Review of 2020 Annual Groundwater Monitoring Report: Content satisfactory

1. Continue to monitor contaminant concentrations in well MW-1R on a biannual basis
2. OCD agrees with WSP that background sampling should be emphasized to evaluate potential natural levels in manganese, sulfate, and TDS constituents
3. Submit the Annual Monitoring Report to the OCD no later than March 31, 2022

12/28/2021 - NV

January 27, 2021

Ms. Clara Cardoza
Hilcorp Energy Company
PO Box 61229
Houston, TX 77208

Subject: **2020 Annual Groundwater Monitoring Report**
Charles et al #1
NMOCD Incident Number: NRMD0928136813
NMOCD Administrative Order: 3R-432
San Juan County, New Mexico

Dear Ms. Cardoza:

WSP USA Inc. (WSP, formerly LT Environmental, Inc.) presents this annual report on behalf of Hilcorp Energy Company (Hilcorp) to the New Mexico Oil Conservation Division (NMOCD) to document groundwater monitoring activities conducted at the former Charles et al #1 natural gas production well (Site) during 2020 (well plugged and abandoned in 2010). 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 well owner) in 2008 while investigating a pipeline release approximately 0.25 miles from the Charles et al #1 production well. ConocoPhillips further investigated the release and subsequently installed seven groundwater monitoring wells at the Site. 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 7 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, all shallow groundwater monitoring wells were removed using a backhoe in June 2016.

Because petroleum hydrocarbon contaminants were still present in soil and groundwater near groundwater 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 location as former groundwater monitoring well MW-1 for monitoring purposes. Hilcorp acquired the Site from ConocoPhillips in April 2017 and has continued to monitor groundwater conditions in well MW-1R. Additional details regarding the history of the Site can be found in the *2019 Annual Groundwater Monitoring Report* prepared by GHD Services Inc. (dated March 24, 2020). Former well locations and Site features are shown 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" and dated 2012. Additionally, NMOCD requires that groundwater-quality standards presented by the New Mexico Water Quality Control Commission (NMWQCC) in 20.6.2.3103 of the New Mexico Administrative Code (NMAC) be met. Because of this, the most conservative cleanup standards developed by the NNEPA and NMWQCC have been used to compare groundwater analytical results obtained at the Site. The standards are presented in milligrams per liter (mg/L) and are as follows:

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DURANGO CO 81301

Tel.: 970-385-1096
wsp.com

ANALYTE	LIMIT	AGENCY
Benzene	0.005 mg/L	NNEPA and NMWQCC
Toluene	1.0 mg/L	NNEPA and NMWQCC
Ethylbenzene	0.7 mg/L	NNEPA and NMWQCC
Xylenes	0.62 mg/L	NMWQCC
Naphthalene	0.0062 mg/L	NNEPA
Sulfate	600 mg/L	NMWQCC
Manganese	0.2 mg/L	NMWQCC
Total Dissolved Solids	1,000 mg/L	NMWQCC

In addition, NMWQCC standards state that light non-aqueous phase liquids (LNAPLs) shall not be present floating on the groundwater.

GROUNDWATER SAMPLING ACTIVITIES AND RESULTS

As proposed in the 2019 annual report and approved on March 26, 2020 by the NMOCD (Enclosure A), groundwater gauging and sampling was performed on a biannual basis at the Site, which occurred in January and July of 2020. The following sections summarize the sampling procedures and results gathered during these events.

GROUNDWATER-LEVEL MEASUREMENTS

Static groundwater level monitoring included recording depth-to-water in monitoring well MW-1R using a Keck oil/water interface probe. Presence of any phase-separated petroleum hydrocarbons (LNAPLs) was investigated using the interface probe. Depth-to-water measurements during the January and July 2020 sampling events were 4.81 and 6.51 feet, respectively, below the top of well casing. Well construction and groundwater depth information is presented in Table 1.

GROUNDWATER SAMPLING

Groundwater 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 0.25 gallons of groundwater were purged prior to sampling during both sampling events. Field measurements of groundwater quality parameters, including temperature, pH, turbidity, electrical conductivity, dissolved oxygen, and oxidation-reduction potential, were collected during the purging process and are presented in Table 2. In general, groundwater conditions at the Site are generally low in dissolved oxygen and have negative oxidation-reduction potential values (anoxic conditions). These conditions are common at natural-attenuation sites where microbial-degradation processes are occurring.

Following well purging, groundwater samples were placed directly into laboratory-provided jars and labeled with the date and time of collection, well designation, project name, sample collector's name, and parameters to be analyzed. They were immediately sealed, packed on ice, and submitted to Pace Analytical for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8260B, naphthalene by EPA Method 8270C-SIM (naphthalene was only analyzed during the first sampling event), manganese by EPA Method 6020, sulfate by EPA Method 9056A, and total dissolved solids (TDS) by EPA Method 2540. Proper chain-of-custody (COC) 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. Analytical laboratory reports from the sampling events are included as Enclosure B.

GROUNDWATER ANALYTICAL RESULTS

During the January 2020 groundwater sampling event, concentrations of ethylbenzene, xylenes, naphthalene, manganese, sulfate, and TDS exceeded the applicable NNEPA/NMWQCC cleanup standards. Although benzene was not detected during the January sampling event, the laboratory reporting limits for benzene were above the applicable cleanup standard.

Concentrations of benzene, ethylbenzene, xylenes, manganese, sulfate, and TDS also exceeded NNEPA/NMWQCC cleanup standards during the July 2020 sampling event. Concentrations of all other constituents during the two sampling events were either below cleanup standards or were not detected above the laboratory reporting limits. A summary of analytical results are presented in Tables 3 and 4 and depicted on Figure 3.

CONCLUSIONS AND RECOMMENDATIONS

Since 2008, BTEX concentrations have declined in well MW-1/MW-1R. The decline in contaminant concentrations indicates that natural attenuation through biodegradation has occurred at the Site. As such, Hilcorp will continue to monitor contaminant concentrations in well MW-1R on a biannual basis.

Although concentrations of manganese, sulfate, and TDS could be elevated as a biproduct of petroleum degradation, these constituents are often naturally occurring at elevated concentrations in areas with shallow groundwater. To assess background concentrations of these constituents at the Site, WSP also proposes the collection of an upgradient groundwater sample at the Site in an area unaffected by the historical release. Groundwater will be sampled from a temporary well (installed by hand using a hand auger/hydropunch) or, if that fails, through the installation of a permanent groundwater monitoring well. Upgradient groundwater will then be sampled during a biannual sampling event in 2021, with concentrations compared to those detected in well MW-1R to assess the potential background contributions to the Site.

WSP appreciates the opportunity to provide these environmental services to Hilcorp. Please contact either of the undersigned with any questions at (970) 385-1096.

Kind regards,

Stuart Hyde, L.G.
Environmental Geologist

Ashley Ager, M.S., P.G.
Regional Manager, Geologist

Enclosed:

Figure 1: Site Location Map
Figure 2: Site Map
Figure 3: 2020 Groundwater Analytical Results

Table 1: Well Construction Information and Groundwater Elevations
Table 2: Field Parameter Results
Table 3: Petroleum Hydrocarbon Groundwater Analytical Results
Table 4: Groundwater General Chemistry Analytical Results

Enclosure A: March 26, 2020 NMOCD Correspondence
Enclosure B: Analytical Laboratory Reports

