

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 Department

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

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	NAB1927332462
District RP	2RP-5634
Facility ID	
Application ID	pAB1927332000

Release Notification SYEB0-190905-C-1410

Responsible Party

Responsible Party XTO Energy	OGRID 5380
Contact Name Kyle Littrell	Contact Telephone 432-221-7331
Contact email Kyle_Littrell@xtoenergy.com	Incident # (assigned by OCD) NAB1927332462
Contact mailing address 522 W. Mermod, Carlsbad, NM 88220	

Location of Release Source

Latitude 32.271080° Longitude -103.931242°
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Remuda Frac Recycle Pond Facility	Site Type Frac Water Recycling Facility
Date Release Discovered 8/21/2019	API# (if applicable) N/A 30-015-30794 (Remuda Basin St 10 nearby well)

Unit Letter	Section	Township	Range	County
P	25	23S	29E	Eddy

Surface Owner: ☒ State ☐ Federal ☐ Tribal ☐ Private (Name: New Mexico)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☒ Produced Water	Volume Released (bbls) 354.67	Volume Recovered (bbls) 0
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	☐ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

The automated water transfer system experienced a level transmitter failure and caused an overflow of fluids at the frac pond. The anomalous failure did not allow the automated safeguards to prevent the overflow in this case. The pumps were manually stopped. Fluids were released to the facility pad and pasture to the south of the facility. The transmitter failure is being addressed and further safeguards installed. Additional third party resources have been retained to assist with remediation.

Form C-141

State of New Mexico
Oil Conservation Division

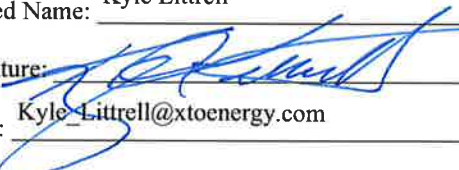
Page 2

Incident ID	NAB1927332462
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Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? An unauthorized release of a volume of 25 barrels or more
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Notice provided by Amy Ruth to Mike Bratcher, Rob Hamlet, Victoria Venegas (NMOCD), and Ryan Mann (SLO) on 8/22/2019 by email	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped. ☒ The impacted area has been secured to protect human health and the environment. ☐ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. ☐ All free liquids and recoverable materials have been removed and managed appropriately.	
If all the actions described above have <u>not</u> been undertaken, explain why: No secondary containment. No free liquids remained to be removed and managed.	
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.	
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.	
Printed Name: <u>Kyle Littrell</u>	Title: <u>SH&E Supervisor</u>
Signature: 	Date: <u>9/5/2019</u>
email: <u>Kyle_Littrell@xtocenergy.com</u>	Telephone: <u>432-221-7331</u>
<u>OCD Only</u> Received by: <u>Amalia Bustamante</u> Date: <u>9/30/2019</u>	

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Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>50 -100</u> (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas not on an exploration, development, production, or storage site?	☒ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: *Each of the following items must be included in the report.*

- ☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☒ Field data
- ☒ Data table of soil contaminant concentration data
- ☒ Depth to water determination
- ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☒ Boring or excavation logs
- ☒ Photographs including date and GIS information
- ☒ Topographic/Aerial maps
- ☒ Laboratory data including chain of custody

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If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: _____ Kyle Littrell _____ Title: _____ SH&E Coordinator _____

Signature: _____  _____ Date: 03/19/2020 _____

email: _____ Kyle_Littrell@xtoenergy.com _____ Telephone: _____ (432)-221-7331 _____

OCD Only

Received by: _____ Date: _____

Incident ID	NAB1927332462
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Closure

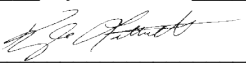
The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- ☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- ☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- ☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- ☒ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Kyle Littrell Title: SH&E Supervisor

Signature:  Date: 03/19/2020

email: Kyle_Littrell@xtoenergy.com Telephone: 432-221-7331

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____



LT Environmental, Inc.

3300 North "A" Street
Building 1, Unit 222
Midland, Texas 79705
432.704.5178

March 19, 2020

Mr. Mike Bratcher
New Mexico Oil Conservation Division
811 South First Street
Artesia, New Mexico 88210

**RE: Closure Request
Remuda Frac Recycle Pond Facility
Remediation Permit Number 2RP-5634
Incident Number NAB1927332462
Eddy County, New Mexico**

Dear Mr. Bratcher:

LT Environmental, Inc. (LTE), on behalf of XTO Energy, Inc. (XTO), presents the following Closure Request detailing site assessment, excavation, and soil sampling activities at the Remuda Frac Recycle Pond Facility (Site) in Unit P, Section 25, Township 23 South, Range 29 East, in Eddy County, New Mexico (Figure 1). The purpose of the site assessment and soil sampling activities was to confirm the presence or absence of soil impacts following a release of produced water at the Site. Based on field observations, field screening, and laboratory analytical results from soil sampling activities, XTO is submitting this Closure Request and requesting no further action (NFA) for the release associated with Remediation Permit (RP) Number 2RP-5634 and Incident Number NAB1927332462.

RELEASE BACKGROUND

On August 21, 2019, a level transmitter failed on an automated water transfer system at the frac pond, resulting in the release of 354.67 barrels (bbls) of produced water onto the facility pad and pasture area to the south of the facility, of which none were recovered. The pumps were manually stopped until repairs could be made. A 48-hour notification was provided to the New Mexico Oil Conservation Division (NMOCD) via email prior to the transmitter inspection and installing further safeguards. XTO reported the release to NMOCD on a Release Notification and Corrective Action Form C-141 (Form C-141) on September 5, 2019 and was subsequently assigned RP Number 2RP-5634 and Incident Number NAB1927332462. Access to disturb soils in the pasture was requested through a Right of Entry Request for Remediation (ROE) submission to the New Mexico State Land Office (NMSLO). Offsite access was approved November 8, 2019.

SITE CHARACTERIZATION

LTE characterized the Site according to Table 1, *Closure Criteria for Soils Impacted by a Release*, of Title 19, Chapter 15, Part 29, Section 12 (19.15.29.12) of the New Mexico Administrative Code



(NMAC). Depth to groundwater at the Site is estimated to be between 51 feet and 100 feet below ground surface (bgs) based on the nearest groundwater well data. The closest permitted groundwater well with depth to groundwater data is United States Geological Survey (USGS) well 321717103561001, located approximately 1.21 miles north of the Site. The groundwater well has an average depth to groundwater of 51.78 feet bgs. Data indicating the total depth of the groundwater well was not available. The closest continuously-flowing water or significant watercourse to the Site is a unnamed dry tributary, located approximately 400 feet southwest of the release extent. The Site is greater than 200 feet from a lakebed, sinkhole, or playa lake and greater than 300 feet from an occupied residence, school, hospital, institution, church, or wetland. The Site is greater than 1,000 feet to a freshwater well or spring and is not within a 100-year floodplain or overlying a subsurface mine. The Site is not located within an area of unstable geology (medium-potential karst designation).

CLOSURE CRITERIA

Based on the results of the site characterization, the following NMOCD Table 1 Closure Criteria (Closure Criteria) apply:

- Benzene: 10 milligrams per kilogram (mg/kg)
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX): 50 mg/kg
- Total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) and TPH-diesel range organics (DRO): 1,000 mg/kg
- TPH: 2,500 mg/kg
- Chloride: 10,000 mg/kg.

Additionally, the reclamation of the affected pasture area must be comprised of non-waste containing earthen material exhibiting chloride concentrations below 600 mg/kg, which was applied per NMAC 19.15.29.13.D (1) to the top 4 feet.

SITE ASSESSMENT AND SOIL SAMPLING ACTIVITIES

On August 22, 2019, LTE evaluated the release extent based on information provided on the Form C-141 and visual observations. The release extent and preliminary soil sample locations were mapped utilizing a handheld Global Positioning System (GPS). LTE personnel collected six preliminary soil samples (SS01 through SS06) from within the release extent. Preliminary soil samples SS01 through SS03 were collected from the southern extent of the facility pad and preliminary soil samples SS04 through SS06 were collected from the southern adjoining pasture. The six preliminary soil samples were collected at a depth of approximately 0.5 foot bgs. Photographic documentation was conducted during the Site visit. A Photographic Log is included in Attachment 1.



Soil from the preliminary soil samples was field screened for volatile aromatic hydrocarbons and chloride utilizing a calibrated photo-ionization detector (PID) and Hach® chloride QuanTab® test strips, respectively. The preliminary soil samples were placed directly into pre-cleaned glass jars, labeled with the location, date, time, sampler name, method of analysis, and immediately placed on ice. The soil samples were transported at or below 4 degrees Celsius (°C) under strict chain-of-custody (COC) procedures to Xenco Laboratories (Xenco) in Carlsbad, New Mexico, for analysis of BTEX following United States Environmental Protection Agency (EPA) Method 8021B; TPH-GRO, TPH-DRO, and TPH-oil range organics (ORO) following EPA Method 8015M/D; and chloride following EPA Method 300.0.

Laboratory analytical results indicated benzene, BTEX, TPH-GRO and TPH-DRO, TPH, and chloride were below the Closure Criteria; however, laboratory analytical results did indicate chloride concentrations in preliminary soil samples SS04 through SS06, collected from the pasture area, were exceeding the pasture reclamation requirement. The highest chloride concentration was reported in preliminary soil sample SS04, at a concentration of 1,220 mg/kg. The locations of the preliminary soil sample are depicted on Figure 2. Laboratory analytical results are summarized in Table 1 and the laboratory analytical report is included in Attachment 2. Based on these findings, prior to requesting NFA for the Site, waste-containing soil would need to be removed.

DELINEATION, EXCAVATION, AND SOIL SAMPLING ACTIVITIES

On November 8, 2019, LTE conducted site delineation activities to demarcate areas of waste containing soil to be excavated following ROE approval. A total of 12 delineation soil samples from six boreholes (BH01 through BH06) were advanced via a stainless-steel hand auger within and adjacent to the release extent (Figure 3). Two delineation soil samples were collected from each borehole at depths of approximately 1 foot and 2 feet bgs. Field screening results and observations for the delineation soil samples were documented on a Lithologic/Soil Sampling Log and are included as Attachment 3.

Laboratory analytical results indicated chloride concentrations exceeded the reclamation requirement in delineation soil sample BH01, collected at a depth of approximately 1-foot bgs. The subsequent soil sample collected from borehole BH01, BH01A, at a depth of approximately 2 feet bgs, and all other remaining delineation soil samples were below the reclamation requirement and Closure Criteria.

On February 19 and February 21, 2020, LTE conducted excavation activities at the Site as indicated by field screening results and as well as preliminary and delineation soil sample analytical results. Excavation activities were performed using track-mounted backhoe and transport vehicles. Waste-containing soil was excavated within an area of approximately 6,060 square feet to an approximate average depth of depth of 3 feet bgs. Approximately 673 cubic yards of soil were removed from the Site and transported to a permitted land farm to achieve reclamation requirements within the pasture.



Following the excavation of waste-containing soil within the release extent, four potholes (PH01 through PH04) were advanced to depth ranging from approximately 2 feet to 4 feet bgs to demonstrate compliance with the pasture reclamation requirement. Laboratory analytical results indicated benzene, BTEX, TPH-GRO and TPH-DRO, TPH, and chloride concentrations were in compliance with the Closure Criteria.

Additionally, laboratory analytical results indicated soil samples collected within the top 4 feet of the pasture within the release extent were in compliance with the reclamation requirement. The delineation soil sample locations are depicted on Figure 3. Laboratory analytical results are summarized on Table 1 and the laboratory analytical report is included in Attachment 2.

CONCLUSIONS

A total of 22 preliminary and delineation soil samples were collected from within and around the release extent associated with the August 21, 2019 produced water release. Laboratory analytical results from the soil samples indicated benzene, BTEX, TPH-GRO and TPH-DRO, TPH, and chloride concentrations were compliant with the Closure Criteria; however, laboratory analytical results did indicate chloride concentrations exceeded the pasture reclamation requirement. As a result, XTO excavated an area of approximately 6,060 square feet to an approximate average depth of depth of 3 feet bgs. Approximately 673 cubic yards of soil were removed from the Site to achieve reclamation requirements.

Based on soil sampling results compliant with the Closure Criteria and the removal of approximately 673 cubic yards of waste containing soil exceeding the reclamation requirement as a result of the produced water release, the Site appears to have been sufficiently remediated. XTO requests NFA for RP Number 2RP-5634 and Incident Number NAB1927332462. An updated Form C-141 is attached to this Closure Request.



Bratcher, M.
Page 5

If you have any questions or comments, please do not hesitate to contact Ms. Ashley Ager at (970) 385-1096.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads 'Kevin M. Axe'.

Kevin M. Axe, P.G.
Senior Geologist

A handwritten signature in blue ink that reads 'Ashley L. Ager'.

