AE Order Number Banner

Report Description

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3RP - 1034

XTO ENERGY, INC

1/23/2018

Federal 18 #1T Remediation System
2017 4th Quarter Report

CS

Submitted By:
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XTO Energy, Inc.
505-333-3711

Submitted to:
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January 2018

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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 XTO Energy, Inc. (XTO) 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. 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. 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.

4th Quarter Activities

During the 4th quarter of 2017, the system ran continuously with no down time. As of December 5, 2017, approximately 21,905.2 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 1,080,550 gallons of water have been removed from the Federal 18 #1T as of December 5, 2017. The attached ***Federal 18 #1T Water Results Table*** shows that that benzene concentrations have increased in the quarter with one (1) sampling event (December 5, 2017) returning results below the WQCC standard at 138 ppb. Chloride levels have remained constant through the quarter, remaining steady at 14.4 ppm. pH values remained constant in the quarter,

returning results of 7.20 TDS continues to be above WQCC standards at 2230 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 1731 Casing Pressures Table***. The pressure remained fairly constant over the course of the quarter. The casing pressure in the water well SJ 1737 has shown an overall decrease from 9 oz. in January of 2011 to 0.0 oz. December 5, 2017. 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 3rd quarter, and are very close to the background levels obtained in water well 1737. XTO 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.

Charlie McCollum
EHS Environmental Compliance Coordinator
XTO Energy, Inc.
Western Division

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
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

Federal 18 #1T Gas Vented

Date	SCFM	ACFM	Gas Vented Total (MCF
1/6/2017	3	6	19006
1/13/2017	3	6	19066.4
1/20/2017	3	6	19126.8
1/27/2017	3	6	19187.2
2/3/2017	3	6	19247.6
2/10/2017	3	6	19308
2/17/2017	3	6	19368.4
2/24/2017	3	6	19428.8
3/3/2017	3	6	19489.2
3/10/2017	3	6	19549.6
3/17/2017	3	6	19610
3/24/2017	3	6	19670.4
3/31/2017	3	6	19730.8
4/7/2017	3	6	19791.2
4/14/2017	3	6	19851.6
4/21/2017	3	6	19912
4/28/2017	3	6	19972.4
5/5/2017	3	6	20032.8
5/12/2017	3	6	20093.2
5/19/2017	3	6	20153.6
5/26/2017	3	6	20214
6/2/2017	3	6	20274.4
6/9/2017	3	6	20334.8
6/16/2017	3	6	20395.2
6/23/2017	3	6	20455.6
6/30/2017	3	6	20516
7/7/2017	3	6	20576.4
7/14/2017	3	6	20636.8
7/21/2017	3	6	20697.2
7/28/2017	3	6	20757.6
8/4/2017	3	6	20818
8/11/2017	3	6	20878.4
8/18/2017	3	6	20938.8
8/25/2017	3	6	20999.2
9/1/2017	3	6	21059.6
9/8/2017	3	6	21120
9/15/2017	3	6	21180.4
9/22/2017	3	6	21240.8
9/29/2017	3	6	21301.2
10/6/2017	3	6	21361.6
10/13/2017	3	6	21422
10/20/2017	3	6	21482.4
10/27/2017	3	6	21542.8
11/3/2017	3	6	21603.2
11/10/2017	3	6	21663.6
11/17/2017	3	6	21724
11/24/2017	3	6	21784.4
12/1/2017	3	6	21844.8
12/5/2017	3	6	21905.2

Well SJ 1737 Casing Pressures		
Date	Casing Pressure (oz)	Average
3/24/2017	1	0.012
4/7/2017	0.5	0.036
7/14/2017	0	0.000
7/26/2017	0	0.000
9/7/2017	0	0.000
10/13/2017	0	0.000
10/20/2017	1.5	0.214
10/30/2017	0	0.000
11/10/2017	0	0.000
11/17/2017	1.25	0.179
11/22/2017	0	0.000
12/1/2017	0	0.000
12/5/2017	0	0.000

