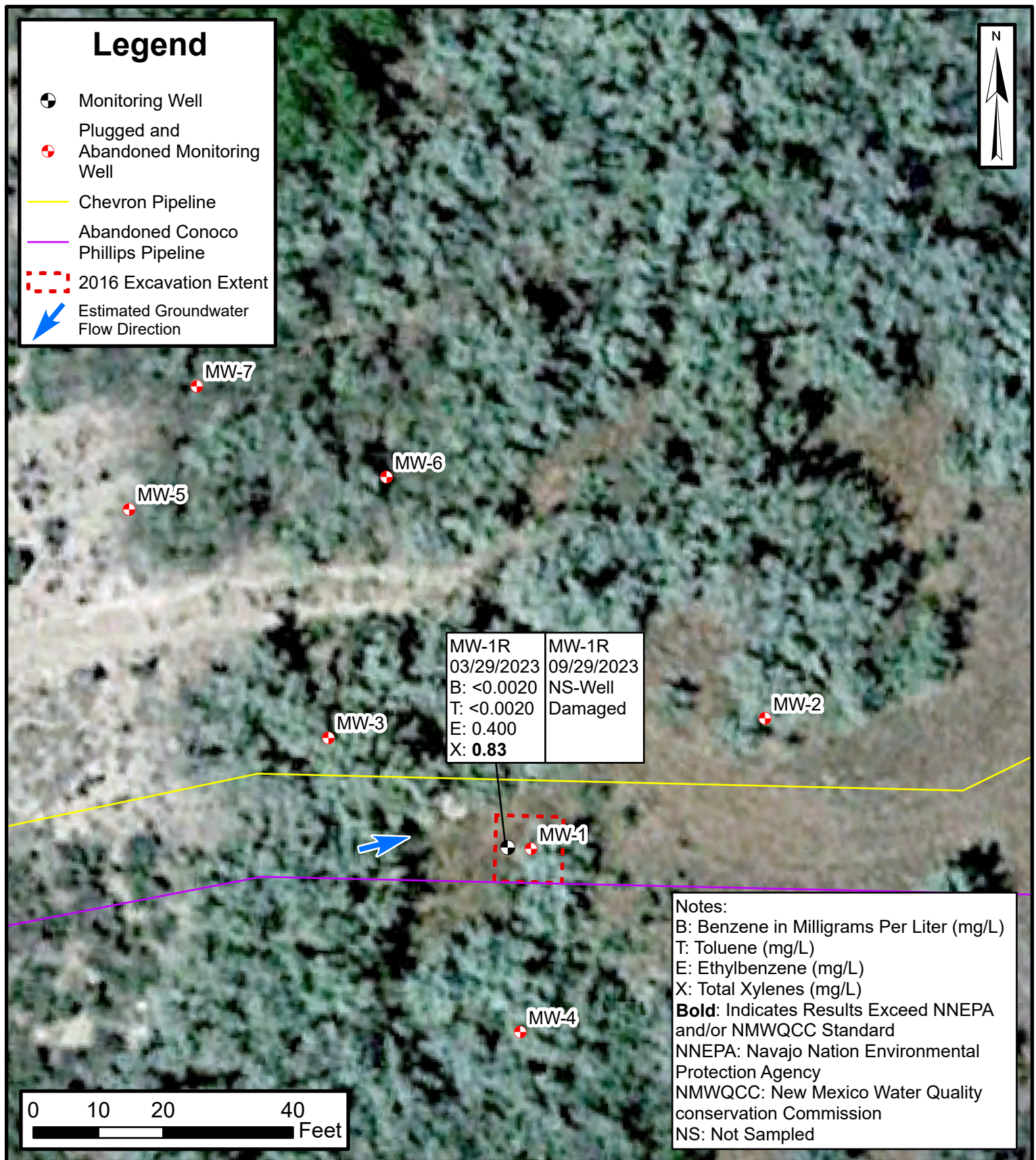


Site Location Map

Charles et al #1
Hilcorp Energy Company
36.586167, -107.740284
San Juan County, New Mexico

FIGURE
1

ENSOLUM
Environmental, Engineering and
Hydrogeologic Consultants



2023 Groundwater Analytical Results

Charles et al #1
 Hilcorp Energy Company
 36.586167, -107.740284
 San Juan County, New Mexico

