APPROVED
By Olivia Yu at 2:38 pm, Aug 28, 2018

NMOCD approves of the delineation completed for 1RP-4721. For proposed remediation, see email correspondence for conditions.

1RP-4721
FINAL
DELINEATION REPORT
EMSU Well #410 Produced Water Spill
Lea County, New Mexico

Latitude: N32° 28' 37.80"
Longitude: W103° 18' 24.39"

LAI Project No. 17-0182-01

August 2, 2018

Prepared for:
XTO Energy, Inc.
500 West Illinois Ave., Suite 100
Midland, Texas 79701

Prepared by:
Larson & Associates, Inc.
507 North Marienfeld Street, Suite 205
Midland, Texas 79701

Mark J. Larson, P.G.
Certified Professional Geologist #10490

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Table of Contents

Figures

Tables

Appendices

1.0 INTRODUCTION

This final delineation report is submitted to the New Mexico Oil Conservation Division (OCD) District 1 on behalf of XTO Energy, Inc. (XTO) for a produced water spill near the Eunice Monument South Unit (EMSU) Well #410 (Site) located in Unit K (NE/4, SW/4), Section 18, Township 21 South, Range 36 East, in Lea County, New Mexico. The geodetic position is latitude North 32° 28' 37.80" and longitude West 103° 18' 24.39". Figure 1 presents a location and topographic map.

1.1 Background

The spill occurred on June 3, 2017, after the injection line ruptured causing approximately 135.79 barrels (bbl) of produced water to be released onto an abandoned well location, lease road and into the pasture. Approximately 120 bbl were recovered. The release covered an area estimated at approximately 5,834 square feet or about 0.133 acre. The plugged and abandoned well, Eunice Monument South #411, previously owned by Chevron USA, Inc., is located approximately 50 feet south of the release. The well was plugged on July 11, 2002. The surface owner is the United States of America (USA) administered by the Department of the Interior Bureau of Land Management (BLM). On June 5, 2017, XTO submitted the initial C-141 to OCD District 1 which assigned the release remediation permit 1RP-4721 with conditions. On September 20, 2017, LAI, on behalf of XTO, submitted the delineation plan to OCD District 1 which was approved on October 3, 2017. BLM approved the plan on December 19, 2017. Appendix A presents the initial C-141. Appendix B presents OCD and BLM communications.

1.2 Physical Setting

The physical setting is as follows:

- Elevation is approximately 3,670 feet above mean sea level (MSL);
- Topography slopes towards the east;
- The nearest surface water feature is small seasonal depression (playa) located about 500 feet west (up gradient) from the Site;
- The soils are designated as "Pyote and maljamar find sands", consisting of approximately 30 inches of fine sand underlain by fine sandy loam to approximately 60 inches derived from sedimentary rock;
- Boring logs indicate a general lithology of unconsolidated eolian sand over a 14 to greater than 22 foot thick unit of carbonate-indurated sand commonly referred to as "caliche", underlain by fine-grained pink quartz sand of the Tertiary-age Blackwater Draw and Ogallala formations, in descending order;
- 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 fresh water well is located in Unit H (SE/4, SE/4), Section 18, Township 21 South, Range 36 East or about 2,800 feet northeast (cross gradient) from the Site;
- Depth to groundwater in the well was reported at approximately 233.83 feet below ground surface (bgs) in 1996.

1.3 Remediation Action Levels

Remediation action levels (RRAL) were calculated for benzene, BTEX and TPH based on the following criteria established by the OCD in "*Guidelines for Remediation of Leaks, Spills and Releases, 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 for a minimum of 3 to 4 feet further in depth.

2.0 DELINEATION

On October 27-28, 2017 and November 1, 2017, LAI personnel collected soil samples near the injection line (HA-1) and at fourteen (14) locations (S-1 through S-14) within and outside the spill area. Samples from HA-1 were collected with a stainless steel hand auger whereas soil samples from S-1 through S-14 were collected with direct push technology (DPT). Hand auger samples were collected from the bottom of the excavation where the pipe was repaired at about 3 feet below ground surface (bgs) to auger refusal at approximately 5 feet bgs. DPT soil samples were collected in one foot increments to about 4 feet bgs and 2 foot increments to refusal between approximately 6 and 8 feet bgs, depending on subsurface conditions. The samples were submitted under chain of custody and preservation to Permian Basin Environmental Laboratory (PBEL) in Midland, Texas. The laboratory analyzed the upper sample from each location for benzene, toluene, ethylene and xylenes (BTEX) and total petroleum hydrocarbons (TPH) , including gasoline range organics (C6-C12), diesel range organics (>C12-C28) and oil range organics (>C28-C35) by EPA SW-846 Methods 8021B and 8015M, respectively. All samples were analyzed for chloride by EPA Method 300.

Benzene, BTEX and TPH were the RRAL in the initial soil samples therefore no additional samples were analyzed for these compounds. Chloride was less than the delineation limit (600 mg/Kg) between ground surface and approximately 4 feet bgs in samples from locations S-1 to S-4, S-9 and S-11 to S-13 suggesting the chloride is from a historical release.

On January 10, 2018, LAI, on behalf of XTO, submitted the initial delineation report to OCD that included a proposal to delineate chloride in soil beneath the injection line and requested approval for no further action of the historical impacts. On January 23, 2018, OCD denied the request for no further action for the historical impacts and required XTO to complete the delineation at the injection line (HA-1) and historical impacts at locations S-1, S-2, S-3, S-4, S-9, S-11, S-12 and S-13. Table 1 presents the

delineation soil sample analytical data summary. Figure 3 presents the soil sample locations. Appendix B presents OCD correspondence. Appendix C presents laboratory reports.

On March 5, 2018, LAI, on behalf of XTO submitted an amended delineation plan for delineating the release at HA-1 and historic chloride contamination at S-1, S-2, S-3, S-4, S-9, S-11, S-12 and S-13. The amended delineation plan was approved by OCD and BLM on March 30, 2018 and April 23, 2018, respectively. Appendix B presents OCD and BLM communications.

On March 28, 2018, Scarborough Drilling Inc. (SDI), under supervision from LAI, used an air rotary rig and jam tube sampler to collect soil samples at 5 foot increments beginning at 5 feet bgs (HA-1) and 10 feet bgs (S-1, S-2, S-3, S-4, S-9, S-11, S-12 and S-13) and terminating between 20 feet bgs (S-3, S-9, S-12 and S-13) and 40 feet bgs (HA-1). On June 4, 2018, LAI personnel collected a soil sample from about 2 feet bgs from each sidewall (north, south, east and west) from the excavation where the injection line was repaired. The excavation samples were analyzed for BTEX, TPH and chloride by EPA SW-846 Methods 8021B, 8015M and EPA Method 300, respectively. The boring samples were analyzed for chloride by EPA Method 300.

BTEX and TPH were below the analytical method reporting limits and RRAL in sidewall samples from the injection line excavation Chloride in sidewall samples from the injection line excavation ranged from less than the analytical method reporting limit (<1.11 mg/Kg) to 355 mg/Kg and below the delineation limit (600 mg/Kg). Chloride was delineated in borings HA-1, S-1, S-2, S-3, S-4, S-9, S-11, S-12 and S-13 to 600 mg/Kg and maintained for a minimum of 3 to 4 feet farther in depth. Chloride in samples from HA-1, beneath the release, decreased below 600 mg/Kg between approximately 30 and 35 feet bgs. Chloride in samples from the remaining borings was less than 600 mg/Kg to about 4 feet bgs, increasing above 600 mg/Kg and decreasing below 600 mg/Kg between about 6 and 25 feet bgs, depending on location. The laboratory analysis of samples from S-1, S-2, S-3, S-4, S-9, S-11, S-12 and S-13 demonstrate that the chloride concentrations are variable and due to historic releases. Table 1 presents the delineation soil sample analytical data summary. Figure 2 presents an aerial map showing the soil sample locations. Appendix C presents the laboratory reports. Appendix D presents the boring logs. Appendix E presents photographs.

3.0 REMEDIATION

XTO proposes to deepen the excavation at HA-1 to approximately 4 feet bgs and square up the sides and install a 20 mil thickness polyethylene liner to be installed in the bottom of the excavation. The proposed final excavation dimensions will be about 10 x 25 feet by 4 feet in depth. Confirmation soil samples will be collected from each sidewall (north, south, east and west) about 2 feet bgs and analyzed for BTEX, TPH, including GRO (C6-C12), DRO (>C12-C28) and ORO (>C28-C35) and chloride by EPA SW-846 Methods 8021B, 8015M and Method 300, respectively. The excavation will be backfilled with caliche following placement of the polyethylene liner to approximately 1 foot bgs and finished with topsoil . The excavation will be seed with BLM Mix No. 2. A final report will be submitted to OCD and BLM upon completion of the remediation. Figure 3 presents the proposed excavation.

Tables

Table 1
1RP-4721
Delineation Soil Sample Analytical Data Summary
XTO Energy, Inc., EMSU Well #410 Produced Water Spill
UL K (NE/4, SW/4), Section 18, Township 21 South, Range 36 East
Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	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 Samples									
W. Side	**2**	6/4/2018	<0.0211	<0.9691	<26.3	<26.3	<26.3	<26.3	355
E. Side	**2**	6/4/2018	<0.00111	<0.05107	<27.8	<27.8	<27.8	<27.8	<1.11
N. Side	**2**	6/4/2018	<0.00108	<0.04956	<26.9	<26.9	<26.9	<26.9	21.1
S. Side	**2**	6/4/2018	<0.00112	<0.05164	<28.1	<28.1	<28.1	<28.1	53.8
Boring Samples									
HA-1	3 - 4	10/27/2017	<0.00112	<0.00794	<28.1	<28.1	<28.1	<28.1	173
	4 - 5	10/27/2017	--	--	--	--	--	--	**677**
	10	3/28/2018	--	--	---	--	--	--	**1,210**
	15	3/28/2018	--	--	---	--	--	--	**975**
	20	3/28/2018	--	--	---	--	--	--	**583**
	25	3/28/2018	--	--	---	--	--	--	**1,080**
	30	3/28/2018	--	--	---	--	--	--	**706**
	35	3/28/2018	--	--	---	--	--	--	**243**
	40	3/28/2018	--	--	---	--	--	--	**186**
S-1	0 - 1	10/27/2017	<0.00105	<0.00737	<26.3	107	164	271	13.7
	1 - 2	10/27/2017	--	--	---	--	--	--	43.60
	2 - 3	10/27/2017	--	--	---	--	--	--	89.50
	3 - 4	10/27/2017	--	--	---	--	--	--	160
	4 -6	10/27/2017	--	--	---	--	--	--	**1,170**
	10	3/27/2018	--	--	---	--	--	--	**1,780**
	15	3/27/2018	--	--	---	--	--	--	**1,250**
	20	3/27/2018	--	--	---	--	--	--	**769**
	25	3/27/2018	--	--	---	--	--	--	367
	30	3/27/2018	--	--	---	--	--	--	50.2
S-2	0 - 1	10/27/2017	<0.00104	<0.00728	<26.0	<26.0	<26.0	<26.0	<1.04
	1 - 2	10/27/2017	--	--	---	--	--	--	<1.04
	2 - 3	10/27/2017	--	--	---	--	--	--	<1.05
	3 - 4	10/27/2017	--	--	---	--	--	--	2.91
	4 -6	10/27/2017	--	--	---	--	--	--	797
	6 - 8	10/27/2017	--	--	---	--	--	--	1,100
	8 - 10	10/27/2017	--	--	---	--	--	--	**939**
	15	3/27/2018	--	--	---	--	--	--	431
	20	3/27/2018	--	--	---	--	--	--	72.2
	25	3/27/2018	--	--	---	--	--	--	341
S-3	0 - 1	10/27/2017	<0.00114	<0.00796	<28.4	38.3	99.8	138.1	18.50
	1 - 2	10/27/2017	--	--	---	--	--	--	121
	2 - 3	10/27/2017	--	--	---	--	--	--	164
	3 - 4	10/27/2017	--	--	---	--	--	--	556
	4 -6	10/27/2017	--	--	---	--	--	--	**1,070**

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Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	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**
	10	3/27/2018	--	--	---	--	--	--	332
	15	3/27/2018	--	--	---	--	--	--	55.0
	20	3/27/2018	--	--	---	--	--	--	35.5
S-4	0 - 1	10/30/2017	<0.00108	<0.00754	<26.9	<26.9	<26.9	<26.9	201
	1 - 2	10/30/2017	--	--	---	--	--	--	226
	2 - 3	10/30/2017	--	--	---	--	--	--	628
	3 - 4	10/30/2017	--	--	---	--	--	--	577
	4 -6	10/30/2017	--	--	---	--	--	--	**1,120**
	10	3/27/2018	--	--	---	--	--	--	187
	15	3/27/2018	--	--	---	--	--	--	269
	20	3/27/2018	--	--	---	--	--	--	**712**
	25	3/27/2018	--	--	---	--	--	--	108
	30	4/26/2018	--	--	---	--	--	--	106.00
	35	4/26/2018							38.70
S-5	0 - 1	10/30/2017	<0.00109	<0.00761	<27.2	<27.2	39.5	39.5	202
	1 - 2	10/30/2017	--	--	---	--	--	--	173
	2 - 3	10/30/2017	--	--	---	--	--	--	502
	3 - 4	10/30/2017	--	--	---	--	--	--	445
	4 -6	10/30/2017	--	--	---	--	--	--	536
S-6	0 - 1	10/30/2017	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	<1.02
	1 - 2	10/30/2017	--	--	---	--	--	--	<1.06
	2 - 3	10/30/2017	--	--	---	--	--	--	<1.09
	3 - 4	10/30/2017	--	--	---	--	--	--	2.59
	4 -6	10/30/2017	--	--	---	--	--	--	<1.04
	6 - 8	10/30/2017	--	--	---	--	--	--	1.14
S-7	0 - 1	10/30/2017	<0.00101	<0.00707	<126	615	915	1,530	<1.01
	1 - 2	10/30/2017	--	--	---	--	--	--	<1.03
	2 - 3	10/30/2017	--	--	---	--	--	--	<1.05
	3 - 4	10/30/2017	--	--	---	--	--	--	<1.04
	4 -6	10/30/2017	--	--	---	--	--	--	10.9
S-8	0 - 1	11/1/2017	<0.00112	<0.00786	<28.1	75.5	159	234.5	<1.12
	1 - 2	11/1/2017	--	--	---	--	--	--	<1.10
	2 - 3	11/1/2017	--	--	---	--	--	--	<1.03
	3 - 4	11/1/2017	--	--	---	--	--	--	6.66
	4 -6	11/1/2017	--	--	---	--	--	--	85.1
S-9	0 - 1	11/1/2017	<0.00101	<0.00707	<25.3	<25.3	<25.3	<25.3	<1.01
	1 - 2	11/1/2017	--	--	---	--	--	--	4.26

