Hilcorp Energy Company

Federal 18 #1T Remediation System
RP# (3RP-1034)
2019 3rd Quarter Report

RCVD Via Email
10/17/2019

Submitted By:
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October 2019

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Introduction

The purpose of this report is to summarize the current on-site activities involving venting gas and producing water from a former coal bed methane gas well at the Federal 18 #1T. 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 (OCD), in November 2010. This quarterly report details operations for the quarter.

History

The vacuum system at the Federal 18 #1T is being operated as part of an on going effort between the OCD and Hilcorp Energy Company (formerly 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. The Federal 1 #18 (30-045-09466), located in Section 10 of Township 30N, Range 13W and approximately 2,600' to the south-west of water well SJ-01737, was plugged in 1988 by Southern Union Oil Company. This well only had an initial surface casing of 200' when it was drilled in 1959. Section 18 also has one (1) additional well plugged by XTO Energy, Inc. (XTO) in 2010. Section 19 of Township 30N, Range 12W has two (2) historically plugged wells. Approximately 4,400' to the south of water well SJ-01737, the Dansby #2 (30-045-09402) was plugged by Don Trader, Inc. in 1954 with a total depth of 1980' and a surface casing of only 100', and the second was a well plugged by Amoco Production in 1988. There are also three (3) additional wells plugged by Texacoma in 1997 in Section 19. There are additionally numerous oil and gas wells being operated by local exploration and production companies in the area. In Section 18, there are five (5) wells being operated by Hilcorp Energy Company (Hilcorp). In Section 19, there are nine (9) wells being operated by Hilcorp. In Section 7, there are seven (7) wells being operated by Hilcorp, and four (4) wells being operated by Robert L Bayless Producers, LLC. Furthermore, there is naturally occurring gas in the formation according to statements from local water well drillers, and a casing leak was discovered at the New Mexico Federal N #3E well site, (located in Unit D, Section 18, Township 30N, Range 12W, and San Juan County, New Mexico). This leak was identified as a result of discovery of gas in a local water well (SJ 1737) in April 2010. Bradenhead pressures were observed at several Hilcorp wells in the area. The New Mexico Federal N #3E, the New Mexico Federal N #3F and the New Mexico Federal N #3 all had bradenhead pressure tests performed. The bradenhead pressure from the New Mexico Federal N #3E was 17 psi, indicating a leak in the casing. The casing leak was repaired, and the New Mexico Federal N #3E was put back into operation. In agreement with the OCD, a nearby gas well scheduled to be plugged, Federal 18 #1T, was modified to act as a venting well by setting a plug at 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 Water Quality Control Commission (WQCC) standards for benzene, total xylenes, and total chlorides; see attached ***Federal 18 #1T Water Results Table***. Due to the low pH and high chlorides, it was inferred that the acid used to dissolve cement during perforation activities may have infiltrated the aquifer, causing the increased levels shown in the sampling results. XTO

recommended pumping the aquifer until sampling results were below the WQCC standards for BTEX and chlorides.

A pump was installed in the Federal 18 #1T on November 9, 2010 at approximately 485 feet. During the pump installation, the water level was checked using a Keck ET Long water level indicator. The static water level was found to be approximately 402.20 feet. The pump was initially set to operate four (4) times a day for 15 minutes, purging approximately 260 gallons per day. During swab and pump installation activities, no gas was found 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 checked using a MSA 4-Gas Monitor, which confirmed that methane, was being vented from the vacuum pump discharge. The vacuum pump operates at a discharge rate of three (3) standard cubic feet per minute (scfm), which is equivalent to approximately six (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 -12 inches of 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 on 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.

Currently the Federal 18-1T system visually checked on a weekly basis. The site check includes verifying pump operation, vacuum operation, recording volume changes based on week prior, and verifying that no other site conditions need adjustment. The 1737 well is evaluated on a weekly basis to open the valve for a week and then closing the valve the following week, before the valve is opened the next week a record of the pressure is taken before opening the valve.

3rd Quarter Activities

During 3rd quarter, Hilcorp encountered issues with the vacuum pump at the site. On August 20, 2019, while taking readings for the SVE operations the vacuum pump was found not running. After trying to fix the existing pump and searching for a new pump, it was replaced on September 16, 2019.

