APPROVED
By CHernandez at 11:30 am, Jul 20, 2018

NMOCD approves of the delineation completed for 1RP-4831 and the proposed remediation plan with these clarifications: 1) Bottom and sidewall confirmation samples for all proposed excavation no greater than 50 ft. apart. 2) Laboratory analyses must include Benzene, BTEX and extended TPH. 3) Mark confirmation sample and excavation locations on a scaled map with GPS coordinates. 3) Include photo documentation of delineation and remediation in subsequent report.

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

Latitude: 32.548117°
Longitude: -103.293928°

LAI Project No. 17-0192-01

July 5, 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
Midland, Texas 79701

Mark J. Larson, P.G.
Certified Professional Geologist

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1.0 INTRODUCTION

Larson & Associates, Inc. (LAI) has prepared this delineation report and remediation plan on behalf of XTO Energy, Inc. (XTO) for submittal to the Oil Conservation Division (OCD) District 1 for a produced water leak near the Eunice Monument South Unit (EMSU) Well #101 (Site) 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 for 1RP-4831. OCD approved the delineation plan on November 28, 2017, with the following stipulations:

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.

On July 5, 2018, LAI personnel performed field reconnaissance to confirm the location of the water well in Unit P (SE/4, SE/4), Section 30, Township 20 South, and Range 37 East. This well was located from GPS coordinates and is located approximately 4,000 southeast of the Site. Depth to groundwater 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. Figure 2 presents an aerial map showing the locations of water wells and monitoring wells. Appendix B presents OCD approval.

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 o 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
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

- 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

On December 7, 2017, LAI personnel collected soil samples from the excavation sidewalls (north, south, east and west sidewalls) at about 2 feet bgs and bottom between approximately 4 to 5 feet bgs. The samples were delivered under preservation and chain of custody to Permian Basin Environmental Lab (PBEL) in Midland, Texas and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH) including gasoline range organics (C6-C12), diesel range organics (>C12-C28) and oil range organics (>C28-C35) EPA SW-846 Methods 8021B and 8015M, respectively, and chloride by EPA Method 300. BTEX and TPH reported below the analytical method reporting limits in all samples. Chloride exceeded the OCD delineation limit of 600 milligrams per kilogram (mg/Kg) in the north (12,300 mg/Kg), south (761 mg/Kg) and west (1,900 mg/Kg) sidewall samples.

On December 12, 2017, LAI personnel used direct push technology (DPT) to collect soil samples at seven (7) locations (DP-1 through DP-7) in 1 foot intervals (i.e. 0 – 1, 1 – 2 etc.) to approximately 4 feet bgs.

PBEL reported BTEX and TPH below the analytical method reporting limits in the upper sample (0 to 1 foot) from each location. Chloride exceeded the delineation limit (600 mg/Kg) in the deepest sample (3 to 4 feet) at DP-4 (923 mg/Kg). Chloride was 745 mg/Kg in sample DP-6, 0 to 1 foot bgs.

On April 26, 2018, Scarborough Drilling Inc. (SDI), under supervision from LAI, used an air rotary rig and jam tube sampler to collect soil samples every 5 feet to approximately 10 feet bgs (DP-6), 20 feet bgs (DP-9 and DP-10) and 25 feet bgs (DP-4). PBEL analyzed the samples for chloride by EPA Method 300. Chloride was delineated vertically to 600 mg/Kg at all locations. Table 1 presents the laboratory analytical data summary. Figure 3 presents an aerial map showing the soil sample locations, excavation and sill area. Appendix C presents the laboratory reports. Appendix D presents photographs.

3.0 REMEDIATION PLAN

XTO proposes the following remedial actions:

- Expand excavation north, south and west between about 5 to 10 feet from current excavation boundary and 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.

XTO will submit a report and final C-141 upon completion of the remediation. Figure 4 presents the proposed excavations.

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)

