APPROVED
By CHernandez at 12:05 pm, Sep 21, 2018

NMOCD grants closure to 1RP-4831.

1RP-4831
REMEDIATION REPORT
EMSU #101 Flowline Leak
Lea County, New Mexico

Latitude: 32.548117°
Longitude: -103.293928°

LAI Project No. 17-0192-01

August 17, 2018

Prepared for:

XTO Energy, Inc.
6401 Holiday Hill Road, Building 5
Midland, Texas 79707

Prepared by:

Larson & Associates, Inc.
507 North Marienfeld Street, Suite 205
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Certified Professional Geologist

Ashton H. Thielke
Staff Geologist

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1.0 INTRODUCTION

Larson & Associates, Inc. (LAI) has prepared this remediation report on behalf of XTO Energy, Inc. (XTO) for submittal to the New Mexico Oil Conservation Division (OCD) District 1, for a produced water leak from a flow line located northwest of the Eunice Monument South Unit (EMSU) Well #101 (Site). The Site is located in Unit C (NW/4, NE/4), Section 30, Township 20 South, Range 37 East, in Lea County, New Mexico. The geodetic position is latitude 32.548117° and longitude -103.293928°. Figure 1 presents a topographic map.

1.1 Background

The spill occurred on September 20, 2017, after a crew installing a fresh water line cut through the 2 inch fiberglass flow line that conveys produced water from the EMSU Well #101 to a satellite battery located northwest of the Site. The line strike caused approximately 135.79 barrels (bbl) of produced water to be released. A vacuum truck picked up approximately 30 bbl. The release covered an area estimated at approximately 30 x 264 feet or about 7,920 square feet to a depth of approximately 18 inches. XTO excavated an area measuring approximately 530 square feet to about 4 feet below ground surface (bgs) for repairing the flow line. The surface and mineral owner is the State of New Mexico State Land Office (SLO). XTO submitted the initial C-141 to OCD District 1 on September 27, 2017. The release was assigned remediation permit 1RP-4831, with conditions. Appendix A presents the initial C-141.

On November 27, 2017, LAI, on behalf of XTO, submitted the delineation plan to OCD, which was approved on November 28, 2017, with the following stipulations:

1. The topographic map for Figure 1 indicated water tanks rather than the nearest NMOSE freshwater well. Please provide documentation for the water well in Section 30P- 20S- 37E. Based on the GPS coordinates of the release location, the nearest NMOSE well with depth to groundwater (L04410) approximately 5300 ft. Northeast- indicates depth at 35 ft.
2. Please be advised that based on verification of depth to groundwater, the additional depth to maintain permissible chloride levels of 600 mg/kg may differ.
3. On an appropriately scaled map, please indicate the dimensions of the pipeline trench and which sample points are within the trench.

On July 5, 2018, LAI personnel performed field reconnaissance to confirm the location of the water well identified in Unit P (SE/4, SE/4), Section 30, Township 20 South, and Range 37 East. This well was located from GPS coordinates and located approximately 4,000 southeast of the Site. On July 5, 2018, depth to groundwater in this well was greater than 200 feet below ground surface (bgs). LAI personnel gauged a monitoring well about 5,400 feet north of the Site with groundwater approximately 28 feet bgs.

LAI responded to OCD's information request on July 13, 2018, and submitted the water well location and depth to groundwater information. On July 20, 2018, OCD issued final approval of the delineation plan on with the following clarifications:

1. Sidewall AND bottom confirmation samples taken for all proposed excavation areas and must be no greater than 50 ft apart.
2. Laboratory analyses must include Benzene, BTEX, and extended TPH.

3. On an appropriately scaled map, demarcate confirmation sample locations with GPS coordinates.
4. Include dated photo documentation of delineation and remediation in the subsequent report.

Like approval from NMSLO required. Additional stipulations regarding right of entry may exist. NMSLO may verify. On July 24, 2017, the New Mexico State Land Office (NMSLO) approved the remediation plan with no additional concerns or right of entry permit required. Appendix B presents OCD and SLO communications.

1.2 Physical Setting

The physical setting is as follows:

- The surface elevation is approximately 3,540 feet above mean sea level (MSL);
- The topography slopes towards the east and southeast;
- There are no surface water features within 1,000 feet of the Site;
- The soils are designated as "Pyote and maljamar fine sands", consisting of approximately 30 inches of fine sand underlain by fine sandy loam to approximately 60 inches derived from sedimentary rock;
- The upper geological unit is the Tertiary-age Blackwater Draw and Ogallala formations, in descending order, comprised of very fine to medium-grained quartz sand and gravel, with minor amount of silt and clay with indistinct to massive cross beds;
- The Ogallala formation is underlain by clay, silty clay, shale and sandstone of the Chinle formation (Triassic) and is about 300 feet thick;
- According to records from the U.S. Geological Survey (U.S.G.S.) and State of New Mexico Office of the State Engineer (OSE) the nearest freshwater well is located in Unit P (SE/4, SE/4), Section 30, Township 20 South, Range 37 East or about 104.10 feet bgs (1996), however, on July 5, 2018, depth to groundwater was greater than 200 feet bgs.

1.3 Recommended Remediation Action Levels

Remediation action levels were calculated for benzene, BTEX and TPH based on the following criteria established by the OCD in "*Guidelines for Remediation of Leaks, Spills and Release, pp. 6-7, August 13, 1993"*:

Criteria	***Result***	***Score***
Depth-to-Groundwater	>100 Feet	0 20
Wellhead Protection Area	No	0
Distance to Surface Water Body	>1000 Horizontal Feet	0

The following RRAL apply to the release for ranking score: 0 20

- Benzene 10 mg/Kg
- BTEX 50 mg/Kg
- TPH 5,000 mg/Kg

Depth to groundwater greater than 100 feet bgs requires vertical delineation for chloride to 600 milligrams per kilogram (mg/Kg) and maintained a minimum 3-4 feet farther in depth.

2.0 DELINEATION

The spill was delineated between December 7, 2017 and April 26, 2018, and documented in a report titled "1RP-4831 Delineation Report EMSU Well #101 Flowline Leak, Lea County, New Mexico, July 5, 2018") which was submitted to OCD on November 28, 2017. Table 1 presents the delineation soil sample analytical data summary.

3.0 REMEDIATION

Soil remediation was performed between July 30, 2018 and August 3, 2018, according to the plan approved by OCD District 1 on July 20, 2018. Rocky Peak, Inc. (RPI), under supervision from LAI, excavated soil from the areas around DP-6, DP-4, and expanded and deepened the flow line excavation. DP-6 was excavated to 15 x 15 feet or approximately 400 ft² and a depth of 3 ft bgs. DP-4 was excavated to 15 x 15 feet or approximately 240 ft² and a depth of 4 ft bgs. The flow line excavation expanded to 50 x 20 feet or approximately 800 ft² and to 4 ft bgs, except the west end which, was excavated to 5 ft bgs. .

On July 31, 2018, soil samples were collected from the excavation sidewalls and bottom no further than 50 ft apart to satisfy OCD requirements. Soil samples were analyzed by Permian Basin Environmental Lab (PBEL) for benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA SW-846 Method 8020B and TPH by EPA SW-846 Method 8015 including GRO (C6 – C12), DRO (>C12 – C28) and ORO (>C28 – C35) and chloride by EPA Method 300. Benzene and BTEX were less than the analytical method reporting limits (RL) in the sidewall and bottom samples from the excavations. TPH was less than the method reporting limit in sidewall and bottom samples from excavations at DP-4 and DP-6 and less than the RRAL (5,000 mg/Kg) in the sidewall and bottom samples from the flow line excavation. Chloride was less than 600 mg/Kg in the bottom samples from 1 and 2 feet bgs but less than 600 mg/Kg in the final sample (4 feet) following soil excavation to 4 feet bgs. Chloride exceeded 600 mg/Kg in the east sidewall (1,230 mg/Kg) and west bottom (1,270 mg/Kg) samples. Chloride was less than 600 mg/Kg in the final east sidewall (386 mg/Kg) and west bottom (71.1 mg/Kg) samples on August 2, 2018, following excavation expansion to the east and deepening to 5 feet on the west end.
A total of 228 cubic yards of contaminated soil was disposed at Sundance Services (Parabo) located east of Eunice, New Mexico. A total of 240 cubic yards of clean soil was acquired from a nearby private landowner to fill the excavations. On August 13, 2018, the remediation areas were seeded with BLM Mix No. 3. Table 2 presents the confirmation soil sample analytical data summary. Figure 3 presents an aerial map showing the excavations and confirmation soil sample locations. Table 3 presents the confirmation soil sample GPS coordinates. Appendix C presents photographs. Appendix D presents the final C-141.