FIGURES

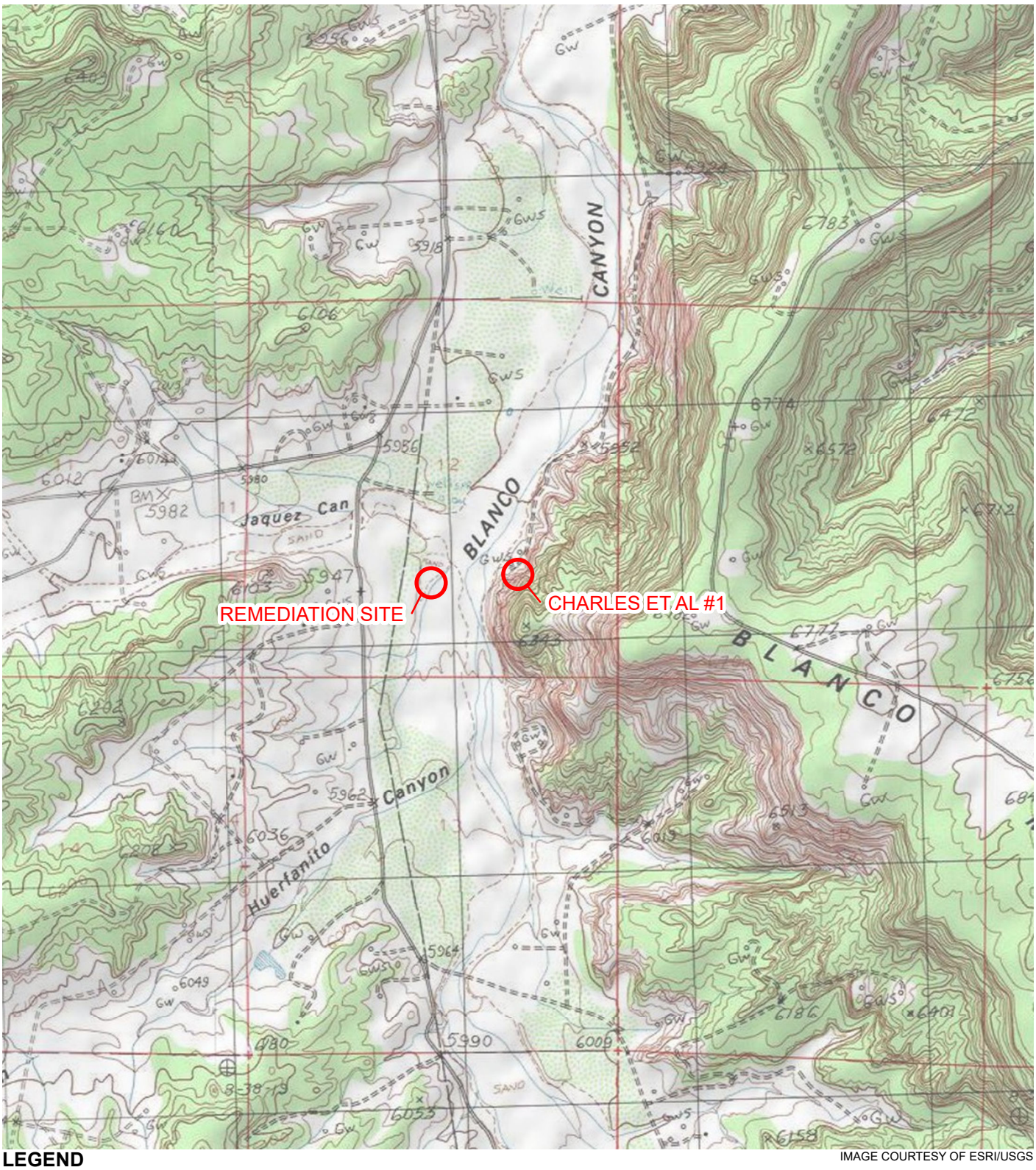

IMAGE COURTESY OF ESRI/USGS

LEGEND

SITE LOCATION

0 2,000 4,000

Feet

N

NEW MEXICO

FIGURE 1
SITE LOCATION MAP
CHARLES ET AL #1
SEC 12-T27N-R9W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017819028_CHARLES ET AL #1\017819028_FIG01_SL_2020.mxd

IMAGE COURTESY OF ESRI

LEGEND

- REPLACEMENT MONITORING WELL
- PLUGGED AND ABANDONED MONITORING WELL (JUNE 2016)
- CHEVRON PIPELINE
- ABANDONED PIPELINE (CONOCO PHILLIPS)
- EXCAVATION EXTENT (JUNE 2016)

0 30 60

Feet

N

FIGURE 2
SITE MAP
CHARLES ET AL #1
SEC 12-T27N-R9W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017819028_CHARLES ET AL #1\017819028_FIG02_SITE_2020.mxd

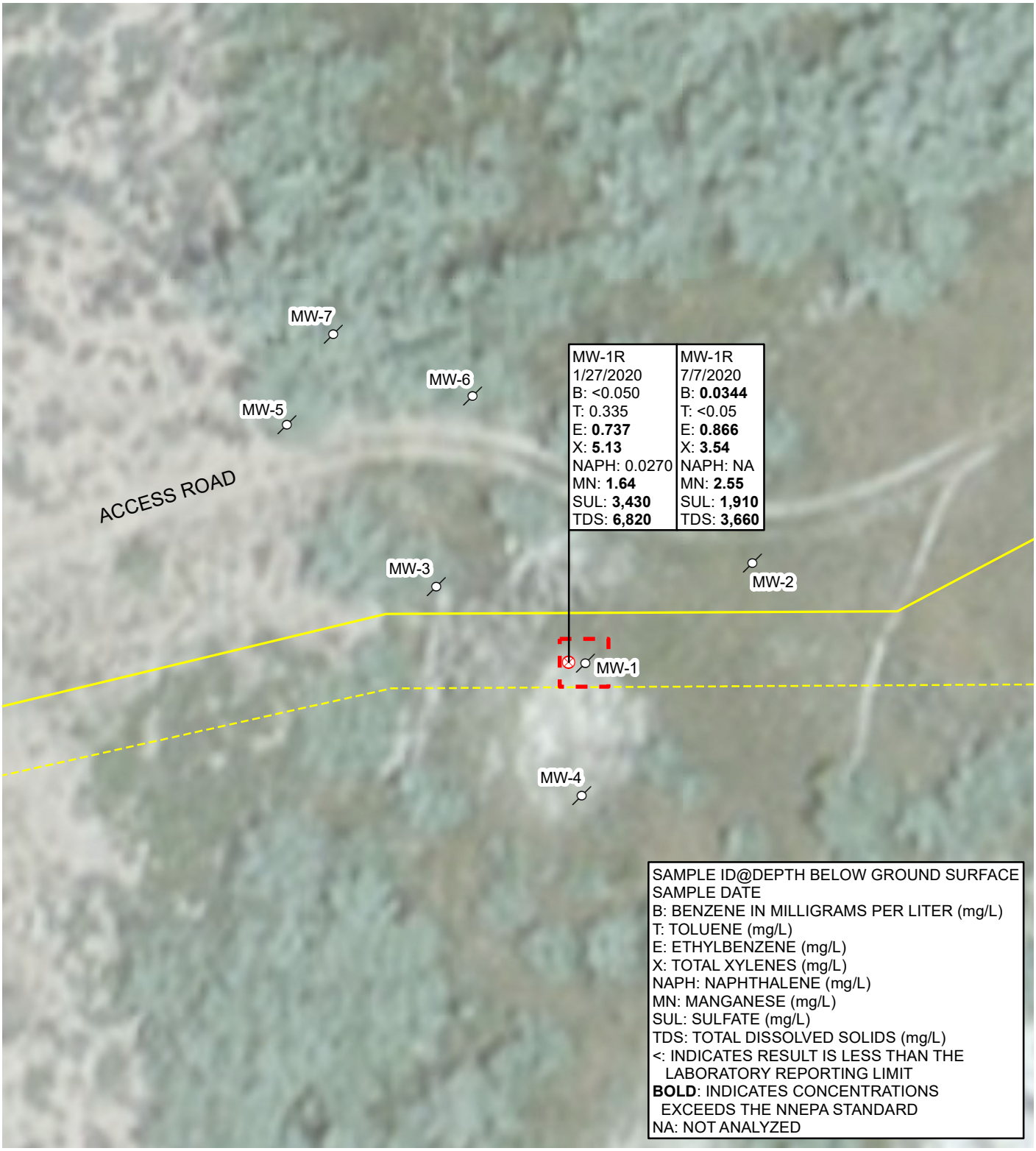

IMAGE COURTESY OF ESRI

LEGEND

- REPLACEMENT MONITORING WELL
- PLUGGED AND ABANDONED MONITORING WELL (JUNE 2016)
- CHEVRON PIPELINE
- ABANDONED PIPELINE (CONOCO PHILLIPS)
- EXCAVATION EXTENT (JUNE 2016)

0 30 60
Feet

N

FIGURE 3
2020 GROUNDWATER ANALYTICAL RESULTS
CHARLES ET AL #1
SEC 12-T27N-R9W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017819028_CHARLES ET AL #1\017819028_FIG03_GWA_2020.mxd

