

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	NRM2001058690
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

IVQ71-191115-C-1410

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)	
Contact mailing address	522 W. Mermod, Carlsbad, NM 88220		

Location of Release Source

Latitude 32.560358 Longitude -103.322666
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	EMSU SWD Injection – Circulation Line	Site Type	Well Location
Date Release Discovered	11/03/2019	API# (if applicable)	30-025-04301 (Eunice Monument South Unit B #905)

Unit Letter	Section	Township	Range	County
G	23	20S	36E	LEA

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

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)	0.0	Volume Recovered (bbls)	0.0
☒ Produced Water	Volume Released (bbls)	2300.59	Volume Recovered (bbls)	1440.0
	Is the concentration of dissolved chloride 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: Lateral injection line which was a 4" steel cement line had a leak due to internal corrosion. A total of 1440 bbls of produced water was recovered by vacuum truck. Additional third party resources have been retained to assist in the remediation.

Form C-141

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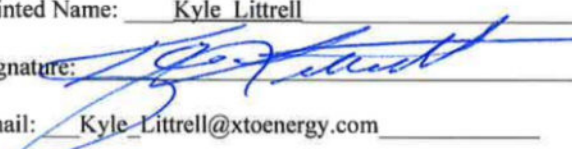
State of New Mexico
Oil Conservation Division

Incident ID	NRM2001058690
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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? YES – An unauthorized release of fluid over 25 barrels
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? YES by Amy Ruth : to emnrd-ocd-district1spills@state.nm.us; blm_nm_cfo_spill@blm.gov; Jim Griswald on November 4, 2019.	

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: N/A	
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> Signature:  email: <u>Kyle_Littrell@xtoenergy.com</u>	Title: <u>SH&E Supervisor</u> Date: <u>11/15/2019</u> Telephone: _____
<u>OCD Only</u> Received by: <u>Ramona Marcus</u> Date: <u>01/10/2020</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</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

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.

State of New Mexico
Oil Conservation Division

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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: _____ 04/01/2020 _____

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

OCD Only

Received by: _____ Date: _____

Incident ID	NRM2001058690
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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: 04/01/2020

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

April 1, 2020

New Mexico Oil Conservation Division
District I
1625 North French Drive
Hobbs, New Mexico 88240

**RE: Closure Request
EMSU SWD Injection – Circulation Line
Incident Number NRM2001058690
Lea County, New Mexico**

To Whom it May Concern:

LT Environmental, Inc. (LTE), on behalf of XTO Energy, Inc. (XTO), presents the following Closure Request detailing soil sampling and excavation activities at the EMSU SWD Injection – Circulation Line (Site) in Unit G, Section 23, Township 20 South, Range 36 East, in Lea County, New Mexico (Figure 1). The purpose of the soil sampling and excavation activities was to address impacts to soil following a release of produced water at the Site. Based on field observations, excavation activities, and soil sample laboratory analytical results, XTO is submitting this Closure Request, describing remediation that has occurred, and requesting no further action (NFA) for the release associated with Incident Number NRM2001058690.

RELEASE BACKGROUND

On November 3, 2019, a lateral injection line failed due to internal corrosion, resulting in the release of approximately 2,301 barrels (bbls) of produced water onto the pasture area surrounding the injection line. A vacuum truck was dispatched to the Site; approximately 1,440 bbls of produced water were recovered. XTO reported the release to the New Mexico Oil Conservation Division (NMOCD) on a Release Notification and Corrective Action Form C-141 (Form C-141) on November 15, 2019, and the release was subsequently assigned Incident Number NRM2001058690.

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 less than 50 feet below ground surface (bgs) based on the nearest groundwater well data. The nearest permitted groundwater well with depth to groundwater data is New Mexico Office of the State Engineer (NMOSE) well L 04506, located approximately 3,811 feet northwest of the Site. There are closer NMOSE wells to the Site; however, depth to groundwater data is not available for these groundwater wells. The groundwater well has a depth to groundwater of 50 feet bgs and a total depth of 70 feet bgs.



Ground surface elevation at the groundwater well location is approximately 3,574 feet above mean sea level (AMSL), which is approximately 1 foot higher in elevation than the Site. The closest continuously flowing water or significant watercourse to the Site is a freshwater pond located approximately 2.17 miles southwest of the Site. 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 underlain by unstable geology (low potential karst designation area). The Site receptors are depicted on Figure 1.

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): 100 mg/kg
- Chloride: 600 mg/kg

SITE ASSESSMENT AND SOIL SAMPLING ACTIVITIES

On November 14, 2019, LTE personnel inspected the Site to evaluate the release extent based on information provided on the Form C-141 and visual observations. LTE personnel collected five preliminary soil samples (SS01 through SS05) within the release extent from a depth of approximately 0.5 feet bgs to assess the lateral extent of soil impacts. 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 release extent and preliminary soil sample locations were mapped utilizing a handheld Global Positioning System (GPS) unit and are depicted on Figure 1. Photographic documentation was conducted during excavation activities. Photographs are included in Attachment 1.

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 shipped 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.



Based on field observations for preliminary soil samples SS01 and SS02, and the laboratory analytical results for preliminary soil samples for SS03 through SS05, excavation and delineation activities appeared to be warranted. Laboratory analytical results for the preliminary soil samples are presented on Figure 2 and summarized in Table 1.

EXCAVATION AND SOIL SAMPLING ACTIVITIES

From January 9 through March 27, 2020, LTE personnel oversaw excavation of impacted soil in the areas of SS01 through SS05 via track-mounted backhoe and hydrovacuum. To direct excavation activities, LTE screened soil for volatile aromatic hydrocarbons and chloride utilizing a calibrated PID and Hach® chloride QuanTab® test strips, respectively. The final excavation extent is presented on Figure 3A and Figure 3B. The majority of the excavation was 5 feet in depth, except in the areas of preliminary soil samples SS02 and SS05, where depths ranged from 5 feet to 9.5 feet bgs.

Following removal of impacted soil, LTE collected 5-point composite soil samples every 200 square feet from the sidewalls and floor of the excavation. The 5-point composite samples were collected by depositing five aliquots of soil into a 1-gallon, resealable plastic bag and homogenizing the samples by thoroughly mixing. Composite soil samples SW01 through SW63 were collected from the sidewalls of the excavation from depths ranging from the ground surface to approximately eight feet bgs. Composite soil samples FS01 through FS87, FS55A, FS56A, FS75A, and FS75B, were collected from the floor of the excavation from depths ranging from approximately four feet to 9.5 feet bgs. The excavation soil samples were collected, handled and analyzed as described above, and submitted to Xenco in Carlsbad, New Mexico.

The excavation extents measured a total of approximately 18,500 square feet in area. A total of approximately 4,023 cubic yards of impacted soil were removed from the excavation. The impacted soil was transported and properly disposed of at the R360 landfill facility located in Hobbs, New Mexico. The excavation extent and excavation soil sample locations are depicted on Figure 3A and Figure 3B.

ANALYTICAL RESULTS

Laboratory analytical results indicated that TPH concentrations exceeded the Closure Criteria in preliminary soil samples SS03 through SS05, collected at a depth of approximately 0.5 feet bgs. Based on field observations for preliminary soil samples SS01 and SS02, and the laboratory analytical results for preliminary soil samples SS03 through SS05, impacted soil was excavated in these areas.

Following excavation of impacted soil, excavation soil samples were collected from the sidewalls and floor of the excavation. Laboratory analytical results indicated that TPH and/or chloride concentrations exceeded the Closure Criteria in excavation soil samples FS55, FS56, FS75A, SW31, SW32, SW50, and SW60, collected at depths ranging from the ground surface and approximately

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8.5 feet bgs. Further excavation of impacted soil appeared to be warranted in these areas, and confirmation soil samples FS55A, FS56A, FS75B, SW61, SW62, and SW63, collected at depths ranging from the ground surface to approximately 9.5 feet bgs, confirmed the absence of impacts in these areas. Laboratory analytical results indicated that benzene, BTEX, TPH, and chloride concentrations were compliant with the Closure Criteria in all confirmation floor samples. Laboratory analytical results are summarized in Table 1, and the complete laboratory analytical reports are included in Attachment 2.

CONCLUSIONS

A total of approximately 4,023 cubic yards of impacted soil were excavated from the Site during remediation activities. Laboratory analytical results indicated that benzene, BTEX, TPH, and chloride concentrations are compliant with Closure Criteria in all confirmation soil samples collected from the final excavation extent.

Based on initial response efforts, excavation of impacted soil, and laboratory analytical results compliant with the Closure Criteria, XTO respectfully requests NFA the release associated with Incident Number NRM2001058690. Upon approval of this Closure Request, XTO will backfill the excavation with material purchased locally and recontour the Site to match pre-existing site conditions.

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

Sincerely,

LT ENVIRONMENTAL, INC.

Tacoma Morrissey
Project Geologist

Ashley L. Ager, P.G.
Senior Geologist

cc: Kyle Littrell, XTO
United States Bureau of Land Management – New Mexico
Robert Hamlet, NMOCD
Victoria Venegas, NMOCD