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Lea County, New Mexico

Sample	Depth (Feet)	Collection Date	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**
	2 - 3	11/1/2017	--	--	---	--	--	--	94.5
	3 - 4	11/1/2017	--	--	---	--	--	--	125
	4 -6	11/1/2017	--	--	---	--	--	--	**1,050**
	10	3/28/2018	--	--	---	--	--	--	333
	15	3/28/2018	--	--	---	--	--	--	41.9
	20	3/28/2018	--	--	---	--	--	--	39.6
S-10	0 - 1	11/1/2017	<0.00105	<0.00737	<26.3	<26.3	<26.3	<26.3	32.2
	1 - 2	11/1/2017	--	--	---	--	--	--	135
	2 - 3	11/1/2017	--	--	---	--	--	--	220
	3 - 4	11/1/2017	--	--	---	--	--	--	274
	4 -6	11/1/2017	--	--	---	--	--	--	513
S-11	0 - 1	11/1/2017	<0.00109	<0.00761	<27.2	154	106	261	54.5
	1 - 2	11/1/2017	--	--	---	--	--	--	74.5
	2 - 3	11/1/2017	--	--	---	--	--	--	246
	3 - 4	11/1/2017	--	--	---	--	--	--	345
	4 -6	11/1/2017	--	--	---	--	--	--	1,440
	6 - 8	11/1/2017	--	--	---	--	--	--	**225**
	10	3/28/2018	--	--	---	--	--	--	**735**
	15	3/28/2018	--	--	---	--	--	--	**619**
	20	3/28/2018	--	--	---	--	--	--	188
	25	4/26/2018	--	--	---	--	--	--	37.30
	30	4/26/2018	--	--	---	--	--	--	13.50
	35	4/26/2018	--	--	---	--	--	--	7.82
S-12	0 - 1	11/1/2017	<0.00108	<0.00754	<26.9	112	62.3	174.3	95.7
	1 - 2	11/1/2017	--	--	---	--	--	--	119
	2 - 3	11/1/2017	--	--	---	--	--	--	277
	3 - 4	11/1/2017	--	--	---	--	--	--	376
	4 -6	11/1/2017	--	--	---	--	--	--	829
	6 - 8	11/1/2017	--	--	---	--	--	--	**1,450**
	10	3/28/2018	--	--	---	--	--	--	**707**
	15	3/28/2018	--	--	---	--	--	--	489
	20	3/28/2018	--	--	---	--	--	--	396
S-13	0 - 1	11/1/2017	<0.00120	<0.00842	<30.1	195	110	305	629
	1 - 2	11/1/2017	--	--	---	--	--	--	677
	2 - 3	11/1/2017	--	--	---	--	--	--	564
	3 - 4	11/1/2017	--	--	---	--	--	--	418
	4 -6	11/1/2017	--	--	---	--	--	--	976
	6 - 8	11/1/2017	--	--	---	--	--	--	**757**
	10	3/28/2018	--	--	---	--	--	--	567

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Sample	Depth (Feet)	Collection Date	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**
	15	3/28/2018	--	--	---	--	--	--	281
	20	3/28/2018	--	--	---	--	--	--	89.6
S-14	0 - 1	11/1/2017	<0.00114	<0.00796	<28.4	81.3	38.0	119.3	<1.14
	1 - 2	11/1/2017	--	--	---	--	--	--	<1.01
	2 - 3	11/1/2017	--	--	---	--	--	--	<1.03
	3 - 4	11/1/2017	--	--	---	--	--	--	<1.03
	4 -6	11/1/2017	--	--	---	--	--	--	<1.01

Notes: Analysis by Permian Basin Environmental Lab, Midland, Texas by EPA SW-846 Methods 8021B (BTEX), 8015M (TPH) a
*: OCD delineation limit
Depth in feet below ground surface (bgs)
mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)
P: Laboratory results pending
Bold exceeds OCD delineation limit (Chloride)

Figures

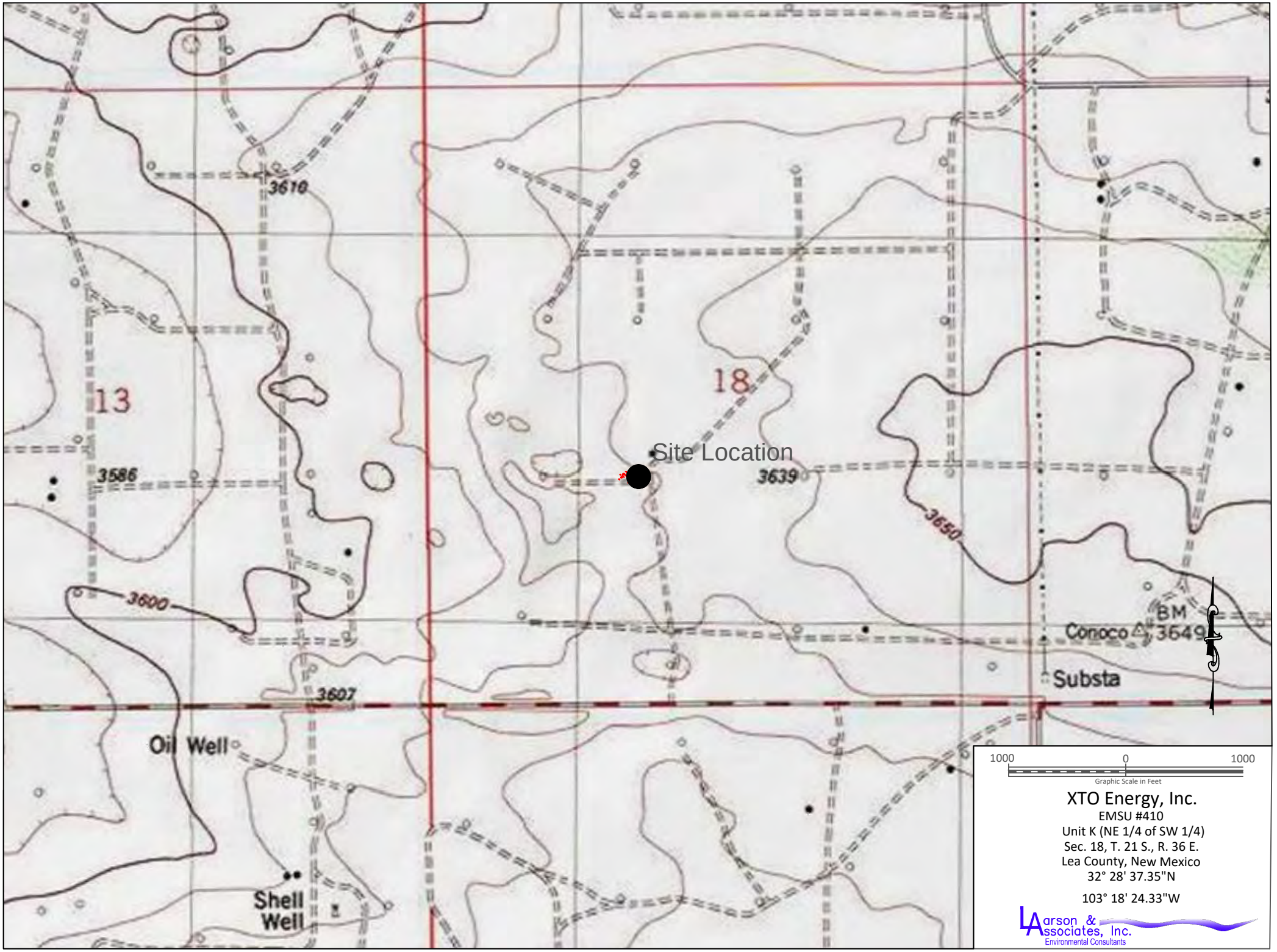

Figure 1 - Topographic Map

Figure 2 - Aerial Map Showing Sample Locations

Figure 3 - Aerial Map Showing Proposed Excavation Area

Appendix 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

X Initial Report ☐ Final Report

Name of Company XTO Energy	Contact Shannon Walker
Address 500 W Illinois St. Suite 100 Midland Texas 79701	Telephone No. 432-661-4649
Facility Name EMSU 410 WIW	Facility Type Injection

Surface Owner BLM	Mineral Owner BLM	API No.3002530281

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
K	18	21S	36E					

Latitude 32° 28' 37.80" N **Longitude** 103° 18' 24.39"W NAD83

NATURE OF RELEASE

Type of Release Produced Water	Volume of Release 135.79 bbls	Volume Recovered 120 bbls
Source of Release Injection Line	Date and Hour of Occurrence 6/3/2017	Date and Hour of Discovery 6/3/2017
Was Immediate Notice Given? ☐ Yes X No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes X No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

RECEIVED
By Olivia Yu at 12:58 pm, Jun 13, 2017

Describe Cause of Problem and Remedial Action Taken.*

Injection line ruptured causing produced water to spill on pasture and road. Cleaned up all standing fluids with vacuum truck. Will clean area to NMOCD statdards.

Describe Area Affected and Cleanup Action Taken.*

Pasture and Lease Road. All standing fluid cleaned up with vacuum truck.

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: Shannon Walker

Printed Name: Shannon Walker

Title: Production Foreman

E-mail Address: shannon_walker@xtoenergy.com

Date: 6/5/17 Phone: 432-661-4649

OIL CONSERVATION DIVISION

Approved by Environmental Specialist: JJ

Approval Date: 6/13/2017 Expiration Date:

Conditions of Approval: see attached directive

Attached ☑

* Attach Additional Sheets If Necessary

1RP-4721 fOY1716446806 nOY1716446999

pOY1716447243

Operator/Responsible Party,

The OCD has received the form C-141 you provided on _6/5/2017_ regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number _1RP-4721__ 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 _7/13/2017_. 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

Appendix B

OCD/BLM Communications

Mark Larson

From: Yu, Olivia, EMNRD [Olivia.Yu@state.nm.us]
Sent: Friday, March 30, 2018 11:56 AM
To: Sarah Johnson; Shelly Tucker (stucker@blm.gov)
Cc: Luke_Williams@xtoenergy.com; Mark Larson; doug_parks@xtoenergy.com; ronald_goodman@xtoenergy.com
Subject: RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018
Attachments: approved_1RP-4721, Amended Delineation Plan, EMSU Well #410.pdf

Ms. Johnson:

NMOCD approves of the proposed additional delineation for 1RP-4721.

Like approval from BLM required.

Thanks,
Olivia

From: Sarah Johnson <SJohnson@laenvironmental.com>
Sent: Monday, March 5, 2018 7:16 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Shelly Tucker (stucker@blm.gov) <stucker@blm.gov>
Cc: Luke_Williams@xtoenergy.com; Mark Larson <Mark@laenvironmental.com>; doug_parks@xtoenergy.com; ronald_goodman@xtoenergy.com
Subject: RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

Dear Ms. Yu,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached amended delineation plan for the produced water spill at the EMSU Well #410 (1RP-4721) in Lea County, New Mexico. Your approval of the amended delineation plan is requested. Please contact Doug Parks with XTO at (432) 620-6712 or doug_parks @xtoenergy.com or me at (432) 687-0901 (office) or (432) 664-5357 (cell) or Mark Larson if you have any questions.

Respectfully,

Sarah Johnson
Staff Geologist
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-664-5357
Fax – 432-687-0456
sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Tuesday, January 23, 2018 12:37 PM
To: Sarah Johnson; Shelly Tucker (stucker@blm.gov)
Cc: Luke_Williams@xtoenergy.com; Mark Larson
Subject: RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

Mr. Williams:

Delineation is not completed for 1RP-4721. The historic release rationale for incompletion is not accepted. The Responsible Operator is required to address all environmental issues on the lease, which XTO Energy has held since 2004, regardless of the time of release. Furthermore, delineation began at the end of October 2017, 5 months after the release, on sandy soil with potential for chloride movement.

In addition to HA-1, further vertical delineation is required at the areas represented by S-1, S-2, S-3, S-4, S-9, S-11, S-12, S-13.

Please be advised that even under proper storage condition, HA-1 3-4 sample analyzed on November 21, 2017, collected on October 27, 2017, was almost at the maximum allowable holding time for BTEX and TPH analyses.

Please confirm or inform for clarification.

Thanks,

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

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Wednesday, January 10, 2018 7:28 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Luke_Williams@xtoenergy.com; Mark Larson <Mark@laenvironmental.com>
Subject: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

Dear Ms. Yu,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached delineation report for the produced water spill at the EMSU Well #410 (1RP-4721) in Lea County, New Mexico. Your approval of the delineation report is requested. Please contact Luke Williams with XTO at (432) 620-6729 or luke_williams@xtoenergy.com or me at (432) 687-0901 (office) or (432) 664-5357 (cell) or Mark Larson if you have any questions.

Respectfully,

Sarah Johnson
Staff Geologist
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-664-5357
Fax – 432-687-0456
sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

APPROVED
By Olivia Yu at 10:54 am, Mar 30, 2018

NMOCD approves of the proposed additional delineation for 1RP-4721.

1RP-4721
AMENDED DELINEATION PLAN
EMSU #410 Produced Water Spill
Lea County, New Mexico

Latitude: N32° 28' 37.80"
Longitude: W103° 18' 24.39"

LAI Project No. 17-0182-01

February 26, 2018

Prepared for:
XTO Energy, Inc.
500 West Illinois Ave., Suite 100
Midland, Texas 79701

Prepared by:
Larson & Associates, Inc.
507 North Marienfeld Street, Suite 205
Midland, Texas 79701

Mark J. Larson, P.G.
Certified Professional Geologist #10490

Sarah R. Johnson
Staff Geologist

Mark Larson

From: Sarah Johnson
Sent: Monday, April 23, 2018 2:56 PM
To: Mark Larson
Subject: FW: [EXTERNAL] RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

From: Tucker, Shelly
Sent: Monday, April 23, 2018 2:56:37 PM (UTC-06:00) Central Time (US & Canada)
To: Yu, Olivia, EMNRD
Cc: Sarah Johnson; Luke_Williams@xtoenergy.com; Mark Larson; doug_parks@xtoenergy.com; ronald_goodman@xtoenergy.com
Subject: Re: [EXTERNAL] RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

BLM concurs with NMOCD approval.