Ashley L. Ager, P.G.
Senior Geologist

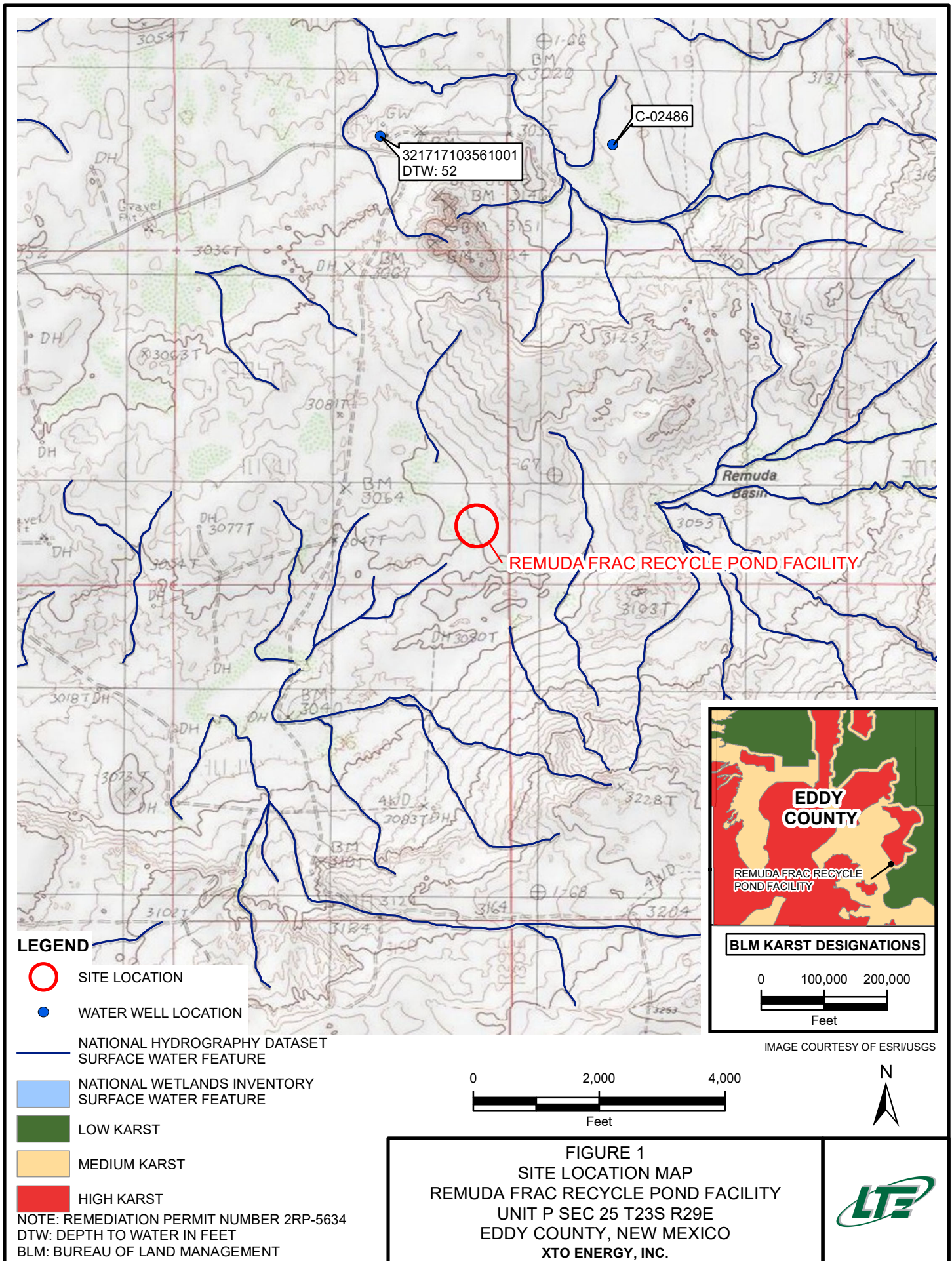
cc: Kyle Littrell, XTO
Ryan Mann, NMSLO
Robert Hamlet, NMOCD
Victoria Venegas, NMOCD

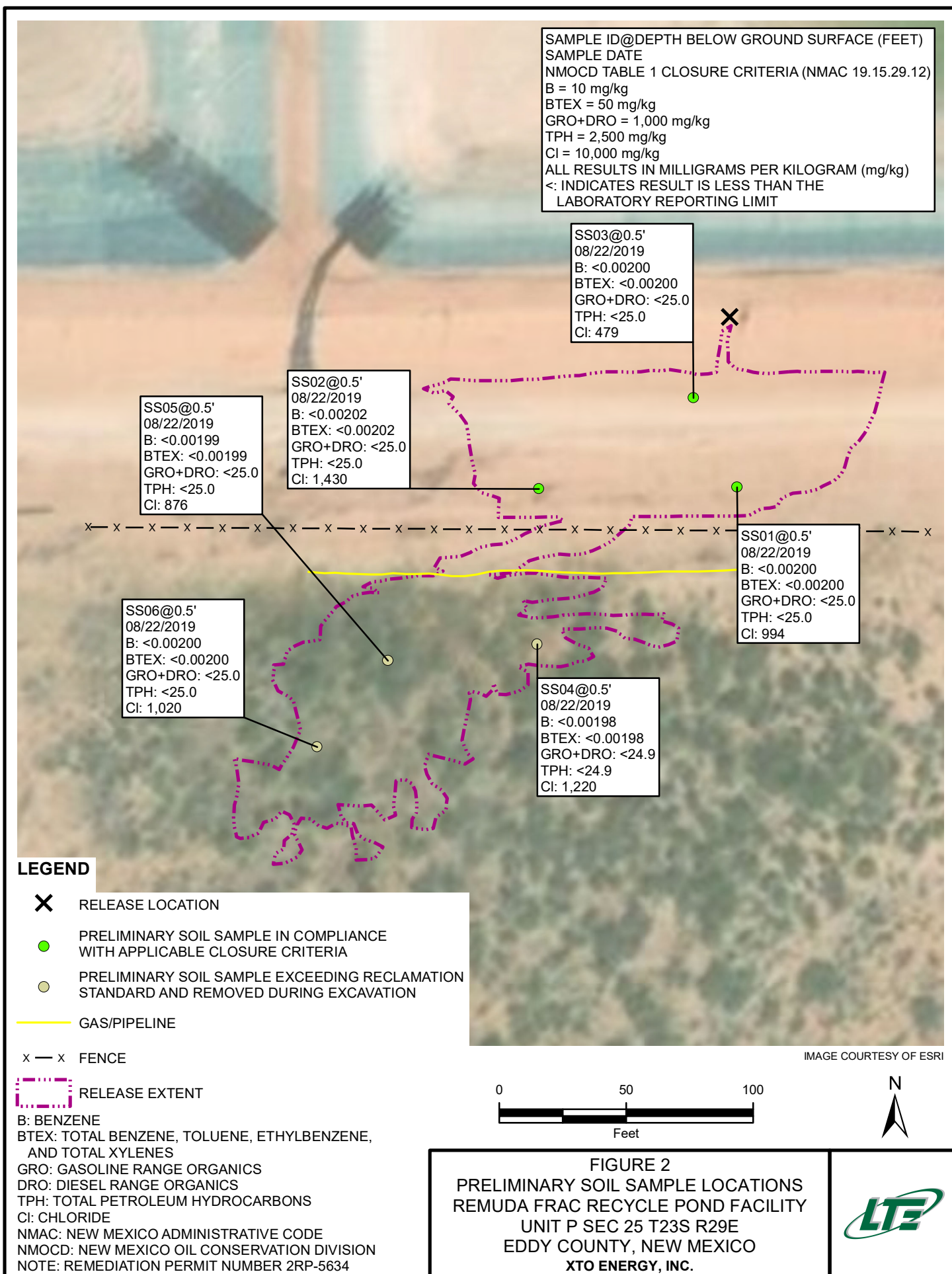
Appendices:

Figure 1 Site Location Map
Figure 2 Preliminary Soil Sampling Locations
Figure 3 Delineation Soil Sample Locations
Table 1 Soil Analytical Results
Attachment 1 Photographic Log
Attachment 2 Laboratory Analytical Reports
Attachment 3 Lithologic / Soil Sampling Logs

FIGURES







SAMPLE ID@DEPTH BELOW GROUND SURFACE (FEET)
 SAMPLE DATE
 NMOCD TABLE 1 CLOSURE CRITERIA (NMAC 19.15.29.12)
 B = 10 mg/kg
 BTEX = 50 mg/kg
 GRO+DRO = 1,000 mg/kg
 TPH = 2,500 mg/kg
 Cl = 10,000 mg/kg
 ALL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)
 <: INDICATES RESULT IS LESS THAN THE
 LABORATORY REPORTING LIMIT

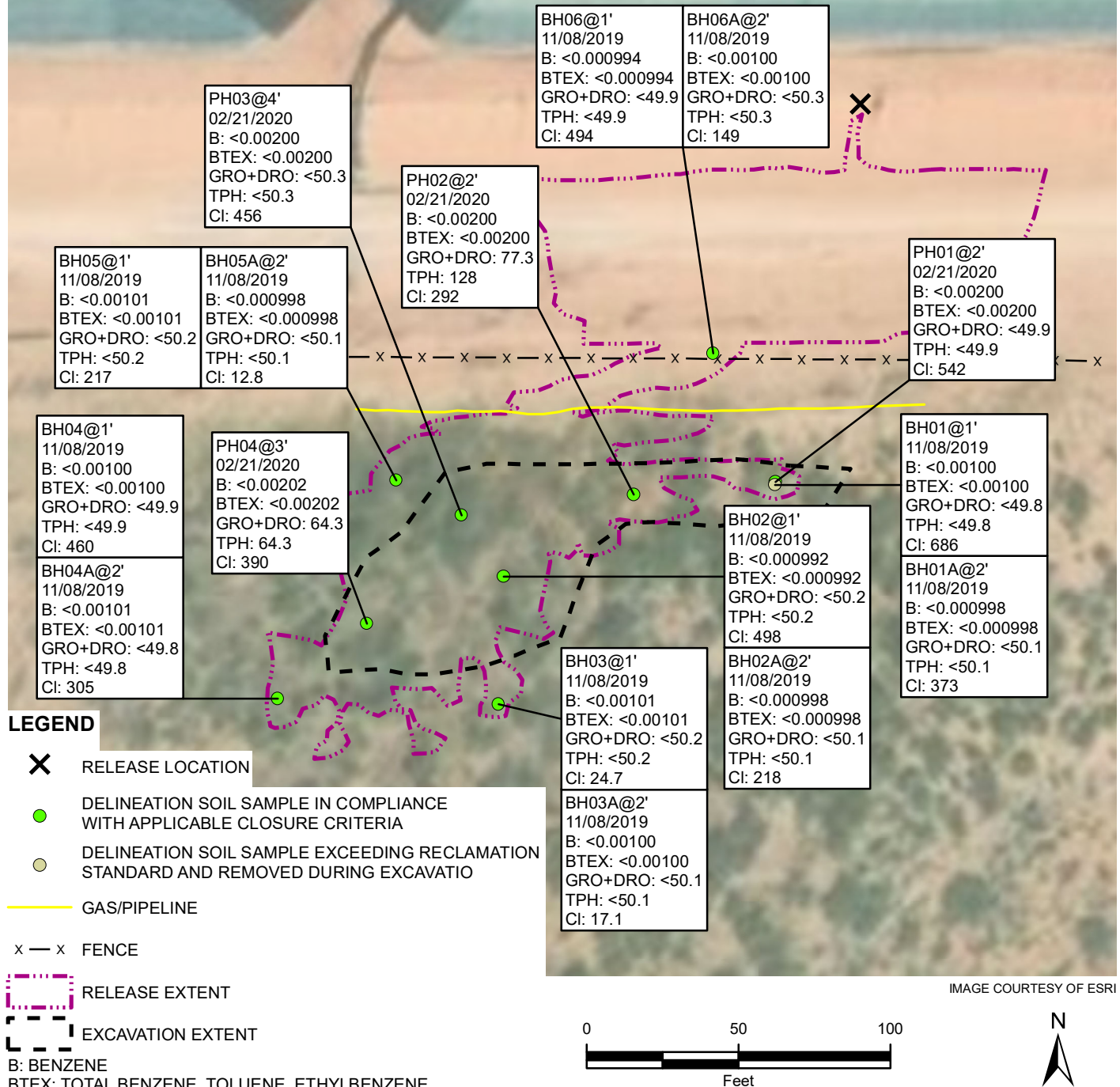


FIGURE 3
 DELINEATION SOIL SAMPLE LOCATIONS
 REMUDA FRAC RECYCLE POND FACILITY
 UNIT P SEC 25 T23S R29E
 EDDY COUNTY, NEW MEXICO
 XTO ENERGY, INC.