Figures

Figure 1 - Topographic Map

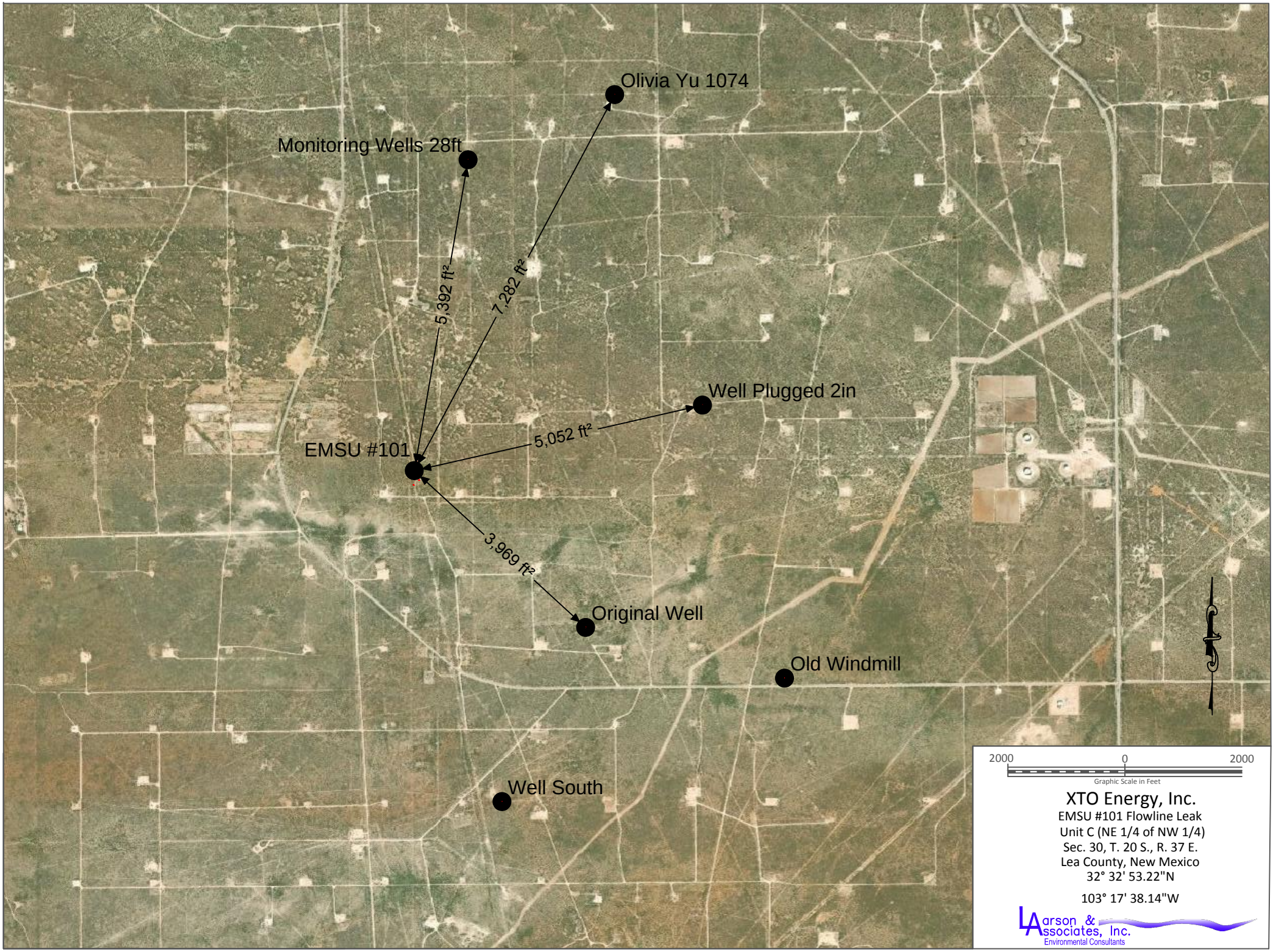

Figure 2 - Aerial Map Showing Well Locations

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

Figure 4 - Aerial Map Showing Proposed Excavations

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/BLM Communications

Mark Larson

From: Yu, Olivia, EMNRD [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)

Larson & 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)
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Larson & Associates, Inc.
Environmental Consultants

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:

Lab Order Number: 7L13001

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-16-7

Report Date: 12/15/17

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-1 0-1	7L13001-01	Soil	12/12/17 10:46	12-13-2017 09:23
DP-1 1-2	7L13001-02	Soil	12/12/17 10:47	12-13-2017 09:23
DP-1 2-3	7L13001-03	Soil	12/12/17 10:48	12-13-2017 09:23
DP-1 3-4	7L13001-04	Soil	12/12/17 10:49	12-13-2017 09:23
DP-2 0-1	7L13001-05	Soil	12/12/17 10:57	12-13-2017 09:23
DP-2 1-2	7L13001-06	Soil	12/12/17 10:58	12-13-2017 09:23
DP-2 2-3	7L13001-07	Soil	12/12/17 10:59	12-13-2017 09:23
DP-2 3-4	7L13001-08	Soil	12/12/17 11:00	12-13-2017 09:23
DP-3 0-1	7L13001-09	Soil	12/12/17 11:05	12-13-2017 09:23
DP-3 1-2	7L13001-10	Soil	12/12/17 11:06	12-13-2017 09:23
DP-3 2-3	7L13001-11	Soil	12/12/17 11:07	12-13-2017 09:23
DP-3 3-4	7L13001-12	Soil	12/12/17 11:08	12-13-2017 09:23
DP-4 0-1	7L13001-13	Soil	12/12/17 11:09	12-13-2017 09:23
DP-4 1-2	7L13001-14	Soil	12/12/17 11:10	12-13-2017 09:23
DP-4 2-3	7L13001-15	Soil	12/12/17 11:11	12-13-2017 09:23
DP-4 3-4	7L13001-16	Soil	12/12/17 11:12	12-13-2017 09:23
DP-5 0-1	7L13001-17	Soil	12/12/17 11:13	12-13-2017 09:23
DP-5 1-2	7L13001-18	Soil	12/12/17 11:14	12-13-2017 09:23
DP-5 2-3	7L13001-19	Soil	12/12/17 11:15	12-13-2017 09:23
DP-5 3-4	7L13001-20	Soil	12/12/17 11:16	12-13-2017 09:23
DP-6 0-1	7L13001-21	Soil	12/12/17 11:19	12-13-2017 09:23
DP-6 1-2	7L13001-22	Soil	12/12/17 11:20	12-13-2017 09:23
DP-6 2-3	7L13001-23	Soil	12/12/17 11:21	12-13-2017 09:23
DP-6 3-4	7L13001-24	Soil	12/12/17 11:22	12-13-2017 09:23
DP-7 0-1	7L13001-25	Soil	12/12/17 11:24	12-13-2017 09:23
DP-7 1-2	7L13001-26	Soil	12/12/17 11:25	12-13-2017 09:23
DP-7 2-3	7L13001-27	Soil	12/12/17 11:26	12-13-2017 09:23
DP-7 3-4	7L13001-28	Soil	12/12/17 11:27	12-13-2017 09:23
DP-7 4-6	7L13001-29	Soil	12/12/17 11:28	12-13-2017 09:23

DP-1 0-1

7L13001-01 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00213	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00213	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*91.1 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*88.8 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.06	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*116 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*132 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	*S-GC*
Total Petroleum Hydrocarbon C6-C35	ND	26.6	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

DP-1 1-2

7L13001-02 (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	ND	1.15	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

DP-1 2-3

7L13001-03 (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	ND	1.12	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

DP-1 3-4

7L13001-04 (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	**13.0**	1.19	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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

Fax: (432) 687-0456

DP-2 0-1

7L13001-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.00111	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00222	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00111	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00222	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00111	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*97.6 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*87.0 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**572**	1.11	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.8	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	27.8	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	27.8	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*115 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*131 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	*S-GC*
Total Petroleum Hydrocarbon C6-C35	ND	27.8	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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DP-2 1-2

7L13001-06 (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	**290**	1.18	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**15.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-2 2-3

7L13001-07 (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	**39.8**	1.14	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-2 3-4

7L13001-08 (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	**94.3**	1.14	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-3 0-1

7L13001-09 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00104	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00208	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00104	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00208	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00104	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*95.2 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**8.50**	1.04	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*108 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*124 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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DP-3 1-2

7L13001-10 (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	ND	1.10	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-3 2-3

7L13001-11 (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	**9.07**	1.10	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-3 3-4

7L13001-12 (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	ND	1.10	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-4 0-1

7L13001-13 (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	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00220	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00110	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00220	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00110	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*143 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	*S-GC*
Surrogate: 1,4-Difluorobenzene		*115 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1520**	5.49	mg/kg dry	5	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.5	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*108 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*123 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.5	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

Larson & Associates, Inc.	Project: EMSU Well #101	Fax: (432) 687-0456
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Midland TX, 79710	Project Manager: Mark Larson	

DP-4 1-2

7L13001-14 (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	**2270**	5.75	mg/kg dry	5	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

DP-4 2-3

7L13001-15 (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	**1730**	5.75	mg/kg dry	5	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-4 3-4

7L13001-16 (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	**923**	1.14	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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DP-5 0-1

7L13001-17 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00213	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00213	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00106	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*98.0 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*84.5 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**19.9**	1.06	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	26.6	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*96.6 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*111 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.6	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-18 (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	ND	1.11	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-19 (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	ND	1.14	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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