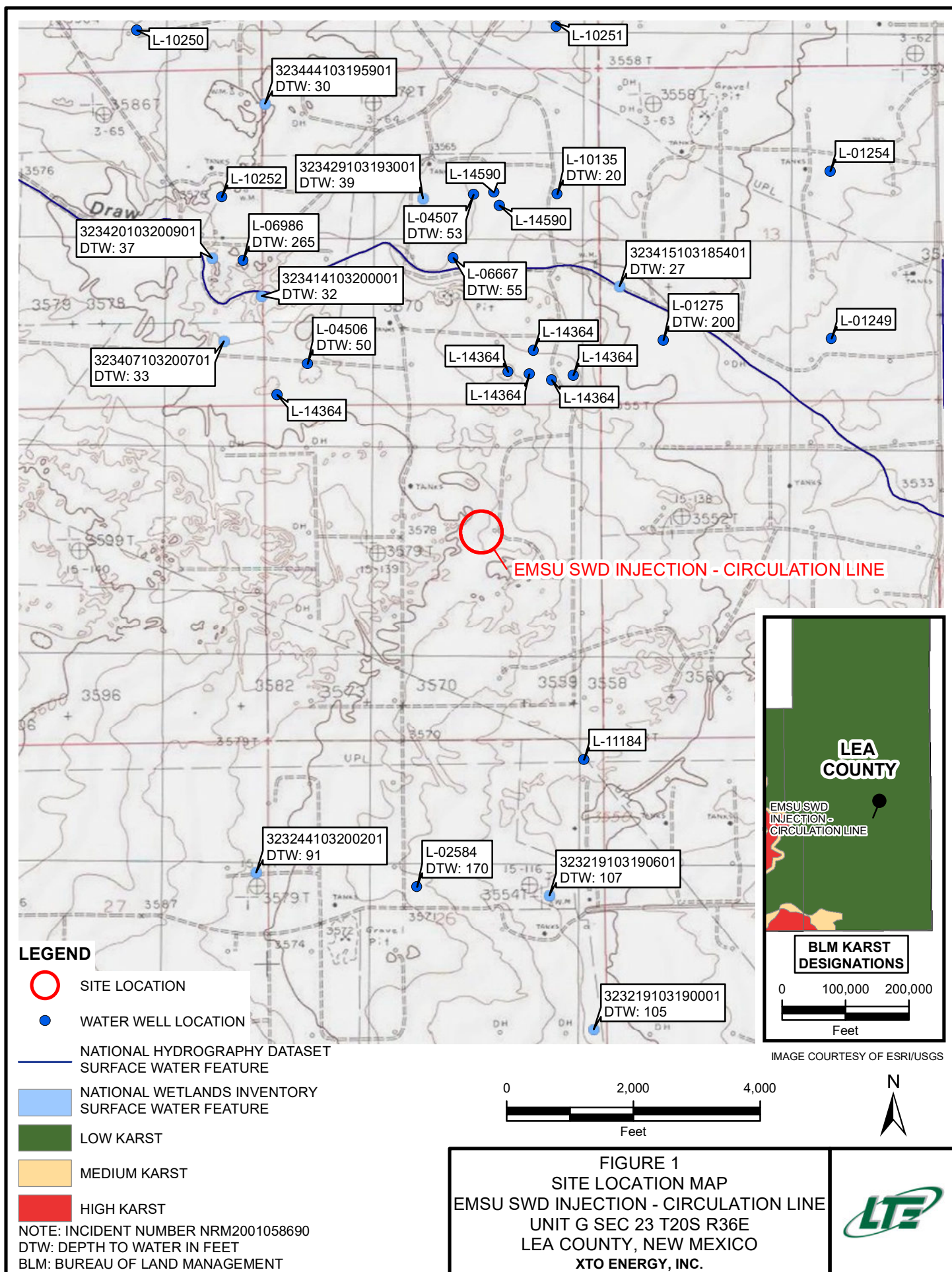
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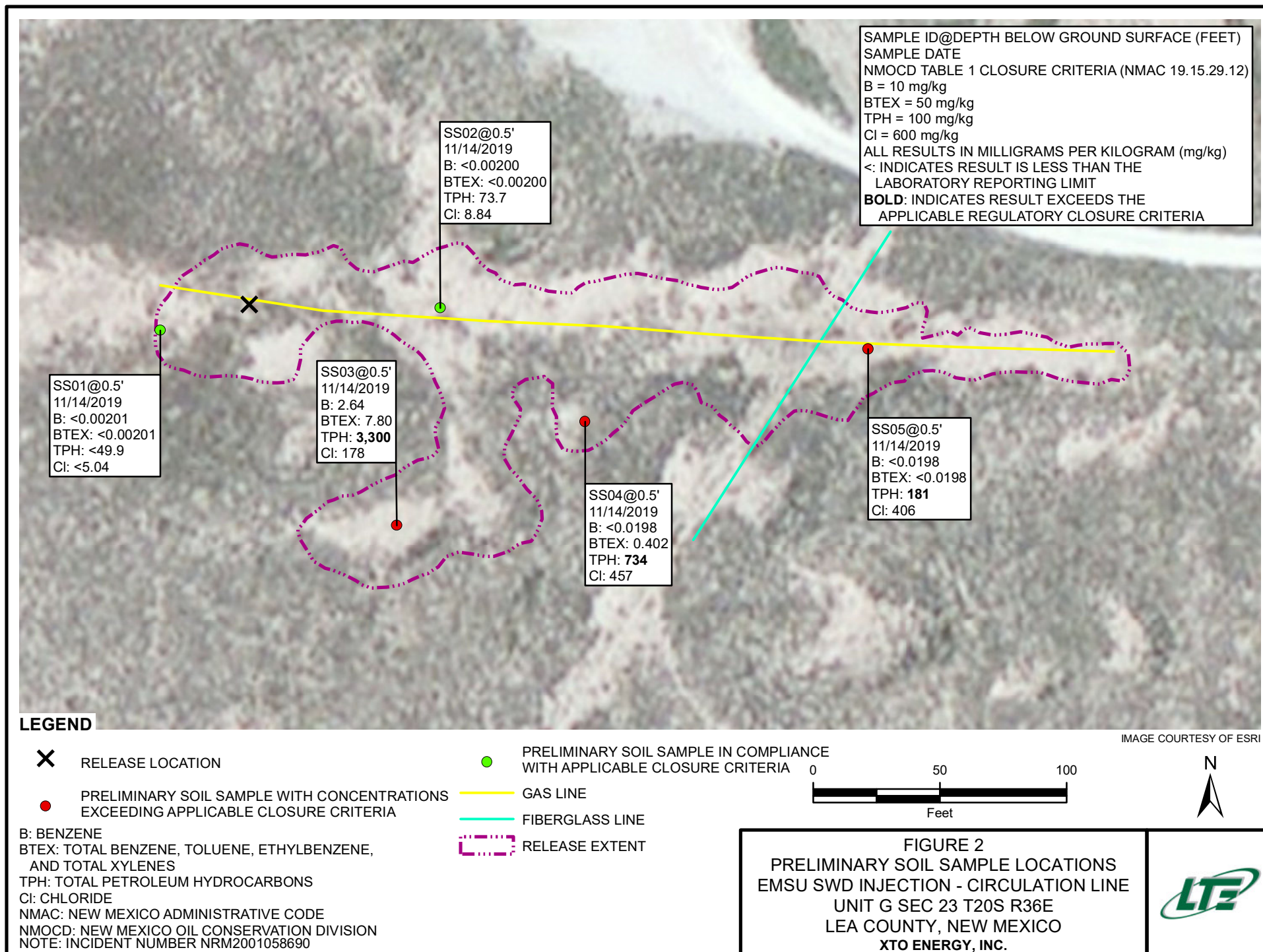
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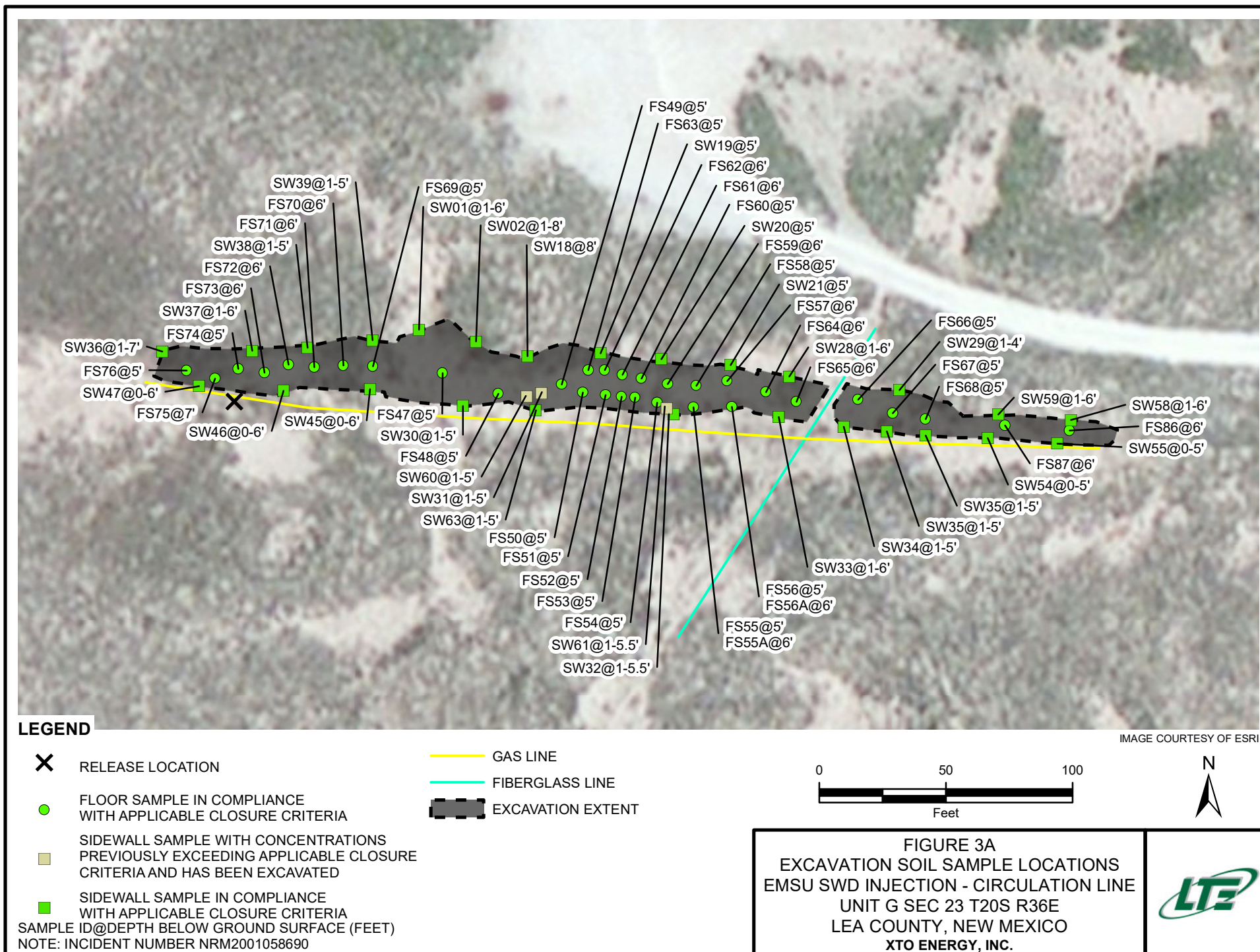
- Figure 1 Site Location Map
- Figure 2 Preliminary Soil Sample Locations
- Figure 3A Excavation Soil Sample Locations
- Figure 3B Excavation Soil Sample Locations
- Table 1 Soil Analytical Report
- Attachment 1 Photographic Log
- Attachment 2 Laboratory Analytical Reports