4.0 CONCLUSION

The spill was remediated according to the remediation plan approved by OCD District 1 on July 20, 2018. XTO respectfully requests no further action for 1RP-4831.

Tables

Table 1
1RP-4831
Delineation Soil Sample Analytical Data Summary
XTO Energy, Inc., EMSU Well #101 Injection Line
Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	Status	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C12 (mg/Kg)	C12 - C28 (mg/Kg)	C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:				**10**	**50**				**5,000**	***600**
Excavation Soil Samples										
North Sidewall	2	12/07/2017	In-Situ	<0.00103	<0.00721	<25.8	283	429	713	**12,300**
East Sidewall	2	12/07/2017	In-Situ	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	45.9
South Sidewall	2	12/07/2017	In-Situ	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	**761**
West Sidewall	2	12/07/2017	In-Situ	<0.00104	<0.00728	<26.0	<26.0	<26.0	<26.0	**1,900**
Bottom	4-5	12/7/2017	In- Situ	<0.00109	<0.00763	<27.2	<27.2	<27.2	<27.2	286
Soil Boring Samples										
DP-1	0 - 1	12/12/2017	In-Situ	<0.00106	<0.00744	<26.6	<26.6	<26.6	<26.6	<1.06
	1 - 2	12/12/2017	In-Situ	--	--	--	--	--	--	<1.15
	2 - 3	12/12/2017	In-Situ	--	--	--	--	--	--	<1.12
	3 - 4	12/12/2017	In-Situ	--	--	--	--	--	--	13.0
DP-2	0 - 1	12/12/2017	In-Situ	<0.00111	<0.00777	<27.8	<27.8	<27.8	<27.8	572
	1 - 2	12/12/2017	In-Situ	--	--	--	--	--	--	290
	2 - 3	12/12/2017	In-Situ	--	--	--	--	--	--	39.8
	3 - 4	12/12/2017	In-Situ	--	--	--	--	--	--	94.3
DP-3	0 - 1	12/12/2017	In-Situ	<0.00104	<0.00728	<26.0	<26.0	<26.0	<26.0	8.50
	1 - 2	12/12/2017	In-Situ	--	--	--	--	--	--	<1.10
	2 - 3	12/12/2017	In-Situ	--	--	--	--	--	--	9.07
	3 - 4	12/12/2017	In-Situ	--	--	--	--	--	--	<1.10
DP-4	0 - 1	12/12/2017	In-Situ	<0.00110	<0.0077	<27.5	<27.5	<27.5	<27.5	**1,520**
	1 - 2	12/12/2017	In-Situ	--	--	--	--	--	--	**2,270**
	2 - 3	12/12/2017	In-Situ	--	--	--	--	--	--	**1,730**
	3 - 4	12/12/2017	In-Situ	--	--	--	--	--	--	**923**
	5	4/26/2018		--	--	--	--	--	--	29.6
	10	4/26/2018		--	--	--	--	--	--	103
	15	4/26/2018		--	--	--	--	--	--	113
	20	4/26/2018		--	--	--	--	--	--	53.9
	25	4/26/2018		--	--	--	--	--	--	65.8
DP-5	0 - 1	12/12/2017	In-Situ	<0.00106	<0.00744	<26.6	<26.6	<26.6	<26.6	19.9
	1 - 2	12/12/2017	In-Situ	--	--	--	--	--	--	<1.11
	2 - 3	12/12/2017	In-Situ	--	--	--	--	--	--	<1.14
	3 - 4	12/12/2017	In-Situ	--	--	--	--	--	--	22.9
DP-6	0-1	12/12/2017	In-Situ	<0.00108	<.00756	<26.9	<26.9	<26.9	<26.9	**745**
	1-2	12/12/2017	In-Situ	--	--	--	--	--	--	562
	2-3	12/12/2017	In-Situ	--	--	--	--	--	--	53.3
	3-4	12/12/2017	In-Situ	--	--	--	--	--	--	78.5

Table 1
1RP-4831
Delineation Soil Sample Analytical Data Summary
XTO Energy, Inc., EMSU Well #101 Injection Line
Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	Status	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C12 (mg/Kg)	C12 - C28 (mg/Kg)	C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:				**10**	**50**				**5,000**	***600**
	5	4/26/2018		--	--	--	--	--	--	12.7
	10	4/26/2018		--	--	--	--	--	--	<1.30
DP-7	0-1	12/12/2017	In-Situ	<0.00120	<0.0084	<30.1	<30.1	<30.1	<30.1	<1.20
	1-2	12/12/2017	In-Situ	--	--	--	--	--	--	<1.14
	2-3	12/12/2017	In-Situ	--	--	--	--	--	--	<1.11
	3-4	12/12/2017	In-Situ	--	--	--	--	--	--	<1.10
DP-8	0	4/26/2018		--	--	--	--	--	--	<1.06
	5	4/26/2018		--	--	--	--	--	--	<1.30
	10	4/26/2018		--	--	--	--	--	--	<1.32
	15	4/26/2018		--	--	--	--	--	--	<1.25
	20	4/26/2018		--	--	--	--	--	--	<1.05
	25	4/26/2018		--	--	--	--	--	--	<1.09
DP-9	0	4/26/2018		--	--	--	--	--	--	<1.02
	5	4/26/2018		--	--	--	--	--	--	96.4
	10	4/26/2018		--	--	--	--	--	--	115
	15	4/26/2018		--	--	--	--	--	--	17.8
	20	4/26/2018		--	--	--	--	--	--	61.3
DP-10	0	4/26/2018		--	--	--	--	--	--	<1.10
	5	4/26/2018		--	--	--	--	--	--	39.0
	10	4/26/2018		--	--	--	--	--	--	124
	15	4/26/2018		--	--	--	--	--	--	46.5
	20	4/26/2018		--	--	--	--	--	--	19.1

Notes: Laboratory analysis performed by Permian Basin Environmental Lab, Midland, Texas by EPA SW-846 Methods 8021B (BTEX) 8015M (TPH) and Method 300 (chloride)
Depth in feet below ground surface (bgs)
mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)
RRAL: recommended remediation action level
*: OCD delineation level
Bold and highlighted denotes chloride concentration exceeds OCD delineation limit (600 mg/Kg)