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7L13001-20 (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	**22.9**	1.11	mg/kg dry	1	P7L1308	12/13/17	12/14/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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7L13001-21 (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	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00215	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00108	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00215	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00108	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*86.9 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**745**	1.08	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*105 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*121 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.9	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-22 (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	**562**	1.09	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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7L13001-23 (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	**53.3**	1.05	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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7L13001-24 (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	**78.5**	1.11	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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

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7L13001-25 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.00120	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Toluene	ND	0.00241	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Ethylbenzene	ND	0.00120	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00241	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Xylene (o)	ND	0.00120	mg/kg dry	1	P7L1310	12/13/17	12/14/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*103 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*66.6 %*	*75-125*		*P7L1310*	*12/13/17*	*12/14/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.20	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**17.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	30.1	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C12-C28	ND	30.1	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
>C28-C35	ND	30.1	mg/kg dry	1	P7L1311	12/13/17	12/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*115 %*	*70-130*		*P7L1311*	*12/13/17*	*12/13/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	30.1	mg/kg dry	1	[CALC]	12/13/17	12/13/17	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-26 (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	ND	1.14	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-27 (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	ND	1.11	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-28 (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	ND	1.10	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

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7L13001-29 (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	**8.09**	1.09	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7L1404	12/14/17	12/14/17	ASTM D2216	

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 P7L1310 - General Preparation (GC)										
Blank (P7L1310-BLK1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 1,4-Difluorobenzene	*0.0585*		*"*	*0.0600*		*97.6*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0625*		*"*	*0.0600*		*104*	*75-125*			
LCS (P7L1310-BS1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	0.0936	0.00100	mg/kg wet	0.100		93.6	70-130			
Toluene	0.0922	0.00200	"	0.100		92.2	70-130			
Ethylbenzene	0.112	0.00100	"	0.100		112	70-130			
Xylene (p/m)	0.206	0.00200	"				70-130			
Xylene (o)	0.105	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	*0.0596*		*"*	*0.0600*		*99.3*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0611*		*"*	*0.0600*		*102*	*75-125*			
LCS Dup (P7L1310-BSD1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	0.102	0.00100	mg/kg wet	0.100		102	70-130	8.56	20	
Toluene	0.108	0.00200	"	0.100		108	70-130	15.4	20	
Ethylbenzene	0.111	0.00100	"	0.100		111	70-130	0.584	20	
Xylene (p/m)	0.214	0.00200	"				70-130		20	
Xylene (o)	0.116	0.00100	"				70-130		20	
Surrogate: 1,4-Difluorobenzene	*0.0716*		*"*	*0.0600*		*119*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0683*		*"*	*0.0600*		*114*	*75-125*			
Calibration Blank (P7L1310-CCB1)				Prepared & Analyzed: 12/13/17						
Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 1,4-Difluorobenzene	*0.0491*		*"*	*0.0600*		*81.8*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0542*		*"*	*0.0600*		*90.3*	*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 P7L1310 - General Preparation (GC)										
Calibration Check (P7L1310-CCV1)				Prepared & Analyzed: 12/13/17						
Benzene	0.101	0.00100	mg/kg wet	0.100		101	80-120			
Toluene	0.108	0.00200	"	0.100		108	80-120			
Ethylbenzene	0.112	0.00100	"	0.100		112	80-120			
Xylene (p/m)	0.211	0.00200	"	0.200		106	80-120			
Xylene (o)	0.117	0.00100	"	0.100		117	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0624*		*"*	*0.0600*		*104*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0626*		*"*	*0.0600*		*104*	*75-125*			
Calibration Check (P7L1310-CCV2)				Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	0.111	0.00100	mg/kg wet	0.100		111	80-120			
Toluene	0.116	0.00200	"	0.100		116	80-120			
Ethylbenzene	0.115	0.00100	"	0.100		115	80-120			
Xylene (p/m)	0.219	0.00200	"	0.200		110	80-120			
Xylene (o)	0.120	0.00100	"	0.100		120	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0599*		*"*	*0.0600*		*99.8*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0702*		*"*	*0.0600*		*117*	*75-125*			
Matrix Spike (P7L1310-MS1)		**Source: 7L13001-17**		Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	0.0986	0.00106	mg/kg dry	0.106	ND	92.7	80-120			
Toluene	0.0997	0.00213	"	0.106	ND	93.7	80-120			
Ethylbenzene	0.117	0.00106	"	0.106	ND	110	80-120			
Xylene (p/m)	0.199	0.00213	"		ND		80-120			
Xylene (o)	0.0980	0.00106	"		ND		80-120			
Surrogate: 1,4-Difluorobenzene	*0.0677*		*"*	*0.0638*		*106*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0862*		*"*	*0.0638*		*135*	*75-125*			*S-GC*
Matrix Spike Dup (P7L1310-MSD1)		**Source: 7L13001-17**		Prepared: 12/13/17 Analyzed: 12/14/17						
Benzene	0.0933	0.00106	mg/kg dry	0.106	ND	87.7	80-120	5.50	20	
Toluene	0.0961	0.00213	"	0.106	ND	90.3	80-120	3.70	20	
Ethylbenzene	0.118	0.00106	"	0.106	ND	111	80-120	0.607	20	
Xylene (p/m)	0.204	0.00213	"		ND		80-120		20	
Xylene (o)	0.102	0.00106	"		ND		80-120		20	
Surrogate: 4-Bromofluorobenzene	*0.0797*		*"*	*0.0638*		*125*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0681*		*"*	*0.0638*		*107*	*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 P7L1308 - * DEFAULT PREP *** **										
Blank (P7L1308-BLK1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7L1308-BS1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	425	1.00	mg/kg wet	400		106	80-120			
LCS Dup (P7L1308-BSD1)				Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	425	1.00	mg/kg wet	400		106	80-120	0.111	20	
Duplicate (P7L1308-DUP1)		**Source: 7L13001-01**		Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	ND	1.06	mg/kg dry		ND				20	
Duplicate (P7L1308-DUP2)		**Source: 7L13001-11**		Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	11.5	1.10	mg/kg dry		9.07			24.0	20	R4
Matrix Spike (P7L1308-MS1)		**Source: 7L13001-01**		Prepared: 12/13/17 Analyzed: 12/14/17						
Chloride	1190	1.06	mg/kg dry	1060	ND	111	80-120			
Batch P7L1309 - * DEFAULT PREP *** **										
Blank (P7L1309-BLK1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7L1309-BS1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	439	1.00	mg/kg wet	400		110	80-120			
LCS Dup (P7L1309-BSD1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	440	1.00	mg/kg wet	400		110	80-120	0.193	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 P7L1309 - * DEFAULT PREP *** **										
Duplicate (P7L1309-DUP1)		**Source: 7L13001-21**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	760	1.08	mg/kg dry		745			1.99	20	
Duplicate (P7L1309-DUP2)		**Source: 7L08004-01**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	12100	51.5	mg/kg dry		12300			1.35	20	
Matrix Spike (P7L1309-MS1)		**Source: 7L13001-21**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	1780	1.08	mg/kg dry	1080	745	95.8	80-120			
Batch P7L1404 - * DEFAULT PREP *** **										
Blank (P7L1404-BLK1)				Prepared & Analyzed: 12/14/17						
% Moisture	ND	0.1	%							
Duplicate (P7L1404-DUP1)		**Source: 7L13001-26**		Prepared & Analyzed: 12/14/17						
% Moisture	11.0	0.1	%		12.0			8.70	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 P7L1311 - General Preparation (GC)										
Blank (P7L1311-BLK1)				Prepared & Analyzed: 12/13/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*113*		*"*	*100*		*113*	*70-130*			
Surrogate: o-Terphenyl	*66.6*		*"*	*50.0*		*133*	*70-130*			*S-GC*
LCS (P7L1311-BS1)				Prepared & Analyzed: 12/13/17						
C6-C12	1150	25.0	mg/kg wet	1000		115	75-125			
>C12-C28	1180	25.0	"	1000		118	75-125			
Surrogate: 1-Chlorooctane	*125*		*"*	*100*		*125*	*70-130*			
Surrogate: o-Terphenyl	*58.9*		*"*	*50.0*		*118*	*70-130*			
LCS Dup (P7L1311-BSD1)				Prepared & Analyzed: 12/13/17						
C6-C12	1220	25.0	mg/kg wet	1000		122	75-125	6.49	20	
>C12-C28	1240	25.0	"	1000		124	75-125	5.01	20	
Surrogate: 1-Chlorooctane	*132*		*"*	*100*		*132*	*70-130*			*S-GC*
Surrogate: o-Terphenyl	*62.9*		*"*	*50.0*		*126*	*70-130*			
Calibration Blank (P7L1311-CCB2)				Prepared & Analyzed: 12/13/17						
C6-C12	14.6		mg/kg wet							
>C12-C28	23.1		"							
Surrogate: 1-Chlorooctane	*115*		*"*	*100*		*115*	*70-130*			
Surrogate: o-Terphenyl	*67.0*		*"*	*50.0*		*134*	*70-130*			*S-GC*
Calibration Check (P7L1311-CCV2)				Prepared & Analyzed: 12/13/17						
C6-C12	562	25.0	mg/kg wet	500		112	85-115			
>C12-C28	544	25.0	"	500		109	85-115			
Surrogate: 1-Chlorooctane	*111*		*"*	*100*		*111*	*70-130*			
Surrogate: o-Terphenyl	*56.0*		*"*	*50.0*		*112*	*70-130*			