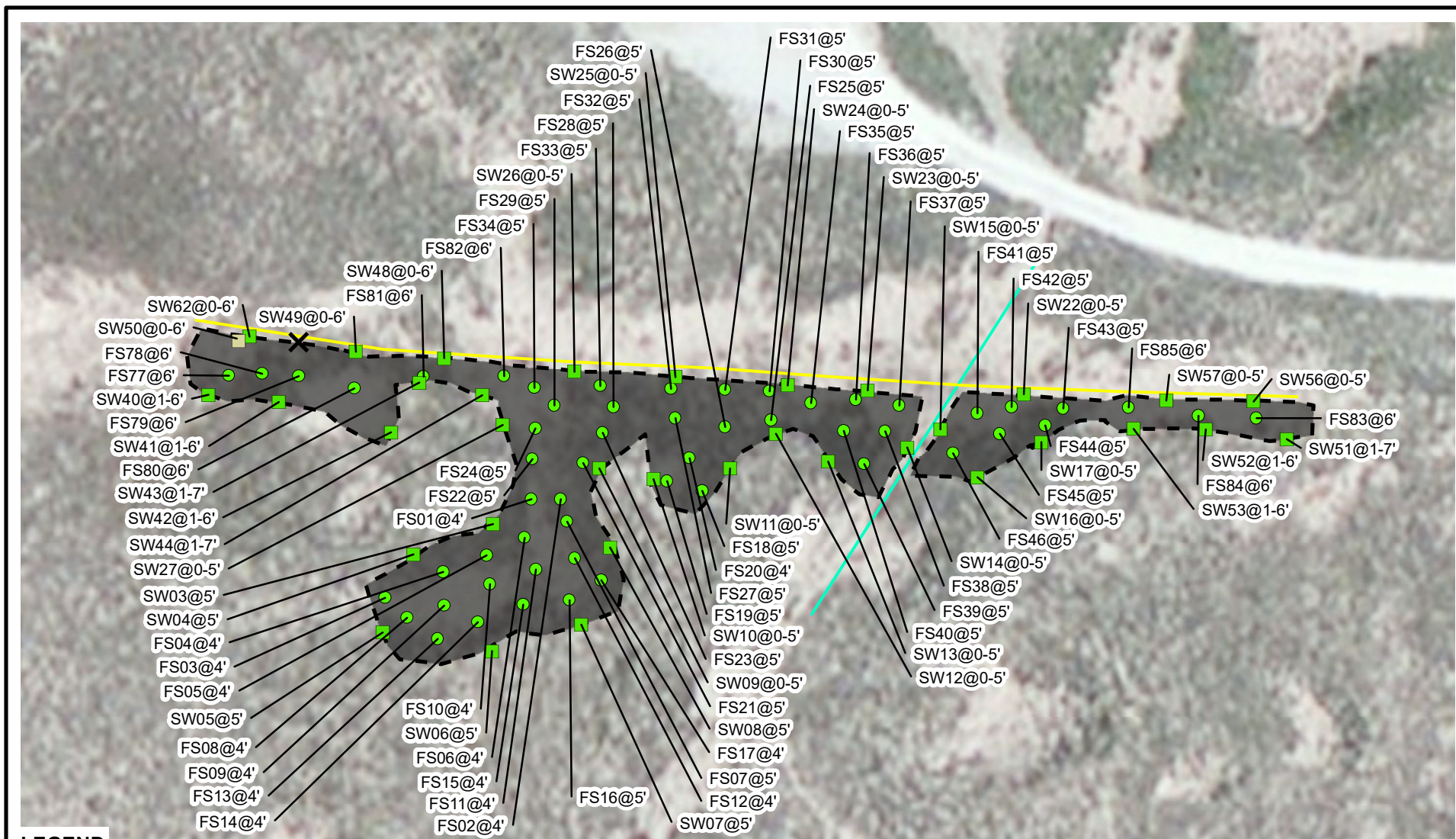
FIGURES









**LEGEND**

RELEASE LOCATION

SIDEWALL SAMPLE IN COMPLIANCE
WITH APPLICABLE CLOSURE CRITERIASIDEWALL SAMPLE WITH CONCENTRATIONS
PREVIOUSLY EXCEEDING APPLICABLE CLOSURE
CRITERIA AND HAS BEEN EXCAVATEDFLOOR SAMPLE IN COMPLIANCE
WITH APPLICABLE CLOSURE CRITERIA

SAMPLE ID@DEPTH BELOW GROUND SURFACE (FEET)

NOTE: INCIDENT NUMBER NRM2001058690

— GAS LINE

— FIBERGLASS LINE



EXCAVATION EXTENT

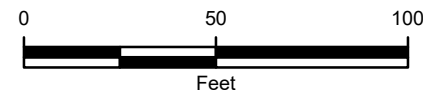


IMAGE COURTESY OF ESRI



FIGURE 3B
EXCAVATION SOIL SAMPLE LOCATIONS
 EMSU SWD INJECTION - CIRCULATION LINE
 UNIT G SEC 23 T20S R36E
 LEA COUNTY, NEW MEXICO
XTO ENERGY, INC.



TABLES



TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
SS01	0.5	11/14/2019	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.9	<49.9	<49.9	<49.9	<49.9	<5.04
SS02	0.5	11/14/2019	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	73.7	<50.0	73.7	73.7	8.84
SS03	0.5	11/14/2019	2.64	0.330	1.15	3.68	7.80	718	2,580	<249	3,300	3,300	178
SS04	0.5	11/14/2019	<0.0198	0.0515	<0.0198	0.350	0.402	85.7	582	66.2	668	734	457
SS05	0.5	11/14/2019	<0.0198	<0.0198	<0.0198	<0.0198	<0.0198	<50.0	181	<50.0	181	181	406
FS01	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	400
FS02	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	471
FS03	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.0	<50.0	<50.0	<50.0	<50.0	476
FS04	4	01/13/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.3	<50.3	<50.3	<50.3	<50.3	417
FS05	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	238
FS06	4	01/13/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	293
FS07	5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.3	<50.3	<50.3	<50.3	<50.3	436
FS08	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.3	<50.3	<50.3	<50.3	<50.3	530
FS09	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	296
FS10	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.3	<50.3	<50.3	<50.3	<50.3	147
FS11	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	239
FS12	4	01/13/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	481
FS13	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	281
FS14	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	171
FS15	4	01/13/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	274
FS16	5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	226
FS17	4	01/13/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	571
FS18	5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<49.9	<49.9	<49.9	<49.9	<49.9	99.3
FS19	5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	79.7
FS20	4	01/15/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	480
FS21	5	01/15/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.0	<50.0	<50.0	<50.0	<50.0	348
FS22	5	01/15/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.0	<50.0	<50.0	<50.0	<50.0	287
FS23	5	01/15/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	425



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TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
FS24	5	01/15/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.3	<50.3	<50.3	<50.3	<50.3	302
FS25	5	01/16/2020	0.0388	0.035	0.032	0.0933	0.199	<50.0	<50.0	<50.0	<50.0	<50.0	177
FS26	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	90.5
FS27	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	149
FS28	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.3	<50.3	<50.3	<50.3	<50.3	117
FS29	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.3	57.9	<50.3	57.9	57.9	260
FS30	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	<50.1	<50.1	<50.1	<50.1	180
FS31	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.9	<49.9	<49.9	<49.9	<49.9	125
FS32	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	105
FS33	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	107
FS34	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.0	<50.0	<50.0	<50.0	<50.0	158
FS35	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.3	<50.3	<50.3	<50.3	<50.3	98.6
FS36	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.9	<49.9	<49.9	<49.9	<49.9	114
FS37	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	173
FS38	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	36.8
FS39	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.0	<50.0	<50.0	<50.0	<50.0	39.9
FS40	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	37.2
FS41	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	418
FS42	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.3	<50.3	<50.3	<50.3	<50.3	326
FS43	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	465
FS44	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.3	<50.3	<50.3	<50.3	<50.3	572
FS45	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	388
FS46	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	162
FS47	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	185
FS48	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.2	<50.2	<50.2	<50.2	<50.2	372
FS49	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	364
FS50	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.3	<50.3	<50.3	<50.3	<50.3	315
FS51	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	462



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TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
FS52	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<49.9	<49.9	<49.9	<49.9	<49.9	492
FS53	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	554
FS54	5	01/16/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<49.8	<49.8	<49.8	<49.8	<49.8	569
FS55	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.0	<50.0	<50.0	<50.0	<50.0	672
FS55A	6	01/20/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.9	<49.9	<49.9	<49.9	<49.9	363
FS56	5	01/16/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	729
FS56A	6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	259
FS57	6	01/20/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	421
FS58	6	01/20/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.1	<50.1	<50.1	<50.1	<50.1	268
FS59	6	01/20/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	248
FS60	5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	247
FS61	6	01/20/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.3	<50.3	<50.3	<50.3	<50.3	83.3
FS62	6	01/20/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.0	<50.0	<50.0	<50.0	<50.0	64.1
FS63	5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	239
FS64	6	01/20/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.3	<50.3	<50.3	<50.3	<50.3	265
FS65	6	01/20/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	398
FS66	5	01/20/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.3	<50.3	<50.3	<50.3	<50.3	249
FS67	5	01/20/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.8	<49.8	<49.8	<49.8	<49.8	343
FS68	5	01/20/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.2	<50.2	<50.2	<50.2	<50.2	380
FS69	5	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.8	<49.8	<49.8	<49.8	<49.8	337
FS70	6	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.9	<49.9	<49.9	<49.9	<49.9	215
FS71	6	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.8	<49.8	<49.8	<49.8	<49.8	202
FS72	6	01/22/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.8	<49.8	<49.8	<49.8	<49.8	235
FS73	6	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.0	<50.0	<50.0	<50.0	<50.0	224
FS74	5	01/22/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.0	<50.0	<50.0	<50.0	<50.0	197
FS75	7	01/22/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<49.9	<49.9	<49.9	<49.9	<49.9	502
FS75A	8.5	02/14/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	777



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TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
FS75B	9.5	02/20/2020	<0.00197	<0.00197	<0.00197	<0.00197	<0.00197	<49.9	<49.9	<49.9	<49.9	<49.9	460
FS76	5	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	193
FS77	6	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	135
FS78	6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	40.0
FS79	6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	212
FS80	6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	225
FS81	6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	366
FS82	6	01/22/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.9	<49.9	<49.9	<49.9	<49.9	369
FS83	6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.3	<50.3	<50.3	<50.3	<50.3	411
FS84	6	01/23/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	168
FS85	6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.9	<49.9	<49.9	<49.9	<49.9	442
FS86	6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	272
FS87	6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	215
SW01	1 - 6	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	<50.1	<50.1	<50.1	<50.1	214
SW02	1 - 8	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	28.1
SW03	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.8	<49.8	<49.8	<49.8	<49.8	447
SW04	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.8	<49.8	<49.8	<49.8	<49.8	547
SW05	5	01/16/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.8	<49.8	<49.8	<49.8	<49.8	390
SW06	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.9	<49.9	<49.9	<49.9	<49.9	165
SW07	5	01/16/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.0	<50.0	<50.0	<50.0	<50.0	102
SW08	5	01/16/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	73.9	<50.0	73.9	73.9	373
SW09	0 - 5	01/17/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.3	<50.3	<50.3	<50.3	<50.3	353
SW10	0 - 5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	176
SW11	0 - 5	01/17/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.9	<49.9	<49.9	<49.9	<49.9	86.0
SW12	0 - 5	01/17/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.1	<50.1	<50.1	<50.1	<50.1	355
SW13	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.3	<50.3	<50.3	<50.3	<50.3	386
SW14	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	374



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TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
SW15	0 - 5	01/17/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	514
SW16	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	529
SW17	0 - 5	01/17/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	<50.1	<50.1	<50.1	<50.1	334
SW18	8	01/17/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.2	<50.2	<50.2	<50.2	<50.2	57.2
SW19	5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.1	<50.1	<50.1	<50.1	<50.1	85.4
SW20	5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.1	<50.1	<50.1	<50.1	<50.1	139
SW21	5	01/17/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	101
SW22	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.1	<50.1	<50.1	<50.1	<50.1	186
SW23	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.1	<50.1	<50.1	<50.1	<50.1	133
SW24	0 - 5	01/17/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	53.4	<50.2	53.4	53.4	360
SW25	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	388
SW26	0 - 5	01/17/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<49.8	<49.8	<49.8	<49.8	<49.8	382
SW27	0 - 5	01/17/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	111
SW28	1 - 6	01/20/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.0	<50.0	<50.0	<50.0	<50.0	377
SW29	1 - 4	01/20/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	173
SW30	1 - 5	01/21/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	<50.1	<50.1	<50.1	<50.1	444
SW31	1 - 5	01/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	282	<50.2	282	282	312
SW32	1 - 5.5	01/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	133	<50.2	133	133	402
SW33	1 - 6	01/21/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.2	<50.2	<50.2	<50.2	<50.2	286
SW34	1 - 5	01/21/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	284
SW35	1 - 5	01/21/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.9	<49.9	<49.9	<49.9	<49.9	120
SW36	1 - 7	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	151
SW37	1 - 6	01/22/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.3	<50.3	<50.3	<50.3	<50.3	175
SW38	1 - 5	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.0	<50.0	<50.0	<50.0	<50.0	32.6
SW39	1 - 5	01/22/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.0	<50.0	<50.0	<50.0	<50.0	149
SW40	1 - 6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.2	<50.2	<50.2	<50.2	<50.2	54.8
SW41	1 - 6	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	172