TABLES



**TABLE 1
SOIL ANALYTICAL RESULTS**

**REMUDA FRAC RECYCLE POND FACILITY
REMEDATION PERMIT NUMBER 2RP-5634
INCIDENT NUMBER NAB1927332462
EDDY COUNTY, NEW MEXICO
XTO ENERGY, INC.**

Sample Name	Sample Depth (feet bgs)	Sample Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	Total GRO+DRO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
NMOCD Table 1 Closure Criteria			10	NE	NE	NE	50	NE	NE	NE	1,000	2,500	10,000
SS01	0.5	08/22/2019	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<25.0	<25.0	<25.0	<25.0	<25.0	994
SS02	0.5	08/22/2019	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<25.0	<25.0	<25.0	<25.0	<25.0	1,430
SS03	0.5	08/22/2019	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<25.0	<25.0	<25.0	<25.0	<25.0	479
SS04	0.5	08/22/2019	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<24.9	<24.9	<24.9	<24.9	<24.9	1,220
PH02	2	02/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.9	77.3	50.6	77.3	128	292
SS05	0.5	08/22/2019	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<25.0	<25.0	<25.0	<25.0	<25.0	876
PH03	4	02/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.3	<50.3	<50.3	<50.3	<50.3	456
SS06	0.5	08/22/2019	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<25.0	<25.0	<25.0	<25.0	<25.0	1,020
PH04	3	02/21/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.0	64.3	<50.0	64.3	64.3	390
PH01	2	02/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.9	<49.9	<49.9	<49.9	<49.9	542
BH01	1	11/08/2019	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<49.8	<49.8	<49.8	<49.8	<49.8	686
BH01A	2	11/08/2019	<0.000998	<0.000998	<0.000998	<0.000998	<0.000998	<50.1	<50.1	<50.1	<50.1	<50.1	373
BH02	1	11/08/2019	<0.000992	<0.000992	<0.000992	<0.000992	<0.000992	<50.2	<50.2	<50.2	<50.2	<50.2	498
BH02A	2	11/08/2019	<0.000998	<0.000998	<0.000998	<0.000998	<0.000998	<50.2	<50.2	<50.2	<50.2	<50.2	218
BH03	1	11/08/2019	<0.00101	<0.00101	<0.00101	<0.00101	<0.00101	<50.2	<50.2	<50.2	<50.2	<50.2	24.7
BH03A	2	11/08/2019	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<50.1	<50.1	<50.1	<50.1	<50.1	17.1
BH04	1	11/08/2019	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<49.9	<49.9	<49.9	<49.9	<49.9	460
BH04A	2	11/08/2019	<0.00101	<0.00101	<0.00101	<0.00101	<0.00101	<49.8	<49.8	<49.8	<49.8	<49.8	305
BH05	1	11/08/2019	<0.00101	<0.00101	<0.00101	<0.00101	<0.00101	<50.2	<50.2	<50.2	<50.2	<50.2	217
BH05A	2	11/08/2019	<0.000998	<0.000998	<0.000998	<0.000998	<0.000998	<50.1	<50.1	<50.1	<50.1	<50.1	12.8



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**TABLE 1
SOIL ANALYTICAL RESULTS**

**REMUDA FRAC RECYCLE POND FACILITY
REMEDATION PERMIT NUMBER 2RP-5634
INCIDENT NUMBER NAB1927332462
EDDY COUNTY, NEW MEXICO
XTO ENERGY, INC.**

Sample Name	Sample Depth (feet bgs)	Sample Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	Total GRO+DRO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
NMOCD Table 1 Closure Criteria			10	NE	NE	NE	50	NE	NE	NE	1,000	2,500	10,000
BH06	1	11/08/2019	<0.000994	<0.000994	<0.000994	<0.000994	<0.000994	<49.9	<49.9	<49.9	<49.9	<49.9	494
BH06A	2	11/08/2019	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<50.3	<50.3	<50.3	<50.3	<50.3	149

Notes:

bgs - below ground surface

BTEX - benzene, toluene, ethylbenzene, and total xylenes

DRO - diesel range organics

GRO - gasoline range organics

mg/kg - milligrams per kilogram

MRO - motor oil range organics

NMAC - New Mexico Administrative Code

NMOCD - New Mexico Oil Conservation Division

NE - not established

TPH - total petroleum hydrocarbons

Bold - indicates result exceeds the applicable regulatory standard

< - indicates result is below laboratory reporting limits

Table 1 - closure criteria for soils impacted by a release per NMAC 19.15.29 August 2018

Grayed samples were excavated

ATTACHMENT 1: PHOTOGRAPHIC LOG

PHOTOGRAPHIC LOG



Photograph 1: Northern view of release location.



Photograph 2: Southwestern view of the release extent.



Photograph 3: Southern view of release extent in pasture area.



Photograph 4: Northern view of release extent in pasture area.

Site Name : Remuda Frac Recycle Pond facility
Site Location : 32.271080, -103.931242
Photographs Taken: February 21, 2020

PHOTOGRAPHIC LOG



Photograph 5 Southern view of excavation during delineation activities.

ATTACHMENT 2 : LABORATORY ANALYTICAL REPORTS



Analytical Report 634977

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

Remuda Frac Pond

spill date 08/21/19

29-AUG-19

Collected By: Client



**1089 N Canal Street
Carlsbad, NM 88220**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-19-29), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142), North Carolina (681)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-19-19), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-18-14)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-19-20)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-18-18)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-18-4)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Atlanta (LELAP Lab ID #04176)
Xenco-Tampa: Florida (E87429), North Carolina (483)



29-AUG-19

Project Manager: **Dan Moir**
LT Environmental, Inc.
4600 W. 60th Avenue
Arvada, CO 80003

Reference: XENCO Report No(s): **634977**
Remuda Frac Pond
Project Address:

Dan Moir:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 634977. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 634977 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink that reads 'Jessica Kramer'.

Jessica Kramer
Project Assistant

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America

**Sample Cross Reference 634977****LT Environmental, Inc., Arvada, CO**

Remuda Frac Pond

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SS01	S	08-22-19 10:00	.5 ft	634977-001
SS02	S	08-22-19 10:05	.5 ft	634977-002
SS03	S	08-22-19 10:10	.5 ft	634977-003
SS04	S	08-22-19 10:20	.5 ft	634977-004
SS05	S	08-22-19 10:25	.5 ft	634977-005
SS06	S	08-22-19 10:30	.5 ft	634977-006



CASE NARRATIVE

Client Name: *LT Environmental, Inc.*

Project Name: *Remuda Frac Pond*

Project ID: *spill date 08/21/19*
Work Order Number(s): *634977*

Report Date: *29-AUG-19*
Date Received: *08/22/2019*

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None



Certificate of Analysis Summary 634977

LT Environmental, Inc., Arvada, CO

Project Name: Remuda Frac Pond

Project Id: spill date 08/21/19

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Aug-22-19 04:39 pm

Report Date: 29-AUG-19

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	634977-001	634977-002	634977-003	634977-004	634977-005	634977-006
	Field Id:	SS01	SS02	SS03	SS04	SS05	SS06
	Depth:	.5- ft	.5- ft	.5- ft	.5- ft	.5- ft	.5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Aug-22-19 10:00	Aug-22-19 10:05	Aug-22-19 10:10	Aug-22-19 10:20	Aug-22-19 10:25	Aug-22-19 10:30
BTEX by EPA 8021B SUB: T104704400-18-16	Extracted:	Aug-26-19 16:00	Aug-26-19 16:00	Aug-26-19 16:00	Aug-26-19 16:00	Aug-26-19 16:00	Aug-26-19 16:00
	Analyzed:	Aug-27-19 15:55	Aug-27-19 16:15	Aug-27-19 16:35	Aug-27-19 16:55	Aug-27-19 18:34	Aug-28-19 08:32
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
Toluene		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
Ethylbenzene		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
m,p-Xylenes		<0.00400 0.00400	<0.00403 0.00403	<0.00399 0.00399	<0.00397 0.00397	<0.00398 0.00398	<0.00400 0.00400
o-Xylene		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
Total Xylenes		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
Total BTEX		<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200
Chloride by EPA 300 SUB: T104704400-18-16	Extracted:	Aug-26-19 10:40	Aug-26-19 10:40	Aug-26-19 10:40	Aug-26-19 10:40	Aug-26-19 10:40	Aug-26-19 10:40
	Analyzed:	Aug-26-19 13:33	Aug-26-19 13:40	Aug-26-19 13:46	Aug-26-19 13:52	Aug-26-19 13:59	Aug-26-19 14:05
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		994 4.98	1430 25.3	479 4.96	1220 4.99	876 5.00	1020 5.00
TPH by SW8015 Mod SUB: T104704400-18-16	Extracted:	Aug-26-19 08:00	Aug-26-19 08:00	Aug-26-19 08:00	Aug-26-19 08:00	Aug-26-19 08:00	Aug-26-19 08:00
	Analyzed:	Aug-26-19 15:38	Aug-26-19 16:36	Aug-26-19 16:55	Aug-26-19 17:14	Aug-26-19 17:34	Aug-26-19 17:53
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<25.0 25.0	<25.0 25.0	<25.0 25.0	<24.9 24.9	<25.0 25.0	<25.0 25.0
Diesel Range Organics (DRO)		<25.0 25.0	<25.0 25.0	<25.0 25.0	<24.9 24.9	<25.0 25.0	<25.0 25.0
Motor Oil Range Hydrocarbons (MRO)		<25.0 25.0	<25.0 25.0	<25.0 25.0	<24.9 24.9	<25.0 25.0	<25.0 25.0
Total TPH		<25.0 25.0	<25.0 25.0	<25.0 25.0	<24.9 24.9	<25.0 25.0	<25.0 25.0
Total GRO-DRO		<25.0 25.0	<25.0 25.0	<25.0 25.0	<24.9 24.9	<25.0 25.0	<25.0 25.0

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer
Project Assistant



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS01** Matrix: Soil Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-001 Date Collected: 08.22.19 10.00 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 08.26.19 10.40 Basis: Wet Weight
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	994	4.98	mg/kg	08.26.19 13.33		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 08.26.19 08.00 Basis: Wet Weight
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<25.0	25.0	mg/kg	08.26.19 15.38	U	1
Diesel Range Organics (DRO)	C10C28DRO	<25.0	25.0	mg/kg	08.26.19 15.38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<25.0	25.0	mg/kg	08.26.19 15.38	U	1
Total TPH	PHC635	<25.0	25.0	mg/kg	08.26.19 15.38	U	1
Total GRO-DRO	PHC628	<25.0	25.0	mg/kg	08.26.19 15.38	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	08.26.19 15.38	
o-Terphenyl	84-15-1	103	%	70-135	08.26.19 15.38	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS01**
 Lab Sample Id: 634977-001

Matrix: Soil
 Date Collected: 08.22.19 10.00

Date Received: 08.22.19 16.39
 Sample Depth: .5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 08.26.19 16.00

Basis: Wet Weight

Seq Number: 3099998

SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	08.27.19 15.55	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
Total BTEX		<0.00200	0.00200	mg/kg	08.27.19 15.55	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	08.27.19 15.55		
1,4-Difluorobenzene	540-36-3	113	%	70-130	08.27.19 15.55		



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS02** Matrix: **Soil** Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-002 Date Collected: 08.22.19 10.05 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: **CHE** % Moisture:
 Analyst: **CHE** Date Prep: 08.26.19 10.40 Basis: **Wet Weight**
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	1430	25.3	mg/kg	08.26.19 13.40		5

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: **DVM** % Moisture:
 Analyst: **ARM** Date Prep: 08.26.19 08.00 Basis: **Wet Weight**
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<25.0	25.0	mg/kg	08.26.19 16.36	U	1
Diesel Range Organics (DRO)	C10C28DRO	<25.0	25.0	mg/kg	08.26.19 16.36	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<25.0	25.0	mg/kg	08.26.19 16.36	U	1
Total TPH	PHC635	<25.0	25.0	mg/kg	08.26.19 16.36	U	1
Total GRO-DRO	PHC628	<25.0	25.0	mg/kg	08.26.19 16.36	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	08.26.19 16.36	
o-Terphenyl	84-15-1	103	%	70-135	08.26.19 16.36	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: SS02
Lab Sample Id: 634977-002

Matrix: Soil
Date Collected: 08.22.19 10.05

Date Received: 08.22.19 16.39
Sample Depth: .5 ft

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3099998

Prep Method: SW5030B

% Moisture:

Date Prep: 08.26.19 16.00

Basis: Wet Weight

SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	08.27.19 16.15	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
Total BTEX		<0.00202	0.00202	mg/kg	08.27.19 16.15	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	08.27.19 16.15		
1,4-Difluorobenzene	540-36-3	99	%	70-130	08.27.19 16.15		



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS03** Matrix: **Soil** Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-003 Date Collected: 08.22.19 10.10 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: **CHE** % Moisture:
 Analyst: **CHE** Date Prep: 08.26.19 10.40 Basis: **Wet Weight**
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	479	4.96	mg/kg	08.26.19 13.46		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: **DVM** % Moisture:
 Analyst: **ARM** Date Prep: 08.26.19 08.00 Basis: **Wet Weight**
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<25.0	25.0	mg/kg	08.26.19 16.55	U	1
Diesel Range Organics (DRO)	C10C28DRO	<25.0	25.0	mg/kg	08.26.19 16.55	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<25.0	25.0	mg/kg	08.26.19 16.55	U	1
Total TPH	PHC635	<25.0	25.0	mg/kg	08.26.19 16.55	U	1
Total GRO-DRO	PHC628	<25.0	25.0	mg/kg	08.26.19 16.55	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	08.26.19 16.55	
o-Terphenyl	84-15-1	101	%	70-135	08.26.19 16.55	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: SS03
Lab Sample Id: 634977-003

Matrix: Soil
Date Collected: 08.22.19 10.10

Date Received: 08.22.19 16.39
Sample Depth: .5 ft

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3099998

Prep Method: SW5030B

% Moisture:

Date Prep: 08.26.19 16.00

Basis: Wet Weight

SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	08.27.19 16.35	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
Total BTEX		<0.00200	0.00200	mg/kg	08.27.19 16.35	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	100	%	70-130	08.27.19 16.35		
4-Bromofluorobenzene	460-00-4	109	%	70-130	08.27.19 16.35		