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 P7L1311 - General Preparation (GC)										
Calibration Check (P7L1311-CCV3)				Prepared: 12/13/17 Analyzed: 12/14/17						
C6-C12	558	25.0	mg/kg wet	500		112	85-115			
>C12-C28	548	25.0	"	500		110	85-115			
Surrogate: 1-Chlorooctane	*118*		*"*	*100*		*118*	*70-130*			
Surrogate: o-Terphenyl	*60.6*		*"*	*50.0*		*121*	*70-130*			
Matrix Spike (P7L1311-MS1)	**Source: 7L13001-25**			Prepared: 12/13/17 Analyzed: 12/14/17						
C6-C12	1250	30.1	mg/kg dry	1200	26.6	102	75-125			
>C12-C28	1240	30.1	"	1200	ND	103	75-125			
Surrogate: 1-Chlorooctane	*155*		*"*	*120*		*129*	*70-130*			
Surrogate: o-Terphenyl	*76.0*		*"*	*60.2*		*126*	*70-130*			
Matrix Spike Dup (P7L1311-MSD1)	**Source: 7L13001-25**			Prepared: 12/13/17 Analyzed: 12/14/17						
C6-C12	1280	30.1	mg/kg dry	1200	26.6	104	75-125	2.37	20	
>C12-C28	1260	30.1	"	1200	ND	105	75-125	1.54	20	
Surrogate: 1-Chlorooctane	*161*		*"*	*120*		*134*	*70-130*			*S-GC*
Surrogate: o-Terphenyl	*77.0*		*"*	*60.2*		*128*	*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

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
R4	Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information.
BULK	Samples received in Bulk soil containers
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: 12/15/2017

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: 12-13-2017 PAGE 1 OF 2

PO #: _____ LAB WORK ORDER #: 17C03001

PROJECT LOCATION OR NAME: EMSU Well #101

LAI PROJECT #: 17-0192-01 COLLECTOR: ZB / AT

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 ☒ ORO ☒	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 ☐ CYANIDE ☐	pH ☐ HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐	FIELD NOTES
DP-1 0-1	1	12/12	10:46	S	1				X		X		X	X													X	
1-2	2		10:47																									
2-3	3		10:48																									
3-4	4		10:49																									
DP-2 0-1	5		10:57								X		X	X														
1-2	6		10:58																									
2-3	7		10:59																									
3-4	8		11:00																									
DP-3 0-1	9		11:05								X		X	X														
1-2	10		11:06																									
2-3	11		11:07																									
3-4	12		11:08																									
DP-4 0-1	13		11:09								X		X	X														
1-2	14		11:10																									
2-3	15		11:11																									
TOTAL																												

RELINQUISHED BY:(Signature) DATE/TIME 12/13 9:23 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 12-13-17 923

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

LABORATORY USE ONLY:
RECEIVING TEMP: 3.0 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☑ HAND DELIVERED

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: 12-13-2017 PAGE 2 OF 2

PO #: LAB WORK ORDER #:

PROJECT LOCATION OR NAME: EMSU Well #101

LAI PROJECT #: 17-0192-01 COLLECTOR: ZB / AT

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

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

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 ☒ | 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 ☐ CYANIDE ☐ | pH ☐ HEXAVALENT CHROMIUM ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	BTEX ☒	TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☒	DIESEL - 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 ☐ CYANIDE ☐	pH ☐ HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐	FIELD NOTES
DP-4 3-4	16	12/12	11:12	S	1				X																		X	
DP-5 0-1	17		11:13								X		X	X														
1-2	18		11:14																									
2-3	19		11:15																									
3-4	20		11:16																									
DP-6 0-1	21		11:19								X		X	X														
1-2	22		11:20																									
2-3	23		11:21																									
3-4	24		11:22																									
DP-7 0-1	25		11:24								X		X	X														
1-2	26		11:25																									
2-3	27		11:26																									
3-4	28		11:27																									
4-6	29		11:28																									
TOTAL																												