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TABLE 1
SOIL ANALYTICAL RESULTS

EMSU SWD INJECTION - CIRCULATION LINE
INCIDENT NUMBER NRM2001058690
LEA 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	NE	100	600
SW42	1 - 6	01/22/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.2	<50.2	<50.2	<50.2	<50.2	11.2
SW43	1 - 7	01/22/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.3	<50.3	<50.3	<50.3	<50.3	215
SW44	1 - 7	01/22/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.2	<50.2	<50.2	<50.2	<50.2	42.5
SW45	0 - 6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	355
SW46	0 - 6	01/23/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	<50.1	<50.1	<50.1	<50.1	401
SW47	0 - 6	01/23/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<50.1	90.7	<50.1	90.7	90.7	447
SW48	0 - 6	01/23/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<50.1	<50.1	<50.1	<50.1	<50.1	318
SW49	0 - 6	01/23/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<50.1	<50.1	<50.1	<50.1	<50.1	171
SW50	0 - 6	01/23/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.9	<49.9	<49.9	<49.9	<49.9	666
SW51	1 - 7	01/23/2020	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	<49.9	<49.9	<49.9	<49.9	<49.9	105
SW52	1 - 6	01/23/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.0	<50.0	<50.0	<50.0	<50.0	327
SW53	1 - 6	01/23/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.9	<49.9	<49.9	<49.9	<49.9	230
SW54	0 - 5	01/23/2020	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	<49.9	<49.9	<49.9	<49.9	<49.9	279
SW55	0 - 5	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.1	<50.1	<50.1	<50.1	<50.1	279
SW56	0 - 5	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<49.8	<49.8	<49.8	<49.8	<49.8	83.2
SW57	0 - 5	01/23/2020	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	<49.9	<49.9	<49.9	<49.9	<49.9	15.2
SW58	1 - 6	01/23/2020	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	<50.2	<50.2	<50.2	<50.2	<50.2	258
SW59	1 - 6	01/23/2020	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<50.3	<50.3	<50.3	<50.3	<50.3	204
SW60	1 - 5	02/14/2020	<0.00952	<0.00952	<0.00952	<0.00952	<0.00952	<49.8	430	<49.8	430	430	365
SW61	1 - 5.5	02/14/2020	<0.00952	<0.00952	<0.00952	0.0166	0.0166	<49.8	<49.8	<49.8	<49.8	<49.8	105
SW62	0 - 6	02/14/2020	<0.00980	<0.00980	<0.00980	<0.00980	<0.00980	<49.9	<49.9	<49.9	<49.9	<49.9	184
SW63	1 - 5	03/27/2020	N/A	N/A	N/A	N/A	N/A	<49.8	<49.8	<49.8	<49.8	<49.8	N/A
NMOCD Table 1 Closure Criteria			10	NE	NE	NE	50	NE	NE	NE	NE	100	600

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

N/A - sample was not analyzed for this constituent



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ATTACHMENT 1: PHOTOGRAPHIC LOG



PHOTOGRAPHIC LOG



Northern view of final excavation extent in during confirmation soil sampling activities.



Northwestern view of final excavation extent during confirmation soil sampling activities.

PHOTOGRAPHIC LOG



Southern view of final excavation extent in during confirmation soil sampling activities.



Eastern view of final excavation extent during confirmation soil sampling activities.

ATTACHMENT 2: LABORATORY ANALYTICAL REPORTS



Analytical Report 643322

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

20-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)



20-NOV-19

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **643322**

EMSU SWD Injection

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) 643322. 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. 643322 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 643322****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SS01	S	11-14-19 13:05	0.5 ft	643322-001
SS02	S	11-14-19 13:25	0.5 ft	643322-002
SS03	S	11-14-19 13:45	0.5 ft	643322-003
SS04	S	11-14-19 14:05	0.5 ft	643322-004
SS05	S	11-14-19 14:25	0.5 ft	643322-005

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 643322Report Date: 20-NOV-19
Date Received: 11/14/2019**Sample receipt non conformances and comments:**

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3107858 BTEX by EPA 8021B

Benzene, Ethylbenzene, Toluene, m,p-Xylenes , o-Xylene Relative Percent Difference (RPD) between matrix spike and duplicate were above quality control limits.

Samples in the analytical batch are: 643322-001, -002, -003, -004, -005

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

Lab Sample ID 643322-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD).

Benzene, Ethylbenzene, Toluene, m,p-Xylenes , o-Xylene recovered below QC limits in the Matrix Spike.

Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 643322-001, -002, -003, -004, -005.

The Laboratory Control Sample for Toluene, m,p-Xylenes , Benzene, Ethylbenzene, o-Xylene is within laboratory Control Limits, therefore the data was accepted.

Surrogate 1,4-Difluorobenzene recovered above QC limits. Matrix interferences is suspected.

Samples affected are: 643322-003.

Surrogate 4-Bromofluorobenzene recovered above QC limits. Matrix interferences is suspected.

Samples affected are: 643322-005,643322-004,643322-003.

Due to the matrix, initial run for samples 003,004 & 005 were performed at a dilution of 10X.



Certificate of Analysis Summary 643322

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location: Eddy County

Date Received in Lab: Thu Nov-14-19 04:42 pm

Report Date: 20-NOV-19

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	643322-001	643322-002	643322-003	643322-004	643322-005	
	Field Id:	SS01	SS02	SS03	SS04	SS05	
	Depth:	0.5- ft	0.5- ft	0.5- ft	0.5- ft	0.5- ft	
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	
	Sampled:	Nov-14-19 13:05	Nov-14-19 13:25	Nov-14-19 13:45	Nov-14-19 14:05	Nov-14-19 14:25	
BTEX by EPA 8021B SUB: T104704400-19-19	Extracted:	Nov-18-19 14:30	Nov-18-19 14:30	Nov-18-19 14:30	Nov-18-19 14:30	Nov-18-19 14:30	
	Analyzed:	Nov-18-19 21:13	Nov-18-19 21:33	Nov-18-19 22:52	Nov-18-19 23:12	Nov-18-19 23:32	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Benzene		<0.00201 0.00201	<0.00200 0.00200	2.64 0.0199	<0.0198 0.0198	<0.0198 0.0198	
Toluene		<0.00201 0.00201	<0.00200 0.00200	0.330 0.0199	0.0515 0.0198	<0.0198 0.0198	
Ethylbenzene		<0.00201 0.00201	<0.00200 0.00200	1.15 0.0199	<0.0198 0.0198	<0.0198 0.0198	
m,p-Xylenes		<0.00402 0.00402	<0.00400 0.00400	2.74 0.0398	0.142 0.0397	<0.0396 0.0396	
o-Xylene		<0.00201 0.00201	<0.00200 0.00200	0.939 0.0199	0.208 0.0198	<0.0198 0.0198	
Total Xylenes		<0.00201 0.00201	<0.00200 0.00200	3.68 0.0199	0.350 0.0198	<0.0198 0.0198	
Total BTEX		<0.00201 0.00201	<0.00200 0.00200	7.80 0.0199	0.402 0.0198	<0.0198 0.0198	
Chloride by EPA 300 SUB: T104704400-19-19	Extracted:	Nov-19-19 08:30	Nov-19-19 08:30	Nov-19-19 08:30	Nov-19-19 08:30	Nov-19-19 08:30	
	Analyzed:	Nov-19-19 09:06	Nov-19-19 10:39	Nov-19-19 09:26	Nov-19-19 09:33	Nov-19-19 09:40	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Chloride		<5.04 5.04	8.84 4.99	178 4.99	457 4.95	406 4.96	
TPH by SW8015 Mod SUB: T104704400-19-19	Extracted:	Nov-18-19 10:00	Nov-18-19 10:00	Nov-18-19 10:00	Nov-18-19 10:00	Nov-18-19 10:00	
	Analyzed:	Nov-18-19 12:50	Nov-18-19 13:53	Nov-18-19 14:14	Nov-18-19 14:34	Nov-18-19 14:55	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Gasoline Range Hydrocarbons (GRO)		<49.9 49.9	<50.0 50.0	718 249	85.7 49.9	<50.0 50.0	
Diesel Range Organics (DRO)		<49.9 49.9	73.7 50.0	2580 249	582 49.9	181 50.0	
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<50.0 50.0	<249 249	66.2 49.9	<50.0 50.0	
Total GRO-DRO		<49.9 49.9	73.7 50.0	3300 249	668 49.9	181 50.0	
Total TPH		<49.9 49.9	73.7 50.0	3300 249	734 49.9	181 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

Jessica Kramer
Project Assistant



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS01** Matrix: Soil Date Received: 11.14.19 16.42
 Lab Sample Id: 643322-001 Date Collected: 11.14.19 13.05 Sample Depth: 0.5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 11.19.19 08.30 Basis: Wet Weight
 Seq Number: 3108000 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<5.04	5.04	mg/kg	11.19.19 09.06	U	1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 11.18.19 10.00 Basis: Wet Weight
 Seq Number: 3107930 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	11.18.19 12.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	11.18.19 12.50	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	11.18.19 12.50	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	11.18.19 12.50	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	11.18.19 12.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	11.18.19 12.50	
o-Terphenyl	84-15-1	96	%	70-135	11.18.19 12.50	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS01**
 Lab Sample Id: 643322-001

Matrix: Soil
 Date Collected: 11.14.19 13.05

Date Received: 11.14.19 16.42
 Sample Depth: 0.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 11.18.19 14.30

Basis: Wet Weight

Seq Number: 3107858

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	11.18.19 21.13	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
Total BTEX		<0.00201	0.00201	mg/kg	11.18.19 21.13	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	108	%	70-130	11.18.19 21.13		
4-Bromofluorobenzene	460-00-4	103	%	70-130	11.18.19 21.13		



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS02** Matrix: Soil Date Received: 11.14.19 16.42
 Lab Sample Id: 643322-002 Date Collected: 11.14.19 13.25 Sample Depth: 0.5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 11.19.19 08.30 Basis: Wet Weight
 Seq Number: 3108000 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	8.84	4.99	mg/kg	11.19.19 10.39		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 11.18.19 10.00 Basis: Wet Weight
 Seq Number: 3107930 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	11.18.19 13.53	U	1
Diesel Range Organics (DRO)	C10C28DRO	73.7	50.0	mg/kg	11.18.19 13.53		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	11.18.19 13.53	U	1
Total GRO-DRO	PHC628	73.7	50.0	mg/kg	11.18.19 13.53		1
Total TPH	PHC635	73.7	50.0	mg/kg	11.18.19 13.53		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	11.18.19 13.53	
o-Terphenyl	84-15-1	111	%	70-135	11.18.19 13.53	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS02**
 Lab Sample Id: 643322-002

Matrix: Soil
 Date Collected: 11.14.19 13.25

Date Received: 11.14.19 16.42
 Sample Depth: 0.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 11.18.19 14.30