Hilcorp Operations sampled on September 10, 2019. A total of 1,125,478 gallons of water has been removed from the Federal 18 1T as of September 10, 2019. The attached ***Federal 18 #1T Water Results Table*** shows that the benzene concentrations have increased since last month and results are above the WQCC standard at 23.2 ppb. Chloride levels have increased from last month with a result of 14.3 ppm. pH values increased from last month to 7.37. TDS continues to be above WQCC standards at 2260 ppm, but background levels (1,400 ppm) in water well SJ 1737 are historically above WQCC standards as well.

The pressure at well SJ 1737 was checked over the course of the quarter. The pressure was checked by shutting in the casing for a minimum of one (1) week prior to reading the pressure gauge. The pressure readings are outlined in the attached ***Well SJ 1737 Casing Pressures Table***. The pressure remained fairly constant over the course of the quarter.

Recommendations

Groundwater samples will continue to be collected quarterly to monitor the benzene concentration in this well. Hilcorp proposes the continued operation of the vacuum pump and water pump at the Federal 18 #1T. Groundwater samples will continue to be collected on a quarterly basis until benzene levels remain below the WQCC standards for four (4) consecutive quarters. An alternative sampling schedule may be recommended at that time.

Jennifer Deal
Environmental Specialist
Hilcorp Energy Company

Federal 18 #1T Gas Vented			
Date	SCFM	ACFM	Gas Vented Total (MCF)
5/22/2018	3	6	22932.0
6/5/2018	3	6	22992.4
6/20/2018	3	6	23052.8
7/2/2018	3	6	23113.2
7/13/2018	3	6	23173.6
7/19/2018	3	6	23234.0
7/25/2018	3	6	23294.4
8/1/2018	3	6	23354.8
8/9/2018	3	6	23415.2
8/22/2018	3	6	23536.0
8/30/2018	3	6	23596.4
9/7/2018	3	6	23656.8
9/14/2018	3	6	23717.2
9/20/2018	3	6	23777.6
9/28/2018	3	6	23838.0
10/15/2018	3	6	23958.8
10/23/2018	3	6	24019.2
11/2/2018	3	6	24140.0
11/9/2018	3	6	24200.4
11/15/2018	3	6	24260.8
11/29/2018	3	6	24381.6
12/6/2018	3	6	24442.0
1/3/2019	3	6	24683.6
1/17/2019	3	6	24804.4
2/8/2019	3	6	24985.6
2/13/2019	3	6	25046.0
2/20/2019	3	6	25106.4
2/27/2019	3	6	25166.8
3/4/2019	3	6	25227.2
4/1/2019	3	6	25468.8
4/11/2019	3	6	25589.6
4/17/2019	3	6	25650.0
4/25/2019	3	6	25710.4
5/9/2019	3	6	25831.2
5/20/2019	3	6	25952.0
6/10/2019	3	6	26133.2
6/26/2019	3	6	26314.4
7/1/2019	3	6	26374.8
7/8/2019	3	6	26435.2
8/2/2019	3	6	26676.8
8/20/2019	Vacuum Pump not running		
8/29/2019	Vacuum Pump not running		
9/10/2019	Vacuum Pump removed		
9/16/2019	Vacuum pump replaced		
9/17/2019	4		26676.8

Well SJ 1737 Casing Pressures

Date	Casing Pressure (oz)	Average
6/5/2018	0	0.000
6/20/2018	0.5	0.033
7/2/2018	0	0.000
7/13/2018	0.25	0.023
7/19/2018	0	0.000
7/25/2018	0	0.000
8/1/2018	0.5	0.071
8/9/2018	bad gauge	
8/22/2018	bad gauge	
8/30/2018	6.0?	
9/7/2018	0	0.000
9/14/2018	0	0.000
9/20/2018	0	0.000
9/28/2018	0.75	0.094
10/15/2018	0.25	0.015
10/23/2018	0	0.000
11/2/2018	1	0.100
11/9/2018	0	0.000
11/15/2018	0	0.000
11/29/2018	0	0.000
12/6/2018	1.25	0.179
1/3/2019	0	0.000
1/17/2019	1	0.071
2/8/2019	0	0.000
2/13/2019	1.5	0.300
2/20/2019	0	0.000
2/27/2019	0.75	0.107
3/4/2019	0	0.000
4/1/2019	1	0.036
4/11/2017	0	0.000
4/17/2019	2.25	0.003
5/9/2019	2	0.091
5/20/2019	0	0.000
6/10/2019	0	0.000
6/26/2019	0	0.000
7/1/2019	0.5	0.100
7/8/2019	0	0.000
8/2/2019	0	0.000
8/20/2019	0	0.000
8/29/2019	0.5	0.056
9/10/2019	0	0.000
9/17/2019	1	0.143