NOTE: *LPC Timing Stipulations are in effect - from* ***March 1st through June 15th****. Please plan remedial activities accordingly. Check for African Rue...treat (before it gets out of control).*

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,
Shelly J Tucker
Environmental Protection Specialist
O&G Spill/Release Coordinator

575.234.5905 - Direct
575.361.0084 - Cellular
575.234.6235 - Emergency Spill Number

stucker@blm.gov

Bureau of Land Management
620 E. Greene St
Carlsbad, NM 88220

On Fri, Mar 30, 2018 at 10:56 AM, Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us> wrote:

Ms. Johnson:

NMOCD approves of the proposed additional delineation for 1RP-4721.

Like approval from BLM required.

Thanks,

Olivia

From: Sarah Johnson <SJohnson@laenvironmental.com>
Sent: Monday, March 5, 2018 7:16 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Shelly Tucker (stucker@blm.gov) <stucker@blm.gov>
Cc: Luke_Williams@xtoenergy.com; Mark Larson <Mark@laenvironmental.com>; doug_parks@xtoenergy.com; ronald_goodman@xtoenergy.com

Subject: RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

Dear Ms. Yu,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached amended delineation plan for the produced water spill at the EMSU Well #410 (1RP-4721) in Lea County, New Mexico. Your approval of the amended delineation plan is requested. Please contact Doug Parks with XTO at (432) 620-6712 or doug_parks @xtoenergy.com or me at (432) 687-0901 (office) or (432) 664-5357 (cell) or Mark Larson if you have any questions.

Respectfully,

Sarah Johnson

Staff Geologist

507 N. Marienfeld St., Suite 205

Midland, Texas 79701

Office – 432-687-0901

Cell – 432-664-5357

Fax – 432-687-0456

sjohnson@laenvironmental.com

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Tuesday, January 23, 2018 12:37 PM
To: Sarah Johnson; Shelly Tucker (stucker@blm.gov)
Cc: Luke_Williams@xtoenergy.com; Mark Larson
Subject: RE: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

Mr. Williams:

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Please be advised that even under proper storage condition, HA-1 3-4 sample analyzed on November 21, 2017, collected on October 27, 2017, was almost at the maximum allowable holding time for BTEX and TPH analyses.

Please confirm or inform for clarification.

Thanks,

Olivia Yu

Environmental Specialist

NMOCD, District I

Olivia.yu@state.nm.us

575-393-6161 x113

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Wednesday, January 10, 2018 7:28 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Luke_Williams@xtoenergy.com; Mark Larson <Mark@laenvironmental.com>
Subject: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

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Respectfully,

Sarah Johnson

Staff Geologist

507 N. Marienfeld St., Suite 205

Midland, Texas 79701

Office – 432-687-0901

Cell – 432-664-5357

Fax – 432-687-0456

sjohnson@laenvironmental.com

Mark Larson

From: Yu, Olivia, EMNRD [Olivia.Yu@state.nm.us]
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To: Sarah Johnson; Shelly Tucker (stucker@blm.gov)
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Please be advised that even under proper storage condition, HA-1 3-4 sample analyzed on November 21, 2017, collected on October 27, 2017, was almost at the maximum allowable holding time for BTEX and TPH analyses.

Please confirm or inform for clarification.

Thanks,

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

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Wednesday, January 10, 2018 7:28 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
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Subject: 1RP-4721 XTO EMSU Well #410 Delienation Report, January 10, 2018

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Respectfully,

Sarah Johnson
Staff Geologist
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-664-5357
Fax – 432-687-0456
sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

Mark Larson

From: Yu, Olivia, EMNRD [Olivia.Yu@state.nm.us]
Sent: Wednesday, October 04, 2017 12:09 PM
To: Sarah Johnson; Tucker, Shelly
Cc: Mark Larson; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: RE: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017
Attachments: approved_1RP-4721 Delineation Plan EMSU Well #410 September 20 2017.pdf

Dear Ms. Johnson:

Acknowledged. Please see the attachment for your records.

Thanks,

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

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Wednesday, October 4, 2017 9:38 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Tucker, Shelly <stucker@blm.gov>
Cc: Mark Larson <Mark@laenvironmental.com>; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: RE: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Dear Ms. Yu,
This message is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of XTO Energy, Inc. (XTO) in response to your question concerning the delineation plan for
1RP-4721:

Condition: The depth to groundwater did not change much, but there is more recent USGS data from 2011. NMOCD approves of the proposed delineation for 1RP-4721 with one condition. Permissible chloride values for delineation and remediation are 600 mg/kg, not 1000 mg/kg. Due to the depth to groundwater, the additional 10 ft. is not necessary. Delineate to 600 mg/kg and maintained for 3-4 ft. further in depth.

Response: The more recent USGS data from 2011 is recognized. The release will be delineated to 600 mg/Kg, rather than 1,000 mg/Kg with concentrations below 600 mg/kg for 3-4 ft further in depth.

Respectfully,

Sarah Johnson
Staff Geologist
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-664-5357
Fax – 432-687-0456
sjohnson@laenvironmental.com

LA arson & Associates, Inc.
Environmental Consultants

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Tuesday, October 03, 2017 10:55 AM
To: Sarah Johnson; Tucker, Shelly
Cc: Mark Larson; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: RE: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Dear Ms. Johnson:

Note:

- The depth to groundwater did not change much, but there is more recent USGS data from 2011.

NMOCD approves of the proposed delineation for 1RP-4721 with one condition. Permissible chloride values for delineation and remediation are 600 mg/kg, not 1000 mg/kg. Due to the depth to groundwater, the additional 10 ft. is not necessary. Delineate to 600 mg/kg and maintained for 3-4 ft. further in depth.

Please confirm.

Thanks,

Olivia Yu

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

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Thursday, September 21, 2017 1:07 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Mark Larson <Mark@laenvironmental.com>; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Ms. Yu,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached delineation plan for the produced water spill at EMSU #410 (1RP-4721) in Lea County, New Mexico. Your approval of the delineation plan is requested. Please contact Dudley McMinn with XTO at (432) 682-8873 or mcminn@xtoenergy.com or me if you have questions.

Respectfully,

Sarah Johnson
Staff Geologist
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-664-5357
Fax – 432-687-0456
sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

APPROVED
By Olivia Yu at 11:06 am, Oct 04, 2017

NMOCD approves of the proposed delineation for 1RP-4721 with one condition:
Delineate to 600 mg/kg chlorides. Laboratory analyses must demonstrate chloride levels were obtained and maintained at 3-4 ft. further in depth.

1RP-4721

DELINEATION PLAN

EMSU Well #410 Produced Water Spill

Lea County, New Mexico

Latitude: N32° 28' 37.80"

Longitude: W103° 18' 24.39"

LAI Project No. 17-0182-01

September 20, 2017

Prepared for:

XTO Energy, Inc.

500 West Illinois Ave., Suite 100

Midland, Texas 79701

Prepared by:

Larson & Associates, Inc.

507 North Marienfeld Street, Suite 205

Midland, Texas 79701

Mark J. Larson, P.G.

Certified Professional Geologist #10490

Sarah R. Johnson

Staff Geologist

Mark Larson

From: Tucker, Shelly [stucker@blm.gov]
Sent: Tuesday, December 19, 2017 8:17 PM
To: Yu, Olivia, EMNRD
Cc: Sarah Johnson; Mark Larson; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: Re: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

BLM concurs approval of the proposed work proposal. Sorry for the delay in this response.

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Shelly J Tucker
Environmental Protection Specialist
O&G Spill/Release Coordinator

Bureau of Land Management
620 E. Greene St
Carlsbad, NM 88220

575.234.5905 - Direct
575.361.0084 - Cellular
575.234.6235 - Emergency Spill Number

stucker@blm.gov

The **BLM acceptance/approval does not** relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that may pose a threat to groundwater, surface water, human health or the environment or if the location fails to reclaim properly. In such an event that the location does not revegetate, or future issues with contaminants are encountered, the operator will be asked to address the issues until the contaminant issues are fully mitigated and the location is successfully reclaimed. In addition, BLM approval does not relieve the operator of responsibility for compliance with any other federal, state or local laws/regulations.

On Wed, Oct 4, 2017 at 11:08 AM, Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us> wrote:

Dear Ms. Johnson:

Acknowledged. Please see the attachment for your records.

Thanks,

Olivia Yu

Environmental Specialist

NMOCD, District I

Olivia.yu@state.nm.us

575-393-6161 x113

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

From: Sarah Johnson [mailto:SJohnson@laenvironmental.com]
Sent: Wednesday, October 4, 2017 9:38 AM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Tucker, Shelly <stucker@blm.gov>
Cc: Mark Larson <Mark@laenvironmental.com>; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com

Subject: RE: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Dear Ms. Yu,

This message is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of XTO Energy, Inc. (XTO) in response to your question concerning the delineation plan for

1RP-4721:

> Condition: The depth to groundwater did not change much, but there is more recent USGS data from 2011. NMOCD approves of the proposed delineation for 1RP-4721 with one condition. Permissible chloride values for delineation and remediation are 600 mg/kg, not 1000 mg/kg. Due to the depth to groundwater, the additional 10 ft. is not necessary. Delineate to 600 mg/kg and maintained for 3-4 ft. further in depth.

Response: The more recent USGS data from 2011 is recognized. The release will be delineated to 600 mg/Kg, rather than 1,000 mg/Kg with concentrations below 600 mg/kg for 3-4 ft further in depth.

Respectfully,

Sarah Johnson

Staff Geologist

507 N. Marienfeld St., Suite 205

Midland, Texas 79701

Office – 432-687-0901

Cell – 432-664-5357

Fax – 432-687-0456

sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Tuesday, October 03, 2017 10:55 AM
To: Sarah Johnson; Tucker, Shelly
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Subject: RE: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Dear Ms. Johnson:

Note:

- The depth to groundwater did not change much, but there is more recent USGS data from 2011.

NMOCD approves of the proposed delineation for 1RP-4721 with one condition. Permissible chloride values for delineation and remediation are 600 mg/kg, not 1000 mg/kg. Due to the depth to groundwater, the additional 10 ft. is not necessary. Delineate to 600 mg/kg and maintained for 3-4 ft. further in depth.

Please confirm.

Thanks,

Olivia Yu

Environmental Specialist

NMOCD, District I

Olivia.yu@state.nm.us

575-393-6161 x113

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Sent: Thursday, September 21, 2017 1:07 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Mark Larson <Mark@laenvironmental.com>; Dudley_McMinn@xtoenergy.com; Shannon_Walker@xtoenergy.com; Luke_Williams@xtoenergy.com
Subject: 1RP-4721 - Delineation Plan, EMSU Well #410, September 21, 2017

Ms. Yu,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO), submits the attached delineation plan for the produced water spill at EMSU #410 (1RP-4721) in Lea County, New Mexico. Your approval of the delineation plan is requested. Please contact Dudley McMinn with XTO at (432) 682-8873 or mcminn@xtoenergy.com or me if you have questions.

Respectfully,

Sarah Johnson

Staff Geologist

507 N. Marienfeld St., Suite 205

Midland, Texas 79701

Office – 432-687-0901

Cell – 432-664-5357

Fax – 432-687-0456

sjohnson@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

Appendix C

Laboratory Reports

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

PBELAB

Revised Analytical Report

Prepared for:

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

Project: XTO EMSU 410
Project Number: 17-0182-01
Location: New Mexico

Lab Order Number: 7K06009

NELAP/TCEQ # T104704516-16-7

Report Date: 12/29/17

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

Project: XTO EMSU 410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-1 0-1	7K06009-01	Soil	10/27/17 11:05	11-06-2017 09:08
S-1 1-2	7K06009-02	Soil	10/27/17 11:11	11-06-2017 09:08
S-1 2-3	7K06009-03	Soil	10/27/17 11:15	11-06-2017 09:08
S-1 3-4	7K06009-04	Soil	10/27/17 11:19	11-06-2017 09:08
S-1 4-6	7K06009-05	Soil	10/27/17 11:23	11-06-2017 09:08
S-2 0-1	7K06009-06	Soil	10/27/17 12:01	11-06-2017 09:08
S-2 1-2	7K06009-07	Soil	10/27/17 12:07	11-06-2017 09:08
S-2 2-3	7K06009-08	Soil	10/27/17 12:12	11-06-2017 09:08
S-2 3-4	7K06009-09	Soil	10/27/17 12:20	11-06-2017 09:08
S-2 4-6	7K06009-10	Soil	10/27/17 12:28	11-06-2017 09:08
S-2 6-8	7K06009-11	Soil	10/27/17 12:36	11-06-2017 09:08
S-2 8-10	7K06009-12	Soil	10/27/17 12:42	11-06-2017 09:08
S-3 0-1	7K06009-13	Soil	10/27/17 13:08	11-06-2017 09:08
S-3 1-2	7K06009-14	Soil	10/27/17 13:13	11-06-2017 09:08
S-3 2-3	7K06009-15	Soil	10/27/17 13:16	11-06-2017 09:08
S-3 3-4	7K06009-16	Soil	10/27/17 13:22	11-06-2017 09:08
S-3 4-6	7K06009-17	Soil	10/27/17 13:27	11-06-2017 09:08
HA-1 3-4	7K06009-18	Soil	10/27/17 13:38	11-06-2017 09:08
HA-1 4-5	7K06009-19	Soil	10/27/17 13:50	11-06-2017 09:08
S-4 0-1	7K06009-20	Soil	10/30/17 12:05	11-06-2017 09:08
S-4 1-2	7K06009-21	Soil	10/30/17 12:07	11-06-2017 09:08
S-4 2-3	7K06009-22	Soil	10/30/17 12:11	11-06-2017 09:08
S-4 3-4	7K06009-23	Soil	10/30/17 12:13	11-06-2017 09:08
S-4 4-6	7K06009-24	Soil	10/30/17 12:16	11-06-2017 09:08
S-5 0-1	7K06009-25	Soil	10/30/17 12:43	11-06-2017 09:08
S-5 1-2	7K06009-26	Soil	10/30/17 12:45	11-06-2017 09:08
S-5 2-3	7K06009-27	Soil	10/30/17 12:49	11-06-2017 09:08
S-5 3-4	7K06009-28	Soil	10/30/17 12:53	11-06-2017 09:08
S-5 4-6	7K06009-29	Soil	10/30/17 13:01	11-06-2017 09:08
S-6 0-1	7K06009-30	Soil	10/30/17 13:28	11-06-2017 09:08
S-6 1-2	7K06009-31	Soil	10/30/17 13:30	11-06-2017 09:08
S-6 2-3	7K06009-32	Soil	10/30/17 13:35	11-06-2017 09:08
S-6 3-4	7K06009-33	Soil	10/30/17 13:39	11-06-2017 09:08
S-6 4-6	7K06009-34	Soil	10/30/17 13:44	11-06-2017 09:08