Basis: Wet Weight

Seq Number: 3107858

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	11.18.19 21.33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	11.18.19 21.33	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	107	%	70-130	11.18.19 21.33		
4-Bromofluorobenzene	460-00-4	110	%	70-130	11.18.19 21.33		



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS03** Matrix: Soil Date Received: 11.14.19 16.42
 Lab Sample Id: 643322-003 Date Collected: 11.14.19 13.45 Sample Depth: 0.5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: CHE % Moisture:
 Analyst: CHE Date Prep: 11.19.19 08.30 Basis: Wet Weight
 Seq Number: 3108000 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	178	4.99	mg/kg	11.19.19 09.26		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DVM % Moisture:
 Analyst: ARM Date Prep: 11.18.19 10.00 Basis: Wet Weight
 Seq Number: 3107930 SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	718	249	mg/kg	11.18.19 14.14		5
Diesel Range Organics (DRO)	C10C28DRO	2580	249	mg/kg	11.18.19 14.14		5
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<249	249	mg/kg	11.18.19 14.14	U	5
Total GRO-DRO	PHC628	3300	249	mg/kg	11.18.19 14.14		5
Total TPH	PHC635	3300	249	mg/kg	11.18.19 14.14		5

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	126	%	70-135	11.18.19 14.14	
o-Terphenyl	84-15-1	123	%	70-135	11.18.19 14.14	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS03**
 Lab Sample Id: 643322-003

Matrix: Soil
 Date Collected: 11.14.19 13.45

Date Received: 11.14.19 16.42
 Sample Depth: 0.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 11.18.19 14.30

Basis: Wet Weight

Seq Number: 3107858

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	2.64	0.0199	mg/kg	11.18.19 22.52		10
Toluene	108-88-3	0.330	0.0199	mg/kg	11.18.19 22.52		10
Ethylbenzene	100-41-4	1.15	0.0199	mg/kg	11.18.19 22.52		10
m,p-Xylenes	179601-23-1	2.74	0.0398	mg/kg	11.18.19 22.52		10
o-Xylene	95-47-6	0.939	0.0199	mg/kg	11.18.19 22.52		10
Total Xylenes	1330-20-7	3.68	0.0199	mg/kg	11.18.19 22.52		10
Total BTEX		7.80	0.0199	mg/kg	11.18.19 22.52		10
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	148	%	70-130	11.18.19 22.52	**	
4-Bromofluorobenzene	460-00-4	367	%	70-130	11.18.19 22.52	**	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS04**
Lab Sample Id: 643322-004

Matrix: Soil
Date Collected: 11.14.19 14.05

Date Received: 11.14.19 16.42
Sample Depth: 0.5 ft

Analytical Method: Chloride by EPA 300

Tech: CHE

Analyst: CHE

Seq Number: 3108000

Date Prep: 11.19.19 08.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	457	4.95	mg/kg	11.19.19 09.33		1

Analytical Method: TPH by SW8015 Mod

Tech: DVM

Analyst: ARM

Seq Number: 3107930

Date Prep: 11.18.19 10.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	85.7	49.9	mg/kg	11.18.19 14.34		1
Diesel Range Organics (DRO)	C10C28DRO	582	49.9	mg/kg	11.18.19 14.34		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	66.2	49.9	mg/kg	11.18.19 14.34		1
Total GRO-DRO	PHC628	668	49.9	mg/kg	11.18.19 14.34		1
Total TPH	PHC635	734	49.9	mg/kg	11.18.19 14.34		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	126	%	70-135	11.18.19 14.34	
o-Terphenyl	84-15-1	118	%	70-135	11.18.19 14.34	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS04**
Lab Sample Id: 643322-004

Matrix: Soil
Date Collected: 11.14.19 14.05

Date Received: 11.14.19 16.42
Sample Depth: 0.5 ft

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3107858

Prep Method: SW5030B

% Moisture:

Date Prep: 11.18.19 14.30

Basis: Wet Weight

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.0198	0.0198	mg/kg	11.18.19 23.12	U	10
Toluene	108-88-3	0.0515	0.0198	mg/kg	11.18.19 23.12		10
Ethylbenzene	100-41-4	<0.0198	0.0198	mg/kg	11.18.19 23.12	U	10
m,p-Xylenes	179601-23-1	0.142	0.0397	mg/kg	11.18.19 23.12		10
o-Xylene	95-47-6	0.208	0.0198	mg/kg	11.18.19 23.12		10
Total Xylenes	1330-20-7	0.350	0.0198	mg/kg	11.18.19 23.12		10
Total BTEX		0.402	0.0198	mg/kg	11.18.19 23.12		10
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	145	%	70-130	11.18.19 23.12	**	
1,4-Difluorobenzene	540-36-3	118	%	70-130	11.18.19 23.12		



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS05**
Lab Sample Id: 643322-005

Matrix: Soil
Date Collected: 11.14.19 14.25

Date Received: 11.14.19 16.42
Sample Depth: 0.5 ft

Analytical Method: Chloride by EPA 300

Tech: CHE

Analyst: CHE

Seq Number: 3108000

Date Prep: 11.19.19 08.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	406	4.96	mg/kg	11.19.19 09.40		1

Analytical Method: TPH by SW8015 Mod

Tech: DVM

Analyst: ARM

Seq Number: 3107930

Date Prep: 11.18.19 10.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	11.18.19 14.55	U	1
Diesel Range Organics (DRO)	C10C28DRO	181	50.0	mg/kg	11.18.19 14.55		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	11.18.19 14.55	U	1
Total GRO-DRO	PHC628	181	50.0	mg/kg	11.18.19 14.55		1
Total TPH	PHC635	181	50.0	mg/kg	11.18.19 14.55		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	119	%	70-135	11.18.19 14.55	
o-Terphenyl	84-15-1	118	%	70-135	11.18.19 14.55	



Certificate of Analytical Results 643322

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SS05**
 Lab Sample Id: 643322-005

Matrix: Soil
 Date Collected: 11.14.19 14.25

Date Received: 11.14.19 16.42
 Sample Depth: 0.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 11.18.19 14.30

Basis: Wet Weight

Seq Number: 3107858

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
Toluene	108-88-3	<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
Ethylbenzene	100-41-4	<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
m,p-Xylenes	179601-23-1	<0.0396	0.0396	mg/kg	11.18.19 23.32	U	10
o-Xylene	95-47-6	<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
Total Xylenes	1330-20-7	<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
Total BTEX		<0.0198	0.0198	mg/kg	11.18.19 23.32	U	10
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	141	%	70-130	11.18.19 23.32	**	
1,4-Difluorobenzene	540-36-3	121	%	70-130	11.18.19 23.32		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3108000

MB Sample Id: 7690623-1-BLK

Matrix: Solid

LCS Sample Id: 7690623-1-BKS

Prep Method: E300P

Date Prep: 11.19.19

LCSD Sample Id: 7690623-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.858	250	247	99	247	99	90-110	0	20	mg/kg	11.19.19 08:53	

Analytical Method: Chloride by EPA 300

Seq Number: 3108000

Parent Sample Id: 643322-001

Matrix: Soil

MS Sample Id: 643322-001 S

Prep Method: E300P

Date Prep: 11.19.19

MSD Sample Id: 643322-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	1.28	252	257	101	255	101	90-110	1	20	mg/kg	11.19.19 09:13	

Analytical Method: Chloride by EPA 300

Seq Number: 3108000

Parent Sample Id: 643322-002

Matrix: Soil

MS Sample Id: 643322-002 S

Prep Method: E300P

Date Prep: 11.19.19

MSD Sample Id: 643322-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	8.84	250	254	98	250	96	90-110	2	20	mg/kg	11.19.19 10:46	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107930

MB Sample Id: 7690515-1-BLK

Matrix: Solid

LCS Sample Id: 7690515-1-BKS

Prep Method: SW8015P

Date Prep: 11.18.19

LCSD Sample Id: 7690515-1-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	1030	103	1050	105	70-135	2	20	mg/kg	11.18.19 12:08	
Diesel Range Organics (DRO)	<50.0	1000	994	99	1040	104	70-135	5	20	mg/kg	11.18.19 12:08	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	99		103		106		70-135	%	11.18.19 12:08
o-Terphenyl	101		84		99		70-135	%	11.18.19 12:08

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107930

Matrix: Solid

MB Sample Id: 7690515-1-BLK

Prep Method: SW8015P

Date Prep: 11.18.19

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	11.18.19 11:47	

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3107930

Parent Sample Id: 643322-001

Matrix: Soil

MS Sample Id: 643322-001 S

Prep Method: SW8015P

Date Prep: 11.18.19

MSD Sample Id: 643322-001 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	999	1110	111	1130	113	70-135	2	20	mg/kg	11.18.19 13:11	
Diesel Range Organics (DRO)	40.0	999	1130	109	1110	107	70-135	2	20	mg/kg	11.18.19 13:11	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	117		116		70-135	%	11.18.19 13:11
o-Terphenyl	104		104		70-135	%	11.18.19 13:11

Analytical Method: BTEX by EPA 8021B

Seq Number: 3107858

MB Sample Id: 7690565-1-BLK

Matrix: Solid

LCS Sample Id: 7690565-1-BKS

Prep Method: SW5030B

Date Prep: 11.18.19

LCSD Sample Id: 7690565-1-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	0.110	110	0.111	111	70-130	1	35	mg/kg	11.18.19 16:33	
Toluene	<0.00200	0.100	0.104	104	0.108	108	70-130	4	35	mg/kg	11.18.19 16:33	
Ethylbenzene	<0.00200	0.100	0.108	108	0.113	113	70-130	5	35	mg/kg	11.18.19 16:33	
m,p-Xylenes	<0.00400	0.200	0.221	111	0.234	117	70-130	6	35	mg/kg	11.18.19 16:33	
o-Xylene	<0.00200	0.100	0.109	109	0.116	116	70-130	6	35	mg/kg	11.18.19 16:33	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	109		111		111		70-130	%	11.18.19 16:33
4-Bromofluorobenzene	96		107		114		70-130	%	11.18.19 16:33

Analytical Method: BTEX by EPA 8021B

Seq Number: 3107858

Parent Sample Id: 643322-001

Matrix: Soil

MS Sample Id: 643322-001 S

Prep Method: SW5030B

Date Prep: 11.18.19

MSD Sample Id: 643322-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00198	0.0992	0.00197	2	0.107	107	70-130	193	35	mg/kg	11.18.19 17:13	XF
Toluene	<0.00198	0.0992	0.00232	2	0.104	104	70-130	191	35	mg/kg	11.18.19 17:13	XF
Ethylbenzene	<0.00198	0.0992	0.00257	3	0.0990	99	70-130	190	35	mg/kg	11.18.19 17:13	XF
m,p-Xylenes	0.00298	0.198	0.00545	1	0.203	100	70-130	190	35	mg/kg	11.18.19 17:13	XF
o-Xylene	<0.00198	0.0992	0.00344	3	0.100	100	70-130	187	35	mg/kg	11.18.19 17:13	XF

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	109		114		70-130	%	11.18.19 17:13
4-Bromofluorobenzene	117		110		70-130	%	11.18.19 17:13

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

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
Phoenix, AZ (480-355-0900) Atlanta, GA (770-449-8800) Tampa, FL (813) 988-3922
Hobbs, NM (575-392-7550)

Work Order No.:

043322

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 \$perfund ☐ State of Project:									
Reporting Level II ☐ Level III ☐ ST/UST ☐ RP ☐ Level IV ☐ Deliverables: EDD ☐ ADAPT ☐ Other:									

Project Name:		EMAS0 SWD Injection										Turn Around	
Project Number:		012919272										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):		0.12		Thermometer ID									
Received In tact:		☒ Yes ☐ No		T-NM-004									
Cooler Custody Seals:		Yes ☒ No ☐		N/A		Correction Factor:		-0.2					
Sample Custody Seals:		Yes ☐ No ☒		N/A		Total Containers:		9					
Number of Containers												Work Order Notes	
A 8015)													
PA 0=8021)													
(EPA 300.0)													
												TAT starts the day received by the lab, if received by 4:30pm	

[illegible]

Total 200.7 / 6010 200.8 / 6020:

Circle Method(s) and Metal(s) to be analyzed

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
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

Office: 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

Urgency 11/12/21	Wick	11/12/19 11:33 ²	Wick	Call	11/12/19 11:47
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[illegible]



Inter-Office Shipment

Page 1 of 1

IOS Number **52336**

Date/Time: 11/15/19 10:38

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.: 777001730763

E-Mail: jessica.kramer@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
643322-001	S	SS01	11/14/19 13:05	SW8015MOD_NM	TPH by SW8015 Mod	11/20/19	11/28/19	JKR	GRO-DRO PHCC10C28 PF	
643322-001	S	SS01	11/14/19 13:05	E300_CL	Chloride by EPA 300	11/20/19	05/12/20	JKR	CL	
643322-001	S	SS01	11/14/19 13:05	SW8021B	BTEX by EPA 8021B	11/20/19	11/28/19	JKR	BZ BZME EBZ XYLENES	
643322-002	S	SS02	11/14/19 13:25	SW8021B	BTEX by EPA 8021B	11/20/19	11/28/19	JKR	BZ BZME EBZ XYLENES	
643322-002	S	SS02	11/14/19 13:25	SW8015MOD_NM	TPH by SW8015 Mod	11/20/19	11/28/19	JKR	GRO-DRO PHCC10C28 PF	
643322-002	S	SS02	11/14/19 13:25	E300_CL	Chloride by EPA 300	11/20/19	05/12/20	JKR	CL	
643322-003	S	SS03	11/14/19 13:45	SW8015MOD_NM	TPH by SW8015 Mod	11/20/19	11/28/19	JKR	GRO-DRO PHCC10C28 PF	
643322-003	S	SS03	11/14/19 13:45	SW8021B	BTEX by EPA 8021B	11/20/19	11/28/19	JKR	BZ BZME EBZ XYLENES	
643322-003	S	SS03	11/14/19 13:45	E300_CL	Chloride by EPA 300	11/20/19	05/12/20	JKR	CL	
643322-004	S	SS04	11/14/19 14:05	SW8015MOD_NM	TPH by SW8015 Mod	11/20/19	11/28/19	JKR	GRO-DRO PHCC10C28 PF	
643322-004	S	SS04	11/14/19 14:05	E300_CL	Chloride by EPA 300	11/20/19	05/12/20	JKR	CL	
643322-004	S	SS04	11/14/19 14:05	SW8021B	BTEX by EPA 8021B	11/20/19	11/28/19	JKR	BZ BZME EBZ XYLENES	
643322-005	S	SS05	11/14/19 14:25	SW8021B	BTEX by EPA 8021B	11/20/19	11/28/19	JKR	BZ BZME EBZ XYLENES	
643322-005	S	SS05	11/14/19 14:25	SW8015MOD_NM	TPH by SW8015 Mod	11/20/19	11/28/19	JKR	GRO-DRO PHCC10C28 PF	
643322-005	S	SS05	11/14/19 14:25	E300_CL	Chloride by EPA 300	11/20/19	05/12/20	JKR	CL	

Inter Office Shipment or Sample Comments:

Relinquished By:

Elizabeth McClellan

Received By:

Brianna Teel

Date Relinquished: 11/15/2019

Date Received: 11/18/2019 07:17

Cooler Temperature: 0.3



Inter Office Report- Sample Receipt Checklist

Sent To: Midland

IOS #: 52336

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sent By: Elizabeth McClellan

Date Sent: 11/15/2019 10:38 AM

Received By: Brianna Teel

Date Received: 11/18/2019 07:17 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	.3
#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: 11/18/2019



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 11/14/2019 04:42:00 PM

Work Order #: 643322

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)?	.6	
#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)?	Yes	Subbed to Midland.
#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: 11/15/2019

Checklist reviewed by:

Jessica Kramer

Date: 11/15/2019

Analytical Report 649110

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

17-JAN-20

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)



17-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649110**

EMSU SWD Injection

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) 649110. 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. 649110 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 649110****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS01	S	01-13-20 11:19	4 ft	649110-001
FS02	S	01-13-20 11:22	4 ft	649110-002
FS03	S	01-13-20 13:09	4 ft	649110-003
FS04	S	01-13-20 13:12	4 ft	649110-004
FS05	S	01-13-20 13:17	4 ft	649110-005
FS06	S	01-13-20 13:20	4 ft	649110-006
FS08	S	01-13-20 13:53	4 ft	649110-007
FS09	S	01-13-20 13:57	4 ft	649110-008
FS10	S	01-13-20 14:00	4 ft	649110-009
FS11	S	01-13-20 14:03	4 ft	649110-010
FS12	S	01-13-20 14:06	4 ft	649110-011
FS13	S	01-13-20 14:54	4 ft	649110-012
FS14	S	01-13-20 14:58	4 ft	649110-013
FS15	S	01-13-20 15:02	4 ft	649110-014
FS17	S	01-13-20 15:09	4 ft	649110-015



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272

Work Order Number(s): 649110

Report Date: 17-JAN-20

Date Received: 01/15/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3113425 BTEX by EPA 8021B

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



Certificate of Analysis Summary 649110

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Wed Jan-15-20 10:15 am

Report Date: 17-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649110-001	649110-002	649110-003	649110-004	649110-005	649110-006
	<i>Field Id:</i>	FS01	FS02	FS03	FS04	FS05	FS06
	<i>Depth:</i>	4- ft	4- ft	4- ft	4- ft	4- ft	4- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-13-20 11:19	Jan-13-20 11:22	Jan-13-20 13:09	Jan-13-20 13:12	Jan-13-20 13:17	Jan-13-20 13:20
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00
	<i>Analyzed:</i>	Jan-15-20 18:09	Jan-15-20 18:26	Jan-15-20 18:44	Jan-15-20 19:01	Jan-15-20 19:18	Jan-15-20 20:28
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
Toluene		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
Ethylbenzene		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
m,p-Xylenes		<0.00402 0.00402	<0.00402 0.00402	<0.00404 0.00404	<0.00398 0.00398	<0.00402 0.00402	<0.00398 0.00398
o-Xylene		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
Total Xylenes		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
Total BTEX		<0.00201 0.00201	<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00201 0.00201	<0.00199 0.00199
Chloride by EPA 300	<i>Extracted:</i>	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00
	<i>Analyzed:</i>	Jan-15-20 13:49	Jan-15-20 13:54	Jan-15-20 14:00	Jan-15-20 14:06	Jan-15-20 14:24	Jan-15-20 14:30
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		400 10.1	471 9.94	476 9.98	417 9.88	238 10.0	293 10.0
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-15-20 18:00	Jan-15-20 18:00	Jan-15-20 18:00	Jan-15-20 18:00	Jan-16-20 12:10	Jan-16-20 12:10
	<i>Analyzed:</i>	Jan-16-20 10:07	Jan-16-20 04:53	Jan-16-20 05:13	Jan-16-20 05:13	Jan-16-20 13:40	Jan-16-20 14:00
	<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)		<50.1 50.1	<50.2 50.2	<50.0 50.0	<50.3 50.3	<50.2 50.2	<50.2 50.2
Diesel Range Organics (DRO)		<50.1 50.1	<50.2 50.2	<50.0 50.0	<50.3 50.3	<50.2 50.2	<50.2 50.2
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<50.2 50.2	<50.0 50.0	<50.3 50.3	<50.2 50.2	<50.2 50.2
Total GRO-DRO		<50.1 50.1	<50.2 50.2	<50.0 50.0	<50.3 50.3	<50.2 50.2	<50.2 50.2
Total TPH		<50.1 50.1	<50.2 50.2	<50.0 50.0	<50.3 50.3	<50.2 50.2	<50.2 50.2

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

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649110

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Wed Jan-15-20 10:15 am

Report Date: 17-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649110-007	649110-008	649110-009	649110-010	649110-011	649110-012
	<i>Field Id:</i>	FS08	FS09	FS10	FS11	FS12	FS13
	<i>Depth:</i>	4- ft	4- ft	4- ft	4- ft	4- ft	4- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-13-20 13:53	Jan-13-20 13:57	Jan-13-20 14:00	Jan-13-20 14:03	Jan-13-20 14:06	Jan-13-20 14:54
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00
	<i>Analyzed:</i>	Jan-15-20 20:45	Jan-15-20 21:03	Jan-15-20 21:20	Jan-15-20 21:38	Jan-15-20 21:55	Jan-15-20 22:12
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
Toluene		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
Ethylbenzene		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
m,p-Xylenes		<0.00403 0.00403	<0.00403 0.00403	<0.00403 0.00403	<0.00404 0.00404	<0.00400 0.00400	<0.00402 0.00402
o-Xylene		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
Total Xylenes		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
Total BTEX		<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201
Chloride by EPA 300	<i>Extracted:</i>	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 12:00	Jan-15-20 15:30	Jan-15-20 15:30
	<i>Analyzed:</i>	Jan-15-20 14:35	Jan-15-20 14:41	Jan-15-20 14:47	Jan-15-20 14:53	*** ** *	Jan-15-20 15:45
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		530 9.98	296 9.92	147 9.98	239 10.0	481 9.96	281 10.0
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-16-20 12:10	Jan-16-20 12:10	Jan-16-20 12:10	Jan-16-20 12:10	Jan-16-20 12:10	Jan-16-20 12:10
	<i>Analyzed:</i>	Jan-16-20 14:20	Jan-16-20 14:20	Jan-16-20 14:40	Jan-16-20 14:40	Jan-16-20 15:00	Jan-16-20 15:00
	<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)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Diesel Range Organics (DRO)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Total GRO-DRO		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Total TPH		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649110