RELINQUISHED BY:(Signature) DATE/TIME 12/13 9:23 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 12-13-17 923

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

LABORATORY USE ONLY:
RECEIVING TEMP: -3.0 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:

Lab Order Number: 7L08004

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-16-7

Report Date: 12/15/17

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
SW-N	7L08004-01	Soil	12/07/17 13:57	12-08-2017 08:40
SW-E	7L08004-02	Soil	12/07/17 14:02	12-08-2017 08:40
SW-S	7L08004-03	Soil	12/07/17 13:55	12-08-2017 08:40
SW-W	7L08004-04	Soil	12/07/17 13:59	12-08-2017 08:40
HA-1	7L08004-05	Soil	12/07/17 14:04	12-08-2017 08:40

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

SW-N

7L08004-01 (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	P7L1202	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*114 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*88.3 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**12300**	51.5	mg/kg dry	50	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7L1101	12/11/17	12/11/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.8	mg/kg dry	1	P7L0812	12/08/17	12/11/17	TPH 8015M	
>C12-C28	**283**	25.8	mg/kg dry	1	P7L0812	12/08/17	12/11/17	TPH 8015M	
>C28-C35	**429**	25.8	mg/kg dry	1	P7L0812	12/08/17	12/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*94.5 %*	*70-130*		*P7L0812*	*12/08/17*	*12/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*123 %*	*70-130*		*P7L0812*	*12/08/17*	*12/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**713**	25.8	mg/kg dry	1	[CALC]	12/08/17	12/11/17	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	

SW-E

7L08004-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*102 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*89.1 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**45.9**	1.02	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P7L1101	12/11/17	12/11/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*83.5 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*95.0 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	12/08/17	12/09/17	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

SW-S

7L08004-03 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00103	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*110 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*134 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**761**	5.15	mg/kg dry	5	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7L1101	12/11/17	12/11/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.8	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*88.4 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*109 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	12/08/17	12/09/17	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

SW-W

7L08004-04 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00104	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00208	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00104	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00208	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00104	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*86.7 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*121 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1900**	5.21	mg/kg dry	5	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7L1101	12/11/17	12/11/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*78.7 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*97.9 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	12/08/17	12/09/17	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

HA-1

7L08004-05 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00109	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00217	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00109	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00217	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00109	mg/kg dry	1	P7L1202	12/11/17	12/11/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*113 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*92.1 %*	*75-125*		*P7L1202*	*12/11/17*	*12/11/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**286**	1.09	mg/kg dry	1	P7L1309	12/13/17	12/15/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7L1101	12/11/17	12/11/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P7L0812	12/08/17	12/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*94.2 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*116 %*	*70-130*		*P7L0812*	*12/08/17*	*12/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.2	mg/kg dry	1	[CALC]	12/08/17	12/09/17	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

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 P7L1202 - General Preparation (GC)										
Blank (P7L1202-BLK1)				Prepared & Analyzed: 12/11/17						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 1,4-Difluorobenzene	*0.0618*		*"*	*0.0600*		*103*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0651*		*"*	*0.0600*		*109*	*75-125*			
LCS (P7L1202-BS1)				Prepared & Analyzed: 12/11/17						
Benzene	0.0923	0.00100	mg/kg wet	0.100		92.3	70-130			
Toluene	0.100	0.00200	"	0.100		100	70-130			
Ethylbenzene	0.118	0.00100	"	0.100		118	70-130			
Xylene (p/m)	0.215	0.00200	"				70-130			
Xylene (o)	0.114	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	*0.0518*		*"*	*0.0600*		*86.4*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0580*		*"*	*0.0600*		*96.6*	*75-125*			
LCS Dup (P7L1202-BSD1)				Prepared & Analyzed: 12/11/17						
Benzene	0.0989	0.00100	mg/kg wet	0.100		98.9	70-130	6.97	20	
Toluene	0.103	0.00200	"	0.100		103	70-130	2.52	20	
Ethylbenzene	0.115	0.00100	"	0.100		115	70-130	2.44	20	
Xylene (p/m)	0.209	0.00200	"				70-130		20	
Xylene (o)	0.113	0.00100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	*0.0580*		*"*	*0.0600*		*96.6*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0553*		*"*	*0.0600*		*92.2*	*75-125*			
Calibration Blank (P7L1202-CCB1)				Prepared & Analyzed: 12/11/17						
Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	*0.0515*		*"*	*0.0600*		*85.9*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0436*		*"*	*0.0600*		*72.6*	*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 P7L1202 - General Preparation (GC)										
Calibration Blank (P7L1202-CCB2)				Prepared & Analyzed: 12/11/17						
Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	*0.0630*		*"*	*0.0600*		*105*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0531*		*"*	*0.0600*		*88.5*	*75-125*			
Calibration Check (P7L1202-CCV1)				Prepared & Analyzed: 12/11/17						
Benzene	0.110	0.00100	mg/kg wet	0.100		110	80-120			
Toluene	0.117	0.00200	"	0.100		117	80-120			
Ethylbenzene	0.109	0.00100	"	0.100		109	80-120			
Xylene (p/m)	0.218	0.00200	"	0.200		109	80-120			
Xylene (o)	0.119	0.00100	"	0.100		119	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0656*		*"*	*0.0600*		*109*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0602*		*"*	*0.0600*		*100*	*75-125*			
Calibration Check (P7L1202-CCV2)				Prepared & Analyzed: 12/11/17						
Benzene	0.0993	0.00100	mg/kg wet	0.100		99.3	80-120			
Toluene	0.101	0.00200	"	0.100		101	80-120			
Ethylbenzene	0.106	0.00100	"	0.100		106	80-120			
Xylene (p/m)	0.218	0.00200	"	0.200		109	80-120			
Xylene (o)	0.117	0.00100	"	0.100		117	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0676*		*"*	*0.0600*		*113*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0634*		*"*	*0.0600*		*106*	*75-125*			
Calibration Check (P7L1202-CCV3)				Prepared & Analyzed: 12/11/17						
Benzene	0.108	0.00100	mg/kg wet	0.100		108	80-120			
Toluene	0.113	0.00200	"	0.100		113	80-120			
Ethylbenzene	0.115	0.00100	"	0.100		115	80-120			
Xylene (p/m)	0.219	0.00200	"	0.200		109	80-120			
Xylene (o)	0.115	0.00100	"	0.100		115	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0610*		*"*	*0.0600*		*102*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0700*		*"*	*0.0600*		*117*	*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 P7L1101 - * DEFAULT PREP *** **										
Blank (P7L1101-BLK1)				Prepared & Analyzed: 12/11/17						
% Moisture	ND	0.1	%							
Duplicate (P7L1101-DUP1)		**Source: 7L08002-01**		Prepared & Analyzed: 12/11/17						
% Moisture	2.0	0.1	%		2.0			0.00	20	
Batch P7L1309 - * DEFAULT PREP *** **										
Blank (P7L1309-BLK1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7L1309-BS1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	439	1.00	mg/kg wet	400		110	80-120			
LCS Dup (P7L1309-BSD1)				Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	440	1.00	mg/kg wet	400		110	80-120	0.193	20	
Duplicate (P7L1309-DUP1)		**Source: 7L13001-21**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	760	1.08	mg/kg dry		745			1.99	20	
Duplicate (P7L1309-DUP2)		**Source: 7L08004-01**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	12100	51.5	mg/kg dry		12300			1.35	20	
Matrix Spike (P7L1309-MS1)		**Source: 7L13001-21**		Prepared: 12/13/17 Analyzed: 12/15/17						
Chloride	1780	1.08	mg/kg dry	1080	745	95.8	80-120			