Table 2
1RP-4831
Remediation Confirmation Soil Samples Analytical Data Summary
XTO Energy, Inc., EMSU Well #101 Flow Line Spill
Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	Status	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C12 (mg/Kg)	C12 - C28 (mg/Kg)	C28 - C35 (mg/Kg)	C6-C35 (mg/Kg)	Chloride (mg/Kg)
RRAL:				**10**	**50**				**5,000**	***600**
Flow Line Excavation										
West Side	2	7/31/2018	In-Situ	<0.00110	<0.05059	<27.5	<27.5	<27.5	<27.5	418
East Side	2	7/31/2018	In-Situ							
South Side - East	2	7/31/2018	In-Situ	<0.00105	<0.04841	<26.3	32.7	<26.3	**32.7**	9.44
South Side - West	2	7/31/2018	In-Situ	<0.00110	<0.05059	<27.5	76.7	<27.5	**76.7**	360
North Side - East	2	7/31/2018	Excavated	<0.00111	<0.05107	<27.8	<27.8	<27.8	<27.8	**1,230**
	2	8/2/2018	In-Situ	--	--	--	--	--	--	387
North Side - West	2	7/31/2018	In-Situ	<0.00105	<0.04841	<26.3	<26.3	<26.3	<26.3	601
Bottom - West	4	7/31/2018	Excavated	<0.00104	<0.04785	<26.0	<26.0	<26.0	<26.0	**1,270**
	5	8/2/2018	In-Situ	--	--	--	--	--	--	71.1
Bottom - East	4	7/31/2018	In-Situ	<0.00116	<0.05347	<29.1	<29.1	<29.1	<29.1	117
DP-4										
West Side	2	7/31/2018	In-Situ	<0.00102	<0.04692	<25.5	<25.5	<25.5	<25.5	<1.02
East Side	2	7/31/2018	In-Situ	<0.00104	<0.04785	<26.0	<26.0	<26.0	<26.0	410
South Side	2	7/31/2018	In-Situ	<0.00103	<0.04738	<25.8	<25.8	<25.8	<25.8	221
North Side	2	7/31/2018	In-Situ	<0.00102	<0.04692	<25.5	<25.5	<25.5	<25.5	7.16
Bottom	4	7/31/2018	In-Situ	<0.00103	<0.04738	<25.8	<25.8	<25.8	<25.8	47.0
DP-6										
West Side	0.5	7/31/2018	In-Situ	<0.00110	<0.05059	<27.5	<27.5	<27.5	<27.5	<1.10
East Side	0.5	7/31/2018	In-Situ	<0.00108	<0.04956	<26.9	<26.9	<26.9	<26.9	585
South Side	0.5	7/31/2018	In-Situ	<0.00102	<0.04692	<25.5	<25.5	<25.5	<25.5	375
North Side	0.5	7/31/2018	In-Situ	<0.00101	<0.04646	<25.3	<25.3	<25.3	<25.3	33.3
Bottom	1	7/31/2018	Excavated	<0.00102	<0.04692	<25.5	<25.5	<25.5	<25.5	**803**
	2	8/2/2018	Excavated	--	--	--	--	--	--	**742**
	4	8/7/2018	In-Situ	--	--	--	--	--	--	311

Notes: Laboratory analysis performed by Permian Basin Environmental Lab, Midland, Texas by EPA SW-846 Method 8015M (TPH) and 300 (chloride)
Depth in feet below ground surface (bgs)
mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)
*: OCD delineation level
Bold and highlighted denotes in-situ soil with chlooirde greater than 600 mg/Kg that was excavated and disposed

Figures

Figure 1 - Topographic Map

Figure 2 - Aerial Map Showing Spill Area and Soil Sample Location

SIDEWALL SAMPLE COORDINATES:	
DP-6	
North	32° 32' 50.16"N, 103° 17' 43.38"W
East	32° 32' 50.14"N, 103° 17' 43.23"W
South	32° 32' 49.98"N, 103° 17' 43.30"W
West	32° 32' 50.03"N, 103° 17' 43.46"W
Center	32° 32' 50.07"N, 103°17' 43.30"W
DP-4	
North	32° 32' 49.40"N, 103° 17' 43.29"W
East	32° 32' 49.31"N, 103° 17' 43.17"W
South	32° 32' 49.23"N, 103° 17' 43.24"W
West	32° 32' 49.27"N, 103° 17' 43.34"W
Center	32° 32' 49.32"N, 103°17' 43.26"W
DP-2 & DP-3	
North West	32° 32' 48.74"N, 103° 17' 43.05"W
North East	32° 32' 48.90"N, 103° 17' 42.92"W
South West	32° 32' 48.56"N, 103° 17' 42.91"W
South East	32° 32' 48.71"N, 103° 17' 42.76"W
West	32° 32' 48.56"N, 103° 17' 43.04"W
Center West	32° 32' 48.65"N, 103° 17' 42.96"W

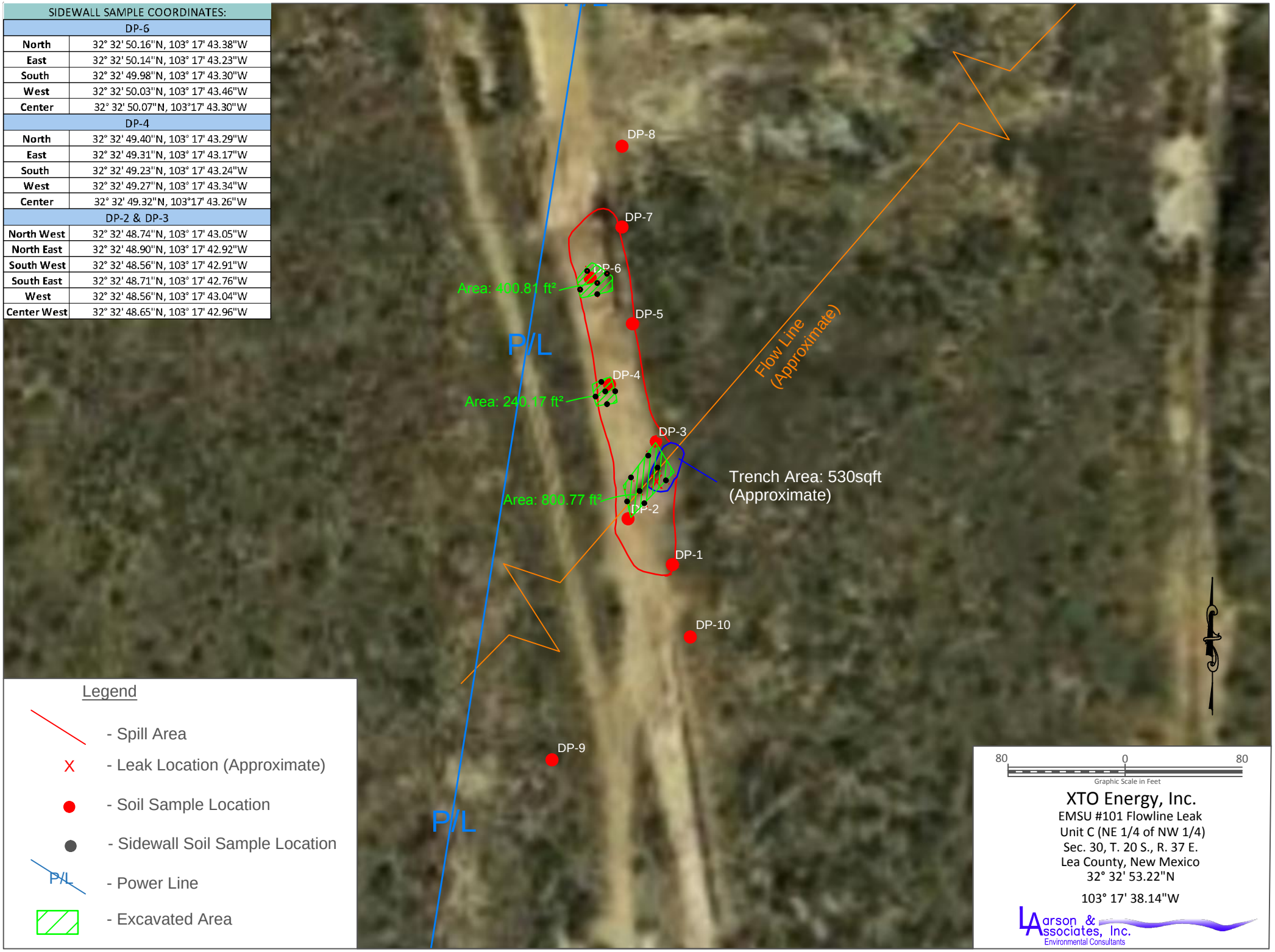

Figure 3 - Aerial Map Showing Spill Area and Soil Sample Location

Attachment A

Initial C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised April 3, 2017

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company XTO Energy Inc.	Contact Shannon Walker
Address 500 W. Illinois Suite 100 Midland, TX 79701	Telephone No.575-394-2089
Facility Name: EMSU 101	Facility Type: Well flow line

Surface Owner: State of New Mexico	Mineral Owner: State of New Mexico	API No.30-025-30220

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
C	30	20S	37E	660	NORTH	1980	WEST	LEA

Latitude 32.548117 **Longitude** -103.293928

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: Estimated 135.79 bbls	Volume Recovered 30bbls
Source of Release: 2" FG Flowline failure due to fatigue	Date and Hour of Occurrence 09/20/2017 @ 12:30MT	Date and Hour of Discovery 09/20/2017 @12:30MT
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Olivia Yu	
By Whom? Shannon Walker	Date and Hour 09/20/2017	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. N/A	

If a Watercourse was Impacted, Describe Fully.* N/A

RECEIVED
By Olivia Yu at 1:12 pm, Sep 29, 2017

Describe Cause of Problem and Remedial Action Taken.*

Line rupture, no remedial action taken at this time.
Estimated area affected L30'x W264'x D18"
Larson and Associates have been contacted to begin remediation.