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS04** Matrix: Soil Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-004 Date Collected: 08.22.19 10.20 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 08.26.19 10.40 Basis: Wet Weight
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	1220	4.99	mg/kg	08.26.19 13.52		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 08.26.19 08.00 Basis: Wet Weight
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<24.9	24.9	mg/kg	08.26.19 17.14	U	1
Diesel Range Organics (DRO)	C10C28DRO	<24.9	24.9	mg/kg	08.26.19 17.14	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<24.9	24.9	mg/kg	08.26.19 17.14	U	1
Total TPH	PHC635	<24.9	24.9	mg/kg	08.26.19 17.14	U	1
Total GRO-DRO	PHC628	<24.9	24.9	mg/kg	08.26.19 17.14	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	08.26.19 17.14	
o-Terphenyl	84-15-1	103	%	70-135	08.26.19 17.14	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS04**
 Lab Sample Id: 634977-004

Matrix: Soil
 Date Collected: 08.22.19 10.20

Date Received: 08.22.19 16.39
 Sample Depth: .5 ft

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3099998

Prep Method: SW5030B

% Moisture:

Date Prep: 08.26.19 16.00

Basis: Wet Weight

SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	08.27.19 16.55	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
Total BTEX		<0.00198	0.00198	mg/kg	08.27.19 16.55	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	112	%	70-130	08.27.19 16.55		
1,4-Difluorobenzene	540-36-3	101	%	70-130	08.27.19 16.55		



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS05** Matrix: **Soil** Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-005 Date Collected: 08.22.19 10.25 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: **CHE** % Moisture:
 Analyst: **CHE** Date Prep: 08.26.19 10.40 Basis: **Wet Weight**
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	876	5.00	mg/kg	08.26.19 13.59		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: **DVM** % Moisture:
 Analyst: **ARM** Date Prep: 08.26.19 08.00 Basis: **Wet Weight**
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<25.0	25.0	mg/kg	08.26.19 17.34	U	1
Diesel Range Organics (DRO)	C10C28DRO	<25.0	25.0	mg/kg	08.26.19 17.34	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<25.0	25.0	mg/kg	08.26.19 17.34	U	1
Total TPH	PHC635	<25.0	25.0	mg/kg	08.26.19 17.34	U	1
Total GRO-DRO	PHC628	<25.0	25.0	mg/kg	08.26.19 17.34	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	08.26.19 17.34	
o-Terphenyl	84-15-1	101	%	70-135	08.26.19 17.34	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: SS05
Lab Sample Id: 634977-005

Matrix: Soil
Date Collected: 08.22.19 10.25

Date Received: 08.22.19 16.39
Sample Depth: .5 ft

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3099998

Prep Method: SW5030B

% Moisture:

Date Prep: 08.26.19 16.00

Basis: Wet Weight

SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	08.27.19 18.34	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
Total BTEX		<0.00199	0.00199	mg/kg	08.27.19 18.34	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	97	%	70-130	08.27.19 18.34		
4-Bromofluorobenzene	460-00-4	130	%	70-130	08.27.19 18.34		



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS06** Matrix: Soil Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-006 Date Collected: 08.22.19 10.30 Sample Depth: .5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 08.26.19 10.40 Basis: Wet Weight
 Seq Number: 3099705 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	1020	5.00	mg/kg	08.26.19 14.05		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 08.26.19 08.00 Basis: Wet Weight
 Seq Number: 3099768 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<25.0	25.0	mg/kg	08.26.19 17.53	U	1
Diesel Range Organics (DRO)	C10C28DRO	<25.0	25.0	mg/kg	08.26.19 17.53	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<25.0	25.0	mg/kg	08.26.19 17.53	U	1
Total TPH	PHC635	<25.0	25.0	mg/kg	08.26.19 17.53	U	1
Total GRO-DRO	PHC628	<25.0	25.0	mg/kg	08.26.19 17.53	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	08.26.19 17.53	
o-Terphenyl	84-15-1	102	%	70-135	08.26.19 17.53	



Certificate of Analytical Results 634977

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **SS06** Matrix: Soil Date Received: 08.22.19 16.39
 Lab Sample Id: 634977-006 Date Collected: 08.22.19 10.30 Sample Depth: .5 ft
 Analytical Method: BTEX by EPA 8021B Prep Method: SW5030B
 Tech: KTL % Moisture:
 Analyst: KTL Date Prep: 08.26.19 16.00 Basis: Wet Weight
 Seq Number: 3099998 SUB: T104704400-18-16

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	08.28.19 08.32	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
Total BTEX		<0.00200	0.00200	mg/kg	08.28.19 08.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	81	%	70-130	08.28.19 08.32		
1,4-Difluorobenzene	540-36-3	91	%	70-130	08.28.19 08.32		



Flagging Criteria

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

****** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation



LT Environmental, Inc.
Remuda Frac Pond

Analytical Method: Chloride by EPA 300

Seq Number: 3099705

MB Sample Id: 7684957-1-BLK

Matrix: Solid

LCS Sample Id: 7684957-1-BKS

Prep Method: E300P

Date Prep: 08.26.19

LCSD Sample Id: 7684957-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	245	98	244	98	90-110	0	20	mg/kg	08.26.19 11:02	

Analytical Method: Chloride by EPA 300

Seq Number: 3099705

Parent Sample Id: 634804-007

Matrix: Soil

MS Sample Id: 634804-007 S

Prep Method: E300P

Date Prep: 08.26.19

MSD Sample Id: 634804-007 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	56.4	250	296	96	296	96	90-110	0	20	mg/kg	08.26.19 11:21	

Analytical Method: Chloride by EPA 300

Seq Number: 3099705

Parent Sample Id: 634970-003

Matrix: Soil

MS Sample Id: 634970-003 S

Prep Method: E300P

Date Prep: 08.26.19

MSD Sample Id: 634970-003 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	27.1	248	272	99	271	98	90-110	0	20	mg/kg	08.26.19 12:55	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3099768

MB Sample Id: 7684950-1-BLK

Matrix: Solid

LCS Sample Id: 7684950-1-BKS

Prep Method: SW8015P

Date Prep: 08.26.19

LCSD Sample Id: 7684950-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	894	89	943	94	70-135	5	20	mg/kg	08.26.19 11:25	
Diesel Range Organics (DRO)	<25.0	1000	936	94	992	99	70-135	6	20	mg/kg	08.26.19 11:25	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	77		118		124		70-135	%	08.26.19 11:25
o-Terphenyl	76		118		121		70-135	%	08.26.19 11:25

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



LT Environmental, Inc.

Remuda Frac Pond

Analytical Method: TPH by SW8015 Mod

Seq Number: 3099768

Parent Sample Id: 634967-001

Matrix: Soil

MS Sample Id: 634967-001 S

Prep Method: SW8015P

Date Prep: 08.26.19

MSD Sample Id: 634967-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	997	952	95	955	96	70-135	0	20	mg/kg	08.26.19 12:24	
Diesel Range Organics (DRO)	<24.9	997	884	89	890	89	70-135	1	20	mg/kg	08.26.19 12:24	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	128		128		70-135	%	08.26.19 12:24
o-Terphenyl	125		106		70-135	%	08.26.19 12:24

Analytical Method: BTEX by EPA 8021B

Seq Number: 3099998

MB Sample Id: 7685031-1-BLK

Matrix: Solid

LCS Sample Id: 7685031-1-BKS

Prep Method: SW5030B

Date Prep: 08.26.19

LCSD Sample Id: 7685031-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.0971	97	0.102	102	70-130	5	35	mg/kg	08.27.19 09:23	
Toluene	<0.000456	0.100	0.0975	98	0.102	102	70-130	5	35	mg/kg	08.27.19 09:23	
Ethylbenzene	<0.000565	0.100	0.102	102	0.108	108	70-130	6	35	mg/kg	08.27.19 09:23	
m,p-Xylenes	<0.00101	0.200	0.197	99	0.206	103	70-130	4	35	mg/kg	08.27.19 09:23	
o-Xylene	<0.000344	0.100	0.102	102	0.107	107	70-130	5	35	mg/kg	08.27.19 09:23	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	97		98		98		70-130	%	08.27.19 09:23
4-Bromofluorobenzene	95		105		104		70-130	%	08.27.19 09:23

Analytical Method: BTEX by EPA 8021B

Seq Number: 3099998

Parent Sample Id: 634978-001

Matrix: Soil

MS Sample Id: 634978-001 S

Prep Method: SW5030B

Date Prep: 08.26.19

MSD Sample Id: 634978-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.0998	0.0735	74	0.0792	80	70-130	7	35	mg/kg	08.27.19 10:03	
Toluene	<0.00200	0.0998	0.0690	69	0.0747	75	70-130	8	35	mg/kg	08.27.19 10:03	X
Ethylbenzene	<0.00200	0.0998	0.0661	66	0.0760	76	70-130	14	35	mg/kg	08.27.19 10:03	X
m,p-Xylenes	<0.00101	0.200	0.120	60	0.124	62	70-130	3	35	mg/kg	08.27.19 10:03	X
o-Xylene	<0.000344	0.0998	0.0651	65	0.0764	77	70-130	16	35	mg/kg	08.27.19 10:03	X

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		104		70-130	%	08.27.19 10:03
4-Bromofluorobenzene	108		107		70-130	%	08.27.19 10:03

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



Houston, TX (281) 240-4200 Dallas, TX (214) 902-0300 San Antonio, TX (210) 505-3334
Midland, TX (432-704-5440) EL Paso, TX (915)565-3443 Lubbock, TX (806)794-1296
Phoenix AZ (480-355-0900) Atlanta GA (770-449-8800) Tampa FL (813)
Jobbs, NM (575-392-7550)

Chain of Custody

Work Order No. 1034977

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO-Energy
Address:	3300 North A Street	Address:	
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM
Phone:	432.704.5178	Email:	dmoir@ltenv.com mmcatee@ltenv.com

Work Order Comments	
Program: UST/PST ☐ PRP ☐ Brownfields ☐ RC ☐ Superfund ☐	
State of Project:	
Reporting Level II ☐ Level III ☐ IST/UST ☐ RRP ☐ Level IV ☐	
Deliverables: EDD ☐ ADAPT ☐ Other:	

[illegible][illegible]

Total	200.7 / 6010	200.8 / 6020:	
<i>Circle Method(s) and Metal(s) to be analyzed</i>	8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO ₂ Na Sr Ti Sn U V Zn		
	TCLP / SPLP 6010: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U		1631 / 245.1 / 7470 / 7471 : Hg

Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Xenco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
		8/22/19 16:57			

IOS Number **46843**

Date/Time: 08/23/19 13:14

Created by: Elizabeth McClellan

Please send report to: Jessica Kramer

Lab# From: **Carlsbad**

Delivery Priority:

Address: 1089 N Canal Street

Lab# To: **Midland**

Air Bill No.: 776067465701

E-Mail: jessica.kramer@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
634977-001	S	SS01	08/22/19 10:00	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-001	S	SS01	08/22/19 10:00	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	
634977-001	S	SS01	08/22/19 10:00	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-002	S	SS02	08/22/19 10:05	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-002	S	SS02	08/22/19 10:05	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-002	S	SS02	08/22/19 10:05	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	
634977-003	S	SS03	08/22/19 10:10	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	
634977-003	S	SS03	08/22/19 10:10	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-003	S	SS03	08/22/19 10:10	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-004	S	SS04	08/22/19 10:20	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	
634977-004	S	SS04	08/22/19 10:20	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-004	S	SS04	08/22/19 10:20	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-005	S	SS05	08/22/19 10:25	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-005	S	SS05	08/22/19 10:25	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	
634977-005	S	SS05	08/22/19 10:25	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-006	S	SS06	08/22/19 10:30	SW8015MOD_NM	TPH by SW8015 Mod	08/28/19	09/05/19	JKR	GRO-DRO PHCC10C28 PF	
634977-006	S	SS06	08/22/19 10:30	E300_CL	Chloride by EPA 300	08/28/19	02/18/20	JKR	CL	
634977-006	S	SS06	08/22/19 10:30	SW8021B	BTEX by EPA 8021B	08/28/19	09/05/19	JKR	BR4FBZ BZ BZME EBZ X	

Inter Office Shipment or Sample Comments:

Relinquished By:



Elizabeth McClellan

Date Relinquished: 08/23/2019

Received By:



Brianna Teel

Date Received: 08/26/2019 07:35

Cooler Temperature: 0.7



Inter Office Report- Sample Receipt Checklist

Sent To: Midland

IOS #: 46843

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sent By: Elizabeth McClellan

Date Sent: 08/23/2019 01:14 PM

Received By: Brianna Teel

Date Received: 08/26/2019 07:35 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	.7
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	Yes
#5 *Custody Seals Signed and dated for Containers/coolers	Yes
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Brianna Teel

Date: 08/26/2019



Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 08/22/2019 04:39:00 PM

Work Order #: 634977

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : T-NM-007

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	3.2
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	No
#5 Custody Seals intact on sample bottles?	No
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes
#18 Water VOC samples have zero headspace?	N/A

Subbed to Xenco Midland.