TABLES

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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	5917.87	6/25/2008	4.71	5913.16
		8/14/2008	5.21	5912.66
	5917.05	10/2/2008	5.13	5911.92
		1/13/2009	4.41	5912.64
		3/23/2009	3.01	5914.04
		6/29/2009	2.12	5914.93
		3/30/2010	2.68	5914.37
		6/11/2010	4.74	5912.31
		9/21/2010	5.52	5911.53
		12/16/2010	3.71	5913.34
		3/18/2011	2.98	5914.07
		6/23/2011	4.99	5912.06
		9/27/2011	4.55	5912.50
		12/12/2011	3.23	5913.82
		3/7/2012	3.67	5913.38
		6/4/2012	4.75	5912.30
		9/17/2012	5.57	5911.48
		1/9/2013	3.87	5913.18
		3/18/2013	3.09	5913.96
		6/14/2013	4.83	5912.22
		9/13/2013	5.42	5911.63
		12/13/2013	3.67	5913.38
		3/21/2014	3.27	5913.78
		6/16/2014	5.13	5911.92
		9/19/2014	5.70	5911.35
		12/17/2014	4.22	5912.83
		3/19/2015	3.36	5913.69
		6/19/2015	4.34	5912.71
		9/14/2015	5.55	5911.50
		6/2/2016	Plugged and Abandoned	
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	--

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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	5917.33	6/25/2008	4.66	5912.67
		8/14/2008	5.35	5911.98
	5916.53	10/2/2008	5.12	5911.41
		1/13/2009	3.15	5913.38
		3/23/2009	2.65	5913.88
		6/29/2009	4.20	5912.33
		3/30/2010	2.57	5913.96
		6/11/2010	4.63	5911.90
		9/21/2010	5.53	5911.00
		12/16/2010	3.53	5913.00
		3/18/2011	2.70	5913.83
		6/23/2011	4.80	5911.73
		9/27/2011	4.30	5912.23
		12/12/2011	3.13	5913.40
		3/7/2012	2.58	5913.95
		6/4/2012	4.51	5912.02
		9/17/2012	5.56	5910.97
		1/9/2013	3.75	5912.78
		3/18/2013	3.02	5913.51
		6/14/2013	4.69	5911.84
		9/13/2013	5.09	5911.44
		12/13/2013	3.55	5912.98
		3/21/2014	3.15	5913.38
		6/16/2014	4.98	5911.55
		9/19/2014	5.49	5911.04
		12/17/2014	4.11	5912.42
		3/19/2015	3.30	5913.23
		6/19/2015	4.24	5912.29
		9/14/2015	5.57	5910.96
		6/2/2016	Plugged and Abandoned	
MW-3	5920.57	6/25/2008	7.16	5913.41
		8/14/2008	8.86	5911.71
	5919.8	10/2/2008	7.63	5912.17
		1/13/2009	5.56	5914.24
		3/23/2009	5.56	5914.24
		6/29/2009	1.10	5918.70
		3/30/2010	5.38	5914.42
		6/11/2010	7.44	5912.36
		9/21/2010	8.22	5911.58
		12/16/2010	6.06	5913.74
		3/18/2011	5.42	5914.38
		6/23/2011	7.68	5912.12
		9/27/2011	7.13	5912.67
		12/12/2011	5.78	5914.02
		3/7/2012	5.33	5914.47

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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, Continued	5919.8	6/4/2012	7.27	5912.53
		9/17/2012	8.15	5911.65
		1/9/2013	6.37	5913.43
		3/18/2013	5.68	5914.12
		6/14/2013	7.36	5912.44
		9/13/2013	7.72	5912.08
		12/13/2013	6.20	5913.60
		3/21/2014	5.89	5913.91
		6/16/2014	7.71	5912.09
		9/19/2014	8.13	5911.67
		12/17/2014	6.71	5913.09
		3/19/2015	5.98	5913.82
		6/19/2015	7.01	5912.79
		9/14/2015	8.21	5911.59
		6/2/2016	Plugged and Abandoned	
MW-4	5920.48	6/25/2008	4.27	5916.21
		8/14/2008	7.89	5912.59
	5919.69	10/2/2008	7.73	5911.96
		1/13/2009	5.94	5913.75
		3/23/2009	5.64	5914.05
		6/29/2009	6.84	5912.85
		3/30/2010	5.40	5914.29
		6/11/2010	7.23	5912.46
		9/21/2010	8.17	5911.52
		12/16/2010	6.24	5913.45
		3/18/2011	5.50	5914.19
		6/23/2011	7.50	5912.19
		9/27/2011	6.98	5912.71
		12/12/2011	5.94	5913.75
		3/7/2012	5.36	5914.33
		6/4/2012	7.18	5912.51
		9/17/2012	8.18	5911.51
		1/9/2013	6.53	5913.16
		3/18/2013	5.81	5913.88
		6/14/2013	7.40	5912.29
		9/13/2013	7.77	5911.92
		12/13/2013	6.37	5913.32
		3/21/2014	6.03	5913.66
		6/16/2014	7.63	5912.06
		9/19/2014	8.09	5911.60
		12/17/2014	6.87	5912.82
		3/19/2015	6.05	5913.64
		6/19/2015	6.92	5912.77
		9/14/2015	DRY	NA
		6/2/2016	Plugged and Abandoned	

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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	5923.63	6/26/2008	8.23	5915.40
		8/14/2008	8.68	5914.95
	5921.55	10/2/2008	8.70	5912.85
		1/13/2009	6.96	5914.59
		3/23/2009	6.58	5914.97
		6/29/2009	4.10	5917.45
		3/30/2010	NM	NA
		6/11/2010	8.20	5913.35
		9/21/2010	9.25	5912.30
		12/16/2010	7.40	5914.15
		3/18/2011	6.74	5914.81
		6/23/2011	NM	NA
		9/26/2011	8.25	5913.30
		12/12/2011	7.12	5914.43
		3/7/2012	6.65	5914.90
		6/4/2012	8.17	5913.38
		9/17/2012	9.30	5912.25
		1/9/2013	7.76	5913.79
		3/18/2013	7.05	5914.50
		6/14/2013	8.49	5913.06
		9/13/2013	8.97	5912.58
		12/13/2013	7.55	5914.00
		3/21/2014	7.17	5914.38
		6/16/2014	8.72	5912.83
		9/19/2014	9.35	5912.20
		12/17/2014	8.07	5913.48
		3/19/2015	7.33	5914.22
		6/19/2015	8.24	5913.31
		9/14/2015	9.48	5912.07
		6/2/2016	Plugged and Abandoned	
MW-6	5920.68	6/26/2008	6.75	5913.93
		8/14/2008	6.97	5913.71
	5918.64	10/2/2008	6.83	5911.81
		1/13/2009	4.89	5913.75
		3/23/2009	4.12	5914.52
		6/29/2009	1.80	5916.84
		3/30/2010	NM	NA
		6/11/2010	6.63	5912.01
		9/21/2010	7.41	5911.23
		12/16/2010	5.12	5913.52
		3/15/2011	4.49	5914.15
		6/23/2011	6.80	5911.84
		9/26/2011	6.33	5912.31
		12/12/2011	4.84	5913.80
		3/7/2012	4.46	5914.18

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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, Continued	5918.64	6/4/2012	6.45	5912.19
		9/17/2012	7.37	5911.27
		1/9/2013	5.46	5913.18
		3/18/2013	4.80	5913.84
		6/14/2013	6.60	5912.04
		9/13/2013	6.90	5911.74
		12/13/2013	5.32	5913.32
		3/21/2014	5.03	5913.61
		6/16/2014	6.85	5911.79
		9/19/2014	7.34	5911.30
		12/17/2014	5.79	5912.85
		3/19/2015	5.22	5913.42
		6/19/2015	6.21	5912.43
		9/14/2015	DRY	NA
		6/2/2016	Plugged and Abandoned	
MW-7	5920.75	6/26/2008	6.32	5914.43
		8/14/2008	7.17	5913.58
	5918.74	10/2/2008	6.42	5912.32
		1/13/2009	NM	NA
		3/23/2009	4.67	5914.07
		6/29/2009	1.56	5917.18
		3/30/2010	NM	NA
		6/11/2010	NM	NA
		9/21/2010	NM	NA
		12/16/2010	4.91	5913.83
		3/18/2011	DRY	NA
		6/23/2011	6.55	5912.19
		9/26/2011	6.14	5912.60
		12/12/2011	DRY	NA
		3/7/2012	DRY	NA
		6/4/2012	6.08	5912.66
		9/17/2012	7.11	5911.63
		1/9/2013	5.28	5913.46
		3/18/2013	4.54	5914.20
		6/14/2013	6.31	5912.43
		9/13/2013	6.66	5912.08
		12/13/2013	5.35	5913.39
		3/21/2014	4.70	5914.04
		6/16/2014	6.59	5912.15
		9/19/2014	7.14	5911.60
		12/17/2014	5.59	5913.15
		3/19/2015	4.98	5913.76