FIGURE
2



TABLES



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-1	5,917.87	6/25/2008	4.71	5,913.16
		8/14/2008	5.21	5,912.66
	5,917.05	10/2/2008	5.13	5,911.92
		1/13/2009	4.41	5,912.64
		3/23/2009	3.01	5,914.04
		6/29/2009	2.12	5,914.93
		3/30/2010	2.68	5,914.37
		6/11/2010	4.74	5,912.31
		9/21/2010	5.52	5,911.53
		12/16/2010	3.71	5,913.34
		3/18/2011	2.98	5,914.07
		6/23/2011	4.99	5,912.06
		9/27/2011	4.55	5,912.50
		12/12/2011	3.23	5,913.82
		3/7/2012	3.67	5,913.38
		6/4/2012	4.75	5,912.30
		9/17/2012	5.57	5,911.48
		1/9/2013	3.87	5,913.18
		3/18/2013	3.09	5,913.96
		6/14/2013	4.83	5,912.22
		9/13/2013	5.42	5,911.63
		12/13/2013	3.67	5,913.38
		3/21/2014	3.27	5,913.78
		6/16/2014	5.13	5,911.92
		9/19/2014	5.70	5,911.35
		12/17/2014	4.22	5,912.83
		3/19/2015	3.36	5,913.69
		6/19/2015	4.34	5,912.71
		9/14/2015	5.55	5,911.50
		6/2/2016	Plugged and Abandoned	



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-1R	Not Determined	6/23/2016	6.28	--
		9/12/2016	6.49	--
		11/28/2016	5.13	--
		3/6/2017	4.29	--
		6/12/2017	3.07	--
		9/25/2017	3.38	--
		12/4/2017*	1.84	--
		3/13/2018*	1.85	--
		6/25/2018**	3.25	--
		9/4/2018**	3.53	--
		12/6/2018**	4.04	--
		2/26/2019***	4.37	--
		5/17/2019***	4.60	--
		8/9/2019***	6.39	--
		10/28/2019***	6.15	--
		1/27/2020***	4.81	--
		7/7/2020***	6.51	--
		3/12/2021***	4.98	--
		8/6/2021***	NM	--
		1/7/2022***	5.54	--
		9/26/2022***	5.53	--
		3/29/2023***	4.85	--
		9/29/2023***	7.11	--
MW-2	5,917.33	6/25/2008	4.66	5,912.67
	5,916.53	8/14/2008	5.35	5,911.98
		10/2/2008	5.12	5,911.41
		1/13/2009	3.15	5,913.38
		3/23/2009	2.65	5,913.88
		6/29/2009	4.20	5,912.33
		3/30/2010	2.57	5,913.96
		6/11/2010	4.63	5,911.90
		9/21/2010	5.53	5,911.00
		12/16/2010	3.53	5,913.00
		3/18/2011	2.70	5,913.83



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-2	5,916.53	6/23/2011	4.80	5,911.73
		9/27/2011	4.30	5,912.23
		12/12/2011	3.13	5,913.40
		3/7/2012	2.58	5,913.95
		6/4/2012	4.51	5,912.02
		9/17/2012	5.56	5,910.97
		1/9/2013	3.75	5,912.78
		3/18/2013	3.02	5,913.51
		6/14/2013	4.69	5,911.84
		9/13/2013	5.09	5,911.44
		12/13/2013	3.55	5,912.98
		3/21/2014	3.15	5,913.38
		6/16/2014	4.98	5,911.55
		9/19/2014	5.49	5,911.04
		12/17/2014	4.11	5,912.42
		3/19/2015	3.30	5,913.23
		6/19/2015	4.24	5,912.29
		9/14/2015	5.57	5,910.96
		6/2/2016	Plugged and Abandoned	
MW-3	5,920.57	6/25/2008	7.16	5,913.41
	5,919.80	8/14/2008	8.86	5,911.71
		10/2/2008	7.63	5,912.17
		1/13/2009	5.56	5,914.24
		3/23/2009	5.56	5,914.24
		6/29/2009	1.10	5,918.70
		3/30/2010	5.38	5,914.42
		6/11/2010	7.44	5,912.36
		9/21/2010	8.22	5,911.58
		12/16/2010	6.06	5,913.74
		3/18/2011	5.42	5,914.38
		6/23/2011	7.68	5,912.12
		9/27/2011	7.13	5,912.67