ANALYTICAL REPORT

December 12, 2017

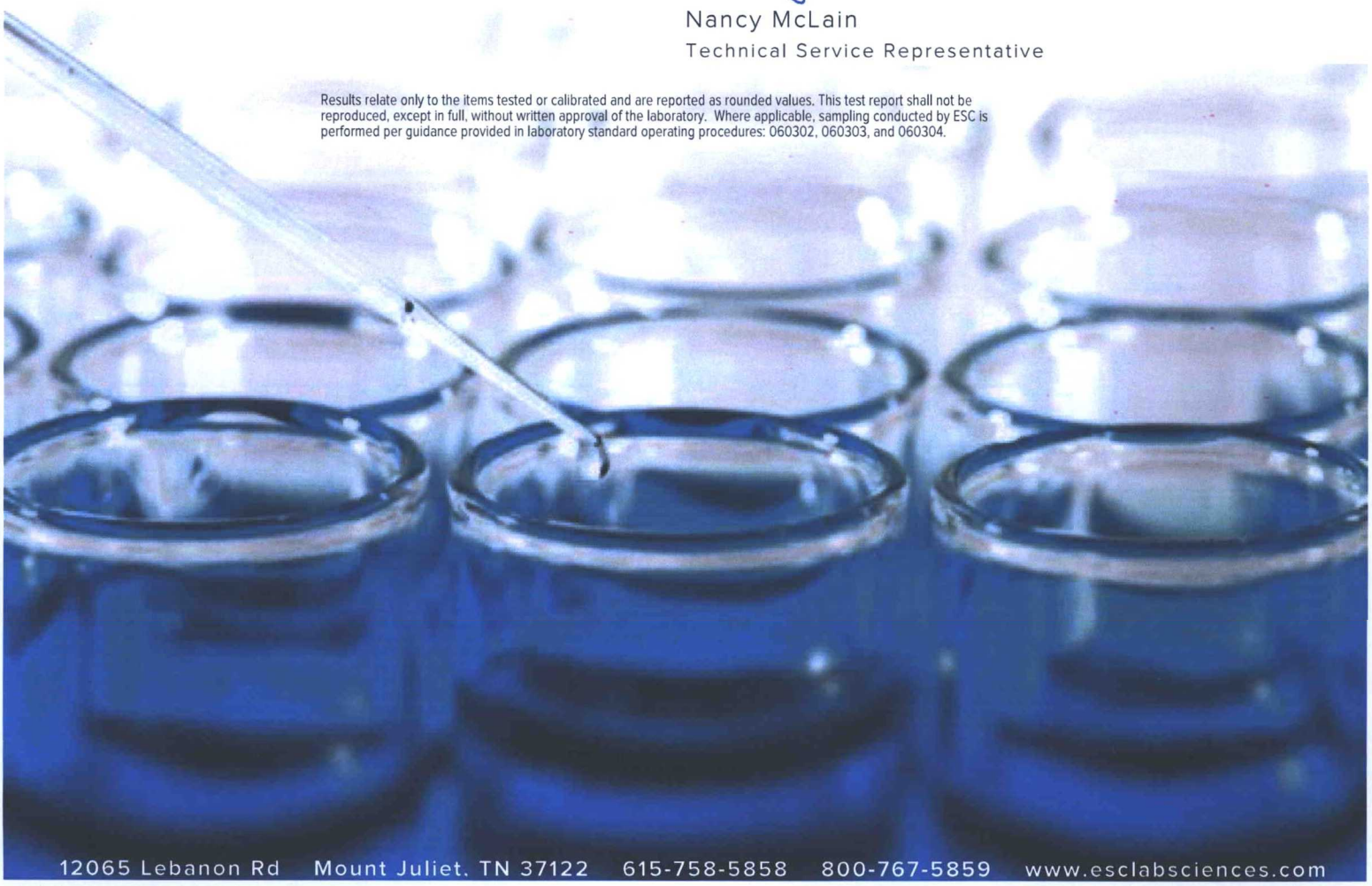
XTO Energy - Sidney, MT

Sample Delivery Group:	L955941
Samples Received:	12/07/2017
Project Number:	
Description:	Federal 18-1T

Report To: Tim Hazen
2320 South Central Avenue
Sidney, MT 59270

Entire Report Reviewed By: Nancy F. McLain

Nancy McLain
Technical Service Representative



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ONE LAB. NATIONWIDE.