TABLE 1

WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS
CHARLES ET AL #1
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, Continued	5918.74	6/19/2015	6.10	5912.64
		9/14/2015	7.34	5911.40
		6/3/2016	Plugged and Abandoned	

Notes:
ft - feet
AMSL - above mean sea level
BTOC - below top of casing
NA - not available
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

FIELD PARAMETER RESULTS
CHARLES ET AL #1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Volume (gallons)
MW-1R	6/23/2016	18.40	6.43	--	3.63	2.23	-68.3	0.25
	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	0.25
	10/28/2019	--	7.27	1.23	5.80	5.70	-85.5	0.25
	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	--

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
-- - insuficient volume to collect field parameters

TABLE 3

PETROLEUM HYDROCARBON GROUNDWATER ANALYTICAL RESULTS
CHARLES ET AL #1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)
NNEPA/NMWQCC Standard				**0.005**	**1.0**	**0.7**	**0.62**	**0.0062**
MW-1	MW-1	6/25/2008	(orig)	**1.85**	0.486	**0.971**	0.379	NT
	MW-1	9/25/2008	(orig)	**0.575**	0.66	0.293	**1.547**	NT
	MW-1	1/13/2009	(orig)	**0.494**	0.581	0.474	**3.572**	NT
	MW-1	3/23/2009	(orig)	**0.21**	0.311	0.378	**1.418**	NT
	MW-1	6/29/2009	(orig)	**0.839**	0.107	0.674	**3.404**	NT
	MW-1	3/30/2010	(orig)	**0.48**	0.11	0.25	**1.573**	NT
	MW-1	6/11/2010	(orig)	**3.2**	0.45	0.69	**4.51**	NT
	MW-1	9/21/2010	(orig)	**2.3**	**1.1**	0.25	**4.84**	NT
	MW-1	12/16/2010	(orig)	**0.18**	0.2	0.25	**1.79**	NT
	MW-1	3/18/2011	(orig)	**0.15**	0.14	0.16	**1.083**	NT
	GW-74935-062311-PG04	6/23/2011	(orig)	**3.2**	0.933	**0.972**	**5.8**	NT
	GW-74935-062311-PG05	6/23/2011	(Duplicate)	**3.38**	**1.45**	**1.06**	**6.76**	NT
	GW-074935-092611-CM-008	9/26/2011	(orig)	**1.56**	**2.61**	0.624	**6.59**	NT
	GW-074935-092611-CM-009	9/26/2011	(Duplicate)	**1.57**	**3.02**	**0.756**	**7.26**	NT
	GW-074935-121211-CB-MW-1	12/12/2011	(orig)	**0.232**	0.947	0.5	**3.94**	NT
	GW-074935-121211-CB-DUP	12/12/2011	(Duplicate)	**0.244**	0.994	0.58	**4.65**	NT
	GW-074935-3712-CB-MW-1	3/7/2012	(orig)	**0.0637**	0.366	0.293	**2.23**	NT
	GW-074935-3712-CB-DUP	3/7/2012	(Duplicate)	**0.0693**	0.416	0.333	**2.63**	NT
	GW-074935-060412-CB-MW-1	6/4/2012	(orig)	**0.956**	**2.38**	**0.919**	**6.71**	NT
	GW-074935-060412-CB-DUP	6/4/2012	(Duplicate)	**0.934**	**2.26**	**0.966**	**6.36**	NT
	GW-074935-091712-CM-MW-1	9/17/2012	(orig)	**0.941**	**3.51**	**0.785**	**5.56**	NT
	GW-074935-091712-CM-DUP	9/17/2012	(Duplicate)	**0.984**	**3.04**	**0.852**	**5.87**	NT
	GW-074935-010913-CM-MW-1	1/9/2013	(orig)	**0.125**	**1.14**	0.334	**2.44**	NT
	GW-074935-010913-CM-DUP	1/9/2013	(Duplicate)	**0.142**	**1.52**	0.438	**3.09**	NT
	GW-074935-031813-CM-MW-1	3/18/2013	(orig)	**0.012**	0.195	0.0871	0.581	NT
	GW-074935-031813-CM-DUP	3/18/2013	(Duplicate)	**0.0114**	0.188	0.0891	0.575	NT
	GW-074935-061413-JK-MW1	6/14/2013	(orig)	**0.174**	**1.41**	0.668	**3.26**	NT
	GW-074935-061413-JK-DUP	6/14/2013	(Duplicate)	**0.189**	**2.02**	**0.742**	**4.17**	NT
	GW-074935-091313-CM-MW-1	9/13/2013	(orig)	**0.0414**	**3.24**	0.123	**4.34**	NT
	GW-074935-091313-CM-DUP	9/13/2013	(Duplicate)	**0.0372**	**3.3**	0.126	**4.43**	NT
	GW-074935-121313-CM-MW-1	12/13/2013	(orig)	**0.0053**	0.188	0.122	**0.681**	NT
	GW-074935-121313-CM-DUP	12/13/2013	(Duplicate)	**0.0071**	0.258	0.148	**0.843**	NT
	GW-074935-032114-CK-MW-1	3/21/2014	(orig)	<0.001	0.0348	0.0591	0.247	NT
	GW-074935-032114-CK-DUP	3/21/2014	(Duplicate)	<0.001	0.0385	0.0651	0.26	NT
	GW-074935-061614-CK-MW-1	6/16/2014	(orig)	**0.133**	**1.94**	**0.994**	**4.5**	NT
	GW-074935-061614-CK-DUP	6/16/2014	(Duplicate)	**0.134**	**1.92**	**0.921**	**4.5**	NT
	GW-074935-091914-CB-MW-1	9/19/2014	(orig)	**0.159**	**2.34**	0.630	**3.38**	NT
	GW-074935-121714-JW-MW-1	12/17/2014	(orig)	**0.0138**	0.422	0.248	**1.48**	NT
	GW-074935-121714-JW-DUP	12/17/2014	(Duplicate)	**0.0137**	0.44	0.251	**1.52**	NT
	GW-074935-031915-CM-MW-1	3/19/2015	(orig)	<0.005	0.227	0.174	**1.03**	NT
	GW-074935-061915-CB-MW-1	6/19/2015	(orig)	**0.025**	0.326	0.496	**2.44**	NT
	GW-074935-061915-CB-DUP	6/19/2015	(Duplicate)	**0.0241**	0.306	0.472	**2.31**	NT
	GW-074935-091415-CK-MW-1	9/14/2015	(orig)	**0.0339**	0.0257	0.242	0.504	NT
	Plugged and Abandoned June 2016							
MW-1R	GW-074935-062316-SP-MW-1R	6/23/2016	(orig)	0.0026	0.002	0.0521	0.215	NT
	GW-074935-091216-CM-MW-1R	9/23/2016	(orig)	<0.001	< 0.001	0.191	0.518	NT
	GW-074935-11282016-CN-MW-1R	11/28/2016	(orig)	**0.028**	0.0084	**0.901**	**4.39**	NT
	GW-074635-030617-CN-MW-1R	3/6/2017	(orig)	**0.0342**	<0.020	0.333	**1.940**	NT
	GW-074935-061217-CN-MW1R	6/12/2017	(orig)	**0.0162**	<0.010	0.304	0.522	NT
	GW-11146002-092517-CN-MW-1R	9/25/2017	(orig)	**0.0126**	<0.010	0.600	**1.05**	NT
	GW-11146002-120417-SP-MW-1R	12/4/2017	(dup)	**0.015**	**1.880**	**0.946**	**7.96**	NT
	GW-11146002-031318-CN-MW1R	3/13/2018	(orig)	<0.050	0.505	**0.840**	**4.80**	NT
	GW-11146002-062518-CM-MW-1R	6/25/2018	(orig)	<0.025	**1.010**	0.165	**4.41**	NT
	GW-11146002-090418-JP-MW-1R	9/4/2018	(orig)	<0.020	0.798	<0.020	**1.55**	NT
	MW-1R	12/6/2018	(orig)	<0.010	0.268	**0.922**	**3.40**	NT
	MW-1R	2/26/2019	(orig)	**0.0101**	0.519	0.576	**6.71**	NT
	MW-1R	5/17/2019	(orig)	<0.0100	<0.100	**0.923**	**3.66**	**0.0753**
	MW-1R	8/9/2019	(orig)	**0.0211**	<0.100	0.594	**1.56**	**0.0258**
	MW-1R	10/28/2019	(orig)	<0.250	<0.250	**1.11**	**3.29**	**0.447**
	MW-1R	1/27/2020	(orig)	<0.050	0.335	**0.737**	**5.13**	**0.0270**
	MW-1R	7/7/2020	(orig)	**0.0344**	<0.05	**0.866**	**3.54**	NT