Describe Area Affected and Cleanup Action Taken.*
Pasture Land. We were able to recover 30 barrels. As of this time no remediation has been taken.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: Patricia Donald

Printed Name: Patricia Donald

Title: Regulatory Analyst

E-mail Address:Patricia_Donald@xtoenergy.com

Date: 09/27/2017 Phone:432-571-8220

OIL CONSERVATION DIVISION

Approved by Environmental Specialist:

Approval Date: 9/29/2017 Expiration Date:

Conditions of Approval: see attached directive

Attached ☑

* Attach Additional Sheets If Necessary

1RP-4831 nOY1727247823 fOY1727247704 pOY1727248175

Operator/Responsible Party,

The OCD has received the form C-141 you provided on _9/28/2017_ regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number _1RP-4831__ has been assigned. **Please refer to this case number in all future correspondence.**

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

> *The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC.* [emphasis added]

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District _1_ office in __Hobbs____ on or before _10/29/2017_. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

● Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.

● Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.

● Nominal detection limits for field and laboratory analyses must be provided.

● Composite sampling is not generally allowed.

● Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

●Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

● If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

● Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.

Jim Griswold
OCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505-476-3465
jim.griswold@state.nm.us

Attachment B

OCD and SLO Communications

From:	Mann, Ryan
To:	"Hernandez, Christina, EMNRD"; Mark Larson; Yu, Olivia, EMNRD
Cc:	"Pennington, Shelby"
Subject:	RE: 1RP-4831 - Delineation Report, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., July 5, 2018
Date:	Tuesday, July 24, 2018 3:47:17 PM

NMSLO approves of the plan with no additional concerns. No entry permit will be necessary.

Ryan Mann
Remediation Specialist
Field Operation Division
(575) 392-3697
(505) 699-1989
New Mexico State Land Office
2827 N. Dal Paso Suite 117
Hobbs, NM 88240

From: Hernandez, Christina, EMNRD [mailto:Christina.Hernandez@state.nm.us]
Sent: Friday, July 20, 2018 2:02 PM
To: Mark Larson <Mark@laenvironmental.com>; Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Mann, Ryan <rmann@slo.state.nm.us>
Cc: 'Pennington, Shelby' <Shelby_Pennington@xtoenergy.com>
Subject: RE: 1RP-4831 - Delineation Report, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., July 5, 2018

Dear Mr. Larson:

When citing USGS records for a particular day (i.e. July 5, 2018) it is helpful to include documentation of those records in your report. Additionally, photo documentation of field reconnaissance of water monitoring wells is also helpful.

NMOCD approves of the delineation completed for 1RP-4831 and the proposed remediation with these clarifications:

1) Sidewall AND bottom confirmation samples taken for all proposed excavation areas and must be no greater than 50 ft apart.
2) Laboratory analyses must include Benzene, BTEX, and extended TPH.
3) On an appropriately scaled map, demarcate confirmation sample locations with GPS coordinates.
4) Include dated photo documentation of delineation and remediation in the subsequent report.

Like approval from NMSLO required. Additional stipulations regarding right of entry may exist. NMSLO may verify.

Thanks,

Christina Hernandez
EMNRD-OCD
Environmental Specialist
1625 N. French Drive
Hobbs, NM 88240
575-393-6161 x111
Christina.Hernandez@state.nm.us

From: Mark Larson <Mark@laenvironmental.com>
Sent: Friday, July 13, 2018 4:44 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Hernandez, Christina, EMNRD <Christina.Hernandez@state.nm.us>; 'rmann@slo.state.nm.us' <rmann@slo.state.nm.us>
Cc: 'Pennington, Shelby' <Shelby_Pennington@xtoenergy.com>
Subject: Re: 1RP-4831 - Delineation Report, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., July 5, 2018

Dear Ms. Yu, Ms. Hernandez and Mr. Mann,
Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached delineation report for a produced water leak from a flowline connected with the EMSU Well #101 in Lea County, New Mexico. The spill occurred where the flowline crosses a pipeline right of way where a contractor for the pipeline company accidentally cut the line. XTO proposes the following remedial actions in response to the spill:

- Expand excavation where flowline was repaired to the north, south and west laterally between about 5 to 10 feet from current excavation boundary to the current excavation depth;
- Collect confirmation sidewall samples at approximately 2 feet bgs and analyze for chloride by EPA Method 300;
- Excavate soil from area around DP-4 for approximately 15 x 15 feet, depending on pipelines, to approximately 4 feet bgs and collect confirmation sidewall (north, south, east and west) at approximately 2 feet bgs and bottom sample at approximately 4 feet bgs and analyze for chloride by EPA Method 300;
- Excavate soil from area around DP-6 for approximately 10 x 10 feet to approximately,

depending on pipelines, to 1 foot bgs and collect confirmation sidewall (north, south, east and west at approximately 0.5 feet bgs and bottom sample at approximately 1 foot bgs and analyze for chloride by EPA Method 300;

- Dispose of excavated soil at Sundance (Parabo) disposal;
- Assuming no further soil excavation is required backfill excavations with clean soil and seed with BLM Mix No. 3.

Your approval of the delineation report and proposed remediation plan are appreciated. Please contact Shelby Pennington with XTO at (432) 682-8873 or email Shelby_Pennington@xtoenergy.com or me if you have questions.
Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
(432) 687-0901 (O)
(432) 556-8656 (C)

LArson & Associates, Inc.
Environmental Consultants

www.LAEnvironmental.com

"Serving the Permian Basin Since 2000"

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Tuesday, November 28, 2017 4:59 PM
To: Mark Larson; 'Groves, Amber'
Cc: 'Williams, Luke'; 'Donald, Patricia'
Subject: RE: Re: 1RP-4831 - Delineation Plan, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., October 15, 2017

Mr. Larson:

Please address these concerns regarding the proposed delineation plan for 1RP-4831:

1. The topographic map for Figure 1 indicated water tanks rather than the nearest NMOSE freshwater well. Please provide documentation for the water well in Section 30P- 20S- 37E. Based on the GPS coordinates of the release location, the nearest NMOSE well with depth to groundwater (L04410)- approximately 5300 ft. Northeast- indicates depth at 35 ft.
2. Please be advised that based on verification of depth to groundwater, the additional depth to maintain permissible chloride levels of 600 mg/kg may differ.

3. On an appropriately scaled map, please indicate the dimensions of the pipeline trench and which sample points are within the trench.