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 P7L0812 - General Preparation (GC)										
Blank (P7L0812-BLK1)				Prepared & Analyzed: 12/08/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*79.8*		*"*	*100*		*79.8*	*70-130*			
Surrogate: o-Terphenyl	*49.8*		*"*	*50.0*		*99.7*	*70-130*			
LCS (P7L0812-BS1)				Prepared & Analyzed: 12/08/17						
C6-C12	758	25.0	mg/kg wet	1000		75.8	75-125			
>C12-C28	899	25.0	"	1000		89.9	75-125			
Surrogate: 1-Chlorooctane	*99.8*		*"*	*100*		*99.8*	*70-130*			
Surrogate: o-Terphenyl	*58.8*		*"*	*50.0*		*118*	*70-130*			
LCS Dup (P7L0812-BSD1)				Prepared & Analyzed: 12/08/17						
C6-C12	784	25.0	mg/kg wet	1000		78.4	75-125	3.38	20	
>C12-C28	953	25.0	"	1000		95.3	75-125	5.86	20	
Surrogate: 1-Chlorooctane	*112*		*"*	*100*		*112*	*70-130*			
Surrogate: o-Terphenyl	*57.9*		*"*	*50.0*		*116*	*70-130*			
Calibration Blank (P7L0812-CCB1)				Prepared & Analyzed: 12/08/17						
C6-C12	24.3		mg/kg wet							
>C12-C28	12.2		"							
Surrogate: 1-Chlorooctane	*81.2*		*"*	*100*		*81.2*	*70-130*			
Surrogate: o-Terphenyl	*52.4*		*"*	*50.0*		*105*	*70-130*			
Calibration Blank (P7L0812-CCB2)				Prepared & Analyzed: 12/08/17						
C6-C12	22.2		mg/kg wet							
>C12-C28	19.6		"							
Surrogate: 1-Chlorooctane	*109*		*"*	*100*		*109*	*70-130*			
Surrogate: o-Terphenyl	*65.4*		*"*	*50.0*		*131*	*70-130*			*S-GC*

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 P7L0812 - General Preparation (GC)										
Calibration Check (P7L0812-CCV1)				Prepared & Analyzed: 12/08/17						
C6-C12	442	25.0	mg/kg wet	500		88.4	85-115			
>C12-C28	463	25.0	"	500		92.6	85-115			
Surrogate: 1-Chlorooctane	*97.5*		*"*	*100*		*97.5*	*70-130*			
Surrogate: o-Terphenyl	*55.6*		*"*	*50.0*		*111*	*70-130*			
Calibration Check (P7L0812-CCV2)				Prepared & Analyzed: 12/08/17						
C6-C12	509	25.0	mg/kg wet	500		102	85-115			
>C12-C28	523	25.0	"	500		105	85-115			
Surrogate: 1-Chlorooctane	*120*		*"*	*100*		*120*	*70-130*			
Surrogate: o-Terphenyl	*67.1*		*"*	*50.0*		*134*	*70-130*			*S-GC*
Calibration Check (P7L0812-CCV3)				Prepared: 12/08/17 Analyzed: 12/09/17						
C6-C12	518	25.0	mg/kg wet	500		104	85-115			
>C12-C28	548	25.0	"	500		110	85-115			
Surrogate: 1-Chlorooctane	*123*		*"*	*100*		*123*	*70-130*			
Surrogate: o-Terphenyl	*67.6*		*"*	*50.0*		*135*	*70-130*			*S-GC*

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

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
BULK	Samples received in Bulk soil containers
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: 12/15/2017

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: 12.8.2017 PAGE 1 OF

PO #: LAB WORK ORDER #: 7608004

PROJECT LOCATION OR NAME: EMSU Well #101

LAI PROJECT #: 17-0192-01 COLLECTOR: ZB/AT

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

~~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 ☒	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 ☐ CYANIDE ☐	pH ☐ HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐	FIELD NOTES
SW-N	1	12/7	13:57	S	1				X		X			X	X												X	
SW-E	2	12/7	14:02																									
SW-S	3	12/7	13:55																									
SW-W	4	12/7	13:59																									
HA-1	5	12/7	14:04																									
TOTAL																												

RELINQUISHED BY: (Signature) DATE/TIME 12/11/17 RECEIVED BY: (Signature)

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

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) 12-8-17 840

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

LABORATORY USE ONLY:
RECEIVING TEMP: -11 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: 8D26009

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-17-8

Report Date: 05/04/18

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-4 (5FT)	8D26009-01	Soil	04/26/18 09:48	04-26-2018 16:40
DP-4 (10 FT)	8D26009-02	Soil	04/26/18 09:52	04-26-2018 16:40
DP-4 (15 FT)	8D26009-03	Soil	04/26/18 09:54	04-26-2018 16:40
DP-4 (20 FT)	8D26009-04	Soil	04/26/18 09:56	04-26-2018 16:40
DP-4 (25 FT)	8D26009-05	Soil	04/26/18 09:59	04-26-2018 16:40
DP-6 (5 FT)	8D26009-06	Soil	04/26/18 10:08	04-26-2018 16:40
DP-6 (10 FT)	8D26009-07	Soil	04/26/18 10:10	04-26-2018 16:40
DP-8 (0 FT)	8D26009-08	Soil	04/26/18 10:18	04-26-2018 16:40
DP-8 (5FT)	8D26009-09	Soil	04/26/18 10:20	04-26-2018 16:40
DP-8 (10FT)	8D26009-10	Soil	04/26/18 10:21	04-26-2018 16:40
DP-8 (15FT)	8D26009-11	Soil	04/26/18 10:23	04-26-2018 16:40
DP-8 (20 FT)	8D26009-12	Soil	04/26/18 10:24	04-26-2018 16:40
DP-8 (25FT)	8D26009-13	Soil	04/26/18 10:26	04-26-2018 16:40
DP-9 (0 FT)	8D26009-14	Soil	04/26/18 10:53	04-26-2018 16:40
DP-9 (5FT)	8D26009-15	Soil	04/26/18 10:56	04-26-2018 16:40
DP-9 (10 FT)	8D26009-16	Soil	04/26/18 10:57	04-26-2018 16:40
DP-9 (15 FT)	8D26009-17	Soil	04/26/18 10:59	04-26-2018 16:40
DP-9 (20 FT)	8D26009-18	Soil	04/26/18 11:01	04-26-2018 16:40
DP-10 (0 FT)	8D26009-19	Soil	04/26/18 09:25	04-26-2018 16:40
DP-10 (5 FT)	8D26009-20	Soil	04/26/18 09:27	04-26-2018 16:40
DP-10 (10 FT)	8D26009-21	Soil	04/26/18 09:32	04-26-2018 16:40
DP-10 (15 FT)	8D26009-22	Soil	04/26/18 09:33	04-26-2018 16:40
DP-10 (20 FT)	8D26009-23	Soil	04/26/18 09:35	04-26-2018 16:40