Larson & Associates, Inc.
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Midland TX, 79710

Project: XTO EMSU 410
Project Number: 17-0182-01
Project Manager: Mark Larson

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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-6 6-8	7K06009-35	Soil	10/30/17 13:50	11-06-2017 09:08
S-7 0-1	7K06009-36	Soil	10/30/17 14:39	11-06-2017 09:08
S-7 1-2	7K06009-37	Soil	10/30/17 14:41	11-06-2017 09:08
S-7 2-3	7K06009-38	Soil	10/30/17 14:45	11-06-2017 09:08
S-7 3-4	7K06009-39	Soil	10/30/17 14:48	11-06-2017 09:08
S-7 4-6	7K06009-40	Soil	10/30/17 14:51	11-06-2017 09:08
S-8 0-1	7K06009-41	Soil	11/01/17 10:49	11-06-2017 09:08
S-8 1-2	7K06009-42	Soil	11/01/17 10:53	11-06-2017 09:08
S-8 2-3	7K06009-43	Soil	11/01/17 10:55	11-06-2017 09:08
S-8 3-4	7K06009-44	Soil	11/01/17 10:59	11-06-2017 09:08
S-8 4-6	7K06009-45	Soil	11/01/17 11:02	11-06-2017 09:08
S-9 0-1	7K06009-46	Soil	11/01/17 11:12	11-06-2017 09:08
S-9 1-2	7K06009-47	Soil	11/01/17 11:15	11-06-2017 09:08
S-9 2-3	7K06009-48	Soil	11/01/17 11:19	11-06-2017 09:08
S-9 3-4	7K06009-49	Soil	11/01/17 11:23	11-06-2017 09:08
S-9 4-7	7K06009-50	Soil	11/01/17 11:30	11-06-2017 09:08
S-10 0-1	7K06009-51	Soil	11/01/17 11:37	11-06-2017 09:08
S-10 1-2	7K06009-52	Soil	11/01/17 11:46	11-06-2017 09:08
S-10 2-3	7K06009-53	Soil	11/01/17 11:50	11-06-2017 09:08
S-10 3-4	7K06009-54	Soil	11/01/17 11:53	11-06-2017 09:08
S-10 4-6	7K06009-55	Soil	11/01/17 11:59	11-06-2017 09:08
S-11 0-1	7K06009-56	Soil	11/01/17 12:04	11-06-2017 09:08
S-11 1-2	7K06009-57	Soil	11/01/17 12:08	11-06-2017 09:08
S-11 2-3	7K06009-58	Soil	11/01/17 12:11	11-06-2017 09:08
S-11 3-4	7K06009-59	Soil	11/01/17 12:16	11-06-2017 09:08
S-11 4-6	7K06009-60	Soil	11/01/17 12:21	11-06-2017 09:08
S-11 6-8	7K06009-61	Soil	11/01/17 12:25	11-06-2017 09:08
S-12 0-1	7K06009-62	Soil	11/02/17 10:08	11-06-2017 09:08
S-12 1-2	7K06009-63	Soil	11/02/17 10:12	11-06-2017 09:08
S-12 2-3	7K06009-64	Soil	11/02/17 10:15	11-06-2017 09:08
S-12 3-4	7K06009-65	Soil	11/02/17 10:18	11-06-2017 09:08
S-12 4-6	7K06009-66	Soil	11/02/17 10:22	11-06-2017 09:08
S-12 6-8	7K06009-67	Soil	11/02/17 10:27	11-06-2017 09:08
S-13 0-1	7K06009-68	Soil	11/02/17 10:50	11-06-2017 09:08

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

Project: XTO EMSU 410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-13 1-2	7K06009-69	Soil	11/02/17 10:53	11-06-2017 09:08
S-13 2-3	7K06009-70	Soil	11/02/17 10:57	11-06-2017 09:08
S-13 3-4	7K06009-71	Soil	11/02/17 11:00	11-06-2017 09:08
S-13 4-6	7K06009-72	Soil	11/02/17 11:04	11-06-2017 09:08
S-13 6-8	7K06009-73	Soil	11/02/17 11:09	11-06-2017 09:08
S-14 0-1	7K06009-74	Soil	11/02/17 11:15	11-06-2017 09:08
S-14 1-2	7K06009-75	Soil	11/02/17 11:17	11-06-2017 09:08
S-14 2-3	7K06009-76	Soil	11/02/17 11:19	11-06-2017 09:08
S-14 3-4	7K06009-77	Soil	11/02/17 11:21	11-06-2017 09:08
S-14 4-6	7K06009-78	Soil	11/02/17 11:36	11-06-2017 09:08

On 12/29/2017 PBELAB staff was advised to report BTEX and TPH on sample HA-1 3-4'. This revised report reflects that addition.

S-1 0-1

7K06009-01 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00105	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00211	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00105	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00211	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00105	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*99.2 %*	*75-125*		*P7K0706*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*92.7 %*	*75-125*		*P7K0706*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**13.7**	1.05	mg/kg dry	1	P7K0902	11/09/17	11/09/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**107**	26.3	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**164**	26.3	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*104 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**271**	26.3	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

Larson & Associates, Inc.	Project: XTO EMSU 410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 1-2

7K06009-02 (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	**43.6**	1.04	mg/kg dry	1	P7K0902	11/09/17	11/09/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

Larson & Associates, Inc.	Project: XTO EMSU 410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 2-3

7K06009-03 (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	**89.5**	1.03	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

Larson & Associates, Inc.	Project: XTO EMSU 410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 3-4

7K06009-04 (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	**160**	1.04	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

S-1 4-6

7K06009-05 (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	**1170**	5.95	mg/kg dry	5	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

Larson & Associates, Inc.
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Midland TX, 79710

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S-2 0-1

7K06009-06 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00104	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00208	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00104	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00208	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00104	mg/kg dry	1	P7K0706	11/07/17	11/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*97.4 %*	*75-125*		*P7K0706*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*109 %*	*75-125*		*P7K0706*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.04	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.0	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*99.6 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*109 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

Larson & Associates, Inc.	Project: XTO EMSU 410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2 1-2

7K06009-07 (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	1.04	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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Project Manager: Mark Larson

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S-2 2-3

7K06009-08 (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	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-2 3-4

7K06009-09 (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	**2.91**	1.08	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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Midland TX, 79710	Project Manager: Mark Larson	

S-2 4-6

7K06009-10 (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	**797**	1.16	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-2 6-8

7K06009-11 (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	**1100**	5.95	mg/kg dry	5	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2 8-10

7K06009-12 (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	**939**	1.18	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**15.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-3 0-1

7K06009-13 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*121 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*106 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**18.5**	1.14	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.4	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**38.3**	28.4	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**99.8**	28.4	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*98.0 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*97.3 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**138**	28.4	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-3 1-2

7K06009-14 (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	**121**	1.06	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-3 2-3

7K06009-15 (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	**164**	1.03	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-3 3-4

7K06009-16 (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	**556**	1.05	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-3 4-6

7K06009-17 (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	**1070**	1.15	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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HA-1 3-4

7K06009-18 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00112	mg/kg dry	1	P7K2009	11/20/17	11/21/17	EPA 8021B	O-04
Toluene	ND	0.00225	mg/kg dry	1	P7K2009	11/20/17	11/21/17	EPA 8021B	O-04
Ethylbenzene	ND	0.00112	mg/kg dry	1	P7K2009	11/20/17	11/21/17	EPA 8021B	O-04
Xylene (p/m)	ND	0.00225	mg/kg dry	1	P7K2009	11/20/17	11/21/17	EPA 8021B	O-04
Xylene (o)	ND	0.00112	mg/kg dry	1	P7K2009	11/20/17	11/21/17	EPA 8021B	O-04
Surrogate: 1,4-Difluorobenzene		*86.9 %*	*75-125*		*P7K2009*	*11/20/17*	*11/21/17*	*EPA 8021B*	*O-04*
Surrogate: 4-Bromofluorobenzene		*102 %*	*75-125*		*P7K2009*	*11/20/17*	*11/21/17*	*EPA 8021B*	*O-04*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**173**	1.12	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.1	mg/kg dry	1	P7K1715	11/17/17	11/21/17	TPH 8015M	
>C12-C28	ND	28.1	mg/kg dry	1	P7K1715	11/17/17	11/21/17	TPH 8015M	
>C28-C35	ND	28.1	mg/kg dry	1	P7K1715	11/17/17	11/21/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*120 %*	*70-130*		*P7K1715*	*11/17/17*	*11/21/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*133 %*	*70-130*		*P7K1715*	*11/17/17*	*11/21/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	28.1	mg/kg dry	1	[CALC]	11/17/17	11/21/17	calc	

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HA-1 4-5

7K06009-19 (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	**677**	6.02	mg/kg dry	5	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**17.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-4 0-1

7K06009-20 (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	P7K0707	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00215	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00108	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00215	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00108	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*119 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*100 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**201**	1.08	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*98.5 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.9	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-4 1-2

7K06009-21 (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	**226**	1.03	mg/kg dry	1	P7K0910	11/09/17	11/09/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-4 2-3

7K06009-22 (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	**628**	1.06	mg/kg dry	1	P7K0910	11/09/17	11/10/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-4 3-4

7K06009-23 (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	**577**	1.05	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-4 4-6

7K06009-24 (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	**1120**	5.75	mg/kg dry	5	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-5 0-1

7K06009-25 (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	P7K0707	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00217	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00109	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00217	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00109	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*104 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*116 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**202**	1.09	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**39.5**	27.2	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*103 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**39.5**	27.2	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-5 1-2

7K06009-26 (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	**173**	1.02	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-5 2-3

7K06009-27 (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	**502**	1.06	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-5 3-4

7K06009-28 (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	**445**	1.05	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-5 4-6

7K06009-29 (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	**536**	1.08	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-6 0-1

7K06009-30 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00102	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*94.2 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*114 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.02	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.5	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*96.4 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*105 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-6 1-2

7K06009-31 (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	1.06	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-6 2-3

7K06009-32 (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	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-6 3-4

7K06009-33 (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	**2.59**	1.06	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-6 4-6

7K06009-34 (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	ND	1.04	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-6 6-8

7K06009-35 (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	**1.14**	1.05	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-7 0-1

7K06009-36 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Toluene	ND	0.00202	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Ethylbenzene	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (p/m)	ND	0.00202	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Xylene (o)	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*111 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*127 %*	*75-125*		*P7K0707*	*11/07/17*	*11/09/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.01	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**1.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	126	mg/kg dry	5	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**615**	126	mg/kg dry	5	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**915**	126	mg/kg dry	5	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*105 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**1530**	126	mg/kg dry	5	[CALC]	11/10/17	11/11/17	calc	

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S-7 1-2

7K06009-37 (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	1.03	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-7 2-3

7K06009-38 (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	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-7 3-4

7K06009-39 (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	1.04	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-7 4-6

7K06009-40 (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	**10.9**	1.10	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-8 0-1

7K06009-41 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00112	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00225	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00112	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00225	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00112	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*90.7 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*102 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.12	mg/kg dry	1	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.1	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**75.5**	28.1	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**159**	28.1	mg/kg dry	1	P7K1003	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*101 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*105 %*	*70-130*		*P7K1003*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**234**	28.1	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-8 1-2

7K06009-42 (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	P7K0911	11/09/17	11/10/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-8 2-3

7K06009-43 (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	1.03	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-8 3-4

7K06009-44 (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	**6.66**	1.03	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-8 4-6

7K06009-45 (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	**85.1**	1.08	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-9 0-1

7K06009-46 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00202	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00202	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00101	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*104 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*91.4 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.01	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	25.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	25.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	ND	25.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*104 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*111 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	25.3	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-9 1-2

7K06009-47 (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	**4.26**	1.03	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-9 2-3

7K06009-48 (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	**94.5**	1.04	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-9 3-4

7K06009-49 (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	**125**	1.02	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-9 4-7

7K06009-50 (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	**1050**	5.49	mg/kg dry	5	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-10 0-1

7K06009-51 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00105	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00211	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00105	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00211	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00105	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*96.3 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**32.2**	1.05	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*104 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*109 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	26.3	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-10 1-2

7K06009-52 (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	**135**	1.05	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-10 2-3

7K06009-53 (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	**220**	1.04	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-10 3-4

7K06009-54 (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	**274**	1.04	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-10 4-6

7K06009-55 (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	**513**	1.14	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-11 0-1

7K06009-56 (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	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00217	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00109	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00217	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00109	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*81.9 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*98.1 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**54.5**	1.09	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**154**	27.2	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**107**	27.2	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*106 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*114 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**261**	27.2	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-11 1-2

7K06009-57 (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	**74.5**	1.12	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-11 2-3

7K06009-58 (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	**246**	1.06	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-11 3-4

7K06009-59 (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	**345**	1.05	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-11 4-6

7K06009-60 (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	**1440**	5.88	mg/kg dry	5	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**15.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-11 6-8

7K06009-61 (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	**225**	1.15	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-12 0-1

7K06009-62 (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	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00215	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00108	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00215	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00108	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*83.6 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*99.2 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**95.7**	1.08	mg/kg dry	1	P7K0912	11/09/17	11/10/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.9	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**112**	26.9	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**62.3**	26.9	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*106 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*109 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**174**	26.9	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-12 1-2

7K06009-63 (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	**119**	1.09	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-12 2-3

7K06009-64 (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	**277**	1.05	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-12 3-4

7K06009-65 (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	**376**	1.05	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-12 4-6

7K06009-66 (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	**829**	1.08	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-12 6-8

7K06009-67 (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	**1450**	5.75	mg/kg dry	5	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-13 0-1

7K06009-68 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00120	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00241	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00120	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00241	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00120	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*98.9 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*94.1 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**629**	6.02	mg/kg dry	5	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**17.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	30.1	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**195**	30.1	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**110**	30.1	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*108 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*117 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**305**	30.1	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-13 1-2

7K06009-69 (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	**677**	5.38	mg/kg dry	5	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-13 2-3

7K06009-70 (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	**564**	1.09	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-13 3-4

7K06009-71 (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	**418**	1.05	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-13 4-6

7K06009-72 (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	**976**	5.26	mg/kg dry	5	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-13 6-8

7K06009-73 (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	**757**	1.15	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-14 0-1

