



Accepted for the record. See App ID 132101 for most updated status.

July 29, 2021

New Mexico Energy, Minerals and Natural Resources Department
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

**Subject: Second Quarter 2021 - Remediation System Update
Hilcorp Energy Company
Federal 18 #1T
San Juan County, New Mexico
Incident # NCS2103335776**

Dear Mr. Smith:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following second quarter 2021 summary report discussing the current activities being conducted at the former Federal 18 #1T coal bed methane gas well (Site). The casing of this well has been modified to vent gas and purge water from the Ojo Alamo Formation. The setup and initial installation of this system is detailed in a report submitted to Brandon Powell, New Mexico Oil Conservation Division (NMOCD), in November 2010. Since 2010, quarterly reports have been submitted to the NMOCD to record activities performed at the Site, as well as document well-casing pressures, the volume of gas vented from well Federal 18 #1T, and water-quality analytical results collected from the well. This quarterly report details operations for the second quarter of 2021.

BACKGROUND

A vacuum system installed at the Site is being operated as part of an ongoing effort between the NMOCD and Hilcorp (project formerly under XTO Energy, Inc.) to vent gas from the Nacimiento formation just above the Ojo Alamo Formation. Gas was found in the Nacimiento formation, which could have come from several contributing sources in the area including existing and abandoned gas wells in close proximity. In agreement with the NMOCD, XTO Energy, Inc. (XTO) modified a nearby gas well that was scheduled to be plugged, Federal 18 #1T, to act as a venting well by setting a plug at a depth of approximately 513 feet. Perforations were made in the casing at 437 feet and 457 feet in order to assess the groundwater and vent gas from the Nacimiento.

On September 24, 2010, a swab rig was used to determine if the well would produce water using the perforations. The swab rig recovered approximately 2 barrels of water, indicating that the perforations would produce water. A sample collected during the swab returned results above New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, total xylenes, and total chloride (see attached Table 1). Due to the low pH and high chloride, it was inferred that the acid used to dissolve cement during perforation activities may have infiltrated the aquifer, causing the increased concentrations shown in the sampling results. XTO recommended pumping the aquifer until sampling results were below the NMWQCC standards for BTEX and chloride.

A pump was installed in the Federal 18 #1T on November 9, 2010 at a depth of approximately 485 feet. During the pump installation, the water level was measured using a Keck ET Long water level indicator. The static water level was measured as 402.20 feet. The pump was initially set to operate four times a day for 15 minutes, purging approximately 260 gallons per day. During swab and pump installation activities, no gas was observed flowing from the well. On November 11, 2010, a small vacuum pump was installed at the Federal 18 #1T to determine if gas could be vented. The discharge from the vacuum was monitored using a MSA 4-Gas Monitor, which confirmed that methane, was being vented from the vacuum pump discharge. The vacuum pump operated at a discharge rate of 3 standard cubic feet per minute (scfm), which is equivalent to approximately 6 actual cubic feet per minute (acfm) based on elevation. This volume was calculated using the conversion factors provided by the vacuum pump manufacturer, Becker. The vacuum pump initially held a vacuum of approximately negative (-) 12 inches of

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mercury on the casing of the Federal 18 #1T during operation. A portable generator placed on-site powered both the vacuum pump and the water pump. The water pump was plumbed into the existing water lines at the Site, so that all water would pump into the 210-barrel water tank left on-Site from production activities. Water piping above ground was wrapped with heat trace and insulation to prevent freezing.

The system was electrified on February 3, 2011 to prevent down time due to generator maintenance issues. Operation and maintenance inspections include visual checks of the system, generally on a weekly to biweekly basis, depending on weather-related delays. The site check includes verifying pump operation, vacuum operation, recording volume changes based on prior visit, and verifying that no other site conditions need adjustment. The nearby SJ 1737 production well is used to monitor potential pressure variations in the subsurface resulting from the vacuum pump. The SJ 1737 is generally evaluated on a weekly basis to open the valve for a week and then close the valve the following week. Before the valve is opened the subsequent week, pressure is measured before opening the valve. Casing pressure readings for the SJ 1737 are summarized on Table 2.