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

Fax: (432) 687-0456

DP-4 (5FT)

8D26009-01 (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	**29.6**	1.20	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**17.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-4 (10 FT)

8D26009-02 (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	**103**	1.15	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-4 (15 FT)

8D26009-03 (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	**113**	1.06	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-4 (20 FT)

8D26009-04 (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	**53.9**	1.37	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**27.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-4 (25 FT)

8D26009-05 (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	**65.8**	1.22	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**18.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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 (5 FT)

8D26009-06 (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	**12.7**	1.19	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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 (10 FT)

8D26009-07 (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	ND	1.30	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**23.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (0 FT)

8D26009-08 (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	ND	1.06	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (5FT)

8D26009-09 (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	ND	1.30	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**23.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (10FT)

8D26009-10 (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	ND	1.32	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**24.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (15FT)

8D26009-11 (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	ND	1.25	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**20.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (20 FT)

8D26009-12 (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	ND	1.05	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-8 (25FT)

8D26009-13 (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	ND	1.09	mg/kg dry	1	P8E0207	05/02/18	05/03/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-9 (0 FT)

8D26009-14 (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	ND	1.02	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-9 (5FT)

8D26009-15 (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	**96.4**	1.47	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**32.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-9 (10 FT)

8D26009-16 (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	**115**	1.15	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-9 (15 FT)

8D26009-17 (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	**17.8**	1.25	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**20.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-9 (20 FT)

8D26009-18 (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	**61.3**	1.03	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-10 (0 FT)

8D26009-19 (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	ND	1.10	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-10 (5 FT)

8D26009-20 (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	**39.0**	1.05	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-10 (10 FT)

8D26009-21 (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	**124**	1.28	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**22.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-10 (15 FT)

8D26009-22 (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	**46.5**	1.14	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	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-10 (20 FT)

8D26009-23 (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	**19.1**	1.08	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	ASTM D2216	

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 P8D3001 - * DEFAULT PREP *** **										
Blank (P8D3001-BLK1)				Prepared & Analyzed: 04/30/18						
% Moisture	ND	0.1	%							
Duplicate (P8D3001-DUP1)		**Source: 8D26010-03**		Prepared & Analyzed: 04/30/18						
% Moisture	21.0	0.1	%		22.0			4.65	20	
Duplicate (P8D3001-DUP2)		**Source: 8D27004-20**		Prepared & Analyzed: 04/30/18						
% Moisture	13.0	0.1	%		13.0			0.00	20	
Duplicate (P8D3001-DUP3)		**Source: 8D27008-01**		Prepared & Analyzed: 04/30/18						
% Moisture	2.0	0.1	%		2.0			0.00	20	
Duplicate (P8D3001-DUP4)		**Source: 8D27008-03**		Prepared & Analyzed: 04/30/18						
% Moisture	1.0	0.1	%		1.0			0.00	20	
Batch P8E0207 - * DEFAULT PREP *** **										
Blank (P8E0207-BLK1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8E0207-BS1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	403	1.00	mg/kg wet	400		101	80-120			
LCS Dup (P8E0207-BSD1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	404	1.00	mg/kg wet	400		101	80-120	0.277	20	
Duplicate (P8E0207-DUP1)		**Source: 8D25016-01**		Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	5090	25.3	mg/kg dry		5110			0.471	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 P8E0207 - * DEFAULT PREP *** **										
Duplicate (P8E0207-DUP2)	**Source: 8D26009-04**			Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	54.4	1.37	mg/kg dry		53.9			0.961	20	
Matrix Spike (P8E0207-MS1)	**Source: 8D25016-01**			Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	7200	25.3	mg/kg dry	2020	5110	103	80-120			
Batch P8E0208 - * DEFAULT PREP *** **										
Blank (P8E0208-BLK1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8E0208-BS1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	385	1.00	mg/kg wet	400		96.4	80-120			
LCS Dup (P8E0208-BSD1)				Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	386	1.00	mg/kg wet	400		96.6	80-120	0.254	20	
Duplicate (P8E0208-DUP1)	**Source: 8D25003-02**			Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	552	5.00	mg/kg dry		550			0.481	20	
Duplicate (P8E0208-DUP2)	**Source: 8D26009-20**			Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	39.6	1.05	mg/kg dry		39.0			1.55	20	
Matrix Spike (P8E0208-MS1)	**Source: 8D25003-02**			Prepared: 05/02/18 Analyzed: 05/03/18						
Chloride	1490	5.00	mg/kg dry	1000	550	94.0	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: 5/4/2018

Brent Barron, Laboratory Director/Technical Director

PEEL

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: 4-26-18 PAGE 1 OF

PO #: LAB WORK ORDER #: 8D2600[illegible]9

PROJECT LOCATION OR NAME: EMSU 101

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

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

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

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 ☐ | 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 ☐ CYANIDE ☐ | pH ☐ HEXAVALENT CHROMIUM ☐ | EXPLOSIVES ☐ PECHLORATE ☐ | CHLORIDES ☒ ANIONS ☐ ALKALINITY ☐ | 1300

	Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	FIELD NOTES
1	DP-4 (5ft)		4-26-18	9:48	S	1				X		
2	(10ft)			9:52								
3	(15ft)			9:54								
4	(20ft)			9:56								
5	(25ft)			9:59								
6	DP-6 (5ft)			10:08								
7	(10ft)			10:10								
8	DP-8 (0ft)			10:18								
9	(5ft)			10:20								
10	(10ft)			10:21								
11	(15ft)			10:23								
12	(20ft)			10:24								
13	~~DP-8 (20ft)~~ (25ft)			10:26								
14	DP-9 ~~5ft~~ (0ft)			10:53								
15	(5ft)			10:56								