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

Analyst:

PH Device/Lot#:

Checklist completed by:

Elizabeth McClellan

Date: 08/23/2019

Checklist reviewed by:

Jessica Kramer

Date: 08/27/2019

Analytical Report 642783

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

Remuda Frac Pond

012919195

15-NOV-19

Collected By: Client



**1089 N Canal Street
Carlsbad, NM 88220**

Xenco-Houston (EPA Lab Code: TX00122):

Texas (T104704215-19-30), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2019-058), North Carolina (681), Arkansas (19-037-0)

Xenco-Dallas (EPA Lab Code: TX01468):

Texas (TX104704295-19-22), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-19-16)

Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-19-21)

Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-19)

Xenco-Carlsbad (LELAP): Louisiana (05092)

Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-19-5)

Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Tampa: Florida (E87429), North Carolina (483)



15-NOV-19

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **642783**

Remuda Frac Pond

Project Address: Eddy County

Dan Moir:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 642783. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 642783 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink that reads 'Jessica Kramer'. The signature is written in a cursive, flowing style.

Jessica Kramer

Project Assistant

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America

**Sample Cross Reference 642783****LT Environmental, Inc., Arvada, CO**

Remuda Frac Pond

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
BH01	S	11-08-19 09:30	1 ft	642783-001
BH01A	S	11-08-19 09:40	2 ft	642783-002
BH02	S	11-08-19 10:20	1 ft	642783-003
BH02A	S	11-08-19 10:30	2 ft	642783-004
BH03	S	11-08-19 10:55	1 ft	642783-005
BH03A	S	11-08-19 11:05	2 ft	642783-006
BH04	S	11-08-19 11:30	1 ft	642783-007
BH04A	S	11-08-19 11:40	2 ft	642783-008
BH05	S	11-08-19 11:55	1 ft	642783-009
BH05A	S	11-08-19 12:05	2 ft	642783-010
BH06	S	11-08-19 12:20	1 ft	642783-011
BH06A	S	11-08-19 12:30	2 ft	642783-012

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: Remuda Frac Pond**

Project ID: 012919195
Work Order Number(s): 642783

Report Date: 15-NOV-19
Date Received: 11/11/2019

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3107138 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Lab Sample ID 642783-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Ethylbenzene recovered below QC limits in the Matrix Spike. Benzene recovered below QC limits in the Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 642783-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012.

The Laboratory Control Sample for Benzene, Ethylbenzene is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3107160 Chloride by EPA 300

Lab Sample ID 642783-011 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered below QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 642783-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.



Certificate of Analysis Summary 642783

LT Environmental, Inc., Arvada, CO

Project Name: Remuda Frac Pond

Project Id: 012919195

Contact: Dan Moir

Project Location: Eddy County

Date Received in Lab: Mon Nov-11-19 10:18 am

Report Date: 15-NOV-19

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	642783-001	642783-002	642783-003	642783-004	642783-005	642783-006
	<i>Field Id:</i>	BH01	BH01A	BH02	BH02A	BH03	BH03A
	<i>Depth:</i>	1- ft	2- ft	1- ft	2- ft	1- ft	2- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-08-19 09:30	Nov-08-19 09:40	Nov-08-19 10:20	Nov-08-19 10:30	Nov-08-19 10:55	Nov-08-19 11:05
BTEX by EPA 8021B	<i>Extracted:</i>	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11
	<i>Analyzed:</i>	Nov-11-19 23:28	Nov-11-19 23:47	Nov-12-19 00:06	Nov-12-19 00:25	Nov-12-19 00:45	Nov-12-19 01:04
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
Toluene		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
Ethylbenzene		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
m,p-Xylenes		<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200
o-Xylene		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
Total Xylenes		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
Total BTEX		<0.00100 0.00100	<0.00098 0.00098	<0.00092 0.00092	<0.00098 0.00098	<0.00101 0.00101	<0.00100 0.00100
Chloride by EPA 300	<i>Extracted:</i>	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11
	<i>Analyzed:</i>	Nov-11-19 20:47	Nov-11-19 21:07	Nov-11-19 21:14	Nov-11-19 21:21	Nov-11-19 21:27	Nov-11-19 21:46
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		686 50.4	373 10.1	498 10.1	218 9.92	24.7 10.0	17.1 10.1
TPH by SW8015 Mod	<i>Extracted:</i>	Nov-12-19 14:00	Nov-12-19 14:00	Nov-12-19 14:00	Nov-12-19 14:00	Nov-12-19 14:00	Nov-12-19 14:00
	<i>Analyzed:</i>	Nov-13-19 18:50	Nov-13-19 19:10	Nov-13-19 19:31	Nov-13-19 19:51	Nov-13-19 20:11	Nov-13-19 20:32
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<49.8 49.8	<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.1 50.1
Diesel Range Organics (DRO)		<49.8 49.8	<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.1 50.1
Motor Oil Range Hydrocarbons (MRO)		<49.8 49.8	<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.1 50.1
Total GRO-DRO		<49.8 49.8	<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.1 50.1
Total TPH		<49.8 49.8	<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.1 50.1

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 642783

LT Environmental, Inc., Arvada, CO

Project Name: Remuda Frac Pond

Project Id: 012919195

Contact: Dan Moir

Project Location: Eddy County

Date Received in Lab: Mon Nov-11-19 10:18 am

Report Date: 15-NOV-19

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	642783-007	642783-008	642783-009	642783-010	642783-011	642783-012
	<i>Field Id:</i>	BH04	BH04A	BH05	BH05A	BH06	BH06A
	<i>Depth:</i>	1- ft	2- ft	1- ft	2- ft	1- ft	2- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-08-19 11:30	Nov-08-19 11:40	Nov-08-19 11:55	Nov-08-19 12:05	Nov-08-19 12:20	Nov-08-19 12:30
BTEX by EPA 8021B	<i>Extracted:</i>	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11	Nov-11-19 18:11
	<i>Analyzed:</i>	Nov-12-19 01:23	Nov-12-19 01:42	Nov-12-19 02:01	Nov-12-19 02:20	Nov-12-19 03:24	Nov-12-19 03:43
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
Toluene		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
Ethylbenzene		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
m,p-Xylenes		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200
o-Xylene		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
Total Xylenes		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
Total BTEX		<0.00100 0.00100	<0.00101 0.00101	<0.00101 0.00101	<0.000998 0.000998	<0.000994 0.000994	<0.00100 0.00100
Chloride by EPA 300	<i>Extracted:</i>	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11	Nov-11-19 17:11
	<i>Analyzed:</i>	Nov-11-19 21:52	Nov-11-19 21:59	Nov-11-19 22:05	Nov-11-19 22:11	Nov-11-19 22:18	Nov-11-19 22:37
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		460 10.1	305 9.92	217 49.9	12.8 9.98	494 10.0	149 9.96
TPH by SW8015 Mod	<i>Extracted:</i>	Nov-12-19 14:00	Nov-12-19 14:00	Nov-12-19 14:00	Nov-13-19 17:11	Nov-13-19 17:11	Nov-13-19 17:11
	<i>Analyzed:</i>	Nov-13-19 20:52	Nov-13-19 21:13	Nov-13-19 21:33	Nov-14-19 01:35	Nov-14-19 02:36	Nov-14-19 02:56
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<49.9 49.9	<49.8 49.8	<50.2 50.2	<50.1 50.1	<49.9 49.9	<50.3 50.3
Diesel Range Organics (DRO)		<49.9 49.9	<49.8 49.8	<50.2 50.2	<50.1 50.1	<49.9 49.9	<50.3 50.3
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<49.8 49.8	<50.2 50.2	<50.1 50.1	<49.9 49.9	<50.3 50.3
Total GRO-DRO		<49.9 49.9	<49.8 49.8	<50.2 50.2	<50.1 50.1	<49.9 49.9	<50.3 50.3
Total TPH		<49.9 49.9	<49.8 49.8	<50.2 50.2	<50.1 50.1	<49.9 49.9	<50.3 50.3

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer
Project Assistant



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH01** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-001 Date Collected: 11.08.19 09.30 Sample Depth: 1 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	686	50.4	mg/kg	11.11.19 20.47		5

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.12.19 14.00 Basis: Wet Weight
 Seq Number: 3107436

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	11.13.19 18.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	11.13.19 18.50	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	11.13.19 18.50	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	11.13.19 18.50	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	11.13.19 18.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	11.13.19 18.50	
o-Terphenyl	84-15-1	116	%	70-135	11.13.19 18.50	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH01**
 Lab Sample Id: 642783-001

Matrix: Soil
 Date Collected: 11.08.19 09.30

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
Toluene	108-88-3	<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
Ethylbenzene	100-41-4	<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.11.19 23.28	U	1
o-Xylene	95-47-6	<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
Total Xylenes	1330-20-7	<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
Total BTEX		<0.00100	0.00100	mg/kg	11.11.19 23.28	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	113	%	70-130	11.11.19 23.28		
1,4-Difluorobenzene	540-36-3	102	%	70-130	11.11.19 23.28		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH01A** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-002 Date Collected: 11.08.19 09.40 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	373	10.1	mg/kg	11.11.19 21.07		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.12.19 14.00 Basis: Wet Weight
 Seq Number: 3107436

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	11.13.19 19.10	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	11.13.19 19.10	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	11.13.19 19.10	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	11.13.19 19.10	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	11.13.19 19.10	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	123	%	70-135	11.13.19 19.10	
o-Terphenyl	84-15-1	125	%	70-135	11.13.19 19.10	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH01A**
 Lab Sample Id: 642783-002

Matrix: Soil
 Date Collected: 11.08.19 09.40

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
Toluene	108-88-3	<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
Ethylbenzene	100-41-4	<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.11.19 23.47	U	1
o-Xylene	95-47-6	<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
Total Xylenes	1330-20-7	<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
Total BTEX		<0.000998	0.000998	mg/kg	11.11.19 23.47	U	1
Surrogate	Cas Number	% Recovery		Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	120	%	70-130	11.11.19 23.47		
1,4-Difluorobenzene	540-36-3	104	%	70-130	11.11.19 23.47		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH02** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-003 Date Collected: 11.08.19 10.20 Sample Depth: 1 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	498	10.1	mg/kg	11.11.19 21.14		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.12.19 14.00 Basis: Wet Weight
 Seq Number: 3107436

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	11.13.19 19.31	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	11.13.19 19.31	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	11.13.19 19.31	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	11.13.19 19.31	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	11.13.19 19.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	11.13.19 19.31	
o-Terphenyl	84-15-1	116	%	70-135	11.13.19 19.31	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH02**
 Lab Sample Id: 642783-003

Matrix: Soil
 Date Collected: 11.08.19 10.20

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
Toluene	108-88-3	<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
Ethylbenzene	100-41-4	<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
m,p-Xylenes	179601-23-1	<0.00198	0.00198	mg/kg	11.12.19 00.06	U	1
o-Xylene	95-47-6	<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
Total Xylenes	1330-20-7	<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
Total BTEX		<0.000992	0.000992	mg/kg	11.12.19 00.06	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	124	%	70-130	11.12.19 00.06		
1,4-Difluorobenzene	540-36-3	103	%	70-130	11.12.19 00.06		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH02A**
Lab Sample Id: 642783-004

Matrix: Soil
Date Collected: 11.08.19 10.30

Date Received: 11.11.19 10.18
Sample Depth: 2 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	218	9.92	mg/kg	11.11.19 21.21		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107436

Date Prep: 11.12.19 14.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	11.13.19 19.51	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	11.13.19 19.51	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	11.13.19 19.51	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	11.13.19 19.51	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	11.13.19 19.51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	123	%	70-135	11.13.19 19.51	
o-Terphenyl	84-15-1	127	%	70-135	11.13.19 19.51	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH02A**
 Lab Sample Id: 642783-004

Matrix: Soil
 Date Collected: 11.08.19 10.30

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
Toluene	108-88-3	<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
Ethylbenzene	100-41-4	<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.12.19 00.25	U	1
o-Xylene	95-47-6	<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
Total Xylenes	1330-20-7	<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
Total BTEX		<0.000998	0.000998	mg/kg	11.12.19 00.25	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	120	%	70-130	11.12.19 00.25		
1,4-Difluorobenzene	540-36-3	103	%	70-130	11.12.19 00.25		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH03**
Lab Sample Id: 642783-005

Matrix: Soil
Date Collected: 11.08.19 10.55

Date Received: 11.11.19 10.18
Sample Depth: 1 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	24.7	10.0	mg/kg	11.11.19 21.27		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107436

Date Prep: 11.12.19 14.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	11.13.19 20.11	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	11.13.19 20.11	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	11.13.19 20.11	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	11.13.19 20.11	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	11.13.19 20.11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	130	%	70-135	11.13.19 20.11	
o-Terphenyl	84-15-1	133	%	70-135	11.13.19 20.11	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH03**
 Lab Sample Id: 642783-005

Matrix: Soil
 Date Collected: 11.08.19 10.55

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
Toluene	108-88-3	<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
Ethylbenzene	100-41-4	<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
m,p-Xylenes	179601-23-1	<0.00202	0.00202	mg/kg	11.12.19 00.45	U	1
o-Xylene	95-47-6	<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
Total Xylenes	1330-20-7	<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
Total BTEX		<0.00101	0.00101	mg/kg	11.12.19 00.45	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	107	%	70-130	11.12.19 00.45		
1,4-Difluorobenzene	540-36-3	90	%	70-130	11.12.19 00.45		