TABLE 3

PETROLEUM HYDROCARBON GROUNDWATER ANALYTICAL RESULTS
CHARLES ET AL #1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)
NNEPA/NMWQCC Standard				**0.005**	**1.0**	**0.7**	**0.62**	**0.0062**
MW-2	MW-2	6/25/2008	(orig)	0.0042	0.0046	0.0016	0.0011	NT
	MW-2	9/25/2008	(orig)	**0.0195**	0.0258	0.0051	0.1008	NT
	MW-2	1/13/2009	(orig)	0.0021	0.002	0.0022	0.0281	NT
	MW-2	3/23/2009	(orig)	0.0014	0.0004	0.0006	0.0073	NT
	MW-2	6/29/2009	(orig)	0.0015	< 0.0002	0.0002	0.0004	NT
	MW-2	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-2	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-2	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-2	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-2	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	GW-74935-062311-PG02	6/23/2011	(orig)	0.0006	< 0.001	< 0.001	< 0.003	NT
	GW-074935-092611-JP-010	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121211-CB-MW-2	12/12/2011	(orig)	0.00034	< 0.001	< 0.001	< 0.003	NT
	GW-074935-3712-CB-MW-2	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-060412-CB-MW-2	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091712-CM-MW-2	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-010913-CM-MW-2	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-031813-CM-MW-2	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061413-JK-MW-2	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091313-CM-MW-2	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121313-CM-MW-2	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-032114-CK-MW-2	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061614-CK-MW-2	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091914-CB-MW-2	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121714-JW-MW-2	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	Plugged and Abandoned June 2016							
MW-3	MW-3	6/25/2008	(orig)	ND	ND	ND	ND	NT
	MW-3	9/25/2008	(orig)	ND	0.0023	0.0009	0.0121	NT
	MW-3	1/13/2009	(orig)	ND	ND	ND	ND	NT
	MW-3	3/23/2009	(orig)	< 0.0002	0.0002	0.0002	0.0014	NT
	MW-3	6/29/2009	(orig)	< 0.0002	0.0017	0.0007	0.0082	NT
	MW-3	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-3	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-3	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-3	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-3	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	GW-74935-062311-PG01	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-092611-CM-006	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121211-CB-MW-3	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-3712-CB-MW-3	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-060412-CB-MW-3	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091712-CM-MW-3	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-010913-CM-MW-3	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-031813-CM-MW-3	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061413-JK-MW-3	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091313-CM-MW-3	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121313-CM-MW-3	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-032114-CK-MW-3	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061614-CK-MW-3	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091914-CB-MW-3	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091914-CB-DUP	9/19/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121714-JW-MW-3	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	Plugged and Abandoned June 2016							

TABLE 3

PETROLEUM HYDROCARBON GROUNDWATER ANALYTICAL RESULTS
CHARLES ET AL #1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample ID	Sample Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)
NNEPA/NMWQCC Standard				**0.005**	**1.0**	**0.7**	**0.62**	**0.0062**
MW-4	MW-4	6/25/2008	(orig)	0.0038	0.0199	0.0014	0.007	NT
	MW-4	9/25/2008	(orig)	ND	ND	ND	ND	NT
	MW-4	1/13/2009	(orig)	ND	ND	ND	ND	NT
	MW-4	3/23/2009	(orig)	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NT
	MW-4	6/29/2009	(orig)	< 0.0002	< 0.0002	0.0002	0.0029	NT
	MW-4	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-4	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-4	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-4	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	MW-4	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	NT
	GW-74935-062311-PG03	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-092611-SP-007	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121211-CB-MW-4	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-3712-CB-MW-4	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-060412-CB-MW-4	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-010913-CM-MW-4	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091712-CM-MW-4	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-031813-CM-MW-4	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061413-JK-MW-4	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091313-CM-MW-4	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121313-CM-MW-4	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-032114-CK-MW-4	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-061614-CK-MW-4	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-091914-CB-MW-4	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	GW-074935-121714-JW-MW-4	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	NT
	Plugged and Abandoned June 2016							
MW-5	MW-5	6/26/2008	(orig)	ND	ND	ND	ND	NT
	MW-5	9/25/2008	(orig)	ND	ND	ND	ND	NT
	MW-5	1/13/2009	(orig)	ND	ND	ND	ND	NT
	MW-5	3/23/2009	(orig)	ND	ND	ND	ND	NT
	Plugged and Abandoned June 2016							
MW-6	MW-6	6/26/2008	(orig)	ND	ND	ND	ND	NT
	MW-6	9/25/2008	(orig)	ND	ND	ND	ND	NT
	MW-6	1/13/2009	(orig)	ND	ND	ND	ND	NT
	MW-6	3/23/2009	(orig)	ND	ND	ND	ND	NT
	Plugged and Abandoned June 2016							
MW-7	MW-7	6/26/2008	(orig)	ND	ND	ND	ND	NT
	MW-7	9/25/2008	(orig)	ND	ND	ND	ND	NT
	MW-7	3/23/2009	(orig)	ND	ND	ND	ND	NT
	Plugged and Abandoned June 2016							

Notes:
mg/L - milligrams per liter
ND - not detected, practical quantitation limit unknown
NE - not established
NNEPA - Navajo Nation Environmental Protection Agency
NT - not tested
<0.037 - indicates result less than the stated laboratory reporting limit (PQL)
BOLD - indicates concentration exceeds the applicable standard

TABLE 4

GROUNDWATER GENERAL CHEMISTRY ANALYTICAL RESULTS
CHARLES ET AL #1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample ID	Sample Date	Alkalinity (mg/L)	Bicarbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Manganese (mg/L)	Nitrate (as N) (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Specific Conductance (µmhos/cm)	Sulfate (mg/L)	TDS (mg/L)
NMWQCC Standard			**NE**	**NE**	**250**	**1.6**	**0.2**	**10**	**7 - 9**	**NE**	**NE**	**NE**	**600**	**1,000**
MW-1R	MW-1R	5/17/2019	1,010	1,010	111	0.30	**17.6**	<0.100	7.53	2.88	1,820	8,440	**4,300**	**7,670**
	MW-1R	8/9/2019	NT	NT	NT	NT	**3.41**	NT	NT	NT	NT	NT	**2,900**	**5,030**
	MW-1R	10/28/2019	NT	NT	NT	NT	**1.17**	NT	NT	NT	NT	NT	**1,040**	**2,850**
	MW-1R	1/27/2020	NT	NT	NT	NT	**1.64**	NT	NT	NT	NT	NT	**3,430**	**6,820**
	MW-1R	7/7/2020	NT	NT	NT	NT	**2.55**	NT	NT	NT	NT	NT	**1,910**	**3,660**

Notes:
µmhos/cm - microohms per centimeter
mg/L - milligrams per liter
NE - not established
NMWQCC - New Mexico Water Quality Control Commission
NT - not tested
<0.037 - indicates result less than the stated laboratory reporting limit (PQL)
BOLD - indicates concentration exceeds the NMWQCC standard

ENCLOSURE A – MARCH 26, 2020 NMOCD CORRESPONDENCE

From: Clara Cardoza
To: Devin Hencmann; Stuart Hyde
Subject: FW: [EXTERNAL] RE: Incident # NRMD0928136813-Charles el al #1 2019 Annual GWM Rpt
Date: Thursday, April 9, 2020 9:46:33 AM
Attachments: image001.png
image002.png
image003.png
image004.png

FYI, Cory's response to the Charles et al GW report.

From: Smith, Cory, EMNRD [mailto:Cory.Smith@state.nm.us]
Sent: Thursday, March 26, 2020 11:01 AM
To: Clara Cardoza <ccardoza@hilcorp.com>
Cc: Jeffrey Walker <Jeff.Walker@ghd.com>; nnepawq@frontiernet.net
Subject: [EXTERNAL] RE: Incident # NRMD0928136813-Charles el al #1 2019 Annual GWM Rpt

Clara,

OCD has reviewed the 2019 annual Ground Water report for the release at the Charles el al #1 OCD incident# nRMD0928136813

OCD approves HEC request to transfer to Bi-Annual sampling events until HEC believes the site is ready to transition back to quarterly sampling to pursue closure.

Please continue to sample for the previously approved sample constituents. OCD recommends that an upgradient background sample be collected to compare the inorganic constituents which maybe naturally occurring in the area.

Please include this approval in your 2020 AGWR. The Report will be scanned into the Online Incident File.