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Wed Jan-15-20 10:15 am

Report Date: 17-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649110-013	649110-014	649110-015			
	Field Id:	FS14	FS15	FS17			
	Depth:	4- ft	4- ft	4- ft			
	Matrix:	SOIL	SOIL	SOIL			
	Sampled:	Jan-13-20 14:58	Jan-13-20 15:02	Jan-13-20 15:09			
BTEX by EPA 8021B	Extracted:	Jan-15-20 13:00	Jan-15-20 13:00	Jan-15-20 13:00			
	Analyzed:	Jan-15-20 22:30	Jan-15-20 22:47	Jan-15-20 23:05			
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL			
Benzene		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
Toluene		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
Ethylbenzene		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
m,p-Xylenes		<0.00402 0.00402	<0.00404 0.00404	<0.00402 0.00402			
o-Xylene		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
Total Xylenes		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
Total BTEX		<0.00201 0.00201	<0.00202 0.00202	<0.00201 0.00201			
Chloride by EPA 300	Extracted:	Jan-15-20 15:30	Jan-15-20 15:30	Jan-15-20 15:30			
	Analyzed:	Jan-15-20 15:51	Jan-15-20 15:57	Jan-15-20 16:03			
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL			
Chloride		171 10.0	274 9.94	571 9.98			
TPH by SW8015 Mod	Extracted:	Jan-16-20 12:10	Jan-16-20 12:10	Jan-16-20 12:10			
	Analyzed:	Jan-16-20 15:20	Jan-16-20 15:20	Jan-16-20 15:40			
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL			
Gasoline Range Hydrocarbons (GRO)		<50.2 50.2	<50.2 50.2	<50.1 50.1			
Diesel Range Organics (DRO)		<50.2 50.2	<50.2 50.2	<50.1 50.1			
Motor Oil Range Hydrocarbons (MRO)		<50.2 50.2	<50.2 50.2	<50.1 50.1			
Total GRO-DRO		<50.2 50.2	<50.2 50.2	<50.1 50.1			
Total TPH		<50.2 50.2	<50.2 50.2	<50.1 50.1			

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

Jessica Kramer
Project Assistant



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS01**
 Lab Sample Id: 649110-001

Matrix: Soil
 Date Collected: 01.13.20 11.19

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 12.00

Basis: Wet Weight

Seq Number: 3113337

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	400	10.1	mg/kg	01.15.20 13.49		1

Analytical Method: TPH by SW8015 Mod

Prep Method: SW8015P

Tech: DTH

% Moisture:

Analyst: DTH

Date Prep: 01.15.20 18.00

Basis: Wet Weight

Seq Number: 3113414

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.16.20 10.07	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.16.20 10.07	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.16.20 10.07	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.16.20 10.07	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.16.20 10.07	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.16.20 10.07	
o-Terphenyl	84-15-1	104	%	70-135	01.16.20 10.07	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS01**
 Lab Sample Id: 649110-001

Matrix: Soil
 Date Collected: 01.13.20 11.19

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 18.09	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 18.09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	105	%	70-130	01.15.20 18.09		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.15.20 18.09		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS02**
Lab Sample Id: 649110-002

Matrix: Soil
Date Collected: 01.13.20 11.22

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	471	9.94	mg/kg	01.15.20 13.54		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113414

Date Prep: 01.15.20 18.00

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	01.16.20 04.53	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 04.53	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 04.53	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 04.53	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 04.53	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.16.20 04.53	
o-Terphenyl	84-15-1	93	%	70-135	01.16.20 04.53	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS02**
 Lab Sample Id: 649110-002

Matrix: Soil
 Date Collected: 01.13.20 11.22

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 18.26	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 18.26	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.15.20 18.26		
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.15.20 18.26		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS03**
 Lab Sample Id: 649110-003

Matrix: Soil
 Date Collected: 01.13.20 13.09

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	476	9.98	mg/kg	01.15.20 14.00		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113414

Date Prep: 01.15.20 18.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.16.20 05.13	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.16.20 05.13	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.16.20 05.13	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.16.20 05.13	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.16.20 05.13	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-135	01.16.20 05.13	
o-Terphenyl	84-15-1	92	%	70-135	01.16.20 05.13	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS03**
 Lab Sample Id: 649110-003

Matrix: Soil
 Date Collected: 01.13.20 13.09

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.15.20 18.44	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 18.44	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.15.20 18.44		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.15.20 18.44		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS04**
Lab Sample Id: 649110-004

Matrix: Soil
Date Collected: 01.13.20 13.12

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	417	9.88	mg/kg	01.15.20 14.06		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113414

Date Prep: 01.15.20 18.00

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	01.16.20 05.13	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.16.20 05.13	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.16.20 05.13	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.16.20 05.13	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.16.20 05.13	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.16.20 05.13	
o-Terphenyl	84-15-1	96	%	70-135	01.16.20 05.13	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS04**
 Lab Sample Id: 649110-004

Matrix: Soil
 Date Collected: 01.13.20 13.12

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.15.20 19.01	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.15.20 19.01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.15.20 19.01		
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.15.20 19.01		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS05**
 Lab Sample Id: 649110-005

Matrix: Soil
 Date Collected: 01.13.20 13.17

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 12.00

Basis: Wet Weight

Seq Number: 3113337

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	238	10.0	mg/kg	01.15.20 14.24		1

Analytical Method: TPH by SW8015 Mod

Prep Method: SW8015P

Tech: DTH

% Moisture:

Analyst: DTH

Date Prep: 01.16.20 12.10

Basis: Wet Weight

Seq Number: 3113555

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.16.20 13.40	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 13.40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 13.40	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 13.40	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 13.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.16.20 13.40	
o-Terphenyl	84-15-1	96	%	70-135	01.16.20 13.40	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS05**
 Lab Sample Id: 649110-005

Matrix: Soil
 Date Collected: 01.13.20 13.17

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 19.18	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 19.18	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.15.20 19.18		
1,4-Difluorobenzene	540-36-3	98	%	70-130	01.15.20 19.18		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS06** Matrix: Soil Date Received: 01.15.20 10.15
 Lab Sample Id: 649110-006 Date Collected: 01.13.20 13.20 Sample Depth: 4 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.15.20 12.00 Basis: Wet Weight
 Seq Number: 3113337

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	293	10.0	mg/kg	01.15.20 14.30		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.16.20 12.10 Basis: Wet Weight
 Seq Number: 3113555

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.16.20 14.00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 14.00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 14.00	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 14.00	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 14.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-135	01.16.20 14.00	
o-Terphenyl	84-15-1	96	%	70-135	01.16.20 14.00	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS06**
 Lab Sample Id: 649110-006

Matrix: Soil
 Date Collected: 01.13.20 13.20

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.15.20 20.28	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.15.20 20.28	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.15.20 20.28		
1,4-Difluorobenzene	540-36-3	99	%	70-130	01.15.20 20.28		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS08**
Lab Sample Id: 649110-007

Matrix: Soil
Date Collected: 01.13.20 13.53

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	530	9.98	mg/kg	01.15.20 14.35		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 14.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.16.20 14.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.16.20 14.20	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.16.20 14.20	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.16.20 14.20	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.16.20 14.20	
o-Terphenyl	84-15-1	97	%	70-135	01.16.20 14.20	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS08**
 Lab Sample Id: 649110-007

Matrix: Soil
 Date Collected: 01.13.20 13.53

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.15.20 20.45	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 20.45	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.15.20 20.45		
1,4-Difluorobenzene	540-36-3	98	%	70-130	01.15.20 20.45		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS09**
 Lab Sample Id: 649110-008

Matrix: Soil
 Date Collected: 01.13.20 13.57

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	296	9.92	mg/kg	01.15.20 14.41		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 14.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 14.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 14.20	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 14.20	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 14.20	U	1

Surrogate

1-Chlorooctane

o-Terphenyl

Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
111-85-3	99	%	70-135	01.16.20 14.20	
84-15-1	97	%	70-135	01.16.20 14.20	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS09**
 Lab Sample Id: 649110-008

Matrix: Soil
 Date Collected: 01.13.20 13.57

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.15.20 21.03	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 21.03	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.15.20 21.03		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.15.20 21.03		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS10**
Lab Sample Id: 649110-009

Matrix: Soil
Date Collected: 01.13.20 14.00

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	147	9.98	mg/kg	01.15.20 14.47		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 14.40	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.16.20 14.40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.16.20 14.40	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.16.20 14.40	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.16.20 14.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.16.20 14.40	
o-Terphenyl	84-15-1	95	%	70-135	01.16.20 14.40	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS10**
 Lab Sample Id: 649110-009

Matrix: Soil
 Date Collected: 01.13.20 14.00

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.15.20 21.20	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 21.20	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.15.20 21.20		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.15.20 21.20		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS11**
 Lab Sample Id: 649110-010

Matrix: Soil
 Date Collected: 01.13.20 14.03

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113337

Date Prep: 01.15.20 12.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	239	10.0	mg/kg	01.15.20 14.53		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 14.40	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 14.40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 14.40	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 14.40	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 14.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.16.20 14.40	
o-Terphenyl	84-15-1	97	%	70-135	01.16.20 14.40	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS11**
 Lab Sample Id: 649110-010

Matrix: Soil
 Date Collected: 01.13.20 14.03

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.15.20 21.38	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 21.38	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.15.20 21.38		
4-Bromofluorobenzene	460-00-4	104	%	70-130	01.15.20 21.38		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS12**
Lab Sample Id: 649110-011

Matrix: Soil
Date Collected: 01.13.20 14.06

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113412

Date Prep: 01.15.20 15.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	481	9.96	mg/kg	01.15.20 15.28		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 15.00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 15.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	93	%	70-135	01.16.20 15.00	
o-Terphenyl	84-15-1	92	%	70-135	01.16.20 15.00	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS12**
 Lab Sample Id: 649110-011

Matrix: Soil
 Date Collected: 01.13.20 14.06

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.15.20 21.55	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.15.20 21.55	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.15.20 21.55		
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.15.20 21.55		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS13**
Lab Sample Id: 649110-012

Matrix: Soil
Date Collected: 01.13.20 14.54

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113412

Date Prep: 01.15.20 15.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	281	10.0	mg/kg	01.15.20 15.45		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 15.00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 15.00	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 15.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.16.20 15.00	
o-Terphenyl	84-15-1	98	%	70-135	01.16.20 15.00	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS13**
 Lab Sample Id: 649110-012

Matrix: Soil
 Date Collected: 01.13.20 14.54

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 22.12	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 22.12	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.15.20 22.12		
1,4-Difluorobenzene	540-36-3	99	%	70-130	01.15.20 22.12		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS14**
Lab Sample Id: 649110-013

Matrix: Soil
Date Collected: 01.13.20 14.58

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113412

Date Prep: 01.15.20 15.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	171	10.0	mg/kg	01.15.20 15.51		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 15.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 15.20	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.16.20 15.20	
o-Terphenyl	84-15-1	99	%	70-135	01.16.20 15.20	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS14**
 Lab Sample Id: 649110-013

Matrix: Soil
 Date Collected: 01.13.20 14.58

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 22.30	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 22.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	107	%	70-130	01.15.20 22.30		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.15.20 22.30		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS15**
Lab Sample Id: 649110-014

Matrix: Soil
Date Collected: 01.13.20 15.02

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113412

Date Prep: 01.15.20 15.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	274	9.94	mg/kg	01.15.20 15.57		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

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	01.16.20 15.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.16.20 15.20	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.16.20 15.20	U	1

Surrogate

1-Chlorooctane

o-Terphenyl

Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
111-85-3	104	%	70-135	01.16.20 15.20	
84-15-1	93	%	70-135	01.16.20 15.20	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS15**
 Lab Sample Id: 649110-014

Matrix: Soil
 Date Collected: 01.13.20 15.02

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.15.20 22.47	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.15.20 22.47	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	107	%	70-130	01.15.20 22.47		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.15.20 22.47		



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS17**
Lab Sample Id: 649110-015

Matrix: Soil
Date Collected: 01.13.20 15.09

Date Received: 01.15.20 10.15
Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113412

Date Prep: 01.15.20 15.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	571	9.98	mg/kg	01.15.20 16.03		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113555

Date Prep: 01.16.20 12.10

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.16.20 15.40	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.16.20 15.40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.16.20 15.40	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.16.20 15.40	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.16.20 15.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.16.20 15.40	
o-Terphenyl	84-15-1	96	%	70-135	01.16.20 15.40	