TOTAL

RELINQUISHED BY:(Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	4-26-18	
RELINQUISHED BY:(Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature)	DATE/TIME 4/26/18 1640	RECEIVED BY: (Signature) [signature]

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

LABORATORY USE ONLY:
RECEIVING TEMP: 2.1 T4 THERM #: 2.5 C1
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants

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

Data Reported to:

DATE: 4-26-18 PAGE 2 OF

PO #: LAB WORK ORDER #:

PROJECT LOCATION OR NAME: EMSU 101

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

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST

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	FIELD NOTES
DP-9 (10ft)		4-26-18	10:57	S	1				X		Chlorides X M300	
(15ft)			10:59									
(20ft)			11:01									
DP-10 (0ft)			9:25									
(5ft)			9:27									
(10ft)			9:32									
(15ft)			9:33									
(20ft)			9:35									

TOTAL

RELINQUISHED BY:(Signature) DATE/TIME 4-26-18 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME 4/26/18 1640 RECEIVED BY: (Signature)

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

LABORATORY USE ONLY:
RECEIVING TEMP: 2.1/0.4 THERM #: 2.541
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

Appendix D

Boring Logs

BORING RECORD

Start: 9:45
Finish: 9:59

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 1)	SAMPLE NUMBER	SAMPLE PID READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND PID READING
	0	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Well Rounded, Poorly Sorted	SW						0	9:45
	5								5	9:48
	10	Caliche, 7.5YR, 8/4, Pink Fine Grained Quartz Sand, Sub- Angular Medium Grained Quartz Sand	Caliche						10	9:52
	15	Coarse Grained Quartz Sand							15	9:54
19	20	Sand, 7.5YR, 7/4, Pink, Fine Grained Quartz Sand, Well Rounded, Sand with Gravel: 90% Sand 10% Gravel	SP						20	9:56
	25	TD: 25'							25	9:59
	30									
	35									

PID READING scale: 2 4 6 8 10 12 14 16 18

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : XTO Energy/ 17-0192-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU 101 Flowline Leak
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 04-26-2018

BORING NUMBER : DP-4

BORING RECORD

Start: 10:07
Finish: 10:10

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 1)	SAMPLE NUMBER	SAMPLE PID READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND PID READING
	0	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Well Rounded	SW						0	10:07
	5	Caliche, 7.5YR, 8/3, Pink Fine Grained Quartz Sand, Sub- Angular	Caliche						5	10:08
	10	TD: 10'							10	10:10
	15									
	20									
	25									
	30									
	35									

PID READING: PPM X 1 — 2 4 6 8 10 12 14 16 18

REMARKS: BACKGROUND PID READING
SOIL : _____ PPM
SOIL : _____ PPM

- ONE CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- L — LABORATORY TEST LOCATION
- \+ — PENETROMETER (TONS/ SQ. FT)
- NR — NO RECOVERY

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 04-26-2018

BORING NUMBER : DP-6

JOB NUMBER : XTO Energy/ 17-0192-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU 101 Flowline Leak
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

BORING RECORD

Start: 10:18
Finish: 10:26

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 1; 2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	SAMPLE PID READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND PID READING (SOIL : PPM, SOIL : PPM)
	0	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Well Rounded, Poorly Sorted	SW						0	10:18
	5								5	10:20
		Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Sand with Gravel: 10% Gravel 90% Sand	SP							10:21
	10								10	
	14									10:23
	15	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Sub- Rounded, Poorly Sorted	SW						15	
	20								20	10:24
	25	TD: 25'							25	10:26
	30									
	35									

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : XTO Energy/ 17-0192-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU 101 Flowline Leak
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 04-26-2018

BORING NUMBER : DP-8

BORING RECORD

Start: 10:53
Finish: 11:01

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 1)	SAMPLE NUMBER	SAMPLE PID READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND PID READING
	0	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Well Rounded, Poorly Sorted	SW						0	10:53
	5								5	10:56
	10	Caliche, 7.5YR, 8/2, Pinkish White, Medium Grained Quartz Sand, Sub- Angular	Caliche						10	10:57
	15	Fine Grained Quartz Sand							15	10:59
	20	TD: 20'							20	11:01
	25									
	30									
	35									

PID READING scale: 2 4 6 8 10 12 14 16 18

REMARKS: SOIL : _____ PPM; SOIL : _____ PPM

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : XTO Energy/ 17-0192-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU 101 Flowline Leak
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 04-26-2018

BORING NUMBER : DP-9

BORING RECORD

Start: 9:24
Finish: 9:35

GEOLOGIC UNIT	DEPTH	DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	PID READING (PPM X 1)	SAMPLE NUMBER	SAMPLE PID READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND PID READING
	0	Sand, 7.5YR, 4/4, Brown, Fine Grained Quartz Sand, Well Rounded	SW						0	9:24
	5	Caliche, 7.5YR, 8/2, Pinkish White, Medium Fine Grained Quartz Sand, Sub- Angular	Caliche						5	9:27
	10								10	9:32
	15	Medium Grained Quartz Sand - Gravel							15	9:33
	20	TD: 20'							20	9:35
	25									
	30									
	35									

PID READING: 2 4 6 8 10 12 14 16 18

REMARKS: SOIL : _____ PPM; SOIL : _____ PPM

ONE CONTINUOUS AUGER SAMPLER
STANDARD PENETRATION TEST
UNDISTURBED SAMPLE
WATER TABLE (24 HRS)
WATER TABLE (TIME OF BORING)
L LABORATORY TEST LOCATION
\+ PENETROMETER (TONS/ SQ. FT)
NR NO RECOVERY

JOB NUMBER : XTO Energy/ 17-0192-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU 101 Flowline Leak
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 04-26-2018

BORING NUMBER : DP-10

Appendix E

Photographs

Leak Site Viewing East

Injection Line Viewing Southeast

Nearest Water Well Approximately 4,000 Feet Southeast of Spill

From:	Hernandez, Christina, EMNRD
To:	"Mark Larson"; Yu, Olivia, EMNRD; "rmann@slo.state.nm.us"
Cc:	"Pennington, Shelby"
Subject:	RE: 1RP-4831 - Delineation Report, EMSU Well #101 Flow Line Leak, XTO Energy, Inc., July 5, 2018
Date:	Friday, July 20, 2018 2:00:00 PM
Attachments:	smaller1RP-4831 EMSU #101 Flowline Leak Delineation Report.pdf

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)

www.LAEnvironmental.com

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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)

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Environmental Consultants

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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

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