Federal 18 #1T Remediation System
2013 4th Quarter Report

Submitted By:
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505-333-3701

Submitted to:
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January 2014

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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 from October 1, 2013 through December 31, 2013.

History

The vacuum system at the Federal 18 #1T is being operated as part of an on going effort between the OCD and XTO Energy, Inc. (XTO) to vent gas from the Nacimiento formation just above the Ojo Alamo Formation. Gas was recently 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. 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 three (3) wells being operated by XTO Energy, Inc., and two (2) wells being operated by ConocoPhillips as Burlington Resources. In Section 19, there are nine (9) wells being operated by XTO Energy, Inc. In Section 7, there are seven (7) wells being operated by XTO Energy, Inc, 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, 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 XTO 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. Both the vacuum pump and the water pump were powered by a portable generator placed on-site.

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.

4th Quarter Activities

During the 4th quarter of 2013, the system ran continuously with no down time. As of December 27, 2013, approximately 9.523.2 cubic feet (MCF) of gas has been vented from the Federal 18 #1T casing, with the system venting approximately 60.4 MCF per week during operation, while maintaining an average casing pressure of -10 inches of mercury on the Federal 18 #1T casing.

A total of 631,430 gallons of water have been removed from the Federal 18 #1T as of December 31, 2013. The attached ***Federal 18 #1T Water Results Table*** shows that benzene concentrations have dropped back below the regulatory standards of 10 ppb during the 4th quarter, returning results of 4.6 ppb. Chloride levels have remained constant through the 4th quarter, remaining steady at 15 ppm. pH values remained constant in the 4th quarter, returning results of 7.7 during the 4th quarter of 2013. All BTEX constituents, as well as chlorides, returned results below WQCC standards. TDS continues to be above WQCC standards at 2,200 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 4th quarter. The pressure was checked by shutting in the casing for a minimum of one week prior to reading the pressure gauge. The pressure readings and average barometric pressures are outlined in the attached ***Well SJ 1731 Casing Pressures Table***. The pressure did not seem to show a correlation to the barometric pressure or temperature, and remained fairly constant over the course of the fourth quarter. The casing pressure in the water well SJ 1737 has shown an overall decrease from 9 oz in January of 2011 to 0.5 oz in December of 2013. Pressure readings of the casing at water well 1737 have consistently remained below one ounce since July of 2013. An overall decreasing trend has existed in the water well casing since 2011.

Recommendations

Groundwater samples will continue to be collected quarterly to monitor the benzene concentration in this well. Chlorides, pH, TDS and EC remained constant over the fourth quarter, and are very close to the background levels obtained in water well 1737. XTO proposes the continued operation of the vacuum pump at the Federal 18 #1T, but without the operation of the water pump, except to collect groundwater samples. 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.

XTO proposes to discontinue gas analysis in water well 1737 due to the minimal pressure that appears on the casing. XTO will continue to monitor the pressure on the casing at water well 1737, and proposes to plug and abandon the well after the first quarter of 2014 if pressure results continue to remain below 1 ounce. XTO will collect a final groundwater sample prior to final plugging and abandoning of this water well.