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-3	5,919.80	12/12/2011	5.78	5,914.02
		3/7/2012	5.33	5,914.47
		6/4/2012	7.27	5,912.53
		9/17/2012	8.15	5,911.65
		1/9/2013	6.37	5,913.43
		3/18/2013	5.68	5,914.12
		6/14/2013	7.36	5,912.44
		9/13/2013	7.72	5,912.08
		12/13/2013	6.20	5,913.60
		3/21/2014	5.89	5,913.91
		6/16/2014	7.71	5,912.09
		9/19/2014	8.13	5,911.67
		12/17/2014	6.71	5,913.09
		3/19/2015	5.98	5,913.82
		6/19/2015	7.01	5,912.79
		9/14/2015	8.21	5,911.59
		6/2/2016	Plugged and Abandoned	
MW-4	5,920.48	6/25/2008	4.27	5,916.21
	5,919.69	8/14/2008	7.89	5,912.59
		10/2/2008	7.73	5,911.96
		1/13/2009	5.94	5,913.75
		3/23/2009	5.64	5,914.05
		6/29/2009	6.84	5,912.85
		3/30/2010	5.40	5,914.29
		6/11/2010	7.23	5,912.46
		9/21/2010	8.17	5,911.52
		12/16/2010	6.24	5,913.45
		3/18/2011	5.50	5,914.19
		6/23/2011	7.50	5,912.19
		9/27/2011	6.98	5,912.71
		12/12/2011	5.94	5,913.75
		3/7/2012	5.36	5,914.33



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-4	5,919.69	6/4/2012	7.18	5,912.51
		9/17/2012	8.18	5,911.51
		1/9/2013	6.53	5,913.16
		3/18/2013	5.81	5,913.88
		6/14/2013	7.40	5,912.29
		9/13/2013	7.77	5,911.92
		12/13/2013	6.37	5,913.32
		3/21/2014	6.03	5,913.66
		6/16/2014	7.63	5,912.06
		9/19/2014	8.09	5,911.60
		12/17/2014	6.87	5,912.82
		3/19/2015	6.05	5,913.64
		6/19/2015	6.92	5,912.77
		9/14/2015	DRY	--
		6/2/2016	Plugged and Abandoned	
MW-5	5,923.63	6/26/2008	8.23	5,915.40
	5,921.55	8/14/2008	8.68	5,914.95
		10/2/2008	8.70	5,912.85
		1/13/2009	6.96	5,914.59
		3/23/2009	6.58	5,914.97
		6/29/2009	4.10	5,917.45
		3/30/2010	NM	--
		6/11/2010	8.20	5,913.35
		9/21/2010	9.25	5,912.30
		12/16/2010	7.40	5,914.15
		3/18/2011	6.74	5,914.81
		6/23/2011	NM	--
		9/26/2011	8.25	5,913.30
		12/12/2011	7.12	5,914.43
		3/7/2012	6.65	5,914.90
	5,921.55	6/4/2012	8.17	5,913.38
		9/17/2012	9.30	5,912.25



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-5	5,921.55	1/9/2013	7.76	5,913.79
		3/18/2013	7.05	5,914.50
		6/14/2013	8.49	5,913.06
		9/13/2013	8.97	5,912.58
		12/13/2013	7.55	5,914.00
		3/21/2014	7.17	5,914.38
		6/16/2014	8.72	5,912.83
		9/19/2014	9.35	5,912.20
		12/17/2014	8.07	5,913.48
		3/19/2015	7.33	5,914.22
		6/19/2015	8.24	5,913.31
		9/14/2015	9.48	5,912.07
		6/2/2016	Plugged and Abandoned	
MW-6	5,920.68	6/26/2008	6.75	5,913.93
	5,918.64	8/14/2008	6.97	5,913.71
		10/2/2008	6.83	5,911.81
		1/13/2009	4.89	5,913.75
		3/23/2009	4.12	5,914.52
		6/29/2009	1.80	5,916.84
		3/30/2010	NM	--
		6/11/2010	6.63	5,912.01
		9/21/2010	7.41	5,911.23
		12/16/2010	5.12	5,913.52
		3/15/2011	4.49	5,914.15
		6/23/2011	6.80	5,911.84
		9/26/2011	6.33	5,912.31
		12/12/2011	4.84	5,913.80
		3/7/2012	4.46	5,914.18
		6/4/2012	6.45	5,912.19
		9/17/2012	7.37	5,911.27
		1/9/2013	5.46	5,913.18
		3/18/2013	4.80	5,913.84