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LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH03A** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-006 Date Collected: 11.08.19 11.05 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	17.1	10.1	mg/kg	11.11.19 21.46		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.12.19 14.00 Basis: Wet Weight
 Seq Number: 3107436

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	11.13.19 20.32	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	11.13.19 20.32	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	11.13.19 20.32	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	11.13.19 20.32	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	11.13.19 20.32	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	11.13.19 20.32	
o-Terphenyl	84-15-1	116	%	70-135	11.13.19 20.32	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH03A**
 Lab Sample Id: 642783-006

Matrix: Soil
 Date Collected: 11.08.19 11.05

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
Toluene	108-88-3	<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
Ethylbenzene	100-41-4	<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.12.19 01.04	U	1
o-Xylene	95-47-6	<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
Total Xylenes	1330-20-7	<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
Total BTEX		<0.00100	0.00100	mg/kg	11.12.19 01.04	U	1
		% Recovery					
Surrogate	Cas Number			Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3		104	%	70-130	11.12.19 01.04	
4-Bromofluorobenzene	460-00-4		122	%	70-130	11.12.19 01.04	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH04**
Lab Sample Id: 642783-007

Matrix: Soil
Date Collected: 11.08.19 11.30

Date Received: 11.11.19 10.18
Sample Depth: 1 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	460	10.1	mg/kg	11.11.19 21.52		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107436

Date Prep: 11.12.19 14.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	11.13.19 20.52	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	11.13.19 20.52	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	11.13.19 20.52	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	11.13.19 20.52	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	11.13.19 20.52	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	130	%	70-135	11.13.19 20.52	
o-Terphenyl	84-15-1	120	%	70-135	11.13.19 20.52	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH04**
 Lab Sample Id: 642783-007

Matrix: Soil
 Date Collected: 11.08.19 11.30

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
Toluene	108-88-3	<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
Ethylbenzene	100-41-4	<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
m,p-Xylenes	179601-23-1	<0.00201	0.00201	mg/kg	11.12.19 01.23	U	1
o-Xylene	95-47-6	<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
Total Xylenes	1330-20-7	<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
Total BTEX		<0.00100	0.00100	mg/kg	11.12.19 01.23	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	11.12.19 01.23		
4-Bromofluorobenzene	460-00-4	120	%	70-130	11.12.19 01.23		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH04A**
 Lab Sample Id: 642783-008

Matrix: Soil
 Date Collected: 11.08.19 11.40

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	305	9.92	mg/kg	11.11.19 21.59		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107436

Date Prep: 11.12.19 14.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	11.13.19 21.13	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	11.13.19 21.13	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	11.13.19 21.13	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	11.13.19 21.13	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	11.13.19 21.13	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	11.13.19 21.13	
o-Terphenyl	84-15-1	119	%	70-135	11.13.19 21.13	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH04A**
 Lab Sample Id: 642783-008

Matrix: Soil
 Date Collected: 11.08.19 11.40

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
Toluene	108-88-3	<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
Ethylbenzene	100-41-4	<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
m,p-Xylenes	179601-23-1	<0.00202	0.00202	mg/kg	11.12.19 01.42	U	1
o-Xylene	95-47-6	<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
Total Xylenes	1330-20-7	<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
Total BTEX		<0.00101	0.00101	mg/kg	11.12.19 01.42	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	11.12.19 01.42		
4-Bromofluorobenzene	460-00-4	121	%	70-130	11.12.19 01.42		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH05** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-009 Date Collected: 11.08.19 11.55 Sample Depth: 1 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	217	49.9	mg/kg	11.11.19 22.05		5

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.12.19 14.00 Basis: Wet Weight
 Seq Number: 3107436

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	11.13.19 21.33	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	11.13.19 21.33	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	11.13.19 21.33	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	11.13.19 21.33	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	11.13.19 21.33	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	134	%	70-135	11.13.19 21.33	
o-Terphenyl	84-15-1	128	%	70-135	11.13.19 21.33	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH05**
 Lab Sample Id: 642783-009

Matrix: Soil
 Date Collected: 11.08.19 11.55

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
Toluene	108-88-3	<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
Ethylbenzene	100-41-4	<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
m,p-Xylenes	179601-23-1	<0.00202	0.00202	mg/kg	11.12.19 02.01	U	1
o-Xylene	95-47-6	<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
Total Xylenes	1330-20-7	<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
Total BTEX		<0.00101	0.00101	mg/kg	11.12.19 02.01	U	1
Surrogate	Cas Number	% Recovery		Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	96	%	70-130	11.12.19 02.01		
1,4-Difluorobenzene	540-36-3	85	%	70-130	11.12.19 02.01		



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH05A** Matrix: Soil Date Received: 11.11.19 10.18
 Lab Sample Id: 642783-010 Date Collected: 11.08.19 12.05 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 11.11.19 17.11 Basis: Wet Weight
 Seq Number: 3107160

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	12.8	9.98	mg/kg	11.11.19 22.11		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 11.13.19 17.11 Basis: Wet Weight
 Seq Number: 3107504

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	11.14.19 01.35	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	11.14.19 01.35	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	11.14.19 01.35	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	11.14.19 01.35	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	11.14.19 01.35	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	11.14.19 01.35	
o-Terphenyl	84-15-1	117	%	70-135	11.14.19 01.35	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH05A**
 Lab Sample Id: 642783-010

Matrix: Soil
 Date Collected: 11.08.19 12.05

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
Toluene	108-88-3	<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
Ethylbenzene	100-41-4	<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.12.19 02.20	U	1
o-Xylene	95-47-6	<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
Total Xylenes	1330-20-7	<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
Total BTEX		<0.000998	0.000998	mg/kg	11.12.19 02.20	U	1
		% Recovery					
Surrogate	Cas Number			Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3		104	%	70-130	11.12.19 02.20	
4-Bromofluorobenzene	460-00-4		126	%	70-130	11.12.19 02.20	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH06**
Lab Sample Id: 642783-011

Matrix: Soil
Date Collected: 11.08.19 12.20

Date Received: 11.11.19 10.18
Sample Depth: 1 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	494	10.0	mg/kg	11.11.19 22.18		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107504

Date Prep: 11.13.19 17.11

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	11.14.19 02.36	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	11.14.19 02.36	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	11.14.19 02.36	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	11.14.19 02.36	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	11.14.19 02.36	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	11.14.19 02.36	
o-Terphenyl	84-15-1	117	%	70-135	11.14.19 02.36	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH06**
 Lab Sample Id: 642783-011

Matrix: Soil
 Date Collected: 11.08.19 12.20

Date Received: 11.11.19 10.18
 Sample Depth: 1 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
Toluene	108-88-3	<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
Ethylbenzene	100-41-4	<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
m,p-Xylenes	179601-23-1	<0.00199	0.00199	mg/kg	11.12.19 03.24	U	1
o-Xylene	95-47-6	<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
Total Xylenes	1330-20-7	<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
Total BTEX		<0.000994	0.000994	mg/kg	11.12.19 03.24	U	1
Surrogate	Cas Number	% Recovery		Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	113		%	70-130	11.12.19 03.24	
1,4-Difluorobenzene	540-36-3	101		%	70-130	11.12.19 03.24	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH06A**
Lab Sample Id: 642783-012

Matrix: Soil
Date Collected: 11.08.19 12.30

Date Received: 11.11.19 10.18
Sample Depth: 2 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3107160

Date Prep: 11.11.19 17.11

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	149	9.96	mg/kg	11.11.19 22.37		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3107504

Date Prep: 11.13.19 17.11

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	11.14.19 02.56	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	11.14.19 02.56	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	11.14.19 02.56	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	11.14.19 02.56	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	11.14.19 02.56	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	111	%	70-135	11.14.19 02.56	
o-Terphenyl	84-15-1	118	%	70-135	11.14.19 02.56	



Certificate of Analytical Results 642783

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **BH06A**
 Lab Sample Id: 642783-012

Matrix: Soil
 Date Collected: 11.08.19 12.30

Date Received: 11.11.19 10.18
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 11.11.19 18.11

Basis: Wet Weight

Seq Number: 3107138

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
Toluene	108-88-3	<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
Ethylbenzene	100-41-4	<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
m,p-Xylenes	179601-23-1	<0.00200	0.00200	mg/kg	11.12.19 03.43	U	1
o-Xylene	95-47-6	<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
Total Xylenes	1330-20-7	<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
Total BTEX		<0.00100	0.00100	mg/kg	11.12.19 03.43	U	1
Surrogate	Cas Number	% Recovery		Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3		103	%	70-130	11.12.19 03.43	
4-Bromofluorobenzene	460-00-4		121	%	70-130	11.12.19 03.43	



Flagging Criteria

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

****** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation



LT Environmental, Inc.

Remuda Frac Pond

Analytical Method: Chloride by EPA 300

Seq Number: 3107160

MB Sample Id: 7690117-1-BLK

Matrix: Solid

LCS Sample Id: 7690117-1-BKS

Prep Method: E300P

Date Prep: 11.11.19

LCSD Sample Id: 7690117-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	256	102	258	103	90-110	1	20	mg/kg	11.11.19 20:33	

Analytical Method: Chloride by EPA 300

Seq Number: 3107160

Parent Sample Id: 642783-001

Matrix: Soil

MS Sample Id: 642783-001 S

Prep Method: E300P

Date Prep: 11.11.19

MSD Sample Id: 642783-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	686	204	857	84	890	101	90-110	4	20	mg/kg	11.11.19 20:54	X

Analytical Method: Chloride by EPA 300

Seq Number: 3107160

Parent Sample Id: 642783-011

Matrix: Soil

MS Sample Id: 642783-011 S

Prep Method: E300P

Date Prep: 11.11.19

MSD Sample Id: 642783-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	494	201	705	105	698	102	90-110	1	20	mg/kg	11.11.19 22:24	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107436

MB Sample Id: 7690307-1-BLK

Matrix: Solid

LCS Sample Id: 7690307-1-BKS

Prep Method: SW8015P

Date Prep: 11.12.19

LCSD Sample Id: 7690307-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	1020	102	1050	105	70-135	3	35	mg/kg	11.13.19 22:34	
Diesel Range Organics (DRO)	<50.0	1000	1030	103	1110	111	70-135	7	35	mg/kg	11.13.19 22:34	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	109		134		133		70-135	%	11.13.19 22:34
o-Terphenyl	110		129		120		70-135	%	11.13.19 22:34

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



LT Environmental, Inc.

Remuda Frac Pond

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107504

MB Sample Id: 7690340-1-BLK

Matrix: Solid

LCS Sample Id: 7690340-1-BKS

Prep Method: SW8015P

Date Prep: 11.13.19

LCSD Sample Id: 7690340-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	958	96	980	98	70-135	2	35	mg/kg	11.14.19 00:55	
Diesel Range Organics (DRO)	<50.0	1000	971	97	987	99	70-135	2	35	mg/kg	11.14.19 00:55	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	120		112		116		70-135	%	11.14.19 00:55
o-Terphenyl	123		104		107		70-135	%	11.14.19 00:55

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107436

Matrix: Solid

MB Sample Id: 7690307-1-BLK

Prep Method: SW8015P

Date Prep: 11.12.19

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	11.13.19 22:13	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107504

Matrix: Solid

MB Sample Id: 7690340-1-BLK

Prep Method: SW8015P

Date Prep: 11.13.19

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	11.14.19 00:35	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107436

Matrix: Soil

Parent Sample Id: 642778-008

MS Sample Id: 642778-008 S

Prep Method: SW8015P

Date Prep: 11.12.19

MSD Sample Id: 642778-008 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<49.9	997	955	96	994	100	70-135	4	35	mg/kg	11.13.19 14:19	
Diesel Range Organics (DRO)	<49.9	997	1010	101	1050	106	70-135	4	35	mg/kg	11.13.19 14:19	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	129		125		70-135	%	11.13.19 14:19
o-Terphenyl	134		122		70-135	%	11.13.19 14:19

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



LT Environmental, Inc.