James McDaniel, CHMM #15676
EH&S Supervisor
XTO Energy, Inc.
Western Division

Federal 18 #1T Gas Vented

Date	SCFM	ACFM	Gas Vented Total (MCF)
11/24/2010	5	10	14.4
12/2/2010	3	6	89.13
12/3/2010	3	6	97.73
12/7/2010	3	6	123.53
12/9/2010	5	10	152.33
12/10/2010	3	6	160.93
12/13/2010	3	6	178.13
12/16/2011	4	8	212.69
12/17/2011	3.5	7	222.77
12/20/2011	3	6	248.57
	Irratic readings due to freezing temperature and down time due to generator failures		
2/9/2011	NA	NA	540.6
2/17/2011	3	6	601
2/24/2011	3	6	661.4
3/3/2011	3	6	721.8
3/10/2011	3	6	782.2
3/17/2011	3	6	842.6
3/24/2011	3	6	903
3/31/2011	3	6	963.4
4/7/2011	3	6	1023.8
4/14/2011	3	6	1084.2
4/21/2011	3	6	1144.6
4/28/2011	3	6	1205
5/5/2011	3	6	1265.4
5/12/2011	3	6	1325.8
5/19/2011	3	6	1386.2
5/26/2011	3	6	1446.6
6/2/2011	3	6	1507
6/9/2011	3	6	1567.4
6/16/2011	3	6	1627.8
6/23/2011	3	6	1688.2
6/30/2011	3	6	1748.6
7/7/2011	3	6	1792
7/14/2011	3	6	1852.4
7/21/2011	3	6	1912.8
7/28/2011	3	6	1973.2
8/5/2011	3	6	2033.6
8/12/2011	3	6	2094
8/19/2011	3	6	2154.4
8/26/2011	3	6	2214.8
9/2/2011	3	6	2275.2
9/9/2011	3	6	2335.6
9/16/2011	3	6	2396
9/23/2011	3	6	2456.4
9/30/2011	3	6	2516.8
10/7/2011	3	6	2577.2
10/14/2011	3	6	2637.6
10/21/2011	3	6	2698
10/28/2011	3	6	2758.4

Federal 18 #1T Gas Vented

Date	SCFM	ACFM	Gas Vented Total (MCF)
11/4/2011	3	6	2818.8
11/11/2011	3	6	2879.2
11/18/2011	3	6	2939.6
11/25/2011	3	6	3000
12/2/2011	3	6	3060.4
12/9/2011	3	6	3120.8
12/16/2011	3	6	3181.2
12/23/2011	3	6	3241.6
12/30/2011	3	6	3302
1/6/2012	3	6	3362.4
1/13/2012	3	6	3422.8
1/20/2012	3	6	3483.2
1/27/2012	3	6	3543.6
2/3/2012	3	6	3604
2/10/2012	3	6	3664.4
2/17/2012	3	6	3724.8
2/24/2012	3	6	3785.2
3/2/2012	3	6	3845.6
3/9/2012	3	6	3906
3/16/2012	3	6	3966.4
3/23/2012	3	6	4026.8
3/30/2012	3	6	4087.2
4/6/2012	3	6	4147.6
4/13/2012	3	6	4208
4/20/2012	3	6	4268.4
4/27/2012	3	6	4328.8
5/4/2012	3	6	4389.2
5/11/2012	3	6	4449.6
5/18/2012	3	6	4510
5/25/2012	3	6	4570.4
6/1/2012	3	6	4630.8
6/8/2012	3	6	4691.2
6/15/2012	3	6	4751.6
6/22/2012	3	6	4812
6/29/2012	3	6	4872.4
7/6/2012	3	6	4932.8
7/13/2012	3	6	4993.2
7/20/2012	3	6	5053.6
7/27/2012	3	6	5114
8/3/2012	3	6	5174.4
8/10/2012	3	6	5234.8
8/17/2012	3	6	5295.2
8/24/2012	3	6	5355.6
8/31/2012	3	6	5416
9/7/2012	3	6	5476.4
9/14/2012	3	6	5536.8
9/21/2012	3	6	5597.2
9/28/2012	3	6	5657.6
10/5/2012	3	6	5718
10/12/2012	3	6	5778.4
10/19/2012	3	6	5838.8