Thanks,

Olivia Yu
Environmental Specialist
NMOCD, District I
Olivia.yu@state.nm.us
575-393-6161 x113

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Monday, November 27, 2017 2:39 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; 'Groves, Amber' <agroves@slo.state.nm.us>
Cc: 'Williams, Luke' <Luke_Williams@xtoenergy.com>; 'Donald, Patricia' <Patricia_Donald@xtoenergy.com>
Subject: FW: Re: 1RP-4831 - Delineation Plan, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., October 15, 2017

Hello Olivia,
This message is submitted on behalf of XTO Energy, Inc. (XTO) as a follow up to the email sent on October 9, 2017, conveying the delineation plan for 1RP-4831, and approval to delineate the spill according to the attached plan? Please contact Luke Williams with XTO at (432) 682-8873 or email Luke_Willaims@xtoenergy.com or me if you have questions.
Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
(432) 687-0901 (O)
(432) 556-8656 (C)

LA arson & Associates, Inc.
Environmental Consultants

www.LAEnvironmental.com

"Serving the Permian Basin Since 2000"

From: Mark Larson
Sent: Thursday, October 19, 2017 5:41 PM
To: 'Yu, Olivia, EMNRD'
Cc: 'Williams, Luke'; Sarah Johnson
Subject: Re: 1RP-4831 - Delineation Plan, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., October 15, 2017

Dear Ms. Yu,
Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached delineation plan for a produced water leak from the flow line from EMSU Well #101. Please contact Luke Williams with XTO at (432) 682-8873 or email Luke_Willaims@xtoenergy.com or me if you have questions.
Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
(432) 687-0901 (O)
(432) 556-8656 (C)

www.LAEnvironmental.com

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Appendix C

Laboratory Reports

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: EMSU Well #101

Project Number: 17-0192-01

Location: None Given

Lab Order Number: 8H01002

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-17-8

Report Date: 08/02/18

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DP-6 (N. Sidewall) 6"	8H01002-01	Soil	07/31/18 15:06	08-01-2018 08:52
DP-6 (S. Sidewall) 6"	8H01002-02	Soil	07/31/18 15:07	08-01-2018 08:52
DP-6 (E. Sidewall) 6"	8H01002-03	Soil	07/31/18 15:08	08-01-2018 08:52
DP-6 (W. Sidewall) 6"	8H01002-04	Soil	07/31/18 15:09	08-01-2018 08:52
DP-6 (Bottom) 1'	8H01002-05	Soil	07/31/18 15:05	08-01-2018 08:52
DP-4 (N. Sidewall) 2'	8H01002-06	Soil	07/31/18 15:17	08-01-2018 08:52
DP-4 (S. Sidewall) 2'	8H01002-07	Soil	07/31/18 15:13	08-01-2018 08:52
DP-4 (E. Sidewall) 2'	8H01002-08	Soil	07/31/18 15:14	08-01-2018 08:52
DP-4 (W. Sidewall) 2'	8H01002-09	Soil	07/31/18 15:15	08-01-2018 08:52
DP-4 (Bottom) 4'	8H01002-10	Soil	07/31/18 15:18	08-01-2018 08:52
West Sidewall 2'	8H01002-11	Soil	07/31/18 15:20	08-01-2018 08:52
S. Sidewall East 2'	8H01002-12	Soil	07/31/18 15:22	08-01-2018 08:52
S. Sidewall West 2'	8H01002-13	Soil	07/31/18 15:21	08-01-2018 08:52
N. Sidewall East 2'	8H01002-14	Soil	07/31/18 15:25	08-01-2018 08:52
N. Sidewall West 2'	8H01002-15	Soil	07/31/18 15:26	08-01-2018 08:52
Bottom West 4'	8H01002-16	Soil	07/31/18 15:24	08-01-2018 08:52
Bottom East 4'	8H01002-17	Soil	07/31/18 15:23	08-01-2018 08:52

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 (N. Sidewall) 6''

8H01002-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.00101	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0101	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00505	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0202	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0101	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*101 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*76.4 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**33.3**	1.01	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**1.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*107 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*103 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.3	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 (S. Sidewall) 6''

8H01002-02 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00510	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0204	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*83.6 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**375**	1.02	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*106 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*104 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 (E. Sidewall) 6''

8H01002-03 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00108	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0108	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00538	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0215	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0108	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*85.3 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*110 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**585**	1.08	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*104 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*102 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.9	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 (W. Sidewall) 6"

8H01002-04 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00549	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0220	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*102 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*79.6 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.10	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*102 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*101 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 (Bottom) 1'

8H01002-05 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00510	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0204	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*113 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*87.0 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**803**	5.10	mg/kg dry	5	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*107 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*106 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
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Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-4 (N. Sidewall) 2'

8H01002-06 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00510	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0204	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*81.0 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**7.16**	1.02	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*106 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*104 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
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Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

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DP-4 (S. Sidewall) 2'

8H01002-07 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00515	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0206	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*113 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*83.2 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**221**	1.03	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*111 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

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Midland TX, 79710

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Project Number: 17-0192-01
Project Manager: Mark Larson

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DP-4 (E. Sidewall) 2'

8H01002-08 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00104	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0104	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00521	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0208	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0104	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*110 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*84.4 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**410**	1.04	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*114 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*112 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
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Project Number: 17-0192-01
Project Manager: Mark Larson

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DP-4 (W. Sidewall) 2'

8H01002-09 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00510	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0204	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0102	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*83.0 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*112 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.02	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*111 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*108 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

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P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

DP-4 (Bottom) 4'

8H01002-10 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00515	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0206	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0103	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*82.0 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**47.0**	1.03	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*117 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*116 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

West Sidewall 2'

8H01002-11 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00549	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0220	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*87.8 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**418**	1.10	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*110 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*108 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

S. Sidewall East 2'

8H01002-12 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00105	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0105	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00526	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0211	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0105	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*83.7 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**9.44**	1.05	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	**32.7**	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*113 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*111 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**32.7**	26.3	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

S. Sidewall West 2'

8H01002-13 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00549	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0220	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0110	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*79.5 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*111 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**360**	5.49	mg/kg dry	5	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	**76.7**	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*111 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*109 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**76.7**	27.5	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.
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Project: EMSU Well #101
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Project Manager: Mark Larson

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N. Sidewall East 2'

8H01002-14 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00111	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Toluene	ND	0.0111	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Ethylbenzene	ND	0.00556	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (p/m)	ND	0.0222	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Xylene (o)	ND	0.0111	mg/kg dry	1	P8H0105	08/01/18	08/01/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*78.7 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*112 %*	*75-125*		*P8H0105*	*08/01/18*	*08/01/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1230**	5.56	mg/kg dry	5	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	27.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	27.8	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*107 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*106 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.8	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

N. Sidewall West 2'

8H01002-15 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00105	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Toluene	ND	0.0105	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Ethylbenzene	ND	0.00526	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (p/m)	ND	0.0211	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (o)	ND	0.0105	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*84.4 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**601**	5.26	mg/kg dry	5	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*112 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*112 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.3	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

Bottom West 4'

8H01002-16 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00104	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Toluene	ND	0.0104	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Ethylbenzene	ND	0.00521	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (p/m)	ND	0.0208	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (o)	ND	0.0104	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*77.2 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*103 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1270**	10.4	mg/kg dry	10	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P8H0104	08/01/18	08/01/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*109 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*108 %*	*70-130*		*P8H0104*	*08/01/18*	*08/01/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	08/01/18	08/01/18	calc	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

Bottom East 4'

8H01002-17 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00116	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Toluene	ND	0.0116	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Ethylbenzene	ND	0.00581	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (p/m)	ND	0.0233	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Xylene (o)	ND	0.0116	mg/kg dry	1	P8H0105	08/01/18	08/02/18	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*84.1 %*	*75-125*		*P8H0105*	*08/01/18*	*08/02/18*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**117**	1.16	mg/kg dry	1	P8H0106	08/01/18	08/02/18	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	P8H0202	08/02/18	08/02/18	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	29.1	mg/kg dry	1	P8H0104	08/01/18	08/02/18	TPH 8015M	
>C12-C28	ND	29.1	mg/kg dry	1	P8H0104	08/01/18	08/02/18	TPH 8015M	
>C28-C35	ND	29.1	mg/kg dry	1	P8H0104	08/01/18	08/02/18	TPH 8015M	
Surrogate: 1-Chlorooctane		*111 %*	*70-130*		*P8H0104*	*08/01/18*	*08/02/18*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P8H0104*	*08/01/18*	*08/02/18*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	29.1	mg/kg dry	1	[CALC]	08/01/18	08/02/18	calc	