TABLE 1
GROUNDWATER ELEVATIONS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-6	5,918.64	6/14/2013	6.60	5,912.04
		9/13/2013	6.90	5,911.74
		12/13/2013	5.32	5,913.32
		3/21/2014	5.03	5,913.61
		6/16/2014	6.85	5,911.79
		9/19/2014	7.34	5,911.30
		12/17/2014	5.79	5,912.85
		3/19/2015	5.22	5,913.42
		6/19/2015	6.21	5,912.43
		9/14/2015	DRY	--
		6/2/2016	Plugged and Abandoned	
MW-7	5,920.75	6/26/2008	6.32	5,914.43
	5,918.74	8/14/2008	7.17	5,913.58
		10/2/2008	6.42	5,912.32
		1/13/2009	NM	--
		3/23/2009	4.67	5,914.07
		6/29/2009	1.56	5,917.18
		3/30/2010	NM	--
		6/11/2010	NM	--
		9/21/2010	NM	--
		12/16/2010	4.91	5,913.83
		3/18/2011	DRY	--
		6/23/2011	6.55	5,912.19
		9/26/2011	6.14	5,912.60
		12/12/2011	DRY	--
		3/7/2012	DRY	--
		6/4/2012	6.08	5,912.66
		9/17/2012	7.11	5,911.63
		1/9/2013	5.28	5,913.46
		3/18/2013	4.54	5,914.20
		6/14/2013	6.31	5,912.43
		9/13/2013	6.66	5,912.08



TABLE 1 GROUNDWATER ELEVATIONS Charles et al #1 Hilcorp Energy Company San Juan County, New Mexico				
Well ID	Top of Casing Elevation (feet AMSL)	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-7	5,918.74	12/13/2013	5.35	5,913.39
		3/21/2014	4.70	5,914.04
		6/16/2014	6.59	5,912.15
		9/19/2014	7.14	5,911.60
		12/17/2014	5.59	5,913.15
		3/19/2015	4.98	5,913.76
		6/19/2015	6.10	5,912.64
		9/14/2015	7.34	5,911.40
		6/3/2016	Plugged and Abandoned	

Notes:

AMSL: above mean sea level

BTOC: below top of casing

NM: not measured

* PVC casing stick up broken off, likely by cattle. Shallower depth to water reflects new top of casing (TOC) measuring point.

**Section of PVC reattached above ground surface. Depth to water reflects new measuring point.

*** 39-inch section PVC added to top of casing resulting in new TOC elevation



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

Well ID	Sample Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)
MW-1R	6/23/2016	18.40	6.43	--	3.63	2.23	-68.3
	3/6/2017	--	--	--	--	--	--
	3/13/2018	--	--	--	--	--	--
	6/25/2018	--	--	--	--	--	--
	9/4/2018	--	--	--	--	--	--
	12/6/2018	--	--	--	--	--	--
	2/26/2019	--	--	--	--	--	--
	5/17/2019	--	--	--	--	--	--
	8/9/2019	18.70	8.03	2.85	5.83	1.40	-72.9
	10/28/2019	--	7.27	1.23	5.80	5.70	-85.5
	1/27/2020	5.20	6.80	3.98	7.99	7.23	-67.1
	7/7/2020	22.70	6.67	2.46	4.90	0.35	-51.1
	3/12/2021	7.90	7.54	4.32	8.75	5.71	-44.3
	8/6/2021	--	--	--	--	--	--
	1/7/2022	6.90	7.73	--	6.42	--	--
	9/26/2022	--	--	--	--	--	--
	3/29/2023	6.10	7.27	3.29	6.58	--	--
	9/29/2023	--	--	--	--	--	--

Notes:

g/L: grams per liter

mS/cm: millisiemens per centimeter

mg/L: milligrams per liter

°C: degrees Celcius

DO: dissolved oxygen

mV: millivolts

ORP: oxidation-reduction potential

TDS: total dissolved solids

--: not measured



TABLE 3
GROUNDWATER ANALYTICAL RESULTS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
NNEPA/NMWQCC Standard			0.005	1.0	0.7	0.62
MW-1	6/25/2008	(orig)	1.85	0.486	0.971	0.379
	9/25/2008	(orig)	0.575	0.66	0.293	1.547
	1/13/2009	(orig)	0.494	0.581	0.474	3.572
	3/23/2009	(orig)	0.21	0.311	0.378	1.418
	6/29/2009	(orig)	0.839	0.107	0.674	3.404
	3/30/2010	(orig)	0.48	0.11	0.25	1.573
	6/11/2010	(orig)	3.2	0.45	0.69	4.51
	9/21/2010	(orig)	2.3	1.1	0.25	4.84
	12/16/2010	(orig)	0.18	0.2	0.25	1.79
	3/18/2011	(orig)	0.15	0.14	0.16	1.083
	6/23/2011	(orig)	3.2	0.933	0.972	5.8
	6/23/2011	(Duplicate)	3.38	1.45	1.06	6.76
	9/26/2011	(orig)	1.56	2.61	0.624	6.59
	9/26/2011	(Duplicate)	1.57	3.02	0.756	7.26
	12/12/2011	(orig)	0.232	0.947	0.5	3.94
	12/12/2011	(Duplicate)	0.244	0.994	0.58	4.65
	3/7/2012	(orig)	0.0637	0.366	0.293	2.23
	3/7/2012	(Duplicate)	0.0693	0.416	0.333	2.63
	6/4/2012	(orig)	0.956	2.38	0.919	6.71
	6/4/2012	(Duplicate)	0.934	2.26	0.966	6.36
	9/17/2012	(orig)	0.941	3.51	0.785	5.56
	9/17/2012	(Duplicate)	0.984	3.04	0.852	5.87
	1/9/2013	(orig)	0.125	1.14	0.334	2.44
	1/9/2013	(Duplicate)	0.142	1.52	0.438	3.09
	3/18/2013	(orig)	0.012	0.195	0.0871	0.581
	3/18/2013	(Duplicate)	0.0114	0.188	0.0891	0.575
	6/14/2013	(orig)	0.174	1.41	0.668	3.26
	6/14/2013	(Duplicate)	0.189	2.02	0.742	4.17
	9/13/2013	(orig)	0.0414	3.24	0.123	4.34
	9/13/2013	(Duplicate)	0.0372	3.3	0.126	4.43
	12/13/2013	(orig)	0.0053	0.188	0.122	0.681
	12/13/2013	(Duplicate)	0.0071	0.258	0.148	0.843
	3/21/2014	(orig)	<0.001	0.0348	0.0591	0.247
	3/21/2014	(Duplicate)	<0.001	0.0385	0.0651	0.26
	6/16/2014	(orig)	0.133	1.94	0.994	4.5
	6/16/2014	(Duplicate)	0.134	1.92	0.921	4.5
	9/19/2014	(orig)	0.159	2.34	0.630	3.38
	12/17/2014	(orig)	0.0138	0.422	0.248	1.48
	12/17/2014	(Duplicate)	0.0137	0.44	0.251	1.52
	3/19/2015	(orig)	<0.005	0.227	0.174	1.03
	6/19/2015	(orig)	0.025	0.326	0.496	2.44
	6/19/2015	(Duplicate)	0.0241	0.306	0.472	2.31
	9/14/2015	(orig)	0.0339	0.0257	0.242	0.504
Plugged and Abandoned June 2016						



TABLE 3
GROUNDWATER ANALYTICAL RESULTS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
NNEPA/NMWQCC Standard			0.005	1.0	0.7	0.62
MW-1R	6/23/2016	(orig)	0.0026	0.002	0.0521	0.215
	9/23/2016	(orig)	<0.001	< 0.001	0.191	0.518
	11/28/2016	(orig)	0.028	0.0084	0.901	4.39
	3/6/2017	(orig)	0.0342	<0.020	0.333	1.940
	6/12/2017	(orig)	0.0162	<0.010	0.304	0.522
	9/25/2017	(orig)	0.0126	<0.010	0.600	1.05
	12/4/2017	(dup)	0.015	1.880	0.946	7.96
	3/13/2018	(orig)	<0.050	0.505	0.840	4.80
	6/25/2018	(orig)	<0.025	1.010	0.165	4.41
	9/4/2018	(orig)	<0.020	0.798	<0.020	1.55
	12/6/2018	(orig)	<0.010	0.268	0.922	3.40
	2/26/2019	(orig)	0.0101	0.519	0.576	6.71
	5/17/2019	(orig)	<0.0100	<0.100	0.923	3.66
	8/9/2019	(orig)	0.0211	<0.100	0.594	1.56
	10/28/2019	(orig)	<0.250	<0.250	1.11	3.29
	1/27/2020	(orig)	<0.050	0.335	0.737	5.13
	7/7/2020	(orig)	0.0344	<0.05	0.866	3.54
	3/12/2021	(orig)	<0.025	0.0822	0.502	3.48
	8/6/2021	(orig)	0.024	<0.005	0.990	1.20
	1/7/2022	(orig)	0.012	0.094	0.700	1.90
	9/26/2022	(orig)	0.059	<0.005	0.440	0.077
	3/29/2023	(orig)	<0.0020	<0.0020	0.400	0.83
	9/29/2023	(orig)	Insufficient Volume to Sample			
MW-2	6/25/2008	(orig)	0.0042	0.0046	0.0016	0.0011
	9/25/2008	(orig)	0.0195	0.0258	0.0051	0.1008
	1/13/2009	(orig)	0.0021	0.002	0.0022	0.0281
	3/23/2009	(orig)	0.0014	0.0004	0.0006	0.0073
	6/29/2009	(orig)	0.0015	< 0.0002	0.0002	0.0004
	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/23/2011	(orig)	0.0006	< 0.001	< 0.001	< 0.003
	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/12/2011	(orig)	0.00034	< 0.001	< 0.001	< 0.003
	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003