SECOND QUARTER 2021 ACTIVITIES

As discussed in Hilcorp's *2021 1st Quarter Report* (dated May 2021), Hilcorp replaced a malfunctioned pump and restarted the vacuum system on March 23, 2021. In order to maintain operations and sustain the life of the pump, the pump is set on a timer and runs for 15 minutes twice a day.

Hilcorp contracted WSP to visit the Site on June 29, 2021 to check system conditions and verify that the system was operating correctly. During the Site visit, the pump was not running and a water sample could not be collected. However, WSP verified that the pump timer was functioning correctly and collected flow-meter measurements to record water volume removed since the previous Site visit on March 23, 2021. A total of 1,134,031 gallons of water have been removed from the Federal 18 #1T well as of June 29, 2021 (Table 1). Additionally, 29,401 thousand cubic feet (MCF) of gas has been vented from the well as of this date (Table 3).

Groundwater sampling will resume in the third quarter of 2021 and quarterly thereafter to monitor the benzene concentrations in the groundwater. Hilcorp also proposes the continued operation of the vacuum pump and water pump at the Federal 18 #1T. Once benzene concentrations decrease to below NMWQCC standards, an alternative sampling schedule may be recommended for operation, maintenance, and groundwater sampling.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact Mitch Killough at (713) 757-5247 or at mkillough@hilcorp.com.

Kind regards,

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Senior Geologist

Ashley Ager, M.S., P.G.
Senior Geologist

Enclosures:

Table 1 – Water Analytical Results

Table 2 – Well SJ-01737 Casing Pressure Readings

Table 3 – Gas Vented

TABLES

TABLE 1
WATER ANALYTICAL RESULTS

FEDERAL 18 #1T
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Sample Date	Lab	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	Chlorides (mg/L)	TDS (mg/L)	EC (umhos/cm)	pH	Purge Water Volume (gallons)
NMWQCC Standard		5	1,000	700	620	250	1,000	NA	6 thru 9	NA
11/5/2010	ESC	ND	5.2	ND	ND	15	1400	2600	7.2	NA
9/24/2010	ESC	150	BDL	76	670	NS	NS	NS	NS	NA
9/24/2010	ESC	190	170	24	210	6800	13000	18000	6.1	NA
9/24/2010	Etech	143	221	63.6	950	NS	NS	NS	NS	NA
9/24/2010	Etech	320	377	31.8	568	7150	11100	16000	5.84	NA
12/10/2011	Hall	NS	NS	NS	NS	2800	7610	8900	6.36	3032.5
1/5/2011	Hall	67	93	7.9	25	NS	NS	NS	NS	7,798
1/5/2011	ESC	73	99	10	39	1600	4800	6000	6.6	7,798
1/29/2011	ESC	60	93	10	33	930	NS	4900	6.4	10791.0
2/28/2011	ESC	42	60	6.1	20	550	3400	4000	6.7	14795.0
4/1/2011	ESC	23	27	1.8	6.8	260	2700	3100	6.8	31237.5
4/29/2011	ESC	29	28	2.4	7.3	140	2600	2900	6.9	50217.0
5/31/2011	ESC	14	19	1.4	4.9	89	2500	2800	6.7	76513.0
6/14/2011	ESC	55	81	2.8	15	73	2500	2700	6.7	88120.0
6/30/2011	ESC	52	67	2.6	12	61	2500	2700	6.9	101208.5
8/15/2011	ESC	21	25	1.2	5.8	44	2500	2600	6.8	140267.0
9/2/2011	ESC	10	12	0.64	3.2	41	2500	2600	7.2	155801.0
9/16/2011	ESC	9.6	11	0.64	3	38	2400	2500	7.2	168040.0
9/30/2011	ESC	7.2	8.7	0.64	2.5	35	2500	2600	7	180392.5
10/28/2011	ESC	5.1	BDL	1.8	2.7	31	2300	2600	6.9	205,220
11/30/2011	ESC	4	BDL	3.9	2	27	2500	2600	7.1	233,487.5
12/30/2011	ESC	3.4	BDL	BDL	2.9	27	2500	2500	7.5	261,390.5
4/3/2012	ESC	6	BDL	BDL	1.6	NS	NS	NS	NS	351,300
4/9/2012	ESC	NS	NS	NS	NS	19	2400	2400	7.4	NA
7/3/2012	ESC	5.3	BDL	BDL	BDL	16	2300	2400	7.4	NA
7/6/2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	441,053
9/19/2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	521,271
9/27/2012	ESC	6.2	BDL	BDL	BDL	15	2300	2500	7.1	NA
12/14/2012	NA	NS	NS	NS	NS	NS	NS	NS	NS	598,540
12/31/2012	Etech	13.9	1.1	ND	3.3	15.5	2690	2440	7.05	604,689
1/23/2013	ESC	160	190	BDL	26	15	2400	2500	8	PUMP SHUT OFF
2/22/2013	ESC	7.1	77	BDL	1.8	15	2100	2500	7.1	605,860
5/2/2013	ESC	9	6.9	BDL	BDL	15	2400	2600	7.5	612,601
8/19/2013	ESC	20	11	BDL	2.3	16	2200	2600	7.2	NA
9/23/2013	ESC	13	11	BDL	2.2	16	2300	2500	7.1	621,744
11/25/2013	ESC	4.6	5.2	BDL	BDL	15	2200	2700	7.7	631,430
2/4/2014	ESC	15	17	0.72	3.1	16	2200	2500	7.3	636,120
10/1/2015	ESC	54.2	57	1.37	9.77	21.3	2260	2640	6.98	639,410
10/20/2015	ESC	42.3	39.9	0.964	7.06	18.1	2330	1460	7.09	642,650
3/28/2016	ESC	38	34.1	0.835	4.82	21.6	2230	2570	6.86	650,850
6/14/2016	ESC	78.3	58.4	1.16	7.22	13.7	2890	2600	6.89	704,371
8/29/2016	ESC	19	BDL	BDL	2.18	14.8	2410	2590	7.02	763,261
11/18/2016	ESC	13.2	5.61	BDL	2.33	13.9	2470	2580	7.03	842,610
3/31/2017	ESC	9.61	7.87	BDL	BDL	14.4	2300	2570	7.28	858,190
6/16/2017	ESC	64.6	29.2	0.781	5.4	14.2	2360	2570	7.05	927,854
9/7/2017	ESC	4.61	1.73	BDL	BDL	13.7	2030	2450	7.14	997,330
12/5/2017	ESC	138	51.5	1.65	9.378	14.4	2230	2590	7.2	1,080,550
3/6/2018	ESC	19.9	14.8	0.543	2.71	14.4	2290	2620	7.13	1,080,840
8/7/2018	Pace	7.9	8.06	<0.5	<1.5	13.7	2200	2300	7.19	1,082,751
1/3/2019	Pace	7.07	3.29	0.177	1.08	15.8	2080	6750	6.35	1,120,220
2/22/2019	Pace	19.8	11.1	<0.5	3.97	14.1	2270	2710	7.46	1,120,366
5/24/2019	Pace	11.9	10.8	ND	ND	13.4	2380	2760	7.15	1,123,853
9/10/2019	Pace	23.2	18.8	ND	ND	14.3	2260	2600	7.37	1,125,478
10/29/2019	Pace	5.41	5.68	ND	ND	14	2300	2530	7.09	1,127,076
2/27/2020	Pace	20.7	19.3	ND	ND	14.4	2280	2580	7.06	1,128,506
5/15/2020	Pace	10.3	8.91	ND	ND	13.6	2460	2570	7.27	1,131,033
8/25/2020	Pace	3.9	3.5	ND	ND	13.9	2190	2640	7.62	1,131,100
10/27/2020	Pace	31.1	24.4	ND	ND	13.9	2240	2530	7.43	1,131,119
2/17/2021	Hall	73	<1	<1	<1.5	18	2200	2400	7.42	1,131,123
6/29/2021 (1)	---	NS	NS	NS	NS	NS	NS	NS	NS	1,134,031