Federal 18 #1T Gas Vented

Date	SCFM	ACFM	Gas Vented Total (MCF)
10/26/2012	3	6	5899.2
11/2/2012	3	6	5959.6
11/9/2012	3	6	6020
11/16/2012	3	6	6080.4
11/23/2012	3	6	6140.8
11/30/2012	3	6	6201.2
12/7/2012	3	6	6261.6
12/14/2012	3	6	6322
12/21/2012	3	6	6382.4
12/28/2012	3	6	6442.8
1/4/2013	3	6	6503.2
1/11/2013	3	6	6563.6
1/18/2013	3	6	6624
1/25/2013	3	6	6684.4
2/1/2013	3	6	6744.8
2/8/2013	3	6	6805.2
2/15/2013	3	6	6865.6
2/22/2013	3	6	6926
3/1/2013	3	6	6986.4
3/8/2013	3	6	7046.8
3/15/2013	3	6	7107.2
3/22/2013	3	6	7167.6
3/29/2013	3	6	7228
4/5/2013	3	6	7288.4
4/12/2013	3	6	7348.8
4/19/2013	3	6	7409.2
4/26/2013	3	6	7469.6
5/3/2013	3	6	7530
5/10/2013	3	6	7590.4
5/17/2013	3	6	7650.8
5/24/2013	3	6	7711.2
5/31/2013	3	6	7771.6
6/7/2013	3	6	7832
6/14/2013	3	6	7892.4
6/21/2013	3	6	7952.8
6/28/2013	3	6	8013.2
7/5/2013	3	6	8073.6
7/12/2013	3	6	8134
7/19/2013	3	6	8194.4
7/26/2013	3	6	8254.8
8/2/2013	3	6	8315.2
8/9/2013	3	6	8375.6
8/16/2013	3	6	8436
8/23/2013	3	6	8496.4
8/30/2013	3	6	8556.8
9/6/2013	0	0	8556.8
9/13/2013	3	6	8617.2
9/20/2013	3	6	8677.6
9/27/2013	3	6	8738
10/4/2013	3	6	8798.4
10/11/2013	3	6	8858.8

Federal 18 #1T Gas Vented

Date	SCFM	ACFM	Gas Vented Total (MCF)
10/18/2013	3	6	8919.2
10/25/2013	3	6	8979.6
11/1/2013	3	6	9040
11/8/2013	3	6	9100.4
11/15/2013	3	6	9160.8
11/22/2013	3	6	9221.2
11/29/2013	3	6	9281.6
12/6/2013	3	6	9342
12/13/2013	3	6	9402.4
12/20/2013	3	6	9462.8
12/27/2013	3	6	9523.2