18-1T TUBING L955941-01 GW

Collected by	Collected date/time	Received date/time
Charlie McCollum	12/05/17 15:00	12/07/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1051233	1	12/08/17 15:32	12/08/17 16:15	MMF
Wet Chemistry by Method 9040C	WG1051428	1	12/10/17 05:01	12/10/17 05:01	GB
Wet Chemistry by Method 9050A	WG1051660	1	12/09/17 11:58	12/09/17 11:58	MA
Wet Chemistry by Method 9056A	WG1050951	1	12/08/17 04:47	12/08/17 04:47	KCF
Volatile Organic Compounds (GC) by Method 8021B	WG1051013	1	12/08/17 06:23	12/08/17 06:23	DWR

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. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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.

Nancy F. McLain

Nancy McLain
Technical Service Representative

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	2230		10.0	1	12/08/2017 16:15	WG1051233

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
pH	7.20	T8	1	12/10/2017 05:01	WG1051428

Sample Narrative:

L955941-01 WG1051428: 7.2 at 17.6C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	2590		10.0	1	12/09/2017 11:58	WG1051660

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloride	14.4		1.00	1	12/08/2017 04:47	WG1050951

Volatile Organic Compounds (GC) by Method 8021B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.138	J6	0.000500	1	12/08/2017 06:23	WG1051013
Toluene	0.0515	J6	0.00100	1	12/08/2017 06:23	WG1051013
Ethylbenzene	0.00165		0.000500	1	12/08/2017 06:23	WG1051013
Total Xylene	0.00978	J6	0.00150	1	12/08/2017 06:23	WG1051013
(S) a,a,a-Trifluorotoluene(PID)	*98.0*		*80.0-121*		*12/08/2017 06:23*	WG1051013

Method Blank (MB)

(MB) R3271777-1 12/08/17 16:15

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

L955941-01 Original Sample (OS) • Duplicate (DUP)

(OS) L955941-01 12/08/17 16:15 • (DUP) R3271777-4 12/08/17 16:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Dissolved Solids	2230	2210	1	0.901		5

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

(LCS) R3271777-2 12/08/17 16:15 • (LCSD) R3271777-3 12/08/17 16:15

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Dissolved Solids	8800	8390	8560	95.3	97.3	85.0-115			2.01	5

L954534-01 Original Sample (OS) • Duplicate (DUP)

(OS) L954534-01 12/10/17 05:01 • (DUP) R3271685-3 12/10/17 05:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.28	7.29	1	0.137		1

Sample Narrative:

OS: 7.28 at 12.5C

DUP: 7.29 at 12.5C

L956434-01 Original Sample (OS) • Duplicate (DUP)

(OS) L956434-01 12/10/17 05:01 • (DUP) R3271685-4 12/10/17 05:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.46	7.47	1	0.134		1

Sample Narrative:

OS: 7.46 at 19.8C

DUP: 7.47 at 19.9C

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

(LCS) R3271685-1 12/10/17 05:01 • (LCSD) R3271685-2 12/10/17 05:01

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	5.96	5.99	5.98	101	100	98.3-102			0.167	1

Sample Narrative:

LCS: 5.99 at 19.5C

LCSD: 5.98 at 19.5C

Method Blank (MB)

(MB) WG1051660-1 12/09/17 11:58

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

L955941-01 Original Sample (OS) • Duplicate (DUP)

(OS) L955941-01 12/09/17 11:58 • (DUP) WG1051660-4 12/09/17 11:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2590	2590	1	0.000		20

L956126-05 Original Sample (OS) • Duplicate (DUP)

(OS) L956126-05 12/09/17 11:58 • (DUP) WG1051660-5 12/09/17 11:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	398	398	1	0.000		20

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

(LCS) WG1051660-2 12/09/17 11:58 • (LCSD) WG1051660-3 12/09/17 11:58

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	560	559	100	100	85.0-115			0.179	20

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3271329-1 12/07/17 21:06

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

L955679-03 Original Sample (OS) • Duplicate (DUP)

(OS) L955679-03 12/07/17 23:01 • (DUP) R3271329-4 12/07/17 23:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	27.1	27.1	1	0		15

L955837-04 Original Sample (OS) • Duplicate (DUP)