7K06009-74 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7K0707	11/07/17	11/10/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*103 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*109 %*	*75-125*		*P7K0707*	*11/07/17*	*11/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.14	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.4	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C12-C28	**81.3**	28.4	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
>C28-C35	**38.0**	28.4	mg/kg dry	1	P7K1004	11/10/17	11/11/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*102 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*110 %*	*70-130*		*P7K1004*	*11/10/17*	*11/11/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**119**	28.4	mg/kg dry	1	[CALC]	11/10/17	11/11/17	calc	

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S-14 1-2

7K06009-75 (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	1.01	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**1.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-14 2-3

7K06009-76 (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	1.03	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-14 3-4

7K06009-77 (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	1.03	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**3.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	ASTM D2216	

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S-14 4-6

7K06009-78 (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	1.01	mg/kg dry	1	P7K0913	11/09/17	11/12/17	EPA 300.0	
% Moisture	**1.0**	0.1	%	1	P7K0804	11/08/17	11/08/17	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 P7K0706 - General Preparation (GC)										
Blank (P7K0706-BLK1)				Prepared: 11/07/17 Analyzed: 11/09/17						
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: 4-Bromofluorobenzene	*0.0617*		*"*	*0.0600*		*103*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0554*		*"*	*0.0600*		*92.4*	*75-125*			
LCS (P7K0706-BS1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.116	0.00100	mg/kg wet	0.100		116	70-130			
Toluene	0.108	0.00200	"	0.100		108	70-130			
Ethylbenzene	0.107	0.00100	"	0.100		107	70-130			
Xylene (p/m)	0.219	0.00200	"				70-130			
Xylene (o)	0.120	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	*0.0843*		*"*	*0.0600*		*141*	*75-125*			*S-GC1*
Surrogate: 4-Bromofluorobenzene	*0.0771*		*"*	*0.0600*		*129*	*75-125*			*S-GC1*
LCS Dup (P7K0706-BSD1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.0951	0.00100	mg/kg wet	0.100		95.1	70-130	19.4	20	
Toluene	0.0877	0.00200	"	0.100		87.7	70-130	20.7	20	R2
Ethylbenzene	0.115	0.00100	"	0.100		115	70-130	6.95	20	
Xylene (p/m)	0.203	0.00200	"				70-130		20	
Xylene (o)	0.106	0.00100	"				70-130		20	
Surrogate: 1,4-Difluorobenzene	*0.0692*		*"*	*0.0600*		*115*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0697*		*"*	*0.0600*		*116*	*75-125*			
Calibration Blank (P7K0706-CCB1)				Prepared: 11/07/17 Analyzed: 11/09/17						
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	*0.0500*		*"*	*0.0600*		*83.4*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0532*		*"*	*0.0600*		*88.6*	*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 P7K0706 - General Preparation (GC)										
Calibration Blank (P7K0706-CCB2)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	*0.0655*		*"*	*0.0600*		*109*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0654*		*"*	*0.0600*		*109*	*75-125*			
Calibration Check (P7K0706-CCV1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.0838	0.00100	mg/kg wet	0.100		83.8	80-120			
Toluene	0.0820	0.00200	"	0.100		82.0	80-120			
Ethylbenzene	0.0818	0.00100	"	0.100		81.8	80-120			
Xylene (p/m)	0.180	0.00200	"	0.200		90.1	80-120			
Xylene (o)	0.0956	0.00100	"	0.100		95.6	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0588*		*"*	*0.0600*		*98.0*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0655*		*"*	*0.0600*		*109*	*75-125*			
Calibration Check (P7K0706-CCV2)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.101	0.00100	mg/kg wet	0.100		101	80-120			
Toluene	0.0899	0.00200	"	0.100		89.9	80-120			
Ethylbenzene	0.0910	0.00100	"	0.100		91.0	80-120			
Xylene (p/m)	0.195	0.00200	"	0.200		97.5	80-120			
Xylene (o)	0.102	0.00100	"	0.100		102	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0582*		*"*	*0.0600*		*96.9*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0636*		*"*	*0.0600*		*106*	*75-125*			
Calibration Check (P7K0706-CCV3)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.0884	0.00100	mg/kg wet	0.100		88.4	80-120			
Toluene	0.0873	0.00200	"	0.100		87.3	80-120			
Ethylbenzene	0.0897	0.00100	"	0.100		89.7	80-120			
Xylene (p/m)	0.199	0.00200	"	0.200		99.6	80-120			
Xylene (o)	0.110	0.00100	"	0.100		110	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0594*		*"*	*0.0600*		*99.0*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0640*		*"*	*0.0600*		*107*	*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 P7K0707 - General Preparation (GC)										
Blank (P7K0707-BLK1)				Prepared: 11/07/17 Analyzed: 11/09/17						
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	*0.0627*		*"*	*0.0600*		*104*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0671*		*"*	*0.0600*		*112*	*75-125*			
LCS (P7K0707-BS1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.0863	0.00100	mg/kg wet	0.100		86.3	70-130			
Toluene	0.0813	0.00200	"	0.100		81.3	70-130			
Ethylbenzene	0.105	0.00100	"	0.100		105	70-130			
Xylene (p/m)	0.185	0.00200	"				70-130			
Xylene (o)	0.0994	0.00100	"				70-130			
Surrogate: 4-Bromofluorobenzene	*0.0653*		*"*	*0.0600*		*109*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0680*		*"*	*0.0600*		*113*	*75-125*			
LCS Dup (P7K0707-BSD1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.100	0.00100	mg/kg wet	0.100		100	70-130	14.8	20	
Toluene	0.0929	0.00200	"	0.100		92.9	70-130	13.3	20	
Ethylbenzene	0.119	0.00100	"	0.100		119	70-130	13.2	20	
Xylene (p/m)	0.211	0.00200	"				70-130		20	
Xylene (o)	0.109	0.00100	"				70-130		20	
Surrogate: 1,4-Difluorobenzene	*0.0660*		*"*	*0.0600*		*110*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0651*		*"*	*0.0600*		*108*	*75-125*			
Calibration Blank (P7K0707-CCB1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	*0.0660*		*"*	*0.0600*		*110*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0651*		*"*	*0.0600*		*108*	*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 P7K0707 - General Preparation (GC)										
Calibration Blank (P7K0707-CCB2)				Prepared: 11/07/17 Analyzed: 11/10/17						
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	*0.0673*		*"*	*0.0600*		*112*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0703*		*"*	*0.0600*		*117*	*75-125*			
Calibration Check (P7K0707-CCV1)				Prepared: 11/07/17 Analyzed: 11/09/17						
Benzene	0.0884	0.00100	mg/kg wet	0.100		88.4	80-120			
Toluene	0.0873	0.00200	"	0.100		87.3	80-120			
Ethylbenzene	0.0897	0.00100	"	0.100		89.7	80-120			
Xylene (p/m)	0.199	0.00200	"	0.200		99.6	80-120			
Xylene (o)	0.110	0.00100	"	0.100		110	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0640*		*"*	*0.0600*		*107*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0594*		*"*	*0.0600*		*99.0*	*75-125*			
Calibration Check (P7K0707-CCV2)				Prepared: 11/07/17 Analyzed: 11/10/17						
Benzene	0.0827	0.00100	mg/kg wet	0.100		82.7	80-120			
Toluene	0.0815	0.00200	"	0.100		81.5	80-120			
Ethylbenzene	0.0828	0.00100	"	0.100		82.8	80-120			
Xylene (p/m)	0.183	0.00200	"	0.200		91.3	80-120			
Xylene (o)	0.0941	0.00100	"	0.100		94.1	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0674*		*"*	*0.0600*		*112*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0694*		*"*	*0.0600*		*116*	*75-125*			
Calibration Check (P7K0707-CCV3)				Prepared: 11/07/17 Analyzed: 11/10/17						
Benzene	0.112	0.00100	mg/kg wet	0.100		112	80-120			
Toluene	0.105	0.00200	"	0.100		105	80-120			
Ethylbenzene	0.111	0.00100	"	0.100		111	80-120			
Xylene (p/m)	0.220	0.00200	"	0.200		110	80-120			
Xylene (o)	0.118	0.00100	"	0.100		118	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0636*		*"*	*0.0600*		*106*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0610*		*"*	*0.0600*		*102*	*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 P7K0707 - General Preparation (GC)										
Matrix Spike Dup (P7K0707-MSD1)	**Source: 7K06009-74**			Prepared: 11/07/17 Analyzed: 11/10/17						
Benzene	0.105	0.00114	mg/kg dry	0.114	ND	92.2	80-120		20	
Toluene	0.0936	0.00227	"	0.114	ND	82.4	80-120		20	
Ethylbenzene	0.0995	0.00114	"	0.114	ND	87.6	80-120		20	
Xylene (p/m)	0.207	0.00227	"		ND		80-120		20	
Xylene (o)	0.0915	0.00114	"		ND		80-120		20	
Surrogate: 1,4-Difluorobenzene	*0.0786*		*"*	*0.0682*		*115*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0725*		*"*	*0.0682*		*106*	*75-125*			
Batch P7K2009 - General Preparation (GC)										
Blank (P7K2009-BLK1)				Prepared: 11/20/17 Analyzed: 11/21/17						
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: 4-Bromofluorobenzene	*0.0763*		*"*	*0.0800*		*95.4*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0681*		*"*	*0.0800*		*85.1*	*75-125*			
LCS (P7K2009-BS1)				Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.100	0.00100	mg/kg wet	0.100		100	70-130			
Toluene	0.106	0.00200	"	0.100		106	70-130			
Ethylbenzene	0.104	0.00100	"	0.100		104	70-130			
Xylene (p/m)	0.219	0.00200	"				70-130			
Xylene (o)	0.110	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	*0.0618*		*"*	*0.0800*		*77.3*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0687*		*"*	*0.0800*		*85.9*	*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 P7K2009 - General Preparation (GC)										
LCS Dup (P7K2009-BSD1)				Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.103	0.00100	mg/kg wet	0.100		103	70-130	2.30	20	
Toluene	0.110	0.00200	"	0.100		110	70-130	3.87	20	
Ethylbenzene	0.0976	0.00100	"	0.100		97.6	70-130	6.22	20	
Xylene (p/m)	0.204	0.00200	"				70-130		20	
Xylene (o)	0.113	0.00100	"				70-130		20	
Surrogate: 1,4-Difluorobenzene	*0.0701*		*"*	*0.0800*		*87.6*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0700*		*"*	*0.0800*		*87.5*	*75-125*			
Calibration Check (P7K2009-CCV2)				Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.107	0.00100	mg/kg wet	0.100		107	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)	0.220	0.00200	"	0.200		110	80-120			
Xylene (o)	0.113	0.00100	"	0.100		113	80-120			
Surrogate: 4-Bromofluorobenzene	*0.0781*		*"*	*0.0800*		*97.6*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0710*		*"*	*0.0800*		*88.8*	*75-125*			
Calibration Check (P7K2009-CCV3)				Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.102	0.00100	mg/kg wet	0.100		102	80-120			
Toluene	0.114	0.00200	"	0.100		114	80-120			
Ethylbenzene	0.113	0.00100	"	0.100		113	80-120			
Xylene (p/m)	0.224	0.00200	"	0.200		112	80-120			
Xylene (o)	0.116	0.00100	"	0.100		116	80-120			
Surrogate: 1,4-Difluorobenzene	*0.0587*		*"*	*0.0800*		*73.4*	*75-125*			*S-GC*
Surrogate: 4-Bromofluorobenzene	*0.0825*		*"*	*0.0800*		*103*	*75-125*			
Matrix Spike (P7K2009-MS1)	**Source: 7K17007-06**			Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.0992	0.00102	mg/kg dry	0.102	ND	97.2	80-120			
Toluene	0.119	0.00204	"	0.102	ND	117	80-120			
Ethylbenzene	0.101	0.00102	"	0.102	ND	98.9	80-120			
Xylene (p/m)	0.200	0.00204	"		ND		80-120			
Xylene (o)	0.114	0.00102	"		ND		80-120			
Surrogate: 1,4-Difluorobenzene	*0.0873*		*"*	*0.0816*		*107*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.119*		*"*	*0.0816*		*146*	*75-125*			*S-GC*

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 P7K2009 - General Preparation (GC)										
Matrix Spike Dup (P7K2009-MSD1)		**Source: 7K17007-06**		Prepared: 11/20/17 Analyzed: 11/21/17						
Benzene	0.110	0.00102	mg/kg dry	0.102	ND	108	80-120	10.1	20	
Toluene	0.117	0.00204	"	0.102	ND	115	80-120	1.22	20	
Ethylbenzene	0.112	0.00102	"	0.102	ND	110	80-120	10.2	20	
Xylene (p/m)	0.213	0.00204	"		ND		80-120		20	
Xylene (o)	0.114	0.00102	"		ND		80-120		20	
Surrogate: 1,4-Difluorobenzene	*0.0710*		*"*	*0.0816*		*87.0*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0813*		*"*	*0.0816*		*99.6*	*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 P7K0804 - * DEFAULT PREP *** **										
Blank (P7K0804-BLK1)				Prepared & Analyzed: 11/08/17						
% Moisture	ND	0.1	%							
Blank (P7K0804-BLK2)				Prepared & Analyzed: 11/08/17						
% Moisture	ND	0.1	%							
Duplicate (P7K0804-DUP1)		**Source: 7K06009-08**		Prepared & Analyzed: 11/08/17						
% Moisture	4.0	0.1	%		5.0			22.2	20	R3
Duplicate (P7K0804-DUP2)		**Source: 7K06009-35**		Prepared & Analyzed: 11/08/17						
% Moisture	6.0	0.1	%		5.0			18.2	20	
Duplicate (P7K0804-DUP3)		**Source: 7K06009-62**		Prepared & Analyzed: 11/08/17						
% Moisture	6.0	0.1	%		7.0			15.4	20	
Batch P7K0902 - * DEFAULT PREP *** **										
LCS (P7K0902-BS1)				Prepared & Analyzed: 11/09/17						
Chloride	414	1.00	mg/kg wet	400		104	80-120			
LCS Dup (P7K0902-BSD1)				Prepared & Analyzed: 11/09/17						
Chloride	412	1.00	mg/kg wet	400		103	80-120	0.593	20	
Duplicate (P7K0902-DUP1)		**Source: 7K03002-07**		Prepared & Analyzed: 11/09/17						
Chloride	4410	27.8	mg/kg dry		4420			0.308	20	
Duplicate (P7K0902-DUP2)		**Source: 7K03004-12**		Prepared & Analyzed: 11/09/17						
Chloride	33.0	1.08	mg/kg dry		32.9			0.359	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 P7K0902 - * DEFAULT PREP *** **										
Matrix Spike (P7K0902-MS1)	**Source: 7K03002-07**			Prepared & Analyzed: 11/09/17						
Chloride	6890	27.8	mg/kg dry	2220	4420	111	80-120			
Batch P7K0910 - * DEFAULT PREP *** **										
Blank (P7K0910-BLK1)				Prepared & Analyzed: 11/09/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7K0910-BS1)				Prepared & Analyzed: 11/09/17						
Chloride	436	1.00	mg/kg wet	400		109	80-120			
LCS Dup (P7K0910-BSD1)				Prepared & Analyzed: 11/09/17						
Chloride	433	1.00	mg/kg wet	400		108	80-120	0.619	20	
Duplicate (P7K0910-DUP1)	**Source: 7K06009-03**			Prepared & Analyzed: 11/09/17						
Chloride	88.2	1.03	mg/kg dry		89.5			1.50	20	
Duplicate (P7K0910-DUP2)	**Source: 7K06009-13**			Prepared & Analyzed: 11/09/17						
Chloride	19.6	1.14	mg/kg dry		18.5			5.91	20	
Matrix Spike (P7K0910-MS1)	**Source: 7K06009-03**			Prepared & Analyzed: 11/09/17						
Chloride	1190	1.03	mg/kg dry	1030	89.5	106	80-120			
Batch P7K0911 - * DEFAULT PREP *** **										
Blank (P7K0911-BLK1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	ND	1.00	mg/kg wet							