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

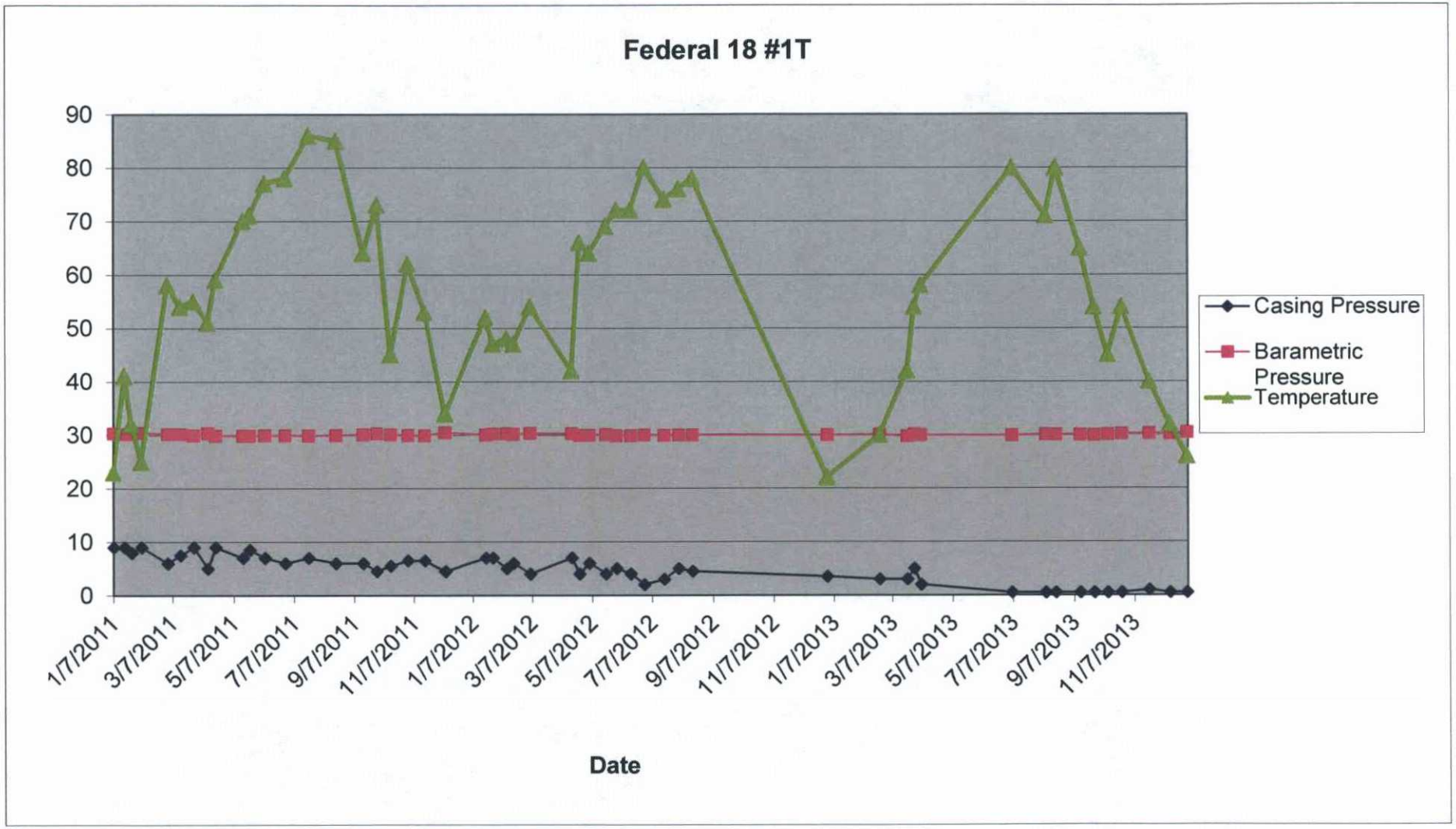
Federal 18 #1T Water Results

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
9/23/2013	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
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

Well SJ 1737 Casing Pressures

Date	Casing Pressure (oz)	Barometric Pressure (Inches of Mercury)	Temperature (F)
1/7/2011	9	30.3	23
1/18/2011	9	30.14	41
1/25/2011	8	30.22	32
2/4/2011	9	30.35	25
3/2/2011	6	30.13	58
3/15/2011	7.5	30.12	54
3/28/2011	9	29.88	55
4/11/2011	5	30.3	51
4/19/2011	9	29.83	59
5/16/2011	7	29.82	70
5/23/2011	8.5	29.78	71
6/7/2011	7	29.87	77
6/28/2011	6	29.87	78
7/22/2011	7	29.85	86
8/19/2011	6	29.9	85
9/16/2011	6	30.04	64
9/30/2011	4.5	30.2	73
10/14/2011	5.5	30.03	45
11/1/2011	6.5	29.9	62
11/18/2011	6.5	29.86	53
12/9/2011	4.5	30.41	34
1/20/2012	7	29.99	52
1/27/2012	7	30.12	47
2/10/2012	5	30.2	48
2/17/2012	6	30.08	47
3/5/2012	4	30.22	54
4/16/2012	7	30.19	42
4/24/2012	4	29.91	66
5/4/2012	6	29.91	64
5/21/2012	4	30.02	69
6/1/2012	5	29.81	72
6/15/2012	4	29.81	72
6/29/2012	2	29.92	80
7/19/2012	3	29.91	74
8/3/2012	5	29.93	76
8/17/2012	4.5	29.96	78
12/31/2012	3.5	29.92	22
2/22/2013	3	29.99	30
3/22/2013	3	29.71	42
3/29/2013	5	30.09	54
4/5/2013	2	29.89	58
7/6/2013	0.5	29.84	80
8/9/2013	0.5	30.02	71
8/19/2013	0.5	29.97	80
9/13/2013	0.5	29.96	65
9/27/2013	0.5	29.89	54
10/11/2013	0.5	30.06	45
10/25/2013	0.5	30.16	54
11/22/2013	1	30.18	40
12/13/2013	0.5	30.14	32
12/30/2013	0.5	30.4	26