Thank you,

Cory

From: Jeffrey Walker <Jeff.Walker@ghd.com>
Sent: Wednesday, March 25, 2020 9:11 AM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>; nnepawq@frontiernet.net
Cc: Clara Cardoza (ccardoza@hilcorp.com) <ccardoza@hilcorp.com>
Subject: [EXT] Incident # NRMD0928136813-Charles el al #1 2019 Annual GWM Rpt

Cory and Steve,

The attached 2019 Annual Groundwater Monitoring Report is submitted on behalf of Hilcorp Energy for your review and comment. Please do not hesitate to contact myself or Clara Cardoza with any questions about this document or the site.

Thank you-Jeff

Jeffrey L. Walker
Sr. Project Manager

GHD
Proudly employee owned
T: +1 505 884 0672 | M: +1 505 377 3920| E: jeff.walker@ghd.com
6121 Indian School Road, NE Ste 200 Albuquerque NM 87110 USA | www.ghd.com
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ENCLOSURE B – ANALYTICAL LABORATORY REPORTS

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 29, 2020

Revised Report

HilCorp-Farmington, NM

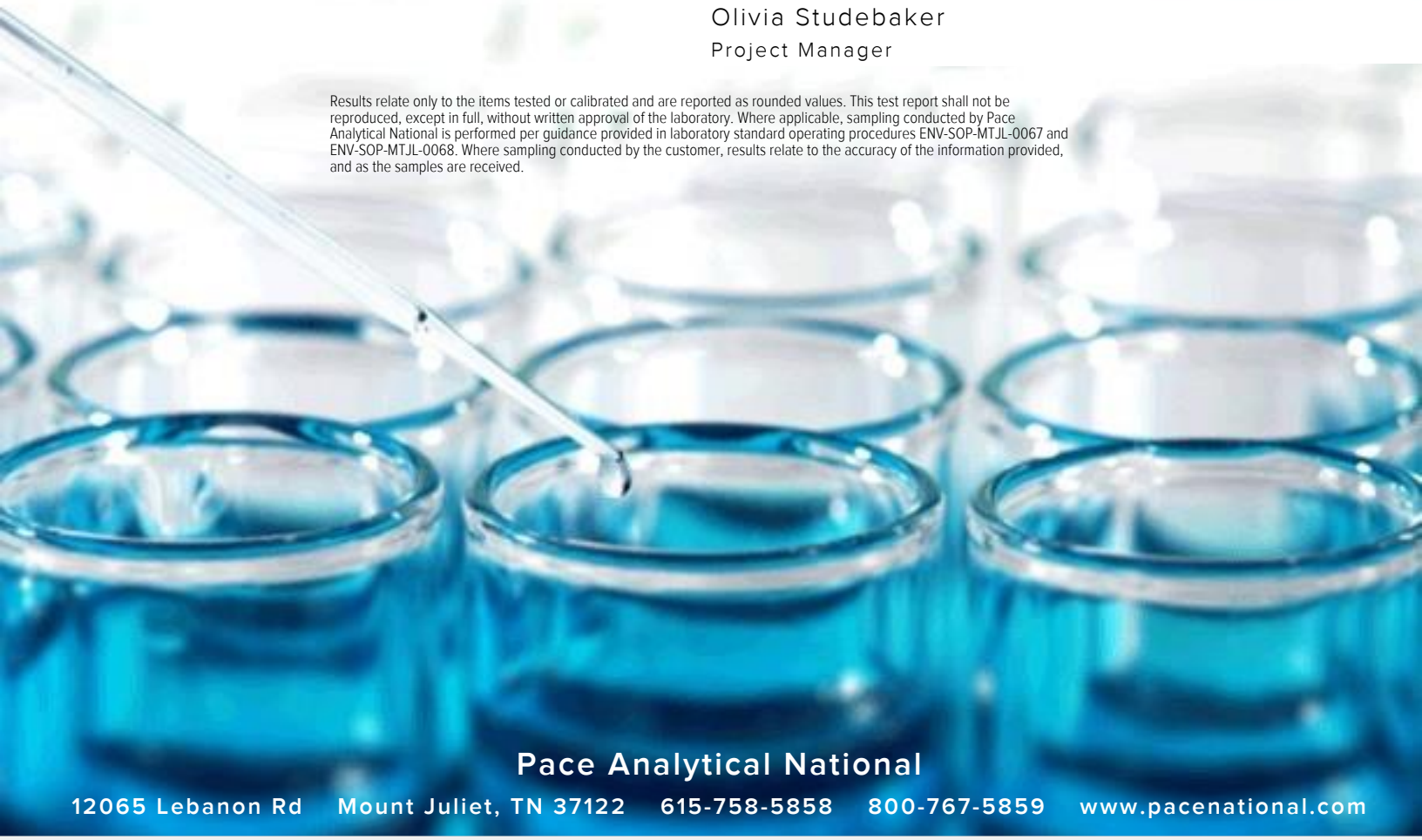
Sample Delivery Group:	L1183917
Samples Received:	01/29/2020
Project Number:	CHARLES ET AL NO. 1
Description:	Charles et al No. 1
Site:	CHARLES ET AL NO. 1
Report To:	Kurt Hoekstra 382 Road 3100 Aztec, NM 87401

Entire Report Reviewed By:

[Preliminary Report]

Olivia Studebaker
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

MW-1R L1183917-01 GW

			Collected by	Collected date/time	Received date/time	
			Kurt Hoekstra	01/27/20 13:00	01/29/20 08:30	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1421126	1	02/03/20 10:39	02/03/20 11:28	MMF	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1419384	100	01/30/20 23:10	01/30/20 23:10	ELN	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1419281	1	01/30/20 11:16	01/30/20 13:39	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1419958	50	01/30/20 22:31	01/30/20 22:31	ADM	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1419894	1	01/30/20 17:13	01/31/20 00:29	AAT	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

[Preliminary Report]

Olivia Studebaker
Project Manager

Report Revision History

Level II Report - Version 1: 02/05/20 17:13

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	6820		100	1	02/03/2020 11:28	WG1421126

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Sulfate	3430		500	100	01/30/2020 23:10	WG1419384

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Manganese,Dissolved	1.64		0.00500	1	01/30/2020 13:39	WG1419281

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.0500	50	01/30/2020 22:31	WG1419958
Toluene	0.335		0.0500	50	01/30/2020 22:31	WG1419958
Ethylbenzene	0.737		0.0500	50	01/30/2020 22:31	WG1419958
Total Xylenes	5.13		0.150	50	01/30/2020 22:31	WG1419958
(S) Toluene-d8	*100*		*80.0-120*		*01/30/2020 22:31*	WG1419958
(S) 4-Bromofluorobenzene	*93.3*		*77.0-126*		*01/30/2020 22:31*	WG1419958
(S) 1,2-Dichloroethane-d4	*95.5*		*70.0-130*		*01/30/2020 22:31*	WG1419958

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Naphthalene	0.0270		0.000250	1	01/31/2020 00:29	WG1419894
(S) Nitrobenzene-d5	*49.1*		*31.0-160*		*01/31/2020 00:29*	WG1419894
(S) 2-Fluorobiphenyl	*70.0*		*48.0-148*		*01/31/2020 00:29*	WG1419894
(S) p-Terphenyl-d14	*93.0*		*37.0-146*		*01/31/2020 00:29*	WG1419894

Method Blank (MB)

(MB) R3496753-1 02/03/20 11:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

L1183308-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1183308-01 02/03/20 11:28 • (DUP) R3496753-3 02/03/20 11:28

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	705	720	1	2.06		5

Laboratory Control Sample (LCS)

(LCS) R3496753-2 02/03/20 11:28

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800	8570	97.4	85.0-115	

Method Blank (MB)

(MB) R3495721-1 01/30/20 18:33

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sulfate, Dissolved	U		0.0774	5.00

L1183816-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1183816-01 01/30/20 20:42 • (DUP) R3495721-3 01/30/20 20:58

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate, Dissolved	ND	ND	1	0.000		15

L1183998-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1183998-01 01/30/20 23:59 • (DUP) R3495721-6 01/31/20 00:15

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate, Dissolved	ND	ND	1	0.000		15

Laboratory Control Sample (LCS)

(LCS) R3495721-2 01/30/20 18:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Sulfate, Dissolved	40.0	40.0	100	80.0-120	

L1183816-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1183816-01 01/30/20 20:42 • (MS) R3495721-4 01/30/20 21:15 • (MSD) R3495721-5 01/30/20 21:31

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sulfate, Dissolved	50.0	ND	48.7	48.7	94.1	94.0	1	80.0-120			0.0948	15