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0105 - General Preparation (GC)										
Blank (P8H0105-BLK1)				Prepared & Analyzed: 08/01/18						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.00500	"							
Xylene (p/m)	ND	0.0200	"							
Xylene (o)	ND	0.0100	"							
Surrogate: 4-Bromofluorobenzene	*0.0636*		*"*	*0.0600*		*106*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0474*		*"*	*0.0600*		*79.0*	*75-125*			
LCS (P8H0105-BS1)				Prepared & Analyzed: 08/01/18						
Benzene	0.102	0.00100	mg/kg wet	0.100		102	70-130			
Toluene	0.0976	0.0100	"	0.100		97.6	70-130			
Ethylbenzene	0.110	0.00500	"	0.100		110	70-130			
Xylene (p/m)	0.206	0.0200	"				70-130			
Xylene (o)	0.109	0.0100	"				70-130			
Surrogate: 4-Bromofluorobenzene	*0.0651*		*"*	*0.0600*		*108*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0631*		*"*	*0.0600*		*105*	*75-125*			
LCS Dup (P8H0105-BSD1)				Prepared & Analyzed: 08/01/18						
Benzene	0.0943	0.00100	mg/kg wet	0.100		94.3	70-130	7.54	20	
Toluene	0.0913	0.0100	"	0.100		91.3	70-130	6.72	20	
Ethylbenzene	0.104	0.00500	"	0.100		104	70-130	5.49	20	
Xylene (p/m)	0.190	0.0200	"				70-130		20	
Xylene (o)	0.100	0.0100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	*0.0602*		*"*	*0.0600*		*100*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0604*		*"*	*0.0600*		*101*	*75-125*			
Matrix Spike (P8H0105-MS1)	**Source: 8H01002-04**			Prepared: 08/01/18 Analyzed: 08/02/18						
Benzene	0.0830	0.00110	mg/kg dry	0.110	ND	75.5	80-120			QM-05
Toluene	0.0663	0.0110	"	0.110	ND	60.3	80-120			QM-05
Ethylbenzene	0.0528	0.00549	"	0.110	ND	48.1	80-120			QM-05
Xylene (p/m)	0.0893	0.0220	"		ND		80-120			
Xylene (o)	0.0450	0.0110	"		ND		80-120			
Surrogate: 4-Bromofluorobenzene	*0.0748*		*"*	*0.0659*		*113*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0688*		*"*	*0.0659*		*104*	*75-125*			

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0105 - General Preparation (GC)										
Matrix Spike Dup (P8H0105-MSD1)	**Source: 8H01002-04**			Prepared: 08/01/18 Analyzed: 08/02/18						
Benzene	0.0827	0.00110	mg/kg dry	0.110	ND	75.3	80-120	0.265	20	QM-05
Toluene	0.0736	0.0110	"	0.110	ND	67.0	80-120	10.5	20	QM-05
Ethylbenzene	0.0739	0.00549	"	0.110	ND	67.3	80-120	33.3	20	QM-05
Xylene (p/m)	0.132	0.0220	"		ND		80-120		20	
Xylene (o)	0.0641	0.0110	"		ND		80-120		20	
Surrogate: 4-Bromofluorobenzene	*0.0777*		*"*	*0.0659*		*118*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0664*		*"*	*0.0659*		*101*	*75-125*			

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0106 - * DEFAULT PREP *** **										
Blank (P8H0106-BLK1)				Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8H0106-BS1)				Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	399	1.00	mg/kg wet	400		99.8	80-120			
LCS Dup (P8H0106-BSD1)				Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	384	1.00	mg/kg wet	400		96.1	80-120	3.79	20	
Duplicate (P8H0106-DUP1)		**Source: 8H01002-01**		Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	24.2	1.01	mg/kg dry		33.3			31.6	20	R3
Duplicate (P8H0106-DUP2)		**Source: 8H01002-11**		Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	422	1.10	mg/kg dry		418			1.14	20	
Matrix Spike (P8H0106-MS1)		**Source: 8H01002-01**		Prepared: 08/01/18 Analyzed: 08/02/18						
Chloride	1080	1.01	mg/kg dry	1010	33.3	103	80-120			
Batch P8H0202 - * DEFAULT PREP *** **										
Blank (P8H0202-BLK1)				Prepared & Analyzed: 08/02/18						
% Moisture	ND	0.1	%							
Duplicate (P8H0202-DUP1)		**Source: 8H01003-06**		Prepared & Analyzed: 08/02/18						
% Moisture	9.0	0.1	%		8.0			11.8	20	
Duplicate (P8H0202-DUP2)		**Source: 8H01005-09**		Prepared & Analyzed: 08/02/18						
% Moisture	13.0	0.1	%		13.0			0.00	20	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0202 - * DEFAULT PREP *** **										
Duplicate (P8H0202-DUP3)		**Source: 8H01007-07**		Prepared & Analyzed: 08/02/18						
% Moisture	13.0	0.1	%		13.0			0.00	20	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0104 - General Preparation (GC)										
Blank (P8H0104-BLK1)				Prepared & Analyzed: 08/01/18						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*106*		*"*	*100*		*106*	*70-130*			
Surrogate: o-Terphenyl	*53.4*		*"*	*50.0*		*107*	*70-130*			
LCS (P8H0104-BS1)				Prepared & Analyzed: 08/01/18						
C6-C12	898	25.0	mg/kg wet	1000		89.8	75-125			
>C12-C28	949	25.0	"	1000		94.9	75-125			
Surrogate: 1-Chlorooctane	*130*		*"*	*100*		*130*	*70-130*			
Surrogate: o-Terphenyl	*53.3*		*"*	*50.0*		*107*	*70-130*			
LCS Dup (P8H0104-BSD1)				Prepared & Analyzed: 08/01/18						
C6-C12	892	25.0	mg/kg wet	1000		89.2	75-125	0.648	20	
>C12-C28	943	25.0	"	1000		94.3	75-125	0.576	20	
Surrogate: 1-Chlorooctane	*129*		*"*	*100*		*129*	*70-130*			
Surrogate: o-Terphenyl	*54.1*		*"*	*50.0*		*108*	*70-130*			
Matrix Spike (P8H0104-MS1)	**Source: 8H01002-09**			Prepared: 08/01/18 Analyzed: 08/02/18						
C6-C12	971	25.5	mg/kg dry	1020	24.6	92.7	75-125			
>C12-C28	1000	25.5	"	1020	12.8	97.2	75-125			
Surrogate: 1-Chlorooctane	*130*		*"*	*102*		*127*	*70-130*			
Surrogate: o-Terphenyl	*53.4*		*"*	*51.0*		*105*	*70-130*			
Matrix Spike Dup (P8H0104-MSD1)	**Source: 8H01002-09**			Prepared: 08/01/18 Analyzed: 08/02/18						
C6-C12	938	25.5	mg/kg dry	1020	24.6	89.5	75-125	3.53	20	
>C12-C28	988	25.5	"	1020	12.8	95.6	75-125	1.69	20	
Surrogate: 1-Chlorooctane	*125*		*"*	*102*		*123*	*70-130*			
Surrogate: o-Terphenyl	*51.6*		*"*	*51.0*		*101*	*70-130*			

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

R3	The RPD exceeded the acceptance limit due to sample matrix effects.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 8/2/2018