TABLE 3
GROUNDWATER ANALYTICAL RESULTS

Charles et al #1
Hilcorp Energy Company
San Juan County, New Mexico

Well ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
NNEPA/NMWQCC Standard			0.005	1.0	0.7	0.62
MW-2	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	Plugged and Abandoned June 2016					
MW-3	6/25/2008	(orig)	ND	ND	ND	ND
	9/25/2008	(orig)	ND	0.0023	0.0009	0.0121
	1/13/2009	(orig)	ND	ND	ND	ND
	3/23/2009	(orig)	< 0.0002	0.0002	0.0002	0.0014
	6/29/2009	(orig)	< 0.0002	0.0017	0.0007	0.0082
	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/19/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003
	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	Plugged and Abandoned June 2016					
MW-4	6/25/2008	(orig)	0.0038	0.0199	0.0014	0.007
	9/25/2008	(orig)	ND	ND	ND	ND
	1/13/2009	(orig)	ND	ND	ND	ND
	3/23/2009	(orig)	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	6/29/2009	(orig)	< 0.0002	< 0.0002	0.0002	0.0029
	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003



TABLE 3 GROUNDWATER ANALYTICAL RESULTS Charles et al #1 Hilcorp Energy Company San Juan County, New Mexico						
Well ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
NNEPA/NMWQCC Standard			0.005	1.0	0.7	0.62
MW-4	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
Plugged and Abandoned June 2016						
MW-5	6/26/2008	(orig)	ND	ND	ND	ND
	9/25/2008	(orig)	ND	ND	ND	ND
	1/13/2009	(orig)	ND	ND	ND	ND
	3/23/2009	(orig)	ND	ND	ND	ND
Plugged and Abandoned June 2016						
MW-6	6/26/2008	(orig)	ND	ND	ND	ND
	9/25/2008	(orig)	ND	ND	ND	ND
	1/13/2009	(orig)	ND	ND	ND	ND
	3/23/2009	(orig)	ND	ND	ND	ND
Plugged and Abandoned June 2016						
MW-7	6/26/2008	(orig)	ND	ND	ND	ND
	9/25/2008	(orig)	ND	ND	ND	ND
	3/23/2009	(orig)	ND	ND	ND	ND
Plugged and Abandoned June 2016						
Background	3/12/2021	(orig)	<0.001	<0.001	<0.001	<0.003

Notes:

mg/L: milligrams per liter

ND: not detected, practical quantitation limit unknown

NMWQCC: New Mexico Water Quality Control Commission

NNEPA: Navajo Nation Environmental Protection Agency

--: not analyzed

<: 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 of the New Mexico Administrative Code



APPENDIX A

Laboratory Analytical Reports



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

April 06, 2023

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

RE: Charles et al

OrderNo.: 2303E74

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/30/2023 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report