Federal 18 #1T Water Results

Date	Lab	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylene (ppb)	Chlorides (ppm)	TDS (ppm)	EC (umhos/cm)	pH	Purge Water Volume
NA	NA	10	750	750	620	250	1000	NA	6 thru 9	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	ESC	7.9	8.06	<0.5	<1.5	13.7	**2200**	2300	7.19	1,082,751
1/3/2019	ESC	7.07	3.29	0.177	1.08	15.8	**2080**	6750	6.35	1,120,220
2/22/2019	ECS	19.8	11.1	<0.5	3.97	14.1	**2270**	2710	7.46	1,120,366
5/24/2019	ECS	11.9	10.8	ND	ND	13.4	**2380**	2760	7.15	1,123,853
9/10/2019	ECS	23.2	18.8	ND	ND	14.3	**2260**	2600	7.37	1,125,478
11/5/2010	ESC	ND	5.2	ND	ND	15	**1400**	2600	7.2	NA

BDL = Below Detection Limits
NS = Not Sampled
Values in **BOLD** exceed WQCC Standards
Baseline Sample (Well SJ 1737)
WQCC Standards

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

September 19, 2019

HilCorp-Farmington, NM

Sample Delivery Group:	L1138672
Samples Received:	09/12/2019
Project Number:	FEDERAL 18 # 1T
Description:	Federal 18 # 1T
Site:	FEDERAL 18 # 1T
Report To:	Jennifer Deal 382 Road 3100 Aztec, NM 87401

Entire Report Reviewed By: Daphne R Richards

Daphne Richards
Project Manager

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FEDERAL 18 # 1T TUBING L1138672-01 GW

Collected by: K. Hoekstra
Collected date/time: 09/10/19 08:05
Received date/time: 09/12/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1345020	1	09/13/19 11:30	09/13/19 12:06	TH	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1345977	1	09/15/19 20:52	09/15/19 20:52	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1345299	1	09/13/19 13:00	09/13/19 13:00	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1345088	1	09/14/19 00:14	09/14/19 00:14	LDC	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1347436	1	09/17/19 22:12	09/17/19 22:12	JAH	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.

Daphne R Richards

Daphne Richards
Project Manager

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	2260		25.0	1	09/13/2019 12:06	WG1345020

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
pH	7.37	T8	1	09/15/2019 20:52	WG1345977

Sample Narrative:

L1138672-01 WG1345977: 7.37 at 22.6C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	2600		10.0	1	09/13/2019 13:00	WG1345299

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloride	14.3		1.00	1	09/14/2019 00:14	WG1345088

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.0232		0.00100	1	09/17/2019 22:12	WG1347436
Toluene	0.0188		0.00100	1	09/17/2019 22:12	WG1347436
Ethylbenzene	ND		0.00100	1	09/17/2019 22:12	WG1347436
Total Xylenes	ND		0.00300	1	09/17/2019 22:12	WG1347436
(S) Toluene-d8	*99.7*		*80.0-120*		*09/17/2019 22:12*	WG1347436
(S) 4-Bromofluorobenzene	*108*		*77.0-126*		*09/17/2019 22:12*	WG1347436
(S) 1,2-Dichloroethane-d4	*89.6*		*70.0-130*		*09/17/2019 22:12*	WG1347436

Method Blank (MB)

(MB) R3450773-1 09/13/19 12:06

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

L1138396-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1138396-11 09/13/19 12:06 • (DUP) R3450773-3 09/13/19 12:06

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	325	340	1	4.51		5

Laboratory Control Sample (LCS)

(LCS) R3450773-2 09/13/19 12:06

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800	8680	98.6	85.0-115	

L1138396-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1138396-11 09/15/19 20:52 • (DUP) R3450864-2 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.58	6.59	1	0.152		1

Sample Narrative:

OS: 6.58 at 22.5C

DUP: 6.59 at 22.6C

L1138396-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1138396-12 09/15/19 20:52 • (DUP) R3450864-3 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.02	7.02	1	0.000		1

Sample Narrative:

OS: 7.02 at 22.6C

DUP: 7.02 at 22.5C

L1138396-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1138396-13 09/15/19 20:52 • (DUP) R3450864-4 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.72	6.70	1	0.298		1

Sample Narrative:

OS: 6.72 at 22.7C

DUP: 6.7 at 22.8C

L1138672-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1138672-01 09/15/19 20:52 • (DUP) R3450864-5 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.37	7.40	1	0.406		1

Sample Narrative:

L1138672-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1138672-01 09/15/19 20:52 • (DUP) R3450864-5 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%

OS: 7.37 at 22.6C
DUP: 7.4 at 22.7C

L1138786-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1138786-01 09/15/19 20:52 • (DUP) R3450864-6 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.59	8.60	1	0.116		1

Sample Narrative:
OS: 8.59 at 22.6C
DUP: 8.6 at 22.7C

L1138921-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1138921-07 09/15/19 20:52 • (DUP) R3450864-7 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.18	7.19	1	0.139		1

Sample Narrative:
OS: 7.18 at 22.5C
DUP: 7.19 at 22.5C

L1138921-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1138921-08 09/15/19 20:52 • (DUP) R3450864-8 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.80	6.82	1	0.294		1

Sample Narrative:
OS: 6.8 at 22.4C
DUP: 6.82 at 22.5C

L1139083-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1139083-01 09/15/19 20:52 • (DUP) R3450864-9 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.12	7.11	1	0.141		1

Sample Narrative:

OS: 7.12 at 23C

DUP: 7.11 at 23C

L1139156-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1139156-01 09/15/19 20:52 • (DUP) R3450864-11 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.66	7.67	1	0.130		1

Sample Narrative:

OS: 7.66 at 22.3C

DUP: 7.67 at 22.3C

L1139156-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1139156-02 09/15/19 20:52 • (DUP) R3450864-12 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.86	7.86	1	0.000		1

Sample Narrative:

OS: 7.86 at 22.1C

DUP: 7.86 at 22.1C

L1139156-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1139156-03 09/15/19 20:52 • (DUP) R3450864-13 09/15/19 20:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.87	7.86	1	0.127		1

Sample Narrative:

L1139156-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1139156-03 09/15/19 20:52 • (DUP) R3450864-13 09/15/19 20:52

Analyte	Original Result su	DUP Result su	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %

OS: 7.87 at 21.7C
DUP: 7.86 at 21.7C

L1139156-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1139156-04 09/15/19 20:52 • (DUP) R3450864-14 09/15/19 20:52

Analyte	Original Result su	DUP Result su	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
pH	7.84	7.83	1	0.128		1

Sample Narrative:
OS: 7.84 at 21.6C
DUP: 7.83 at 21.6C

Laboratory Control Sample (LCS)

(LCS) R3450864-1 09/15/19 20:52

Analyte	Spike Amount su	LCS Result su	LCS Rec. %	Rec. Limits %	LCS Qualifier
pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:
LCS: 9.96 at 22.3C

Method Blank (MB)

(MB) R3450378-1 09/13/19 13:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	U		10.0	10.0

L1136412-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1136412-03 09/13/19 13:00 • (DUP) R3450378-3 09/13/19 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	697	700	1	0.429		20

L1138652-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1138652-01 09/13/19 13:00 • (DUP) R3450378-4 09/13/19 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	1380	1390	1	0.579		20

Laboratory Control Sample (LCS)

(LCS) R3450378-2 09/13/19 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	umhos/cm	umhos/cm	%	%	
Specific Conductance	393	393	100	85.0-115	

Method Blank (MB)

(MB) R3450605-1 09/13/19 15:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.0519	1.00

L1138516-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1138516-07 09/13/19 17:30 • (DUP) R3450605-3 09/13/19 17:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3.31	3.22	1	2.91		15

L1138563-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1138563-08 09/13/19 23:30 • (DUP) R3450605-6 09/13/19 23:45

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	15.7	15.7	1	0.0427		15

Laboratory Control Sample (LCS)

(LCS) R3450605-2 09/13/19 15:50

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40.0	39.2	98.0	80.0-120	

L1138516-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1138516-08 09/13/19 17:59 • (MS) R3450605-4 09/13/19 18:13 • (MSD) R3450605-5 09/13/19 18:28

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 %
Chloride	50.0	7.56	57.0	57.2	98.9	99.4	1	80.0-120			0.421	15

L1138672-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1138672-01 09/14/19 00:14 • (MS) R3450605-7 09/14/19 00:57

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	14.3	63.8	99.0	1	80.0-120	

Method Blank (MB)

(MB) R3451805-3 09/17/19 18:58

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	*96.8*			*80.0-120*
(S) 4-Bromofluorobenzene	*102*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*91.2*			*70.0-130*