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 P7K0911 - * DEFAULT PREP *** **										
LCS (P7K0911-BS1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	422	1.00	mg/kg wet	400		105	80-120			
LCS Dup (P7K0911-BSD1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	415	1.00	mg/kg wet	400		104	80-120	1.55	20	
Duplicate (P7K0911-DUP1)		**Source: 7K06009-23**		Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	594	1.05	mg/kg dry		577			2.90	20	
Duplicate (P7K0911-DUP2)		**Source: 7K06009-33**		Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	3.81	1.06	mg/kg dry		2.59			38.3	20	R4
Matrix Spike (P7K0911-MS1)		**Source: 7K06009-23**		Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	1650	1.05	mg/kg dry	1050	577	102	80-120			
Batch P7K0912 - * DEFAULT PREP *** **										
Blank (P7K0912-BLK1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7K0912-BS1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	412	1.00	mg/kg wet	400		103	80-120			
LCS Dup (P7K0912-BSD1)				Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	409	1.00	mg/kg wet	400		102	80-120	0.609	20	
Duplicate (P7K0912-DUP1)		**Source: 7K06009-43**		Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	ND	1.03	mg/kg dry		ND				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 P7K0912 - * DEFAULT PREP *** **										
Duplicate (P7K0912-DUP2)	**Source: 7K06009-53**			Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	222	1.04	mg/kg dry		220			1.07	20	
Matrix Spike (P7K0912-MS1)	**Source: 7K06009-43**			Prepared: 11/09/17 Analyzed: 11/10/17						
Chloride	1110	1.03	mg/kg dry	1030	ND	108	80-120			
Batch P7K0913 - * DEFAULT PREP *** **										
Blank (P7K0913-BLK1)				Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7K0913-BS1)				Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	429	1.00	mg/kg wet	400		107	80-120			
LCS Dup (P7K0913-BSD1)				Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	439	1.00	mg/kg wet	400		110	80-120	2.41	20	
Duplicate (P7K0913-DUP1)	**Source: 7K06009-63**			Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	123	1.09	mg/kg dry		119			3.42	20	
Duplicate (P7K0913-DUP2)	**Source: 7K06009-73**			Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	758	1.15	mg/kg dry		757			0.0880	20	
Matrix Spike (P7K0913-MS1)	**Source: 7K06009-63**			Prepared: 11/09/17 Analyzed: 11/12/17						
Chloride	1280	1.09	mg/kg dry	1090	119	107	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 P7K1003 - * DEFAULT PREP *** **										
Blank (P7K1003-BLK1)				Prepared & Analyzed: 11/10/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*109*		*"*	*100*		*109*	*70-130*			
Surrogate: o-Terphenyl	*60.3*		*"*	*50.0*		*121*	*70-130*			
LCS (P7K1003-BS1)				Prepared & Analyzed: 11/10/17						
C6-C12	850	25.0	mg/kg wet	1000		85.0	75-125			
>C12-C28	998	25.0	"	1000		99.8	75-125			
Surrogate: 1-Chlorooctane	*107*		*"*	*100*		*107*	*70-130*			
Surrogate: o-Terphenyl	*56.9*		*"*	*50.0*		*114*	*70-130*			
LCS Dup (P7K1003-BSD1)				Prepared: 11/10/17 Analyzed: 11/13/17						
C6-C12	930	25.0	mg/kg wet	1000		93.0	75-125	8.95	20	
>C12-C28	1130	25.0	"	1000		113	75-125	12.0	20	
Surrogate: 1-Chlorooctane	*115*		*"*	*100*		*115*	*70-130*			
Surrogate: o-Terphenyl	*61.3*		*"*	*50.0*		*123*	*70-130*			
Calibration Blank (P7K1003-CCB1)				Prepared & Analyzed: 11/10/17						
C6-C12	17.5		mg/kg wet							
>C12-C28	4.48		"							
Surrogate: 1-Chlorooctane	*97.6*		*"*	*100*		*97.6*	*70-130*			
Surrogate: o-Terphenyl	*53.9*		*"*	*50.0*		*108*	*70-130*			
Calibration Blank (P7K1003-CCB2)				Prepared & Analyzed: 11/10/17						
C6-C12	19.1		mg/kg wet							
>C12-C28	22.6		"							
Surrogate: 1-Chlorooctane	*100*		*"*	*100*		*100*	*70-130*			
Surrogate: o-Terphenyl	*55.5*		*"*	*50.0*		*111*	*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 P7K1003 - * DEFAULT PREP *** **										
Calibration Check (P7K1003-CCV1)				Prepared & Analyzed: 11/10/17						
C6-C12	456	25.0	mg/kg wet	500		91.2	85-115			
>C12-C28	471	25.0	"	500		94.3	85-115			
Surrogate: 1-Chlorooctane	*108*		*"*	*100*		*108*	*70-130*			
Surrogate: o-Terphenyl	*51.2*		*"*	*50.0*		*102*	*70-130*			
Calibration Check (P7K1003-CCV2)				Prepared & Analyzed: 11/10/17						
C6-C12	462	25.0	mg/kg wet	500		92.4	85-115			
>C12-C28	471	25.0	"	500		94.1	85-115			
Surrogate: 1-Chlorooctane	*112*		*"*	*100*		*112*	*70-130*			
Surrogate: o-Terphenyl	*53.8*		*"*	*50.0*		*108*	*70-130*			
Calibration Check (P7K1003-CCV3)				Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	466	25.0	mg/kg wet	500		93.1	85-115			
>C12-C28	496	25.0	"	500		99.2	85-115			
Surrogate: 1-Chlorooctane	*112*		*"*	*100*		*112*	*70-130*			
Surrogate: o-Terphenyl	*53.6*		*"*	*50.0*		*107*	*70-130*			
Matrix Spike (P7K1003-MS1)	**Source: 7K03010-05**			Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	1080	26.6	mg/kg dry	1060	41.1	97.6	75-125			
>C12-C28	2470	26.6	"	1060	1720	71.3	75-125			QM-05
Surrogate: 1-Chlorooctane	*124*		*"*	*106*		*116*	*70-130*			
Surrogate: o-Terphenyl	*63.1*		*"*	*53.2*		*119*	*70-130*			
Matrix Spike Dup (P7K1003-MSD1)	**Source: 7K03010-05**			Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	1050	26.6	mg/kg dry	1060	41.1	94.8	75-125	2.90	20	
>C12-C28	2470	26.6	"	1060	1720	71.1	75-125	0.310	20	QM-05
Surrogate: 1-Chlorooctane	*123*		*"*	*106*		*116*	*70-130*			
Surrogate: o-Terphenyl	*62.4*		*"*	*53.2*		*117*	*70-130*			

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

Project: XTO EMSU 410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

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 P7K1004 - General Preparation (GC)										
Blank (P7K1004-BLK1)				Prepared & Analyzed: 11/10/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*115*		*"*	*100*		*115*	*70-130*			
Surrogate: o-Terphenyl	*62.4*		*"*	*50.0*		*125*	*70-130*			
LCS (P7K1004-BS1)				Prepared & Analyzed: 11/10/17						
C6-C12	1080	25.0	mg/kg wet	1000		108	75-125			
>C12-C28	1050	25.0	"	1000		105	75-125			
Surrogate: 1-Chlorooctane	*133*		*"*	*100*		*133*	*70-130*			*S-GC*
Surrogate: o-Terphenyl	*58.3*		*"*	*50.0*		*117*	*70-130*			
LCS Dup (P7K1004-BSD1)				Prepared: 11/10/17 Analyzed: 11/13/17						
C6-C12	1150	25.0	mg/kg wet	1000		115	75-125	6.37	20	
>C12-C28	1150	25.0	"	1000		115	75-125	9.32	20	
Surrogate: 1-Chlorooctane	*123*		*"*	*100*		*123*	*70-130*			
Surrogate: o-Terphenyl	*62.4*		*"*	*50.0*		*125*	*70-130*			
Calibration Blank (P7K1004-CCB1)				Prepared & Analyzed: 11/10/17						
C6-C12	12.9		mg/kg wet							
>C12-C28	11.8		"							
Surrogate: 1-Chlorooctane	*111*		*"*	*100*		*111*	*70-130*			
Surrogate: o-Terphenyl	*59.2*		*"*	*50.0*		*118*	*70-130*			
Calibration Blank (P7K1004-CCB2)				Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	16.4		mg/kg wet							
>C12-C28	8.34		"							
Surrogate: 1-Chlorooctane	*115*		*"*	*100*		*115*	*70-130*			
Surrogate: o-Terphenyl	*62.1*		*"*	*50.0*		*124*	*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 P7K1004 - General Preparation (GC)										
Calibration Check (P7K1004-CCV1)				Prepared & Analyzed: 11/10/17						
C6-C12	534	25.0	mg/kg wet	500		107	85-115			
>C12-C28	505	25.0	"	500		101	85-115			
Surrogate: 1-Chlorooctane	*118*		*"*	*100*		*118*	*70-130*			
Surrogate: o-Terphenyl	*57.5*		*"*	*50.0*		*115*	*70-130*			
Calibration Check (P7K1004-CCV2)				Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	560	25.0	mg/kg wet	500		112	85-115			
>C12-C28	535	25.0	"	500		107	85-115			
Surrogate: 1-Chlorooctane	*115*		*"*	*100*		*115*	*70-130*			
Surrogate: o-Terphenyl	*61.1*		*"*	*50.0*		*122*	*70-130*			
Matrix Spike (P7K1004-MS1)		**Source: 7K10006-03**		Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	1140	25.8	mg/kg dry	1030	13.7	110	75-125			
>C12-C28	1090	25.8	"	1030	12.3	104	75-125			
Surrogate: 1-Chlorooctane	*125*		*"*	*103*		*121*	*70-130*			
Surrogate: o-Terphenyl	*60.8*		*"*	*51.5*		*118*	*70-130*			
Matrix Spike Dup (P7K1004-MSD1)		**Source: 7K10006-03**		Prepared: 11/10/17 Analyzed: 11/11/17						
C6-C12	1160	25.8	mg/kg dry	1030	13.7	111	75-125	1.34	20	
>C12-C28	1100	25.8	"	1030	12.3	106	75-125	1.05	20	
Surrogate: 1-Chlorooctane	*124*		*"*	*103*		*120*	*70-130*			
Surrogate: o-Terphenyl	*61.4*		*"*	*51.5*		*119*	*70-130*			
Batch P7K1715 - General Preparation (GC)										
Blank (P7K1715-BLK1)				Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*125*		*"*	*100*		*125*	*70-130*			
Surrogate: o-Terphenyl	*70.2*		*"*	*50.0*		*140*	*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 P7K1715 - General Preparation (GC)										
LCS (P7K1715-BS1)				Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	1130	25.0	mg/kg wet	1000		113	75-125			
>C12-C28	1150	25.0	"	1000		115	75-125			
Surrogate: 1-Chlorooctane	*114*		*"*	*100*		*114*	*70-130*			
Surrogate: o-Terphenyl	*62.1*		*"*	*50.0*		*124*	*70-130*			
LCS Dup (P7K1715-BSD1)				Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	1130	25.0	mg/kg wet	1000		113	75-125	0.393	20	
>C12-C28	1190	25.0	"	1000		119	75-125	3.77	20	
Surrogate: 1-Chlorooctane	*126*		*"*	*100*		*126*	*70-130*			
Surrogate: o-Terphenyl	*62.4*		*"*	*50.0*		*125*	*70-130*			
Calibration Check (P7K1715-CCV2)				Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	578	25.0	mg/kg wet	500		116	85-115			
>C12-C28	566	25.0	"	500		113	85-115			
Surrogate: 1-Chlorooctane	*119*		*"*	*100*		*119*	*70-130*			
Surrogate: o-Terphenyl	*60.9*		*"*	*50.0*		*122*	*70-130*			
Matrix Spike (P7K1715-MS1)		**Source: 7K16005-01**		Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	1160	27.8	mg/kg dry	1110	13.1	103	75-125			
>C12-C28	1270	27.8	"	1110	351	82.6	75-125			
Surrogate: 1-Chlorooctane	*139*		*"*	*111*		*125*	*70-130*			
Surrogate: o-Terphenyl	*71.9*		*"*	*55.6*		*129*	*70-130*			
Matrix Spike Dup (P7K1715-MSD1)		**Source: 7K16005-01**		Prepared: 11/17/17 Analyzed: 11/21/17						
C6-C12	1160	27.8	mg/kg dry	1110	13.1	103	75-125	0.378	20	
>C12-C28	1230	27.8	"	1110	351	78.7	75-125	4.81	20	
Surrogate: 1-Chlorooctane	*130*		*"*	*111*		*117*	*70-130*			
Surrogate: o-Terphenyl	*64.1*		*"*	*55.6*		*115*	*70-130*			

Notes and Definitions

S-GC1	Surrogate recovery outside of control limits. A second analysis confirmed the original results..
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.
R3	The RPD exceeded the acceptance limit due to sample matrix effects.
R2	The RPD exceeded the acceptance limit.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
O-04	This sample was analyzed outside the EPA recommended holding time.
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: 12/29/2017

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTOD

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

Data Reported to:

DATE: Nov. 6 2017 PAGE 1 OF 6
PO #: _____ LAB WORK ORDER #: 17K0600 9
PROJECT LOCATION OR NAME: XTO EMSU 410
LAI PROJECT #: 17-0182-01 COLLECTOR: SJ/ZB

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST/NM

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 ☒ ☒ 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 ☐ | M300

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	BTEX	MTBE	TRPH 418.1	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	M300	FIELD NOTES
S-1 0-1	1	10/27	11:05	S	1				✓		✓		✓	✓															✓		
1-2	2		11:11																											
2-3	3		11:15																											
3-4	4		11:19																											
4-6	5		11:23																											
S-2 0-1	6		12:01								✓		✓	✓																
1-2	7		12:07																											
2-3	8		12:12																											
3-4	9		12:20																											
4-6	10		12:28																											
6-8	11		12:36																											
8-10	12		12:42																											
S-3 0-1	13		13:08							✓		✓	✓																	
1-2	14		13:13																											
2-3	15		13:16																											
TOTAL																														

RELINQUISHED BY: (Signature) DATE/TIME 11/6/17 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) 11617 908

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

LABORATORY USE ONLY:
RECEIVING TEMP: 7.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PBEL

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: Nov 6 2017 PAGE 2 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: 17-0162-01
LAI PROJECT #: XTO EMSU 410 COLLECTOR: SJ/TB

TRRP report? ☐ Yes ☒ No
TIME ZONE: Time zone/State: MST/NM

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 ☒ 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 ☐	M 300	FIELD NOTES
S-3 3-4	16	10/27	13:22	S	1				✓																			✓	
4-6	17		13:27																										
HA-1 3-4	18		13:38																										
4-5	19		13:50																										
S-4 0-1	20	10/30	12:05								✓		✓	✓															
1-2	21		12:07																										
2-3	22		12:11																										
3-4	23		12:13																										
4-6	24		12:16																										
S-5 0-1	25		12:43								✓		✓	✓															
1-2	26		12:45																										
2-3	27		12:49																										
3-4	28		12:53																										
4-6	29		13:01																										
S-6 0-1'	30		13:28						✓		✓		✓	✓															
TOTAL																													

RELINQUISHED BY:(Signature) Sandra Ho DATE/TIME 11/10/17 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 11-6-17 911

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

LABORATORY USE ONLY:
RECEIVING TEMP: 2.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PBEI

Orion

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: Nov 6 2017 PAGE 3 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: KD EMSU 410
LAI PROJECT #: 17-0182-01 COLLECTOR: SJ TB

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST/NM

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 ☒ ☒ 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 ☐ | CHLORIDES ☒ ANIONS ☐ ALKALINITY ☐ | M30

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	BTEX	TRPH	GASOLINE	DIESEL	VOC	SVOC	8081	8082	TCLP-METALS	TCLP-PEST	TOTAL METALS	LEAD-TOTAL	RCI	TDS	pH	EXPLOSIVES	CHLORIDES	FIELD NOTES
S-6 1-2	31	10/30	13:30	S	1				✓																		✓	
2-3	32		13:35																									
3-4	33		13:39																									
4-6	34		13:44																									
6-8	35		13:50																									
S-7 0-1	36		14:39								✓		✓	✓														
1-2	37		14:41																									
2-3	38		14:45																									
3-4	39		14:48																									
4-6	40		14:51																									
S-8 0-1	41	11/1	10:49								✓		✓	✓														
1-2	42		10:53																									
2-3	43		10:55																									
3-4	44		10:59																									
4-6	45		11:02																									
TOTAL																												

RELINQUISHED BY:(Signature) DATE/TIME 11/6/17 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 11-6-17 911

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

LABORATORY USE ONLY:
RECEIVING TEMP: 7.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PRE

Amza

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: Nov 6 2017 PAGE 4 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: XTO EMSU 410
LAI PROJECT #: 17-0182-17 COLLECTOR: SJ/TB

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST/NM

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 ☒ GRO | 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 ☐ | M300

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	BTEX	TRPH	GASOLINE	DIESEL	VOC	SVOC	8081	8082	TCLP-METALS	TCLP-PEST	TOTAL METALS	LEAD-TOTAL	RCI	TDS	pH	EXPLOSIVES	CHLORIDE	M300	FIELD NOTES
S-9 0-1	46	11/1	11:12	S	1				✓		✓		✓	✓													✓		
1-2	47		11:15																										
2-3	48		11:19																										
3-4	49		11:23																										
4-7	50		11:30																										
S-10 0-1	51		11:37								✓		✓	✓															
1-2	52		11:46																										
2-3	53		11:50																										
3-4	54		11:53																										
4-6	55		11:59																										
S-11 0-1	56		12:04								✓		✓	✓															
1-2	57		12:08																										
2-3	58		12:11																										
3-4	59		12:16																										
4-6	60		12:21						✓																				
TOTAL																													

RELINQUISHED BY:(Signature) DATE/TIME 11/6/2017 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) Helen 911

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

LABORATORY USE ONLY:
RECEIVING TEMP: 7.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PREL

frozen

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: Nov 6 2017 PAGE 5 OF 6

PO #: _____ LAB WORK ORDER #: _____

PROJECT LOCATION OR NAME: XTO EMSU 410

LAI PROJECT #: 17-0182-17 COLLECTOR: SWB

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST/NM

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 ● C6-C	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 ☐	M3D	FIELD NOTES
S-11 6-8	61	11/1	12:25	S	1				✓																				
S-12 0-1	62	11/2	10:08								✓		✓	✓															
1-2	63		10:12																										
2-3	64		10:15																										
3-4	65		10:18																										
4-6	66		10:22																										
6-8	67		10:27																										
S-13 0-1	68		10:50								✓		✓	✓															
1-2	69		10:53																										
2-3	70		10:57																										
3-4	71		11:00																										
4-6	72		11:04																										
6-8	73		11:09																										
S-14 0-1	74		11:15								✓		✓	✓															
1-2	75		11:17																										
TOTAL																													

RELINQUISHED BY:(Signature) Sandra Rios DATE/TIME 11/6/17 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 11-6-17 911

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

LABORATORY USE ONLY:
RECEIVING TEMP: 7.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PBEL

Frozen

CHAIN-OF-CUSTODY

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

Data Reported to:

DATE: Nov 0 2017 PAGE 6 OF 6

PO #: _____ LAB WORK ORDER #: _____

PROJECT LOCATION OR NAME: XTO EMSU 410

LAI PROJECT #: 17-0182-01 COLLECTOR: SJ/ZB

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MST/NM

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 ☒ OFC ☒	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 ☐ M300	FIELD NOTES
S-14 2-3	76	11/2	11:19	S	1				✓																		✓	
3-4	77	"	11:21	"	1				✓																		✓	
4-6	78	"	11:30	"	1				✓																		✓	
TOTAL																												

RELINQUISHED BY:(Signature) Sarah Allen DATE/TIME 11/6/17 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature) 11-6-17 911

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

LABORATORY USE ONLY:
RECEIVING TEMP: 7.6 THERM #: _____
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # _____
☒ HAND DELIVERED

PBEL

Pinzon

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 #410

Project Number: 17-0182-01

Location:

Lab Order Number: 8C29004

NELAP/TCEQ # T104704516-17-8

Report Date: 04/05/18

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

Project: EMSU Well #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-1 (10FT)	8C29004-01	Soil	03/27/18 10:05	03-29-2018 10:40
S-1 (15FT)	8C29004-02	Soil	03/27/18 10:08	03-29-2018 10:40
S-1 (20FT)	8C29004-03	Soil	03/27/18 10:10	03-29-2018 10:40
S-1 (25FT)	8C29004-04	Soil	03/27/18 10:19	03-29-2018 10:40
S-1 (30FT)	8C29004-05	Soil	03/27/18 10:23	03-29-2018 10:40
S-2 (15FT)	8C29004-06	Soil	03/27/18 10:48	03-29-2018 10:40
S-2 (20FT)	8C29004-07	Soil	03/27/18 10:51	03-29-2018 10:40
S-2 (25FT)	8C29004-08	Soil	03/27/18 10:55	03-29-2018 10:40
S-3 (10FT)	8C29004-09	Soil	03/27/18 12:35	03-29-2018 10:40
S-3 (15FT)	8C29004-10	Soil	03/27/18 12:37	03-29-2018 10:40
S-3 (20FT)	8C29004-11	Soil	03/27/18 12:38	03-29-2018 10:40
S-4 (10FT)	8C29004-12	Soil	03/27/18 12:06	03-29-2018 10:40
S-4 (15FT)	8C29004-13	Soil	03/27/18 12:10	03-29-2018 10:40
S-4 (20FT)	8C29004-14	Soil	03/27/18 12:15	03-29-2018 10:40
S-4 (25FT)	8C29004-15	Soil	03/27/18 12:19	03-29-2018 10:40
S-12 (10FT)	8C29004-16	Soil	03/28/18 09:22	03-29-2018 10:40
S-12 (15FT)	8C29004-17	Soil	03/28/18 09:25	03-29-2018 10:40
S-12 (20FT)	8C29004-18	Soil	03/28/18 09:29	03-29-2018 10:40
S-11 (10FT)	8C29004-19	Soil	03/28/18 09:52	03-29-2018 10:40
S-11 (15FT)	8C29004-20	Soil	03/28/18 09:56	03-29-2018 10:40
S-11 (20FT)	8C29004-21	Soil	03/28/18 09:59	03-29-2018 10:40
S-13 (10FT)	8C29004-22	Soil	03/28/18 10:27	03-29-2018 10:40
S-13 (15FT)	8C29004-23	Soil	03/28/18 10:31	03-29-2018 10:40
S-13 (20FT)	8C29004-24	Soil	03/28/18 10:34	03-29-2018 10:40
HA-1 (10FT)	8C29004-25	Soil	03/28/18 11:01	03-29-2018 10:40
HA-1 (15FT)	8C29004-26	Soil	03/28/18 11:19	03-29-2018 10:40
HA-1 (20FT)	8C29004-27	Soil	03/28/18 11:22	03-29-2018 10:40
HA-1 (25FT)	8C29004-28	Soil	03/28/18 11:32	03-29-2018 10:40
HA-1 (30FT)	8C29004-29	Soil	03/28/18 11:40	03-29-2018 10:40
HA-1 (35FT)	8C29004-30	Soil	03/28/18 11:43	03-29-2018 10:40
HA-1 (40FT)	8C29004-31	Soil	03/28/18 11:47	03-29-2018 10:40
S-9 (10FT)	8C29004-32	Soil	03/28/18 12:46	03-29-2018 10:40
S-9 (15FT)	8C29004-33	Soil	03/28/18 12:49	03-29-2018 10:40
S-9 (20FT)	8C29004-34	Soil	03/28/18 12:54	03-29-2018 10:40

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

Project: EMSU Well #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

S-1 (10FT)

8C29004-01 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1780**	5.68	mg/kg dry	5	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 (15FT)

8C29004-02 (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	**1250**	5.62	mg/kg dry	5	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 (20FT)

8C29004-03 (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	**769**	1.15	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**13.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 (25FT)

8C29004-04 (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	**367**	1.08	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1 (30FT)

8C29004-05 (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	**50.2**	1.04	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2 (15FT)

8C29004-06 (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	**431**	1.12	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2 (20FT)

8C29004-07 (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	**72.2**	1.06	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2 (25FT)

8C29004-08 (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	**341**	1.09	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-3 (10FT)

8C29004-09 (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	**332**	1.06	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-3 (15FT)

8C29004-10 (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	**55.0**	1.06	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-3 (20FT)

8C29004-11 (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	**35.5**	1.05	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4 (10FT)

8C29004-12 (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	**187**	1.11	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4 (15FT)

8C29004-13 (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	**269**	1.09	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4 (20FT)

8C29004-14 (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	**712**	1.06	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4 (25FT)

8C29004-15 (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	**108**	1.05	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-12 (10FT)

8C29004-16 (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	**707**	1.12	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-12 (15FT)

8C29004-17 (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	**489**	1.18	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**15.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-12 (20FT)

8C29004-18 (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	**396**	1.14	mg/kg dry	1	P8D0208	04/02/18	04/04/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (10FT)

8C29004-19 (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	**735**	1.14	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (15FT)

8C29004-20 (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	**619**	1.10	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (20FT)

8C29004-21 (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	**188**	1.10	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-13 (10FT)

8C29004-22 (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	**567**	1.14	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-13 (15FT)

8C29004-23 (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	**281**	1.11	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-13 (20FT)

8C29004-24 (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	**89.6**	1.09	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (10FT)

8C29004-25 (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	**1210**	5.95	mg/kg dry	5	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**16.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (15FT)

8C29004-26 (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	**975**	5.68	mg/kg dry	5	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (20FT)

8C29004-27 (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	**583**	1.09	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (25FT)

8C29004-28 (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	**1080**	5.62	mg/kg dry	5	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (30FT)

8C29004-29 (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	**706**	1.09	mg/kg dry	1	P8D0209	04/02/18	04/03/18	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (35FT)

8C29004-30 (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	**243**	1.06	mg/kg dry	1	P8D0407	04/04/18	04/05/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

HA-1 (40FT)

8C29004-31 (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	**186**	1.06	mg/kg dry	1	P8D0407	04/04/18	04/05/18	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-9 (10FT)

8C29004-32 (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	**333**	1.08	mg/kg dry	1	P8D0407	04/04/18	04/05/18	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-9 (15FT)

8C29004-33 (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	**41.9**	1.08	mg/kg dry	1	P8D0407	04/04/18	04/05/18	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-9 (20FT)