Notes:

(1) - Water pump not running at time of sampling

BDL - Below Detection Limits

NMWQCC - New Mexico Water Quality Control Commission

NS - Not Sampled

Values in **BOLD** exceed WQCC Standards

Baseline Sample (Well SJ 1737)

TABLE 2
WELL SJ-01737 CASING PRESSURE READINGS

FEDERAL 18 #1T
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Date	Casing Pressure (ounces)	Average
9/17/2019	1	0.143
10/7/2019	0	0.000
10/21/2019	1.75	0.125
10/28/2019	0	0.000
12/5/2019	0	0.000
12/19/2019	3	0.214
1/7/2020	0	0.000
1/17/2020	1.25	0.125
1/30/2020	0	0.000
2/12/2020	2.25	0.173
2/25/2020	0	0.000
4/3/2020	1.75	0.046
4/9/2020	0	0.000
4/15/2020	3	0.500
4/23/2020	0	0.000
4/30/2020	0.5	0.071
5/15/2020	0	0.000
5/21/2020	1.25	0.208
5/29/2020	0	0.000
6/5/2020	0.5	0.071
6/29/2020	0	0.000
7/8/2020	0.75	0.083
7/22/2020	0	0.000
8/11/2020	0	0.000
8/25/2020	0	0.000
9/16/2020	0	0.000
9/22/2020	0	0.000
10/26/2020	2.75	0.081
11/9/2020	0	0.000
12/8/2020	0	0.000
12/18/2020	0	0.000
1/5/2021	1.75	0.097
1/20/2021	0	0.000
2/11/2021	1.75	0.080
2/17/2021	0	0.000
3/25/2021	3.5	0.097

**TABLE 3
GAS VENTED**

**FEDERAL 18 #1T
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY**

Date	SCFM	ACFM	Gas Vented Total (MCF)
9/17/2019	4	6	26676.8
10/7/2019	4	6	26848.8
10/21/2019	4	6	26969.2
10/28/2019	4	6	27029.6
12/5/2019	4	6	27356.4
12/19/2019	4	6	27477.2
1/7/2020	4	6	27954.1
1/17/2020	4	6	28040.4
1/30/2020	4	6	28152.6
2/12/2020	4	6	28264.8
2/25/2020	4	6	28377.0
4/3/2020	4	6	28704.6
4/9/2020	4	6	28756.3
4/15/2020	4	6	28808.0
4/23/2020	4	6	28877.0
4/30/2020	4	6	28937.4
5/15/2020	4	6	29066.7
5/21/2020	4	6	29118.4
5/29/2020	4	6	29178.8
6/5/2020	4	6	29239.2
6/29/2020	0	0	Hot, not running
7/8/2020	0	0	Unit Down
8/11/2020	0	0	Unit Down
8/25/2020	0	0	Unit Down
9/16/2020	0	0	Unit Down
9/22/2020	0	0	Unit Down
10/26/2020	0	0	Unit Down
11/9/2020	0	0	Unit Down
12/8/2020	0	0	Unit Down
1/5/2021	0	0	Unit Down
1/20/2021	0	0	Unit Down
2/11/2021	0	0	Unit Down
2/17/2021	0	0	Unit Down
3/22/2021	0	0	Unit Down
*3/31/2021	0.7	1.05	29251.3
6/29/2021	0.7	1.05	29401.0

Notes:

SCFM - pumping rate in standard cubic feet per minute

ACFM - pumping rate in actual cubic feet per minute

* - Pump operated from 3/23 - 3/31/2021.

scf per day based on manufacture specifications.

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CONDITIONS

Action 41947

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 41947
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 132101 for most updated status.	9/8/2022