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

(LCS) R3451805-1 09/17/19 17:58 • (LCSD) R3451805-2 09/17/19 18:18

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	0.0250	0.0239	0.0246	95.7	98.6	70.0-123			2.96	20
Ethylbenzene	0.0250	0.0248	0.0262	99.4	105	79.0-123			5.28	20
Toluene	0.0250	0.0239	0.0246	95.5	98.5	79.0-120			3.08	20
Xylenes, Total	0.0750	0.0770	0.0802	103	107	79.0-123			4.07	20
(S) Toluene-d8				*96.1*	*96.9*	*80.0-120*				
(S) 4-Bromofluorobenzene				*107*	*106*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*89.9*	*90.7*	*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
T8	Sample(s) received past/too close to holding time expiration.

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

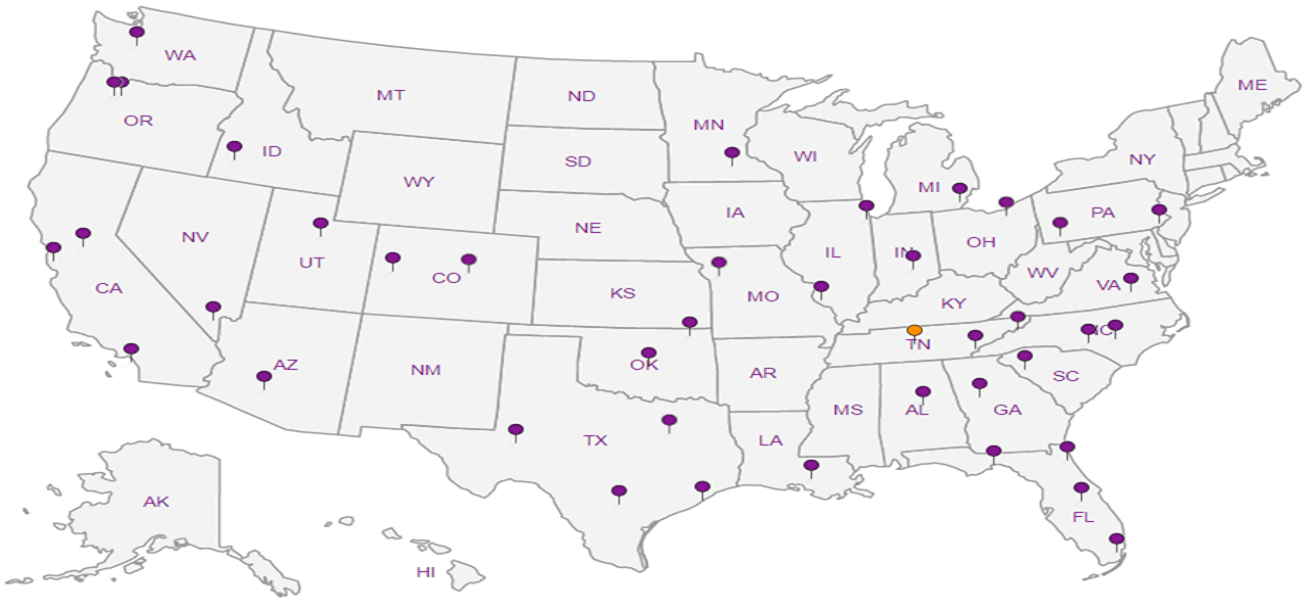
Third Party Federal Accreditations

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.



Billing Information:
ATTN: Jennifer Deal

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

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Mount Juliet, TN 37122
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Fax: 615-758-5859

L# 1138672
C091

Report to: **Jennifer Deal**

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

Project Description: **Federal 18 # 1T**

City/State Collected: **Aztec, NM**

Phone: **505-324-5128**
Fax:

Client Project #

Lab Project #

Collected by (print): **K Hoekstra**

Site/Facility ID # **Federal 18 # 1T**

P.O. #

Collected by (signature): Kurt Hoekstra

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

Acctnum: **HILCORANM**
Template:
Prelogin:
TSR:
PB:

Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	BTEX 8260	EC	pH	TDS	Chloride						Remarks	Sample # (lab only)
Federal 18 # 1T Tubing		**GW**		9-10	8:05	3	X	X	X	X	X							-1

* 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 # Fedex 4794 8844 2273

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	9-12-19	6:30			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: .5-.1=.4 °C Bottles Received: 3	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9/12/19 Time: 8:45	Hold: / Condition: NCF / OK