8C29004-34 (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	**39.6**	1.05	mg/kg dry	1	P8D0407	04/04/18	04/05/18	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P8C2906	03/29/18	03/29/18	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 P8C2906 - * DEFAULT PREP *** **										
Blank (P8C2906-BLK1)				Prepared & Analyzed: 03/29/18						
% Moisture	ND	0.1	%							
Duplicate (P8C2906-DUP1)		**Source: 8C28007-12**		Prepared & Analyzed: 03/29/18						
% Moisture	5.0	0.1	%		5.0			0.00	20	
Duplicate (P8C2906-DUP2)		**Source: 8C28010-01**		Prepared & Analyzed: 03/29/18						
% Moisture	5.0	0.1	%		5.0			0.00	20	
Duplicate (P8C2906-DUP3)		**Source: 8C29004-16**		Prepared & Analyzed: 03/29/18						
% Moisture	11.0	0.1	%		11.0			0.00	20	
Batch P8D0208 - * DEFAULT PREP *** **										
Blank (P8D0208-BLK1)				Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8D0208-BS1)				Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	395	1.00	mg/kg wet	400		98.8	80-120			
LCS Dup (P8D0208-BSD1)				Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	394	1.00	mg/kg wet	400		98.5	80-120	0.324	20	
Duplicate (P8D0208-DUP1)		**Source: 8C28012-01**		Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	1030	5.21	mg/kg dry		1010			1.90	20	
Duplicate (P8D0208-DUP2)		**Source: 8C29004-09**		Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	330	1.06	mg/kg dry		332			0.698	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 P8D0208 - * DEFAULT PREP *** **										
Matrix Spike (P8D0208-MS1)	**Source: 8C28012-01**			Prepared: 04/02/18 Analyzed: 04/04/18						
Chloride	2040	5.21	mg/kg dry	1040	1010	98.7	80-120			
Batch P8D0209 - * DEFAULT PREP *** **										
Blank (P8D0209-BLK1)				Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	ND	1.00	mg/kg wet							
LCS (P8D0209-BS1)				Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	390	1.00	mg/kg wet	400		97.5	80-120			
LCS Dup (P8D0209-BSD1)				Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	391	1.00	mg/kg wet	400		97.7	80-120	0.172	20	
Duplicate (P8D0209-DUP1)	**Source: 8D02013-01**			Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	4650	29.1	mg/kg dry		4630			0.551	20	
Duplicate (P8D0209-DUP2)	**Source: 8C29004-20**			Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	616	1.10	mg/kg dry		619			0.423	20	
Matrix Spike (P8D0209-MS1)	**Source: 8D02013-01**			Prepared: 04/02/18 Analyzed: 04/03/18						
Chloride	6720	29.1	mg/kg dry	2330	4630	90.0	80-120			
Batch P8D0407 - * DEFAULT PREP *** **										
Blank (P8D0407-BLK1)				Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	ND	1.00	mg/kg wet							

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 P8D0407 - * DEFAULT PREP *** **										
LCS (P8D0407-BS1)				Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	410	1.00	mg/kg wet	400		103	80-120			
LCS Dup (P8D0407-BSD1)				Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	414	1.00	mg/kg wet	400		103	80-120	0.808	20	
Duplicate (P8D0407-DUP1)		**Source: 8C20010-04**		Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	29.8	1.08	mg/kg dry		18.4			47.5	20	
Duplicate (P8D0407-DUP2)		**Source: 8D02011-01**		Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	1310	5.26	mg/kg dry		1300			0.388	20	
Matrix Spike (P8D0407-MS1)		**Source: 8C20010-04**		Prepared: 04/04/18 Analyzed: 04/05/18						
Chloride	1010	1.08	mg/kg dry	1080	18.4	92.3	80-120			

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

Project: EMSU Well #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

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: 4/5/2018

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: 3-29-18 PAGE 1 OF 1

PO #: _____ LAB WORK ORDER #: 8C29004

PROJECT LOCATION OR NAME: EMSU Well 410

LAI PROJECT #: 17-0182-01 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: M300	FIELD NOTES
S-1 (10ft)		3-27-18	10:05	S	1				X		X	
(15ft)			10:08									
(20ft)			10:10									
(25ft)			10:19									
(30ft)			10:23									
S-2 (15ft)			10:48									
(20ft)			10:51									
(25ft)			10:55									
S-3 (10ft)			12:35									
(15ft)			12:37									
(20ft)			12:38									
S-4 (10ft)			12:06									
(15ft)			12:10									
(20ft)			12:15									
(25ft)			12:19									
TOTAL												

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 ☐ 8082 PCBS ☐ 8151 HERBICIDES ☐ 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 ☐

RELINQUISHED BY:(Signature) Ashton Thielke DATE/TIME 3-29-18 RECEIVED BY: (Signature)

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

RELINQUISHED BY:(Signature) DATE/TIME 3/29/18 1040 RECEIVED BY: (Signature)

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

LABORATORY USE ONLY:
RECEIVING TEMP: -9.0+04 THERM #: -9.4
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: 3-29-18 PAGE 2 OF

PO #: _____ LAB WORK ORDER #: 18C29006

PROJECT LOCATION OR NAME: EMSU well 410

LAI PROJECT #: 17-0182-01 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
S-12 (10ft)		3-28-18	9:27	S	1				X			
(15ft)			9:25									
(20ft)			9:29									
S-11 (10ft)			9:52									
(15ft)			9:56									
(20ft)			9:59									
S-13 (10ft)			10:27									
(15ft)			10:30									
(20ft)			10:34									
HA-1 (10ft)			11:01									
(15ft)			11:19									
(20ft)			11:22									
(25ft)			11:32									
(30ft)			11:40									
(35ft)			11:43									
TOTAL												

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 ☐

RELINQUISHED BY:(Signature) Ashton DATE/TIME 3-29-18 RECEIVED BY: (Signature)

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

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

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

LABORATORY USE ONLY:
RECEIVING TEMP: _____ 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: 3-29-18 PAGE 3 OF

PO #: LAB WORK ORDER #: 8C29074

PROJECT LOCATION OR NAME: EMSU well 410

LAI PROJECT #: 17-0182-01 COLLECTOR: Ashton

TRRP report? ☐ Yes ☒ No

TIME ZONE: Time zone/State: MSE

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

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☐ MTBE ☐	TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☐	DIESEL - MOD 8015 ☐	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 ☐	M300	FIELD NOTES
MW-1 (40ft)		3-28-18	11:47	S	1				X																	X			
S-9 (10ft)		"	12:46	"	"				"																	"			
(15ft)		"	12:49	"	"				"																	"			
(20ft)		"	12:54	"	"				"																	"			
TOTAL																													

RELINQUISHED BY:(Signature) DATE/TIME 3-29-18 RECEIVED BY: (Signature)

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

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

TURN AROUND TIME

NORMAL ☒
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:

RECEIVING TEMP: _____ THERM #: _____

CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED

☐ CARRIER BILL # _____

☐ HAND DELIVERED

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

PBELAB

Analytical Report

Prepared for:

Mark Larson

Larson & Associates, Inc.

P.O. Box 50685

Midland, TX 79710

Project: EMSU Well #410

Project Number: 17-0182-01

Location: None Given

Lab Order Number: 8D26010

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 #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-4 (30FT)	8D26010-01	Soil	04/26/18 11:50	04-26-2018 17:04
S-4 (35 FT)	8D26010-02	Soil	04/26/18 11:51	04-26-2018 17:04
S-11 (25 FT)	8D26010-03	Soil	04/26/18 12:15	04-26-2018 17:04
S-11 (30 FT)	8D26010-04	Soil	04/26/18 12:18	04-26-2018 17:04
S-11 (35 FT)	8D26010-05	Soil	04/26/18 12:20	04-26-2018 17:04

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

Project: EMSU Well #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

S-4 (30FT)

8D26010-01 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**106**	1.04	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4 (35 FT)

8D26010-02 (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	**38.7**	1.12	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P8D3001	04/30/18	04/30/18	ASTM D2216	

Larson & Associates, Inc.	Project: EMSU Well #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (25 FT)

8D26010-03 (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	**37.3**	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 #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (30 FT)

8D26010-04 (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	**13.5**	1.06	mg/kg dry	1	P8E0208	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 #410	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0182-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-11 (35 FT)

8D26010-05 (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	**7.82**	1.06	mg/kg dry	1	P8E0208	05/02/18	05/03/18	EPA 300.0	
% Moisture	**6.0**	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 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	

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

Project: EMSU Well #410
Project Number: 17-0182-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P8E0208 - * DEFAULT PREP *** **										
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 #410
Project Number: 17-0182-01
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

PBEL

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 #: 8D2601

PROJECT LOCATION OR NAME: EMSU 410

LAI PROJECT #: 17-0182-07 COLLECTOR:

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 ☐ | CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐ | M300

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	HCl	HNO_3	H_2SO_4 NaOH	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
S-4 (30 ft)		4-26-18	11:50	S	1				X		M300	
(35 ft)			11:51									
S-11 (25 ft)			12:15									
(30 ft)			12:18									
(35 ft)			12:20									
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 1644 RECEIVED BY: (Signature)

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

LABORATORY USE ONLY:
RECEIVING TEMP: 2.1.0.4 THERM #: 25L1
CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☐ NOT USED
☐ CARRIER BILL #
☐ HAND DELIVERED

Appendix D

Boring Logs

BORING RECORD

Start: 10:54
Finish: 11:47

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, 2.5YR, 5/8, Red, Fine Grain Quartz Sand, Well Sorted, Dry	SW						1	10:55
	5								5	10:56
	6	Caliche	Caliche							
	7	Sandy Clay, 2.5YR, 5/8, Red, Very Fine Grained Quartz Sand, Low Plasticity, Dry	CL						10	11:01
	10									
	15								15	11:19
	18	Sand 7.5YR, 7/6, Yellowish Red, Fine Grained Quartz Sand	SW							
	20								20	11:22
	21	Caliche, 7.5YR, 8/4, Pink, Fine Grained Quartz Sand, Well Cemented	Caliche							
	25								25	11:32
	30								30	11:40
	35								35	11:43
	40	TD= 40'							40	11:47

PID READING scale: 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

JOB NUMBER : XTO Energy / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc.
Environmental Consultants

DRILL DATE : 3-28-2018

BORING NUMBER : HA-1

BORING RECORD

Start: 9:56 MST
Finish: 10:23

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
	0	Sand, 7.5YR, 4/6, Strong Brown, Fine Grained Quartz Sand, (Contained Caliche on Surface)	SW						0	9:58
	5								5	9:59
	8	Caliche, 7.5YR, 8/4, Pink, Well Cemented, Fine Grained Quartz Sand							10	10:05
	15		Caliche						15	10:08
	20								20	10:10
	25	7.5YR 8/3, Pink Very Fine Grained Quartz Sand							25	10:19
	30	TD: 30'							30	10:23
	35									

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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-27-2018

BORING NUMBER : S-1

BORING RECORD

Start: 10:34
Finish: 10:55

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, 2.5YR 5/6, Red, Fine Grained Quartz Sand, Well Sorted	SW						0	10:35
	5								5	10:36
	9									
	10	Caliche, 7.5YR, 7/6, Reddish Yellow, Fine Grained Quartz Sand, Well Sorted, Well Cemented	Caliche						10	10:43
	15								15	10:48
	20								20	10:51
	23									
	25	Sand, 7.5YR, 6/8, Reddish Yellow, Caliche Modules, Fine Grained Quartz Sand, Well Sorted	SW						25	10:55
		TD: 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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-27-2018

BORING NUMBER : S-2

BORING RECORD

Start: 12:30
Finish: 12:38

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, 2.5YR, 4/6, Red Fine Grained Quartz Sand, Loomy, Well Sorted	SW						0	12:31
	5								5	12:32
	6	Caliche, 7.5YR, 8/6, Reddish Yellow, Fine Grained Quartz Sand, Well Sorted, Well Cemented	Caliche							
	10								10	12:35
	15								15	12:37
	20	TD: 20'							20	12:38
	25									
	30									
	35									

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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-27-2018

BORING NUMBER : S-3

BORING RECORD

Start: 12:02 MST

Finish: 12:19

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, 2.5YR, 4/6, Red, Well Sorted and Well Cemented, Fine Grained Quartz Sand, Dry	SW						0	12:02
	5								5	12:03
	7	Caliche, 7.5YR, 7/6, Reddish Yellow, Fine Grained Quartz Sand, Well Sorted, Well Cemented	Caliche							
	10								10	12:06
	15								15	12:10
	20								20	12:15
	25	TD: 25'							25	12:19
	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

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-27-2018

BORING NUMBER : S-4

JOB NUMBER : XTO Energy / 17-0182-01

HOLE DIAMETER : 7.25"

LOCATION : EMSU Well #410

LAI GEOLOGIST : A. Thielke

DRILLING CONTRACTOR : SDC

DRILLING METHOD : Air Rotary

BORING RECORD

Start: 12:38
Finish: 12:54

DESCRIPTION LITHOLOGIC

GEOLOGIC UNIT	DEPTH	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							0	12:39
	Sand, 2.5YR, 6/8, Light- Red Fine Grain Quartz Sand, Well Sorted	SW							
	5							5	12:40
	7								
	Caliche, 7.5YR, 6/8, Reddish Yellow, Well Cemented, Fine Grained Quartz Sand	Caliche						10	12:46
	10								
	15							15	12:49
	20								12:54
	TD= 20'							20	
	25								
	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

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-28-2018

BORING NUMBER : S-9

JOB NUMBER : XTO Energy / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

BORING RECORD

Start: 9:13 MST

Finish: 9:29

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, 4/6, Strong Brown to Red, Fine Grained Quartz Sand, 2.5YR 5/8, Well Cemented	SW						0	9:46
	5								5	9:47
	6	Caliche, 7.5YR, 8/6, Reddish Yellow, Well Cemented, Fine Grained Quartz Sand	Caliche						10	9:52
	15								15	9:56
	20	TD= 20'							20	9:59
	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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-28-2018

BORING NUMBER : S-11

BORING RECORD

Start: 9:13 MST
Finish: 9:29

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, 2.5YR, 5/8, Red, Fine Grained Quartz Sand, Well Sorted	SW						0	9:14
	5								5	9:15
	7	Caliche, 7.5YR, 8/4, Pink Fine Grained Quartz Sand, Well Sorted, Well Cemented,	Caliche							
	10								10	9:22
	15								15	9:25
	20	TD= 20'							20	9:29
	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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-28-2018

BORING NUMBER : S-12

BORING RECORD

Start: 10:18
Finish: 10:34

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, 2.5YR, 5/8, Red, Fine Grained Quartz Sand, Well Sorted	SW						0	10:18
	5								5	10:20
	7	Caliche, 7.5YR, 7/6, Reddish Yellow, Fine Grained Quartz Sand, Well Cemented and Well Sorted	Caliche						10	10:27
	15								15	10:31
	20	TD= 20'							20	10:34
	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 / 17-0182-01
HOLE DIAMETER : 7.25"
LOCATION : EMSU Well #410
LAI GEOLOGIST : A. Thielke
DRILLING CONTRACTOR : SDC
DRILLING METHOD : Air Rotary

Larson & Associates, Inc. Environmental Consultants

DRILL DATE : 3-28-2018

BORING NUMBER : S-13

Appendix E

Photographs

Leak Site Viewing East

Abandoned Well Site Viewing South from Leak

Abandoned Well Site Viewing Southeast from Leak

Leak Site Viewing North

Pipeline Header Viewing North