L1183998-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1183998-01 01/30/20 23:59 • (MS) R3495721-7 01/31/20 00:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate, Dissolved	50.0	ND	53.3	99.6	1	80.0-120	

Method Blank (MB)

(MB) R3495498-1 01/30/20 13:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Manganese,Dissolved	U		0.000250	0.00500

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3495498-2 01/30/20 13:15 • (LCSD) R3495498-3 01/30/20 13:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Manganese,Dissolved	0.0500	0.0507	0.0505	101	101	80.0-120			0.497	20

L1182735-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1182735-07 01/30/20 13:22 • (MS) R3495498-5 01/30/20 13:29 • (MSD) R3495498-6 01/30/20 13:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese,Dissolved	0.0500	0.0201	0.0697	0.0697	99.2	99.2	1	75.0-125			0.0178	20

Method Blank (MB)

(MB) R3495735-2 01/30/20 19:03

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*102*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.2*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*93.1*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3495735-1 01/30/20 18:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00485	97.0	70.0-123	
Ethylbenzene	0.00500	0.00495	99.0	79.0-123	
Toluene	0.00500	0.00446	89.2	79.0-120	
Xylenes, Total	0.0150	0.0146	97.3	79.0-123	
(S) Toluene-d8			*100*	*80.0-120*	
(S) 4-Bromofluorobenzene			*96.9*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*101*	*70.0-130*	

Method Blank (MB)

(MB) R3495662-3 01/30/20 22:03

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Naphthalene	U		0.0000198	0.000250
(S) Nitrobenzene-d5	*82.0*			*31.0-160*
(S) 2-Fluorobiphenyl	*87.5*			*48.0-148*
(S) p-Terphenyl-d14	*99.5*			*37.0-146*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3495662-1 01/30/20 21:22 • (LCSD) R3495662-2 01/30/20 21:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Naphthalene	0.00200	0.00183	0.00172	91.5	86.0	61.0-137			6.20	20
(S) Nitrobenzene-d5				*89.5*	*83.5*	*31.0-160*				
(S) 2-Fluorobiphenyl				*94.0*	*89.0*	*48.0-148*				
(S) p-Terphenyl-d14				*99.0*	*93.5*	*37.0-146*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	KY90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA

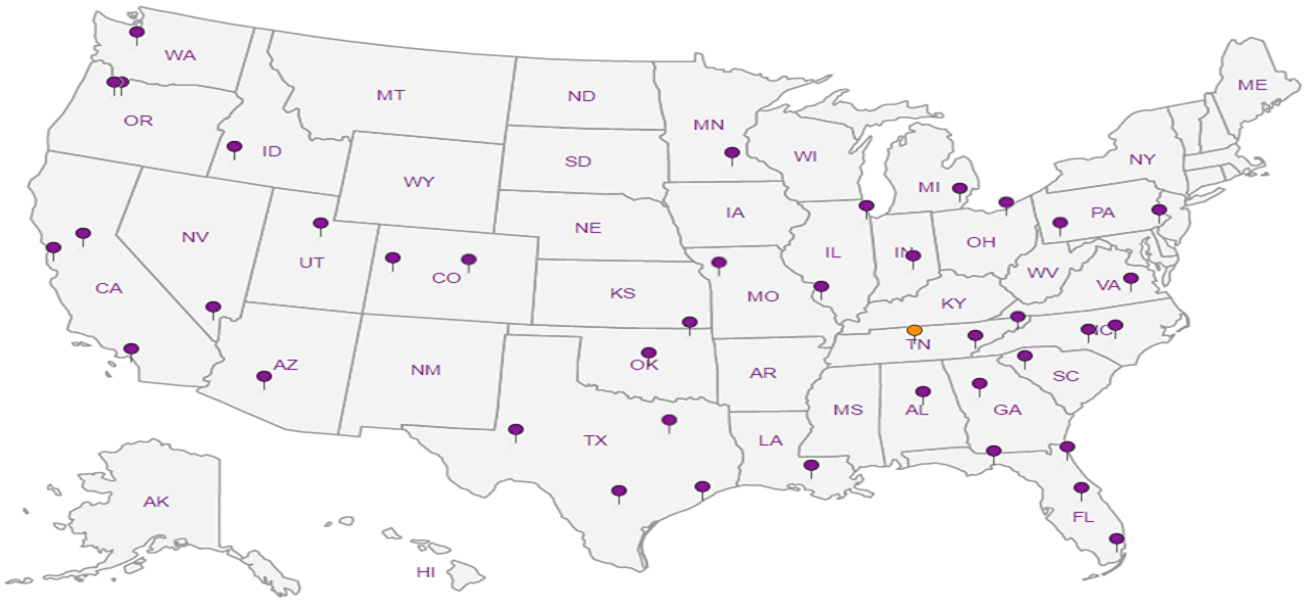
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
HilCorp-Farmington, NM	CHARLES ET AL NO. 1	L1183917	12/29/20 15:26	12 of 13

HilCorp-Farmington, NM

382 Road 3100
Aztec, NM 87401

Billing Information:

PO Box 61529
Houston, TX 77208

Report to: **Kurt Hoekstra**

Email To: **@hilcorp.com;khoekstra@hilcorp.com**

Project Description: **Charles et al No. 1**

City/State Collected:

Phone: **505-486-9543**
Fax:

Client Project # **CHARLES ET AL NO. 1**

Lab Project # **HILCORANM-CHARLES**

Collected by (print): Kurt Hoekstra

Site/Facility ID # **CHARLES ET AL NO. 1**

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day X Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk: X

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Dissolved Mn 250mlHDPE-NoPres	PAHSIMLVI 40mlAmb-NoPres-WT	SULFATE,TDS 250mlHDPE-NoPres	V8260BTEX 40mlAmb-HCl	Remarks	Sample # (lab only)
MW-1R		GW		1-27	1:00	7	X	X	X	X		-01

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1103917

Tab 1051

Acctnum: **HILCORANM**

Template: **T153791**

Prelogin: **P722245**

TSR: **288 - Daphne Richards**

PB:

Shipped Via: **FedEX Ground**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 1145 2233 3008

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Kurt Hoekstra	1-28-20	8:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.1 °C Bottles Received: 7	If preservation required by Login: Date/Time
				1.0±0=1.0	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 29 Jan	Time: 0830

Hold: | Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

July 17, 2020

HilCorp-Farmington, NM

Sample Delivery Group:	L1238502
Samples Received:	07/10/2020
Project Number:	CHARLES ET AL NO. 1
Description:	Charles et al No. 1
Site:	CHARLES ET AL NO. 1
Report To:	Kurt Hoekstra 382 Road 3100 Aztec, NM 87401

Entire Report Reviewed By:

Olivia Studebaker
Project Manager

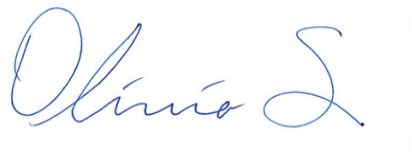
Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

TABLE OF CONTENTS

MW-1R L1238502-01 GW

			Collected by	Collected date/time	Received date/time	
			Kurt	07/07/20 10:40	07/10/20 08:30	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1507913	1	07/12/20 19:09	07/12/20 22:15	TH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1507968	100	07/14/20 03:32	07/14/20 03:32	ELN	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1507526	1	07/14/20 11:34	07/14/20 16:25	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1508073	50	07/13/20 16:33	07/13/20 16:33	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1510850	5	07/17/20 13:17	07/17/20 13:17	KMC	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Olivia Studebaker
Project Manager

Sample Delivery Group (SDG) Narrative

VOC pH outside of method requirement.