Federal 18 #1T
90
80
70
60
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1/7/2011
3/7/2011
5/7/2011
7/7/2011
9/7/2011
11/7/2011
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9/7/2013
11/7/2013
Date
Casing Pressure
Barametric Pressure
Temperature

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YOUR LAB OF CHOICE

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Logan Hixon
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

Report Summary

Wednesday December 04, 2013

Report Number: L670900
Samples Received: 11/26/13
Client Project:

Description: Federal 18 1T

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Daphne R Richards
Daphne Richards , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

ESC
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REPORT OF ANALYSIS

Logan Hixon
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

December 04, 2013

ESC Sample # : L670900-01

Site ID :

Project # :

Date Received : November 26, 2013
Description : Federal 18 1T

Sample ID : FARCH-11-25-13-0906

Collected By : Logan Hixon
Collection Date : 11/25/13 12:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	15.	1.0	mg/l	9056	11/28/13	1
pH	7.7		su	9040C	12/03/13	1
Specific Conductance	2700		umhos/cm	9050A	12/03/13	1
Dissolved Solids	2200	10.	mg/l	2540 C-2011	11/29/13	1
Benzene	0.0046	0.00050	mg/l	8021B	11/27/13	1
Toluene	0.0052	0.0050	mg/l	8021B	11/27/13	1
Ethylbenzene	BDL	0.00050	mg/l	8021B	11/27/13	1
Total Xylene	BDL	0.0015	mg/l	8021B	11/27/13	1
Surrogate Recovery(%)						
a,a,a-Trifluorotoluene(PID)	101.		% Rec.	8021B	11/27/13	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

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Reported: 12/04/13 10:53 Printed: 12/04/13 12:28
L670900-01 (PH) - 7.7@18.7c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L670900-01	WG695177	SAMP	pH	R2862023	T8

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC.
Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods,it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

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Est. 1970

XTO Energy - San Juan Division
Logan Hixon
382 County Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L670900

December 04, 2013

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Chloride	< 1	mg/l			WG694742	11/28/13 09:31
Benzene	< .0005	mg/l			WG694570	11/27/13 14:22
Ethylbenzene	< .0005	mg/l			WG694570	11/27/13 14:22
Toluene	< .005	mg/l			WG694570	11/27/13 14:22
Total Xylene	< .0015	mg/l			WG694570	11/27/13 14:22
a,a,a-Trifluorotoluene(PID)		% Rec.	103.0	55-122	WG694570	11/27/13 14:22
Dissolved Solids	< 10	mg/l			WG694644	11/29/13 16:42
Specific Conductance	0.900	umhos/cm			WG695206	12/03/13 17:40

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Chloride	mg/l	4.40	4.40	0.0	20	L670600-07	WG694742
Chloride	mg/l	0.0	0.0	0.0	20	L670600-16	WG694742
Dissolved Solids	mg/l	2210	2170	1.94	5	L670900-01	WG694644
pH	su	7.90	7.90	0.380	1	L664556-01	WG695177
pH	su	8.70	8.70	0.345	1	L671228-10	WG695177
Specific Conductance	umhos/cm	2700	2700	1.49	20	L670900-01	WG695206

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Chloride	mg/l	40	39.8	99.5	90-110	WG694742
Benzene	mg/l	.05	0.0515	103.	70-130	WG694570
Ethylbenzene	mg/l	.05	0.0518	104.	70-130	WG694570
Toluene	mg/l	.05	0.0508	102.	70-130	WG694570
Total Xylene	mg/l	.15	0.157	104.	70-130	WG694570
a,a,a-Trifluorotoluene(PID)				102.0	55-122	WG694570
Dissolved Solids	mg/l	8800	8870	101.	85-115	WG694644
pH	su	5.93	5.90	99.5	98.3-101.7	WG695177
Specific Conductance	umhos/cm	510	510.	100.	85-115	WG695206

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Chloride	mg/l	39.8	39.8	100.	90-110	0.0	20	WG694742
Benzene	mg/l	0.0477	0.0515	95.0	70-130	7.78	20	WG694570

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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L670900