Lab Order 2303E74

Date Reported: 4/6/2023

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: MW-1R

Project: Charles et al

Collection Date: 3/29/2023 10:00:00 AM

Lab ID: 2303E74-001

Matrix: AQUEOUS

Received Date: 3/30/2023 7:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: RAA
Benzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Toluene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Ethylbenzene	400	20		µg/L	20	4/4/2023 3:13:29 PM
Methyl tert-butyl ether (MTBE)	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2,4-Trimethylbenzene	320	20		µg/L	20	4/4/2023 3:13:29 PM
1,3,5-Trimethylbenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2-Dichloroethane (EDC)	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2-Dibromoethane (EDB)	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Naphthalene	8.2	4.0		µg/L	2	4/4/2023 12:57:38 AM
1-Methylnaphthalene	ND	8.0		µg/L	2	4/4/2023 12:57:38 AM
2-Methylnaphthalene	ND	8.0		µg/L	2	4/4/2023 12:57:38 AM
Acetone	ND	20		µg/L	2	4/4/2023 12:57:38 AM
Bromobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Bromodichloromethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Bromoform	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Bromomethane	ND	6.0		µg/L	2	4/4/2023 12:57:38 AM
2-Butanone	ND	20		µg/L	2	4/4/2023 12:57:38 AM
Carbon disulfide	ND	20		µg/L	2	4/4/2023 12:57:38 AM
Carbon Tetrachloride	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Chlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Chloroethane	ND	4.0		µg/L	2	4/4/2023 12:57:38 AM
Chloroform	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Chloromethane	ND	6.0		µg/L	2	4/4/2023 12:57:38 AM
2-Chlorotoluene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
4-Chlorotoluene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
cis-1,2-DCE	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
cis-1,3-Dichloropropene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2-Dibromo-3-chloropropane	ND	4.0		µg/L	2	4/4/2023 12:57:38 AM
Dibromochloromethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Dibromomethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2-Dichlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,3-Dichlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,4-Dichlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Dichlorodifluoromethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1-Dichloroethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1-Dichloroethene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2-Dichloropropane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,3-Dichloropropane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
2,2-Dichloropropane	ND	4.0		µg/L	2	4/4/2023 12:57:38 AM

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

Qualifiers:	* Value exceeds Maximum Contaminant Level.
	D Sample Diluted Due to Matrix
	H Holding times for preparation or analysis exceeded
	ND Not Detected at the Reporting Limit
	PQL Practical Quantitative 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

Page 1 of 5

Analytical Report

Lab Order 2303E74

Date Reported: 4/6/2023

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: MW-1R

Project: Charles et al

Collection Date: 3/29/2023 10:00:00 AM

Lab ID: 2303E74-001

Matrix: AQUEOUS

Received Date: 3/30/2023 7:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: RAA
1,1-Dichloropropene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Hexachlorobutadiene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
2-Hexanone	ND	20		µg/L	2	4/4/2023 12:57:38 AM
Isopropylbenzene	36	2.0		µg/L	2	4/4/2023 12:57:38 AM
4-Isopropyltoluene	5.5	2.0		µg/L	2	4/4/2023 12:57:38 AM
4-Methyl-2-pentanone	ND	20		µg/L	2	4/4/2023 12:57:38 AM
Methylene Chloride	ND	6.0		µg/L	2	4/4/2023 12:57:38 AM
n-Butylbenzene	ND	6.0		µg/L	2	4/4/2023 12:57:38 AM
n-Propylbenzene	37	2.0		µg/L	2	4/4/2023 12:57:38 AM
sec-Butylbenzene	2.9	2.0		µg/L	2	4/4/2023 12:57:38 AM
Styrene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
tert-Butylbenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1,1,2-Tetrachloroethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1,2,2-Tetrachloroethane	ND	4.0		µg/L	2	4/4/2023 12:57:38 AM
Tetrachloroethene (PCE)	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
trans-1,2-DCE	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
trans-1,3-Dichloropropene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2,3-Trichlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2,4-Trichlorobenzene	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1,1-Trichloroethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,1,2-Trichloroethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Trichloroethene (TCE)	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Trichlorofluoromethane	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
1,2,3-Trichloropropane	ND	4.0		µg/L	2	4/4/2023 12:57:38 AM
Vinyl chloride	ND	2.0		µg/L	2	4/4/2023 12:57:38 AM
Xylenes, Total	830	30		µg/L	20	4/4/2023 3:13:29 PM
Surr: 1,2-Dichloroethane-d4	113	70-130		%Rec	2	4/4/2023 12:57:38 AM
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	2	4/4/2023 12:57:38 AM
Surr: Dibromofluoromethane	88.3	70-130		%Rec	2	4/4/2023 12:57:38 AM
Surr: Toluene-d8	99.2	70-130		%Rec	2	4/4/2023 12:57:38 AM