Brent Barron, Laboratory Director/Technical Director

Nº 0306

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 8-1-18 PAGE 1 OF 2

PO#: LAB WORK ORDER#: 8H01002

PROJECT LOCATION OR NAME: EMSU - 104

LAI PROJECT #: 17-0192-01 COLLECTOR: Ashton

Data Reported to: Ashton Thielke

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MSE

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☒ MTBE ☐	TRPH 418.1 ☐	TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☒	DIESEL - MOD 8015 ☒	OIL - MOD 8015 ☐	VOC 8260 ☐	SVOC 8270 ☐	PAH 8270 ☐	HOLDPAH ☐	8081 PESTICIDES ☐	8151 HERBICIDES ☐	8082 PCBS ☐	TBLP - METALS (RCRA) ☐	TCLP - PEST ☐	TCLP VOC ☐	TOTAL METALS (RCRA) ☐	HERB ☐	Semi-VOC ☐	LEAD - TOTAL ☐	OTHER LIST ☐	RCI ☐	TOX ☐	D.W. 200.8 ☐	TDS ☐	TSS ☐	TCLP ☐	pH ☐	FLASHPOINT ☐	EXPLOSIVES ☐	% MOISTURE ☐	HEXAVALENT CHROMIUM ☐	CHLORIDES ☒	CYANIDE ☐	ANIONS ☐	PECHLORATE ☐	ALKALINITY ☐	Mileage	FIELD NOTES
DP-6 (N. Sidewall) 6"	01	7-31-18	15:06	S	1				X		X		X	X	X																									X						
DP-6 (S. Sidewall) 6"	02		15:07																																										
DP-6 (E. Sidewall) 6"	03		15:08																																										
DP-6 (W. Sidewall) 6"	04		15:09																																										
DP-6 (Bottom) 1'	05		15:05																																										
DP-4 (N. Sidewall) 6"	2'06		15:17																																										
DP-4 (S. Sidewall) 6"	2'07		15:13																																										
DP-4 (E. Sidewall) 6"	2'08		15:14																																										
DP-4 (W. Sidewall) 6"	2'09		15:15																																										
DP-4 (Bottom) 4'	10		15:14																																										
West Sidewall 2'	11		15:20																																										
S. Sidewall East 2'	12		15:22																																										
S. Sidewall West 2'	13		15:21																																										
N. Sidewall East 2'	14		15:25																																										
N. Sidewall West 2'	15		15:26																																										
TOTAL																																												

RELINQUISHED BY:(Signature) Rachel Olsen DATE/TIME 08/01/18 8:52 RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME 8/1/18 8:52 RECEIVED BY: (Signature) Marissa Haddock

LABORATORY: PBEL

TURN AROUND TIME
NORMAL ☐
1 DAY ☒
2 DAY ☐
OTHER ☐ Rush !

LABORATORY USE ONLY:
RECEIVING TEMP: -12 +0.4 -1.6 THERM#:
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

№ 0307

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 8-1-18 PAGE 2 OF 2

PO#: LAB WORK ORDER#: 8HD1002

PROJECT LOCATION OR NAME: EMSU - 101

LAI PROJECT #: 17-0192-01 COLLECTOR: Ashley

Data Reported to:

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4	NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX & MTBE ☐	TRPH 418.1 ☐	TPH 1005 ☐	TPH 1006 ☐	GASOLINE MOD 8015	DIESEL - MOD 8015	OIL - MOD 8015	VOC 8260 ☐	SVOC 8270 ☐	PAH 8270 ☐	HOLDPAH ☐	8081 PESTICIDES ☐	8082 PCBS ☐	8151 HERBICIDES ☐	TBLP - METALS (RCRA) ☐	TCLP - PEST ☐	TCLP VOC ☐	HERB ☐	TOTAL METALS (RCRA) ☐	Semi-VOC ☐	LEAD - TOTAL ☐	D.W. 200.8 ☐	OTHER LIST ☐	RCI ☐	TOX ☐	TCLP ☐	TDS ☐	FLASHPOINT ☐	TSS ☐	% MOISTURE ☐	pH ☐	HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐	CYANIDE ☐	CHLORIDES ☐	PECHLORATE ☐	ANIONS ☐	ALKALINITY ☐	FIELD NOTES
Bottom West 4'	-16	7-31-18	15:24	S	1					X		X		X		X	X	X																														
Bottom East 4'	-17	↓	15:23	S	1					X		X		X		X	X	X																														
TOTAL																																															

RELINQUISHED BY:(Signature) Rachel Owen DATE/TIME 8/01/18 8:52 RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME 8/1/18 8:52 RECEIVED BY: (Signature) Mossa Haddock

LABORATORY: PBEL

TURN AROUND TIME

NORMAL ☐
1 DAY ☒
2 DAY ☐
OTHER ☐ Rush

LABORATORY USE ONLY:

RECEIVING TEMP: _____ THERM#: _____

CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED

☐ CARRIER BILL # _____

☐ HAND DELIVERED

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: EMSU Well #101

Project Number: 17-0192-01

Location: None Given

Lab Order Number: 8H03001

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-17-8

Report Date: 08/06/18

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
West Bottom (5ft)	8H03001-01	Soil	08/02/18 14:50	08-03-2018 08:28
North Sidewall East (2ft)	8H03001-02	Soil	08/02/18 14:55	08-03-2018 08:28
DP-6 Bottom (2ft)	8H03001-03	Soil	08/02/18 15:00	08-03-2018 08:28

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

West Bottom (5ft)

8H03001-01 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**71.1**	1.11	mg/kg dry	1	P8H0608	08/03/18	08/03/18	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P8H0606	08/05/18	08/06/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

North Sidewall East (2ft)

8H03001-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**387**	1.10	mg/kg dry	1	P8H0608	08/03/18	08/03/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0606	08/05/18	08/06/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

DP-6 Bottom (2ft)

8H03001-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**742**	1.10	mg/kg dry	1	P8H0608	08/03/18	08/03/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0606	08/05/18	08/06/18	ASTM D2216	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0606 - * DEFAULT PREP *** **										
Blank (P8H0606-BLK1)				Prepared: 08/05/18 Analyzed: 08/06/18						
% Moisture	ND	0.1	%							
Duplicate (P8H0606-DUP1)		**Source: 8H03011-02**		Prepared: 08/05/18 Analyzed: 08/06/18						
% Moisture	11.0	0.1	%		11.0			0.00	20	
Batch P8H0608 - * DEFAULT PREP *** **										
Blank (P8H0608-BLK1)				Prepared & Analyzed: 08/03/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8H0608-BS1)				Prepared & Analyzed: 08/03/18						
Chloride	422	1.00	mg/kg wet	400		106	80-120			
LCS Dup (P8H0608-BSD1)				Prepared & Analyzed: 08/03/18						
Chloride	427	1.00	mg/kg wet	400		107	80-120	1.16	20	
Duplicate (P8H0608-DUP1)		**Source: 8H03001-01**		Prepared & Analyzed: 08/03/18						
Chloride	72.5	1.11	mg/kg dry		71.1			1.98	20	
Matrix Spike (P8H0608-MS1)		**Source: 8H03001-01**		Prepared & Analyzed: 08/03/18						
Chloride	185	1.11	mg/kg dry	111	71.1	102	80-120			

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 8/6/2018

Brent Barron, Laboratory Director/Technical Director

WORK order #
8H03001

Rush

№ 0308

CHAIN-OF-CUSTO

Page 8 of 8

Larson & Associates, Inc.
Environmental Consultants

507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

Data Reported to:

DATE: 8-3-18 PAGE 1 OF 1

PO#:

LAB WORK ORDER#: 8H03001

PROJECT LOCATION OR NAME: EMSU 101

LAI PROJECT #: 17-0192-01 COLLECTOR: Ashley

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESSERVED	ANALYSES	FIELD NOTES
West Bottom (5ft)		8-2-18	14:50	S	1				X		Chloride ☒	
North Sidewall East (2ft)		1	14:55	S	1				X		Chloride ☒	
3 PP-6 Bottom 2ft		1	15:00	S	1				X		Chloride ☒	
TOTAL												

ANALYSES: BTEX ☐ MTBE ☐ | TRPH 418.1 ☐ | TPH 1005 ☐ TPH 1006 ☐ | GASOLINE MOD 8015 ☐ | DIESEL - MOD 8015 ☐ | OIL - MOD 8015 ☐ | VOC 8260 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ | 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ | 8082 PCBS ☐ | TBLP - METALS (RCRA) ☐ TCLP VOC ☐ | TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ | TOTAL METALS (RCRA) ☐ OTHER LIST ☐ | LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ | RCI ☐ TOX ☐ FLASHPOINT ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | pH ☐ HEXAVALENT CHROMIUM ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐

RELINQUISHED BY:(Signature) Rachel Owen DATE/TIME 8/3/18 8:28 RECEIVED BY: (Signature)