Remuda Frac Pond

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107504

Parent Sample Id: 642783-010

Matrix: Soil

MS Sample Id: 642783-010 S

Prep Method: SW8015P

Date Prep: 11.13.19

MSD Sample Id: 642783-010 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.3	1010	1100	109	921	92	70-135	18	35	mg/kg	11.14.19 01:55	
Diesel Range Organics (DRO)	40.9	1010	1150	110	936	90	70-135	21	35	mg/kg	11.14.19 01:55	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	133		99		70-135	%	11.14.19 01:55
o-Terphenyl	128		94		70-135	%	11.14.19 01:55

Analytical Method: BTEX by EPA 8021B

Seq Number: 3107138

MB Sample Id: 7690090-1-BLK

Matrix: Solid

LCS Sample Id: 7690090-1-BKS

Prep Method: SW5030B

Date Prep: 11.11.19

LCSD Sample Id: 7690090-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00100	0.100	0.0899	90	0.0905	91	70-130	1	35	mg/kg	11.11.19 21:46	
Toluene	<0.00100	0.100	0.0912	91	0.0923	92	70-130	1	35	mg/kg	11.11.19 21:46	
Ethylbenzene	<0.00100	0.100	0.0913	91	0.0930	93	71-129	2	35	mg/kg	11.11.19 21:46	
m,p-Xylenes	<0.00200	0.200	0.195	98	0.199	100	70-135	2	35	mg/kg	11.11.19 21:46	
o-Xylene	<0.00100	0.100	0.0984	98	0.100	100	71-133	2	35	mg/kg	11.11.19 21:46	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	99		101		102		70-130	%	11.11.19 21:46
4-Bromofluorobenzene	109		116		113		70-130	%	11.11.19 21:46

Analytical Method: BTEX by EPA 8021B

Seq Number: 3107138

Parent Sample Id: 642783-001

Matrix: Soil

MS Sample Id: 642783-001 S

Prep Method: SW5030B

Date Prep: 11.11.19

MSD Sample Id: 642783-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00101	0.101	0.0774	77	0.0676	67	70-130	14	35	mg/kg	11.11.19 22:24	X
Toluene	<0.00101	0.101	0.0758	75	0.0765	76	70-130	1	35	mg/kg	11.11.19 22:24	
Ethylbenzene	<0.00101	0.101	0.0708	70	0.0749	74	71-129	6	35	mg/kg	11.11.19 22:24	X
m,p-Xylenes	<0.00202	0.202	0.149	74	0.159	79	70-135	6	35	mg/kg	11.11.19 22:24	
o-Xylene	<0.00101	0.101	0.0759	75	0.0802	79	71-133	6	35	mg/kg	11.11.19 22:24	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	104		95		70-130	%	11.11.19 22:24
4-Bromofluorobenzene	120		117		70-130	%	11.11.19 22:24

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

[D] = 100*(C-A) / B
RPD = 200* |(C-E) / (C+E)|
[D] = 100 * (C) / [B]
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Chain of Custody

Work Order No: 1147783

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littrell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	
City, State ZIP:	Midland, Tx 79705	City, State ZIP:	
Phone:	(432) 236-3849	Email:	enaka@ltenv.com, dmoir@ltenv.com

Work Order Comments	
Program: UST/PST ☐ RP ☐ Growfields ☐ RC ☐ Pertund	
State of Project:	
Reporting Level II ☐ Level III ☐ PST/UST ☐ RP ☐ Level IV	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:		Remuda Trac Pond		Turn Around		ANALYSIS REQUEST												Work Order Notes									
Project Number:		012919195		Routine		☒																					
P.O. Number:		Eddy County		Rush:																							
Sampler's Name:		Elizabeth Naka		Due Date:																							
SAMPLE RECEIPT				Temp Blank:		☒ Yes ☐ No		Wet Ice:		☒ Yes ☐ No																	
Temperature (°C):		24.2		Thermometer ID																							
Received Intact:		☒ Yes ☐ No		T-NH-007																							
Cooler Custody Seals:		☒ Yes ☐ No		Correction Factor:		-0.2																					
Sample Custody Seals:		☒ Yes ☐ No		Total Containers:		12																					
Sample Identification		Matrix		Date Sampled		Time Sampled		Depth		Number of Containers												Sample Comments					
BH01		S		11/8/19		0930		1'		1																	
BH01A						0940		2'		X																	
BH02						1020		1'		X																	
BH02A						1030		2'		X																	
BH03						1055		1'		X																	
BH03A						1105		2'		X																	
BH04						1130		1'		X																	
BH04A						1140		2'		X																	
BH05						1155		1'		X																	
BH05A						1205		2'		X																	
														TAT starts the day received by the lab, if received by 4:30pm													

notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenoco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenoco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Xenoco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenoco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Elizabeth Nash</i>	<i>Ann Bayco</i>	11/11/19 08:45	<i>Ann Bayco</i>	<i>Elizabeth Nash</i>	11/11/19 10:18



Chain of Custody

Houston, TX (281) 240-4200 Dallas, TX (214) 902-0300 San Antonio, TX (210) 509-3334
 Midland, TX (432-704-5440) El Paso, TX (915)585-3443 Lubbock, TX (806)794-1298
 Hobbs, NM (575-332-7550) Phoenix, AZ (480-355-0900) Atlanta, GA (770-449-8800) Tampa, FL (813-620-2000)

Work Order No:

1042783

www.xenco.com

Page 2 of 2

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Litrell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	
City, State ZIP:	Midland, Tx 79705	City, State ZIP:	
Phone:	(432) 236-3849	Email:	jenaka@ltenv.com, dmoir@ltenv.com

Program: UST/PST ☐ RP ☐ Crownfields ☐ RC ☐ Tperfund ☐ State of Project:	
Reporting Level II ☐	Level III ☐
Deliverables: EDD ☐	ADAPT ☐
Other: ☐ RP ☐ Level IV ☐	

Project Name:	Remuda Free Pond	Turn Around	
Project Number:	012919195	Routine	☒
P.O. Number:	Eddy County	Rush:	
Sampler's Name:	Elizabeth Naka	Due Date:	

SAMPLE RECEIPT	Temp Blank:	Yes	No	Wet Ice:	Yes	No
Temperature (°C):						
Received Intact:	Yes	No	Thermometer ID			
Cooler Custody Seals:	Yes	No	N/A	Correction Factor:		
Sample Custody Seals:	Yes	No	N/A	Total Containers:		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number	TPH (EP)	BTEX (EP)	Chloride	Sample Comments									
BH06	S	11/08/19	1220	1'	1	X	X	X	Cyanide Test									
BH06A	↓	↓	1230	2'	↓	↓	↓	↓										

Total 200.7 / 6010	200.8 / 6020:	8RCRA 13PPM Texas 11	Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Ti Sn U V Zn
Circle Method(s) and Metal(s) to be analyzed	TCLP / SPLP 6010: 8RCRA	Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U	1631 / 245.1 / 7470 / 7471 : Hg

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Xenco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Elizabeth Naka	Dawn Boyers	11/11/19 0845	Dawn Boyers	Elizabeth Naka	11/19 10:18



Client: LT Environmental, Inc.

Date/ Time Received: 11/11/2019 10:18:00 AM

Work Order #: 642783

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : T-NM-007

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	Yes
#5 Custody Seals intact on sample bottles?	Yes
#6 *Custody Seals Signed and dated?	Yes
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	No
#18 Water VOC samples have zero headspace?	N/A

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

Analyst:

PH Device/Lot#:

Checklist completed by:

Elizabeth McClellan

Date: 11/11/2019

Checklist reviewed by:

Jessica Kramer

Date: 11/11/2019



Analytical Report 653372

for

LT Environmental, Inc.

Project Manager: Dan Moir

Remuda Frac Pond

012919195

02.24.2020

Collected By: Client

**1089 N Canal Street
Carlsbad, NM 88220**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-19-30), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2019-058), North Carolina (681), Arkansas (19-037-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (TX104704295-19-22), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-19-16)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-19-21)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-19)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TN102385): Texas (T104704534-19-5)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Tampa: Florida (E87429), North Carolina (483)



02.24.2020

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **653372**

Remuda Frac Pond

Project Address: Eddy

Dan Moir:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 653372. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 653372 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'JB', is written over a light blue rectangular background.

John Builes
Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

**Sample Cross Reference 653372****LT Environmental, Inc., Arvada, CO**

Remuda Frac Pond

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
PH01	S	02.21.2020 11:00	2 ft	653372-001
PH02	S	02.21.2020 11:03	2 ft	653372-002
PH03	S	02.21.2020 11:05	4 ft	653372-003
PH04	S	02.21.2020 11:06	3 ft	653372-004



CASE NARRATIVE

Client Name: *LT Environmental, Inc.*

Project Name: *Remuda Frac Pond*

Project ID: 012919195
Work Order Number(s): 653372

Report Date: 02.24.2020
Date Received: 02.21.2020

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3117367 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.



Certificate of Analysis Summary 653372

LT Environmental, Inc., Arvada, CO

Project Name: Remuda Frac Pond

Project Id: 012919195

Contact: Dan Moir

Project Location: Eddy

Date Received in Lab: Fri 02.21.2020 16:13

Report Date: 02.24.2020 16:12

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	653372-001	653372-002	653372-003	653372-004		
	<i>Field Id:</i>	PH01	PH02	PH03	PH04		
	<i>Depth:</i>	2- ft	2- ft	4- ft	3- ft		
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL		
	<i>Sampled:</i>	02.21.2020 11:00	02.21.2020 11:03	02.21.2020 11:05	02.21.2020 11:06		
BTEX by EPA 8021B	<i>Extracted:</i>	02.21.2020 17:00	02.21.2020 17:00	02.21.2020 17:00	02.21.2020 17:00		
	<i>Analyzed:</i>	02.22.2020 02:59	02.22.2020 03:19	02.22.2020 03:39	02.22.2020 04:00		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Benzene		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
Toluene		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
Ethylbenzene		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
m,p-Xylenes		<0.00399 0.00399	<0.00401 0.00401	<0.00399 0.00399	<0.00404 0.00404		
o-Xylene		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
Total Xylenes		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
Total BTEX		<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202		
Chloride by EPA 300	<i>Extracted:</i>	02.21.2020 18:11	02.21.2020 18:11	02.21.2020 18:11	02.21.2020 18:11		
	<i>Analyzed:</i>	02.21.2020 23:54	02.22.2020 00:00	02.22.2020 00:06	02.22.2020 00:12		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Chloride		542 9.96	292 9.98	456 9.96	390 9.98		
TPH by SW8015 Mod	<i>Extracted:</i>	02.21.2020 17:00	02.21.2020 17:00	02.21.2020 17:00	02.21.2020 17:00		
	<i>Analyzed:</i>	02.21.2020 23:27	02.21.2020 23:46	02.21.2020 23:46	02.22.2020 00:06		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Gasoline Range Hydrocarbons (GRO)		<49.9 49.9	<49.9 49.9	<50.3 50.3	<50.0 50.0		
Diesel Range Organics (DRO)		<49.9 49.9	77.3 49.9	<50.3 50.3	64.3 50.0		
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	50.6 49.9	<50.3 50.3	<50.0 50.0		
Total GRO-DRO		<49.9 49.9	77.3 49.9	<50.3 50.3	64.3 50.0		
Total TPH		<49.9 49.9	128 49.9	<50.3 50.3	64.3 50.0		

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

John Builes
Project Manager



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH01** Matrix: Soil Date Received: 02.21.2020 16:13
 Lab Sample Id: 653372-001 Date Collected: 02.21.2020 11:00 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 02.21.2020 18:11 Basis: Wet Weight
 Seq Number: 3117384

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	542	9.96	mg/kg	02.21.2020 23:54		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 02.21.2020 17:00 Basis: Wet Weight
 Seq Number: 3117398

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	02.21.2020 23:27	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	02.21.2020 23:27	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	02.21.2020 23:27	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	02.21.2020 23:27	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	02.21.2020 23:27	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	02.21.2020 23:27	
o-Terphenyl	84-15-1	125	%	70-135	02.21.2020 23:27	



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH01**
 Lab Sample Id: 653372-001

Matrix: Soil
 Date Collected: 02.21.2020 11:00

Date Received: 02.21.2020 16:13
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.21.2020 17:00

Basis: Wet Weight

Seq Number: 3117367

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	02.22.2020 02:59	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
Total BTEX		<0.00200	0.00200	mg/kg	02.22.2020 02:59	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	02.22.2020 02:59		
1,4-Difluorobenzene	540-36-3	104	%	70-130	02.22.2020 02:59		



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH02** Matrix: Soil Date Received: 02.21.2020 16:13
 Lab Sample Id: 653372-002 Date Collected: 02.21.2020 11:03 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 02.21.2020 18:11 Basis: Wet Weight
 Seq Number: 3117384

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	292	9.98	mg/kg	02.22.2020 00:00		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 02.21.2020 17:00 Basis: Wet Weight
 Seq Number: 3117398

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	02.21.2020 23:46	U	1
Diesel Range Organics (DRO)	C10C28DRO	77.3	49.9	mg/kg	02.21.2020 23:46		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	50.6	49.9	mg/kg	02.21.2020 23:46		1
Total GRO-DRO	PHC628	77.3	49.9	mg/kg	02.21.2020 23:46		1
Total TPH	PHC635	128	49.9	mg/kg	02.21.2020 23:46		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	02.21.2020 23:46	
o-Terphenyl	84-15-1	126	%	70-135	02.21.2020 23:46	



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH02**
 Lab Sample Id: 653372-002

Matrix: Soil
 Date Collected: 02.21.2020 11:03

Date Received: 02.21.2020 16:13
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.21.2020 17:00

Basis: Wet Weight

Seq Number: 3117367

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	02.22.2020 03:19	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
Total BTEX		<0.00200	0.00200	mg/kg	02.22.2020 03:19	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	02.22.2020 03:19		
1,4-Difluorobenzene	540-36-3	104	%	70-130	02.22.2020 03:19		



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH03** Matrix: Soil Date Received: 02.21.2020 16:13
 Lab Sample Id: 653372-003 Date Collected: 02.21.2020 11:05 Sample Depth: 4 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 02.21.2020 18:11 Basis: Wet Weight
 Seq Number: 3117384

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	456	9.96	mg/kg	02.22.2020 00:06		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 02.21.2020 17:00 Basis: Wet Weight
 Seq Number: 3117398

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	02.21.2020 23:46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	02.21.2020 23:46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	02.21.2020 23:46	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	02.21.2020 23:46	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	02.21.2020 23:46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	02.21.2020 23:46	
o-Terphenyl	84-15-1	114	%	70-135	02.21.2020 23:46	