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.
	D	Sample Diluted Due to Matrix
	H	Holding times for preparation or analysis exceeded
	ND	Not Detected at the Reporting Limit
	PQL	Practical Quantitative 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

Page 2 of 5

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2303E74

06-Apr-23

Client: HILCORP ENERGY

Project: Charles et al

Sample ID: 100ng lcs		SampType: LCS			TestCode: EPA Method 8260B: VOLATILES					
Client ID: LCSW		Batch ID: R95764			RunNo: 95764					
Prep Date:		Analysis Date: 4/3/2023			SeqNo: 3466375		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	17	1.0	20.00	0	85.1	70	130			
Toluene	21	1.0	20.00	0	106	70	130			
Chlorobenzene	20	1.0	20.00	0	102	70	130			
1,1-Dichloroethene	17	1.0	20.00	0	87.3	70	130			
Trichloroethene (TCE)	17	1.0	20.00	0	83.9	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		110	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		111	70	130			
Surr: Dibromofluoromethane	9.1		10.00		91.0	70	130			
Surr: Toluene-d8	11		10.00		110	70	130			

Sample ID: mb		SampType: MBLK		TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW		Batch ID: R95764		RunNo: 95764						
Prep Date:		Analysis Date: 4/3/2023		SeqNo: 3466389			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								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

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 Quantitative 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

Page 3 of 5

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2303E74

06-Apr-23

Client: HILCORP ENERGY

Project: Charles et al

Sample ID: mb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch ID: R95764			RunNo: 95764						
Prep Date:	Analysis Date: 4/3/2023			SeqNo: 3466389		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

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 Quantitative 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

Page 4 of 5

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2303E74

06-Apr-23

Client: HILCORP ENERGY

Project: Charles et al

Sample ID: mb		SampType: MBLK		TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW		Batch ID: R95764		RunNo: 95764						
Prep Date:		Analysis Date: 4/3/2023		SeqNo: 3466389		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	11		10.00		108	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		102	70	130			
Surr: Dibromofluoromethane	9.6		10.00		95.5	70	130			
Surr: Toluene-d8	10		10.00		103	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 Quantitative 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
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: 2303E74

RcptNo: 1

Received By: Tracy Casarrubias 3/30/2023 7:15:00 AM

Completed By: Tracy Casarrubias 3/30/2023 8:44:42 AM

Reviewed By:

mg 3/30/23

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:

(<2 or >12 unless noted)

Adjusted? _____

Checked by: *ja 3/30/23*

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:

17. Cooler Information

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

Chain-of-Custody Record

Client: Hilcorp

Mailing Address:

Phone #:

email or Fax#: brandon.sinclair@hilcorp.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)Accreditation: ☐ Az Compliance☐ NELAC ☐ Other☐ EDD (Type)# of Coolers: 1Cooler Temp (including CF): 11-10: 1-1 (°C)

Container Type and #

Preservative Type

HEAL No.

Date

Time

Matrix

Sample Name

Date

Time

Relinquished by:

Relinquished by:

Date

Time

Via:

Date

Time

Remarks:

Received by:

Date

Time

Via:

Date

Time

Remarks:

Received by:

Date

Time

Via:

Date

Time

Turn-Around Time:

☒ Standard ☐ Rush

Project Name:

Charles et al

Project #:

Project Manager:

Kate Kayfman

Sampler:

Brandon Sinclair

On Ice:

☒ Yes ☐ No

of Coolers:

1

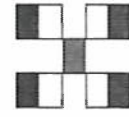
Cooler Temp (including CF):

11-10: 1-1 (°C)

Container Type and #

Preservative Type

HEAL No.

23032740013x Year 1 VOAHCL001HALL ENVIRONMENTAL
ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

BTEX / MTBE / TMB's (8021)

TPH:8015D(GRO / DRO / MRO)

8081 Pesticides/8082 PCB's

EDB (Method 504.1)

PAHs by 8310 or 8270SIMS

RCRA 8 Metals

Cl, F, Br, NO₃, NO₂, PO₄, SO₄

8260 (VOA)

8270 (Semi-VOA)

Total Coliform (Present/Absent)

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 326974

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 326974
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	The 2023 Annual Groundwater Monitoring Report for Charles et al #1 has been received for the record.	5/31/2024