RELINQUISHED BY:(Signature) DATE/TIME 8-3-18 8:28 RECEIVED BY: (Signature) Ashley

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)

LABORATORY: PBEL

TURN AROUND TIME
NORMAL ☐
1 DAY ☒
2 DAY ☐
OTHER ☐ Rush

LABORATORY USE ONLY:
RECEIVING TEMP: 22.4 THERM#:
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☒ HAND DELIVERED

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: EMSU Well #101

Project Number: 17-0192-01

Location: EMSU 101

Lab Order Number: 8H07008

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-17-8

Report Date: 08/08/18

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0192-01	
Midland TX, 79710	Project Manager: Mark Larson	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DP-6 Bottom (4')	8H07008-01	Soil	08/07/18 11:46	08-07-2018 15:11

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

DP-6 Bottom (4')

8H07008-01 (Soil)

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chloride	**311**	1.10	mg/kg dry	1	P8H0707	08/07/18	08/08/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8H0801	08/08/18	08/08/18	ASTM D2216	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8H0707 - * DEFAULT PREP *** **										
Blank (P8H0707-BLK1)				Prepared: 08/07/18 Analyzed: 08/08/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8H0707-BS1)				Prepared & Analyzed: 08/07/18						
Chloride	394	1.00	mg/kg wet	400		98.6	80-120			
LCS Dup (P8H0707-BSD1)				Prepared & Analyzed: 08/07/18						
Chloride	395	1.00	mg/kg wet	400		98.8	80-120	0.233	20	
Duplicate (P8H0707-DUP1)		**Source: 8H07005-01**		Prepared & Analyzed: 08/07/18						
Chloride	466	1.08	mg/kg dry		463			0.586	20	
Duplicate (P8H0707-DUP2)		**Source: 8H07005-11**		Prepared: 08/07/18 Analyzed: 08/08/18						
Chloride	51.8	1.14	mg/kg dry		53.1			2.40	20	
Matrix Spike (P8H0707-MS1)		**Source: 8H07005-01**		Prepared & Analyzed: 08/07/18						
Chloride	1570	1.08	mg/kg dry	1080	463	103	80-120			
Batch P8H0801 - * DEFAULT PREP *** **										
Blank (P8H0801-BLK1)				Prepared & Analyzed: 08/08/18						
% Moisture	ND	0.1	%							
Duplicate (P8H0801-DUP1)		**Source: 8H07007-03**		Prepared & Analyzed: 08/08/18						
% Moisture	7.0	0.1	%		6.0			15.4	20	
Duplicate (P8H0801-DUP2)		**Source: 8H07008-01**		Prepared & Analyzed: 08/08/18						
% Moisture	9.0	0.1	%		9.0			0.00	20	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: EMSU Well #101
Project Number: 17-0192-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 8/8/2018

Brent Barron, Laboratory Director/Technical Director

Nº 0248

CHAIN-OF-CUSTODY

Page 6 of 6

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 08/07/2018 PAGE 1 OF 1

PO#: _____ LAB WORK ORDER#: 8H07008

PROJECT LOCATION OR NAME: EMSU 101

LAI PROJECT #: 17-0192-01 COLLECTOR: RO

Data Reported to:

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State:

S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESSERVED	ANALYSES: BTEX ☐ MTBE ☐	TRPH 418.1 ☐	TPH 1005 ☐	TPH 1006 ☐	GASOLINE MOD 8015 ☐	DIESEL - MOD 8015 ☐	OIL - MOD 8015 ☐	VOC 8260 ☐	SVOC 8270 ☐	PAH 8270 ☐	HOLDPAH ☐	8081 PESTICIDES ☐	8151 HERBICIDES ☐	8082 PCBS ☐	TCLP - METALS (RCRA) ☐	TCLP VOC ☐	TCLP - PEST ☐	HERB ☐	Semi-VOC ☐	TOTAL METALS (RCRA) ☐	OTHER LIST ☐	LEAD - TOTAL ☐	D.W. 200.8 ☐	TCLP ☐	RCI ☐	TOX ☐	FLASHPOINT ☐	TDS ☐	TSS ☐	% MOISTURE ☐	pH ☐	HEXAVALENT CHROMIUM ☐	CYANIDE ☐	EXPLOSIVES ☐	PECHLORATE ☐	CHLORIDE ☐	ANIONS ☐	ALKALINITY ☐	M300	FIELD NOTES
DP-6 Bottom 4'		8/7/18	11:46	S	1					X																																	X			
TOTAL																																														

RELINQUISHED BY:(Signature)	DATE/TIME	RECEIVED BY: (Signature)
Rachel Owen	8-7-18/3:09	
RELINQUISHED BY:(Signature)	DATE/TIME	RECEIVED BY: (Signature)
Ashley Yeager	8-7-18 3:11	
RELINQUISHED BY:(Signature)	DATE/TIME	RECEIVED BY: (Signature)

LABORATORY: PBEL

TURN AROUND TIME

NORMAL ☐
1 DAY ☒
2 DAY ☐
OTHER ☐ Rush

LABORATORY USE ONLY:

RECEIVING TEMP: 2.7 THERM#: _____

CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED

☐ CARRIER BILL # _____

☐ HAND DELIVERED

Appendix D

Photographs

Photographs

Origin of Spill Viewing North

Injection Line Viewing East

Injection Line Viewing West

Nearest Water Well Approximately 4,000 Feet Southeast of Spill

Start of Excavation Viewing South

Start of Excavation at DP-6 Viewing South

Final Depth of DP-6 at 3 Feet Viewing West

Final Depth of DP-4 at 4 Feet Viewing North

Final Depth of DP-4 at 4 Feet Viewing South

Main Excavation Viewing North

Main Excavation Extending North

Main Excavation Viewing West

Main Excavation Viewing Northwest

Site Backfilled Viewing North

DP-6 and DP-4 Backfilled Viewing North

Appendix E

Final C-141

1RP-4831

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company: XTO Energy Inc.	Contact: Shelby Pennington
Address: 6401 Holiday Hill Road, Blg. 5, Midland, TX 79707	Telephone No.: (432) 571-8276
Facility Name: EMSU 101	Facility Type: Well Flow Line

Surface Owner: State of New Mexico	Mineral Owner: State of New Mexico	Lease No.: 30-025-30220

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County:
C	30	20S	37E	660	North	1980	West	Lea

Latitude 32.548117 **Longitude** -103.293928

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: Estimated 135.79 bbls	Volume Recovered: 30 bbls
Source of Release: 2" FG Flowline failure due to fatigue	Date and Hour of Occurrence 09/20/2017 @ 12:30 MST	Date and Hour of Discovery 09/20/2017 @ 12:30 MST
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Ms. Olivia Yu	
By Whom? Cindy Klein	Date and Hour: 09/20/2017	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. N/A	

APPROVED
By CHernandez at 12:08 pm, Sep 21, 2018

If a Watercourse was Impacted, Describe Fully.*
NA

Describe Cause of Problem and Remedial Action Taken.* Spill was caused by flow line rupture. Spill was contained to pipeline right of way (ROW). Approximately 135.79 bbl of produced water was released with approximately 30 bbl recovered. Line was exposed and repaired. Contaminated soil was hauled to an OCD approved landfarm.

Describe Area Affected and Cleanup Action Taken.*Spill covered approximately 7,920 square feet. Spill was delineated and remediated according to plans approved by OCD and SLO on per plan approved November 28, 2017 (Delineation Plan) and July 20, 2018 (Delineation Report). Approximately 228 cubic yards of soil was disposed at Sundance (Parabo) Services and replaced with clean soil obtained from a nearby landowner and seeded to SLO requirements.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION
Printed Name: Shelby Pennington	Approved by Environmental Specialist: CH
Title: Environmental Supervisor	Approval Date: 9/21/2018 Expiration Date: xx/xx/xx
E-mail Address: Shelby_Pennington@xtoenergy.com	Conditions of Approval: SLO approval Attached ☐
Date: 08/17/2018 Phone: (432) 571-8276	

* Attach Additional Sheets If Necessary