Lab Sample ID	Project Sample ID	Method
L1238502-01	MW-1R	8260B

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	3660		100	1	07/12/2020 22:15	WG1507913

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Sulfate	1910		500	100	07/14/2020 03:32	WG1507968

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Manganese,Dissolved	2.55		0.00500	1	07/14/2020 16:25	WG1507526

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.0344		0.00500	5	07/17/2020 13:17	WG1510850
Toluene	ND		0.0500	50	07/13/2020 16:33	WG1508073
Ethylbenzene	0.866		0.0500	50	07/13/2020 16:33	WG1508073
Total Xylenes	3.54		0.150	50	07/13/2020 16:33	WG1508073
(S) Toluene-d8	*98.5*		*80.0-120*		*07/13/2020 16:33*	WG1508073
(S) Toluene-d8	*89.3*		*80.0-120*		*07/17/2020 13:17*	WG1510850
(S) 4-Bromofluorobenzene	*113*		*77.0-126*		*07/13/2020 16:33*	WG1508073
(S) 4-Bromofluorobenzene	*92.0*		*77.0-126*		*07/17/2020 13:17*	WG1510850
(S) 1,2-Dichloroethane-d4	*93.3*		*70.0-130*		*07/13/2020 16:33*	WG1508073
(S) 1,2-Dichloroethane-d4	*98.5*		*70.0-130*		*07/17/2020 13:17*	WG1510850

Method Blank (MB)

(MB) R3549018-1 07/12/20 22:15

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

L1238727-31 Original Sample (OS) • Duplicate (DUP)

(OS) L1238727-31 07/12/20 22:15 • (DUP) R3549018-3 07/12/20 22:15

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	128	132	1	3.08		5

Laboratory Control Sample (LCS)

(LCS) R3549018-2 07/12/20 22:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800	8180	93.0	85.0-115	

Method Blank (MB)

(MB) R3549182-1 07/13/20 22:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sulfate	U		0.594	5.00

L1238213-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1238213-01 07/14/20 02:03 • (DUP) R3549182-3 07/14/20 02:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	935	958	10	2.42		15

L1238583-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1238583-01 07/14/20 09:31 • (DUP) R3549182-7 07/14/20 09:46

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	7.69	7.72	1	0.373		15

Laboratory Control Sample (LCS)

(LCS) R3549182-2 07/13/20 22:53

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Sulfate	40.0	40.5	101	80.0-120	

L1238237-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1238237-01 07/14/20 02:33 • (MS) R3549182-4 07/14/20 02:48 • (MSD) R3549182-5 07/14/20 03:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sulfate	50.0	221	256	257	68.7	70.6	1	80.0-120	E V	E V	0.369	15

L1238570-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1238570-01 07/14/20 09:01 • (MS) R3549182-6 07/14/20 09:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate	50.0	59.8	110	100	1	80.0-120	E

Method Blank (MB)

(MB) R3549344-1 07/14/20 15:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Manganese,Dissolved	U		0.00132	0.00500

Laboratory Control Sample (LCS)

(LCS) R3549344-2 07/14/20 15:08

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Manganese,Dissolved	0.0500	0.0515	103	80.0-120	

Method Blank (MB)

(MB) R3549038-3 07/13/20 08:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylbenzene	U		0.000137	0.00100
Toluene	U		0.000278	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	*97.8*			*80.0-120*
(S) 4-Bromofluorobenzene	*111*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*93.3*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3549038-1 07/13/20 07:06 • (LCSD) R3549038-2 07/13/20 07:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylbenzene	0.00500	0.00476	0.00472	95.2	94.4	79.0-123			0.844	20
Toluene	0.00500	0.00481	0.00473	96.2	94.6	79.0-120			1.68	20
Xylenes, Total	0.0150	0.0151	0.0146	101	97.3	79.0-123			3.37	20
(S) Toluene-d8				*101*	*97.5*	*80.0-120*				
(S) 4-Bromofluorobenzene				*112*	*112*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*93.8*	*93.4*	*70.0-130*				

Method Blank (MB)

(MB) R3550545-3 07/17/20 12:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.0000941	0.00100
(S) Toluene-d8	*97.7*			*80.0-120*
(S) 4-Bromofluorobenzene	*98.3*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*95.2*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3550545-1 07/17/20 11:21 • (LCSD) R3550545-2 07/17/20 11:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.00500	0.00494	0.00532	98.8	106	70.0-123			7.41	20
(S) Toluene-d8				*93.5*	*90.9*	*80.0-120*				
(S) 4-Bromofluorobenzene				*94.4*	*90.6*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*97.4*	*101*	*70.0-130*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
V	The sample concentration is too high to evaluate accurate spike recoveries.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

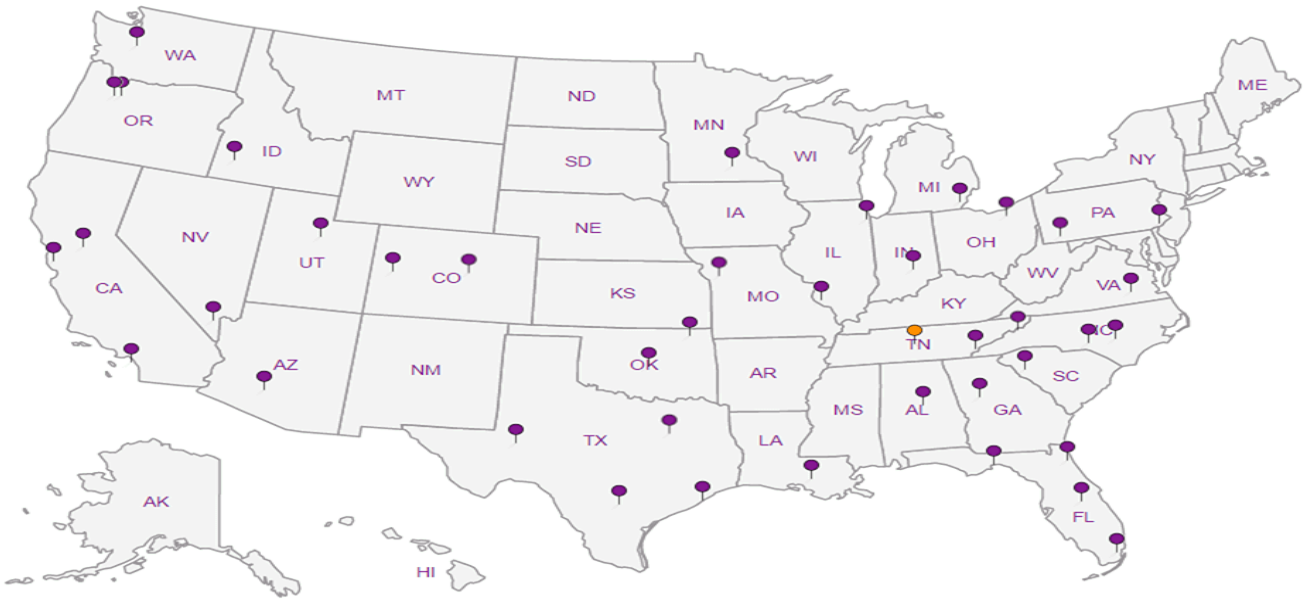
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
HilCorp-Farmington, NM	CHARLES ET AL NO. 1	L1238502	07/17/20 15:42	12 of 13

HilCorp-Farmington, NM

382 Road 3100
Aztec, NM 87401

Billing Information:
Clara Cardoza
PO Box 61529
Houston, TX 77208

Pres Chk

Report to: Kurt Hoekstra

Email To: khoekstra@hilcorp.com

Project Description: Charles et al No. 1

City/State Collected:

Please Circle: PT MT CT ET

Phone: 505-486-9543

Client Project #: CHARLES ET AL NO. 1

Lab Project #: HILCORANM-CHARLES

Collected by (print): Kurt

Collected by (signature): Kurt Hoekstra

Immediately Packed on Ice N ___ Y ___

Site/Facility ID #: CHARLES ET AL NO. 1

P.O. #

Quote #

Rush? (Lab MUST Be Notified)
___ Same Day X Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Dissolved Mn 250mlHDPE-NoPres	SULFATE, TDS 250mlHDPE-NoPres	V8260BTEX 40mlAmb-HCl	No Samples Field Filtered							Remarks	Sample # (lab only)
MW-1R		GW		7-7-20	10:40	5	X	X	X	X								-01

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1238502

Tab C047

Acctnum: HILCORANM

Template: T170423

Prelogin: P784251

PM: 823 - Olivia Studebaker

PB:

Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 1750 0002 6825

Sample Receipt Checklist

COC Seal Present/Intact:	__NP __Y __N
COC Signed/Accurate:	__Y __N
Bottles arrive intact:	__Y __N
Correct bottles used:	__Y __N
Sufficient volume sent:	__Y __N
If Applicable	
VOA Zero Headspace:	__Y __N
Preservation Correct/Checked:	__Y __N
RAD Screen <0.5 mR/hr:	__Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Kurt Hoekstra	7-9-20	11:40		0
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.7 °C Bottles Received: 5
				.7+0=.7
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 07/10/2020 Time: 8:30
			Kristy Smith	

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

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 16653

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 16653
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Review of 2020 Annual Groundwater Monitoring Report: Content satisfactory 1. Continue to monitor contaminant concentrations in well MW-1R on a biannual basis 2. OCD agrees with WSP that background sampling should be emphasized to evaluate potential natural levels in manganese, sulfate, and TDS constituents 3. Submit the Annual Monitoring Report to the OCD no later than March 31, 2022	12/28/2021