(OS) L955837-04 12/08/17 02:09 • (DUP) R3271329-7 12/08/17 02:23

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	80.2	80.5	1	0		15

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

(LCS) R3271329-2 12/07/17 21:21 • (LCSD) R3271329-3 12/07/17 21:35

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 %
Chloride	40.0	40.0	39.9	100	100	80-120			0	15

L955679-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L955679-03 12/07/17 23:01 • (MS) R3271329-5 12/07/17 23:30 • (MSD) R3271329-6 12/07/17 23:45

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	27.1	80.2	76.0	106	98	1	80-120			5	15

L955837-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L955837-04 12/08/17 02:09 • (MS) R3271329-8 12/08/17 02:38

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	80.2	127	94	1	80-120	E

Method Blank (MB)

(MB) R3271771-3 12/07/17 22:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000190	0.000500
Toluene	U		0.000412	0.00100
Ethylbenzene	U		0.000160	0.000500
Total Xylene	U		0.000510	0.00150
(S) a,a,a-Trifluorotoluene(PID)	*100*			*80.0-121*

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

(LCS) R3271771-1 12/07/17 21:18 • (LCSD) R3271771-2 12/07/17 21:40

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	0.0500	0.0525	0.0523	105	105	71.0-121			0.400	20
Toluene	0.0500	0.0537	0.0532	107	106	72.0-120			0.900	20
Ethylbenzene	0.0500	0.0536	0.0532	107	106	75.0-122			0.690	20
Total Xylene	0.150	0.160	0.160	107	107	74.0-124			0.130	20
(S) a,a,a-Trifluorotoluene(PID)				*98.7*	*98.1*	*80.0-121*				

L955941-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L955941-01 12/08/17 06:23 • (MS) R3271771-4 12/08/17 06:46 • (MSD) R3271771-5 12/08/17 07:08

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 %
Benzene	0.0500	0.138	0.124	0.120	0.000	0.000	1	29.0-146	J6	J6	2.86	20
Toluene	0.0500	0.0515	0.0617	0.0585	20.4	13.9	1	35.0-140	J6	J6	5.40	20
Ethylbenzene	0.0500	0.00165	0.0311	0.0290	59.0	54.7	1	39.0-143			7.14	20
Total Xylene	0.150	0.00978	0.0984	0.0918	59.1	54.7	1	42.0-142	J6	J6	6.94	20
(S) a,a,a-Trifluorotoluene(PID)					*97.0*	*97.3*		*80.0-121*				

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.

Abbreviations and Definitions

MDL	Method Detection Limit.
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, 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.
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).
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

ESC Lab Sciences 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.

[1] Cp
[2] Tc
[3] Ss
[4] Cn
[5] Sr
[6] Qc
[7] Gl
[8] Al
[9] Sc

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [14]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

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

Our Locations

ESC Lab Sciences 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. **ESC Lab Sciences performs all testing at our central laboratory.**

XTO ENERGY
Western Division

Well Site/Location: FEDERAL 18-17	Quote Number	Page ___ of ___
Collected By: CORRIE McCOLLUM	XTO Contact: JAMES	XTO Contact Phone #
Company: XTO	Email Results to: JAMES	
Signature	API Number	Saturday Delivery (Y / N)
	Samples on Ice (Y) N	Turnaround: X Standard; ___ Next Day; ___ Two Day; ___ Three Day; ___ Same Day; Date Needed ___
	Test Reason: GW	
	Gray Area: for Lab Use Only!	

Lab Information: L955941

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
18-17 TUBING		GW	12-5	1600	Cool	3-500ml 2-VOA	X	X	X	X	X			-01

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

Relinquished By: (Signature)	Date: 12-05-17	Time: 15:20	Received By: (Signature)	Number of Bottles: 5	Sample Condition
Relinquished By: (Signature)	Date:	Time:		Temperature: 0.9	Other Information
Relinquished By: (Signature)	Date:	Time:	Received for Lab by: (Signature)	Date: 12/7/17 Time: 845	

Comments: OK

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

ESC LAB SCIENCES
Cooler Receipt Form

Client: XTO	SDG#	L455941	
Cooler Received/Opened On: 12/7/17	Temperature:	0.9	
Received by : Kelsey Stephenson			
Signature: KSC			

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	✓		
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			