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH03**
 Lab Sample Id: 653372-003

Matrix: Soil
 Date Collected: 02.21.2020 11:05

Date Received: 02.21.2020 16:13
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.21.2020 17:00

Basis: Wet Weight

Seq Number: 3117367

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	02.22.2020 03:39	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1
Total BTEX		<0.00200	0.00200	mg/kg	02.22.2020 03:39	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	104	%	70-130	02.22.2020 03:39	
4-Bromofluorobenzene	460-00-4	96	%	70-130	02.22.2020 03:39	



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH04** Matrix: Soil Date Received: 02.21.2020 16:13
 Lab Sample Id: 653372-004 Date Collected: 02.21.2020 11:06 Sample Depth: 3 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 02.21.2020 18:11 Basis: Wet Weight
 Seq Number: 3117384

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	390	9.98	mg/kg	02.22.2020 00:12		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 02.21.2020 17:00 Basis: Wet Weight
 Seq Number: 3117398

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	02.22.2020 00:06	U	1
Diesel Range Organics (DRO)	C10C28DRO	64.3	50.0	mg/kg	02.22.2020 00:06		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	02.22.2020 00:06	U	1
Total GRO-DRO	PHC628	64.3	50.0	mg/kg	02.22.2020 00:06		1
Total TPH	PHC635	64.3	50.0	mg/kg	02.22.2020 00:06		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	02.22.2020 00:06	
o-Terphenyl	84-15-1	108	%	70-135	02.22.2020 00:06	



Certificate of Analytical Results 653372

LT Environmental, Inc., Arvada, CO

Remuda Frac Pond

Sample Id: **PH04**
 Lab Sample Id: 653372-004

Matrix: Soil
 Date Collected: 02.21.2020 11:06

Date Received: 02.21.2020 16:13
 Sample Depth: 3 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.21.2020 17:00

Basis: Wet Weight

Seq Number: 3117367

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	02.22.2020 04:00	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1
Total BTEX		<0.00202	0.00202	mg/kg	02.22.2020 04:00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	95	%	70-130	02.22.2020 04:00	
1,4-Difluorobenzene	540-36-3	104	%	70-130	02.22.2020 04:00	



Flagging Criteria

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit. **ND** Not Detected.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

* (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation



LT Environmental, Inc.

Remuda Frac Pond

Analytical Method: Chloride by EPA 300

Seq Number: 3117384

MB Sample Id: 7697232-1-BLK

Matrix: Solid

LCS Sample Id: 7697232-1-BKS

Prep Method: E300P

Date Prep: 02.21.2020

LCSD Sample Id: 7697232-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	257	103	258	103	90-110	0	20	mg/kg	02.21.2020 21:47	

Analytical Method: Chloride by EPA 300

Seq Number: 3117384

Parent Sample Id: 653326-003

Matrix: Soil

MS Sample Id: 653326-003 S

Prep Method: E300P

Date Prep: 02.21.2020

MSD Sample Id: 653326-003 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	5370	201	5560	95	5560	95	90-110	0	20	mg/kg	02.21.2020 23:24	

Analytical Method: Chloride by EPA 300

Seq Number: 3117384

Parent Sample Id: 653332-001

Matrix: Soil

MS Sample Id: 653332-001 S

Prep Method: E300P

Date Prep: 02.21.2020

MSD Sample Id: 653332-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	37.3	200	255	109	247	105	90-110	3	20	mg/kg	02.21.2020 22:05	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117398

MB Sample Id: 7697305-1-BLK

Matrix: Solid

LCS Sample Id: 7697305-1-BKS

Prep Method: SW8015P

Date Prep: 02.21.2020

LCSD Sample Id: 7697305-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	849	85	813	81	70-135	4	35	mg/kg	02.21.2020 22:28	
Diesel Range Organics (DRO)	<50.0	1000	995	100	1010	101	70-135	1	35	mg/kg	02.21.2020 22:28	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	103		112		105		70-135	%	02.21.2020 22:28
o-Terphenyl	117		117		106		70-135	%	02.21.2020 22:28

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117398

Matrix: Solid

MB Sample Id: 7697305-1-BLK

Prep Method: SW8015P

Date Prep: 02.21.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	02.24.2020 11:43	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



LT Environmental, Inc.
Remuda Frac Pond

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117398

Parent Sample Id: 653329-001

Matrix: Soil

MS Sample Id: 653329-001 S

Prep Method: SW8015P

Date Prep: 02.21.2020

MSD Sample Id: 653329-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.2	1000	928	93	918	91	70-135	1	35	mg/kg	02.21.2020 23:07	
Diesel Range Organics (DRO)	<50.2	1000	1120	112	1060	105	70-135	6	35	mg/kg	02.21.2020 23:07	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	124		123		70-135	%	02.21.2020 23:07
o-Terphenyl	126		129		70-135	%	02.21.2020 23:07

Analytical Method: BTEX by EPA 8021B

Seq Number: 3117367

MB Sample Id: 7697231-1-BLK

Matrix: Solid

LCS Sample Id: 7697231-1-BKS

Prep Method: SW5030B

Date Prep: 02.21.2020

LCSD Sample Id: 7697231-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.104	104	0.100	100	70-130	4	35	mg/kg	02.21.2020 19:30	
Toluene	<0.00200	0.100	0.101	101	0.0976	98	70-130	3	35	mg/kg	02.21.2020 19:30	
Ethylbenzene	<0.00200	0.100	0.0974	97	0.0943	94	71-129	3	35	mg/kg	02.21.2020 19:30	
m,p-Xylenes	<0.00400	0.200	0.201	101	0.195	98	70-135	3	35	mg/kg	02.21.2020 19:30	
o-Xylene	<0.00200	0.100	0.101	101	0.0977	98	71-133	3	35	mg/kg	02.21.2020 19:30	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	105		104		104		70-130	%	02.21.2020 19:30
4-Bromofluorobenzene	97		93		94		70-130	%	02.21.2020 19:30

Analytical Method: BTEX by EPA 8021B

Seq Number: 3117367

Parent Sample Id: 653332-001

Matrix: Soil

MS Sample Id: 653332-001 S

Prep Method: SW5030B

Date Prep: 02.21.2020

MSD Sample Id: 653332-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00202	0.101	0.0891	88	0.0848	85	70-130	5	35	mg/kg	02.21.2020 20:11	
Toluene	<0.00202	0.101	0.0827	82	0.0788	79	70-130	5	35	mg/kg	02.21.2020 20:11	
Ethylbenzene	<0.00202	0.101	0.0816	81	0.0773	77	71-129	5	35	mg/kg	02.21.2020 20:11	
m,p-Xylenes	<0.00404	0.202	0.166	82	0.157	79	70-135	6	35	mg/kg	02.21.2020 20:11	
o-Xylene	<0.00202	0.101	0.0844	84	0.0799	80	71-133	5	35	mg/kg	02.21.2020 20:11	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	104		104		70-130	%	02.21.2020 20:11
4-Bromofluorobenzene	94		95		70-130	%	02.21.2020 20:11

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



Chain of Custody

Work Order No: 053372

Houston, TX (281) 240-4200 Dallas, TX (214) 902-0300 San Antonio, TX (210) 509-3334
Midland, TX (432) 704-5440 EL Paso, TX (915) 585-3443 Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7550 Phoenix, AZ (480) 355-0900 Atlanta, GA (770) 449-8800 Tampa, FL (813) 620-2000

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Page 1 of 1

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Litrell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	
City, State ZIP:	Midland, Tx 79705	City, State ZIP:	
Phone:	(432) 236-3849	Email:	wmather@ltenv.com, dmoir@ltenv.com

Program: ☒ UST/PST ☐ RP ☐ Brownfields ☐ RC ☐ Superfund State of Project:	
Reporting Level: ☐ Level I ☐ Level II ☐ Level III ☐ Level IV	Deliverables: EDD ☐ ADAPT ☐ Other:

Project Name:		Remuda Frac Pond		Turn Around		ANALYSIS REQUEST												Work Order Notes					
Project Number:		012919195		Routine ☐																			
P.O. Number:		Eddy		Rush: 24hr																			
Sampler's Name:		William Mather		Due Date:																			
SAMPLE RECEIPT		Temp Blank: Yes ☒ No ☐		Wet Ice: Yes ☒ No ☐														TAT starts the day received by the lab, if received by 4:30pm					
Temperature (°C):		1.2		Thermometer ID																			
Received Intact:		Yes ☒ No ☐		Correction Factor:																			
Cooler Custody Seals:		Yes ☒ No ☐		Total Containers:																			
Sample Custody Seals:		Yes ☒ No ☐																					
Sample Identification		Matrix		Date Sampled		Time Sampled		Depth		Number of Containers												Sample Comments	
PH01		s		2/21/2020		11:00		2'		1		x		x		x		discrete					
PH02		s		2/21/2020		11:03		2'		1		x		x		x		discrete					
PH03		s		2/21/2020		11:05		4'		1		x		x		x		discrete					
PH04		s		2/21/2020		11:06		3'		1		x		x		x		discrete					

Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Ti Sn U V Zn
 Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U 1631 / 245.1 / 7470 / 7471 : Hg

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control Xenco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>[Signature]</i>	<i>[Signature]</i>	2/21/20 16:13			

ATTACHMENT 3: LITHOLOGIC SOIL SAMPLE LOGS



 LT Environmental, Inc. 508 West Stevens Street Carlsbad, New Mexico 88220 Compliance · Engineering · Remediation		Identifier: BH01		Date: 11/8/19
		Project Name: Remed. Franc Pond		RP Number: 2RP-5634
LITHOLOGIC / SOIL SAMPLING LOG		Logged By: Ellie		Method: Hand Auger
		Hole Diameter:		Total Depth:
Lat/Long:		Field Screening:		
Comments:				

Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
				BH01	1	1g+	S	sand, silty clay, brown
				BH01A	2	2g+	S	sand, trace caliche, trace silt, light brown
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			

0936

0940

 LT Environmental, Inc. 508 West Stevens Street Carlsbad, New Mexico 88220 Compliance · Engineering · Remediation		Identifier: BH02	Date: 11/8/19					
		Project Name: Remuda Frac Prod	RP Number: 2RP-5634					
LITHOLOGIC / SOIL SAMPLING LOG								
Lat/Long:		Field Screening:	Logged By: Ellie Method: Hand Auger Hole Diameter: 2 in Total Depth: 28 ft					
Comments:								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
1620 M	554	0.4	N	BH02	1	8 ft	S	sand, silt, trace clay, brown to dark brown
1630 M	218	0.2	N	BH02A	2	28 ft	S	sand, silt, brown
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			

 LT Environmental, Inc. 508 West Stevens Street Carlsbad, New Mexico 88220 Compliance · Engineering · Remediation		Identifier: BH03	Date: 11/8/19					
		Project Name: Remuda Frac Pond	RP Number: 2RP-5634					
LITHOLOGIC / SOIL SAMPLING LOG		Logged By: Ellie	Method: Hand Auger					
Field Screening:		Hole Diameter: 2 in	Total Depth:					
Lat/Long:								
Comments:								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
M	>12	0.3	N	BH03	1	18t	S	sand/silt, brown
M	>12	0.4	N	BH03A	2	28t	S	sand, trace silt, brown
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			

1055
1105



LT Environmental, Inc.
508 West Stevens Street
Carlsbad, New Mexico 88220

Compliance · Engineering · Remediation

Identifier:

BH04

Date:

11/8/17

Project Name:

Remuda Fenc Pond

RP Number:

2RP-5634

LITHOLOGIC / SOIL SAMPLING LOG

Logged By: Elice

Method: Hand Auger

Lat/Long:

Field Screening:

Hole Diameter:

Total Depth:

Comments:

Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
1130 M	616	0.9	N	BH04	1	18+	S	brown, sand, silty clay
1140 M	386	0.5	N	BH04A	2	28+	S	brown, sand, silt
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			

 LT Environmental, Inc. 508 West Stevens Street Carlsbad, New Mexico 88220 Compliance · Engineering · Remediation		Identifier: BH05	Date: 11/8/19
		Project Name: Remuda Frac Pond	RP Number: 2RP-5634
LITHOLOGIC / SOIL SAMPLING LOG		Logged By: Ellie	Method: Hand Auger
Lat/Long:		Field Screening:	Hole Diameter:
Total Depth:			
Comments:			

Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
115%	M >112	0.6	N	BH05	1	18ft	S	sand, trace silt, brown
120%	M >112	0.4 0.5	N	BH05A	2	28ft	S	sand, trace silt, brown to light brown
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			

211 June 10 1 5 0 1

 LT Environmental, Inc. 25 YEARS		LT Environmental, Inc. 508 West Stevens Street Carlsbad, New Mexico 88220 Compliance · Engineering · Remediation		Identifier: BH06		Date: 11/8/19		
				Project Name: Remuda Fmc Pond		RP Number: 2RP-5634		
LITHOLOGIC / SOIL SAMPLING LOG				Logged By: Ellie		Method: Hand Auger		
Lat/Long:		Field Screening:		Hole Diameter:		Total Depth:		
Comments:								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Depth	Soil/Rock Type	Lithology/Remarks
					0			
1220	M	683	0.6	N	BH06	1	18r S	sand, silt, trace clay, brown
1230	M	179	0.6	N	BH06A	2	28r S	sand/silt, brown
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			