December 04, 2013

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Ethylbenzene	mg/l	0.0478	0.0518	96.0	70-130	8.06	20	WG694570
Toluene	mg/l	0.0469	0.0508	94.0	70-130	7.98	20	WG694570
Total Xylene	mg/l	0.145	0.157	96.0	70-130	7.89	20	WG694570
a,a,a-Trifluorotoluene(PID)				102.0	55-122			WG694570
Dissolved Solids	mg/l	8990	8870	102.	85-115	1.34	5	WG694644
pH	su	5.90	5.90	99.0	98.3-101.7	0.0	20	WG695177
Specific Conductance	umhos/	510.	510.	100.	85-115	0.0	20	WG695206

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Chloride	mg/l	54.5	5.70	50	98.0	80-120	L670600-08	WG694742
Benzene	mg/l	0.0521	0.0	.05	100.	57.2-131	L670345-03	WG694570
Ethylbenzene	mg/l	0.0525	0.0	.05	100.	67.5-135	L670345-03	WG694570
Toluene	mg/l	0.0517	0.0	.05	100.	63.7-134	L670345-03	WG694570
Total Xylene	mg/l	0.158	0.0	.15	100.	65.9-138	L670345-03	WG694570
a,a,a-Trifluorotoluene(PID)					102.0	55-122		WG694570

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Chloride	mg/l	54.7	54.5	98.0	80-120	0.366	20	L670600-08	WG694742
Benzene	mg/l	0.0492	0.0521	98.4	57.2-131	5.72	20	L670345-03	WG694570
Ethylbenzene	mg/l	0.0493	0.0525	98.6	67.5-135	6.25	20	L670345-03	WG694570
Toluene	mg/l	0.0485	0.0517	97.0	63.7-134	6.45	20	L670345-03	WG694570
Total Xylene	mg/l	0.149	0.158	99.3	65.9-138	5.98	20	L670345-03	WG694570
a,a,a-Trifluorotoluene(PID)				102.0	55-122				WG694570

Batch number /Run number / Sample number cross reference

WG694742: R2860824: L670900-01
WG694570: R2860840: L670900-01
WG694644: R2861055: L670900-01
WG695177: R2862023: L670900-01
WG695206: R2862439: L670900-01

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Quality Assurance Report
Level II

L670900

December 04, 2013

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

XTO ENERGY
Western Division

Quote Number	Page 1 of 1
XTO Contact: L. Hixon	XTO Contact Phone #: (505) 386-8018
Email Results to: Logan, James, Kurt	

Well Site/Location	API Number	Test Reason
Federal 18 #1T	30-045-33864	Remediation

Collected By: Logan Hixon

Company: XTO

Samples on Ice: (Y) N

QA/QC Requested

Signature: [signature]

Gray Areas for Lab Use Only!

Turnaround:
- X Standard
- ___ Next Day
- ___ Two Day
- ___ Three Day
- ___ Std. 5 Bus. Days (by contract)

Date Needed ______________

Analysis: BTEX (8021), EC (MS 1/2), pH, TDS, Chlorides

Lab Information: L670900

Office Abbreviations
- Farmington = FAR
- Durango = DUR
- Bakken = BAK
- Raton = RAT
- Piceance = PC
- Roosevelt = RSV
- La Barge = LB
- Orangeville = OV

Sample ID	Sample Name	Media	Date	Time	Preservative	No. of Conts.	BTEX (8021)	EC	pH	TDS	Chlorides	Sample Number
FarLH-01-2513-0900	GW Sample	GW	112513	0900	Cool	1-500, 2-40	X	X	X	X	X	01

Media: Filter = F Soil = S Wastewater = WW Groundwater = GW Drinking Waster = DW Sludge = SG Surface Water = SW Air = A Drill Mud = DM Other = OT

Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Number of Bottles	Sample Condition
[signature]	112513	1200		5	OK
Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Temperature: 3.1	Other Information
Relinquished By: (Signature)	Date:	Time:	Received for Lab by: (Signature) [signature]	Date: 11-26-13 Time: 0930	

Comments

3.1°

* Sample ID will be the office and sampler-date-military time FARJM-MMDDYY-1200