Certificate of Analytical Results 649110

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS17**
 Lab Sample Id: 649110-015

Matrix: Soil
 Date Collected: 01.13.20 15.09

Date Received: 01.15.20 10.15
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.15.20 13.00

Basis: Wet Weight

Seq Number: 3113425

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.15.20 23.05	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.15.20 23.05	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.15.20 23.05		
1,4-Difluorobenzene	540-36-3	98	%	70-130	01.15.20 23.05		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113337

MB Sample Id: 7694408-1-BLK

Matrix: Solid

LCS Sample Id: 7694408-1-BKS

Prep Method: E300P

Date Prep: 01.15.20

LCSD Sample Id: 7694408-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	253	101	255	102	90-110	1	20	mg/kg	01.15.20 12:02	

Analytical Method: Chloride by EPA 300

Seq Number: 3113412

MB Sample Id: 7694411-1-BLK

Matrix: Solid

LCS Sample Id: 7694411-1-BKS

Prep Method: E300P

Date Prep: 01.15.20

LCSD Sample Id: 7694411-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	255	102	258	103	90-110	1	20	mg/kg	01.15.20 15:16	

Analytical Method: Chloride by EPA 300

Seq Number: 3113337

Parent Sample Id: 649106-005

Matrix: Soil

MS Sample Id: 649106-005 S

Prep Method: E300P

Date Prep: 01.15.20

MSD Sample Id: 649106-005 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	2490	196	2750	133	2720	116	90-110	1	20	mg/kg	01.15.20 12:18	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113337

Parent Sample Id: 649113-002

Matrix: Soil

MS Sample Id: 649113-002 S

Prep Method: E300P

Date Prep: 01.15.20

MSD Sample Id: 649113-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	11.8	199	213	101	211	100	90-110	1	20	mg/kg	01.15.20 13:37	

Analytical Method: Chloride by EPA 300

Seq Number: 3113412

Parent Sample Id: 649110-011

Matrix: Soil

MS Sample Id: 649110-011 S

Prep Method: E300P

Date Prep: 01.15.20

MSD Sample Id: 649110-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	481	200	689	104	686	103	90-110	0	20	mg/kg	01.15.20 15:34	

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113412

Parent Sample Id: 649169-006

Matrix: Soil

MS Sample Id: 649169-006 S

Prep Method: E300P

Date Prep: 01.15.20

MSD Sample Id: 649169-006 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Chloride	346	200	558	106	561	108	90-110	1	20	mg/kg	01.15.20 16:55	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113414

MB Sample Id: 7694480-1-BLK

Matrix: Solid

LCS Sample Id: 7694480-1-BKS

Prep Method: SW8015P

Date Prep: 01.15.20

LCSD Sample Id: 7694480-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	757	76	729	73	70-135	4	35	mg/kg	01.16.20 01:35	
Diesel Range Organics (DRO)	<50.0	1000	791	79	747	75	70-135	6	35	mg/kg	01.16.20 01:35	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	128		117		128		70-135	%	01.16.20 01:35
o-Terphenyl	126		117		122		70-135	%	01.16.20 01:35

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113555

MB Sample Id: 7694525-1-BLK

Matrix: Solid

LCS Sample Id: 7694525-1-BKS

Prep Method: SW8015P

Date Prep: 01.16.20

LCSD Sample Id: 7694525-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	1140	114	1010	101	70-135	12	35	mg/kg	01.16.20 13:21	
Diesel Range Organics (DRO)	<50.0	1000	1120	112	1110	111	70-135	1	35	mg/kg	01.16.20 13:21	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	97		132		123		70-135	%	01.16.20 13:21
o-Terphenyl	98		128		109		70-135	%	01.16.20 13:21

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113414

Matrix: Solid

MB Sample Id: 7694480-1-BLK

Prep Method: SW8015P

Date Prep: 01.15.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.16.20 01:15	

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113555

Matrix: Solid

Prep Method: SW8015P

Date Prep: 01.16.20

MB Sample Id: 7694525-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.16.20 13:01	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113414

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.15.20

Parent Sample Id: 649169-010

MS Sample Id: 649169-010 S

MSD Sample Id: 649169-010 SD

Parameter	Parent Result	Spike Amount	MS Result	MS % Rec	MSD Result	MSD % Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<49.9	998	944	95	987	99	70-135	4	35	mg/kg	01.16.20 01:55	
Diesel Range Organics (DRO)	<49.9	998	990	99	1030	103	70-135	4	35	mg/kg	01.16.20 01:55	

Surrogate

	MS % Rec	MS Flag	MSD % Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	124		133		70-135	%	01.16.20 01:55
o-Terphenyl	91		101		70-135	%	01.16.20 01:55

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113555

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.16.20

Parent Sample Id: 649110-005

MS Sample Id: 649110-005 S

MSD Sample Id: 649110-005 SD

Parameter	Parent Result	Spike Amount	MS Result	MS % Rec	MSD Result	MSD % Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.1	1000	968	97	986	99	70-135	2	35	mg/kg	01.16.20 13:40	
Diesel Range Organics (DRO)	<50.1	1000	1080	108	1060	106	70-135	2	35	mg/kg	01.16.20 13:40	

Surrogate

	MS % Rec	MS Flag	MSD % Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	132		134		70-135	%	01.16.20 13:40
o-Terphenyl	109		109		70-135	%	01.16.20 13:40

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113425

MB Sample Id: 7694449-1-BLK

Matrix: Solid

LCS Sample Id: 7694449-1-BKS

Prep Method: SW5030B

Date Prep: 01.15.20

LCSD Sample Id: 7694449-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.105	105	0.105	105	70-130	0	35	mg/kg	01.15.20 15:15	
Toluene	<0.00200	0.100	0.105	105	0.104	104	70-130	1	35	mg/kg	01.15.20 15:15	
Ethylbenzene	<0.00200	0.100	0.103	103	0.102	102	71-129	1	35	mg/kg	01.15.20 15:15	
m,p-Xylenes	<0.00400	0.200	0.211	106	0.209	105	70-135	1	35	mg/kg	01.15.20 15:15	
o-Xylene	<0.00200	0.100	0.104	104	0.102	102	71-133	2	35	mg/kg	01.15.20 15:15	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	102		102		102		70-130	%	01.15.20 15:15
4-Bromofluorobenzene	104		104		101		70-130	%	01.15.20 15:15

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113425

Parent Sample Id: 649140-001

Matrix: Soil

MS Sample Id: 649140-001 S

Prep Method: SW5030B

Date Prep: 01.15.20

MSD Sample Id: 649140-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RP D	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.0998	0.0976	98	0.0887	89	70-130	10	35	mg/kg	01.15.20 15:50	
Toluene	<0.00200	0.0998	0.0713	71	0.0756	76	70-130	6	35	mg/kg	01.15.20 15:50	
Ethylbenzene	<0.00200	0.0998	0.0769	77	0.0718	72	71-129	7	35	mg/kg	01.15.20 15:50	
m,p-Xylenes	<0.00399	0.200	0.150	75	0.142	71	70-135	5	35	mg/kg	01.15.20 15:50	
o-Xylene	<0.00200	0.0998	0.0933	93	0.0820	82	71-133	13	35	mg/kg	01.15.20 15:50	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	99		99		70-130	%	01.15.20 15:50
4-Bromofluorobenzene	101		98		70-130	%	01.15.20 15:50

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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: 449110

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, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (904) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Litrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Program: ☐ UST/PS ☐ PRP ☐ Brownfields ☐ RRP ☐ Superfund ☐	
State of Project:	
Reporting Level: ☐ Level ☐ PST/UST ☐ TRRP ☐ Level ☐ HV	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EMSU SWD Injection	Turn Around	ANALYSIS REQUEST																Work Order Notes			
Project Number:	012919272	Routine:																				
PO #:	11/3/19 spill date	Rush: 3 days																				
Sampler's Name:	Faitha Smith	Due Date:																				
SAMPLE RECEIPT	Temp Blank: ☒ Yes ☐ No	Wet Ice: ☒ Yes ☐ No																				
Temperature (°C):	1.2	Thermometer ID																				
Received Intact:	Yes ☒ No ☐	Correction Factor:																				
Cooler Custody Seals:	Yes ☒ No ☐ N/A	Total Containers:																				
Sample Custody Seals:	Yes ☒ No ☐ N/A																					
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers																TAT starts the day received by the lab, if received by 4:30pm	
FS01	S	11/13/20	1119	4'	1																	
FS02			1122																			
FS03			1309																			
FS04			1312																			
FS05			1317																			
FS06			1320																			
FS08			1353																			
FS09			1357																			
FS10			1400																			
FS11			1403																			

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
1 <i>[Signature]</i>	2 <i>[Signature]</i>	11/13/20 10:00 AM	3 <i>[Signature]</i>	4 <i>[Signature]</i>	11/15/20 10:15
5	6				



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) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 986-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 649110

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Little
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Program: ☐ UST/PS ☐ PRP ☐ Brownfields ☐ RRP ☐ Superfund State of Project:	
Reporting Level: ☐ Level 1 ☐ Level 2 ☐ Level 3	TRRP ☐ Level 4
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EMSU SMD Injection	Turn Around	☐
Project Number:	012919272	Routine:	☐
PO #:	11/3/19 spill date	Rush:	3 days
Sampler's Name:	Fatima Smith	Due Date:	
SAMPLE RECEIPT			
Temperature (°C):	Yes ☐ No ☒	Wet Ice:	Yes ☐ No ☒
Received In tact:	Yes ☐ No ☒	Thermometer ID:	
Cooler Custody Seals:	Yes ☐ No ☒	Correction Factor:	
Sample Custody Seals:	Yes ☐ No ☒	Total Containers:	

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH (EPA 8015)	BTEX (EPA 0-8021)	Chloride (EPA 300.0)	ANALYSIS REQUEST	Work Order Notes
FS12	S	1/13/20	1406	4'	1	X	X	X		
FS13			1454							
FS14			1458							
FS15			1502							
FS17			1509							
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 \$15.00 will be applied to each project and a charge of \$8 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.										
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										
Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time					
1 <i>[Signature]</i>	2 <i>[Signature]</i>	1/5/20 10:00 am	3 <i>[Signature]</i>	4 <i>[Signature]</i>	1/5/20 10:15					
5			6							

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.15.2020 10.15.00 AM

Work Order #: 649110

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)?	1.2
#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#:

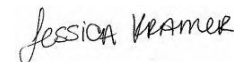
Checklist completed by:



Elizabeth McClellan

Date: 01.15.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.15.2020

Analytical Report 649437

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

EMSU SWD Injection

012919272

21-JAN-20

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)



21-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649437**

EMSU SWD Injection

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) 649437. 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. 649437 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 649437****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS47	S	01-16-20 13:10	5 ft	649437-001
SW01	S	01-16-20 14:00	1 - 6 ft	649437-002
SW02	S	01-16-20 14:15	1 - 8 ft	649437-003
FS48	S	01-16-20 14:50	5 ft	649437-004
FS49	S	01-16-20 15:00	5 ft	649437-005
FS50	S	01-16-20 15:45	5 ft	649437-006
FS51	S	01-16-20 15:50	5 ft	649437-007
FS52	S	01-16-20 15:55	5 ft	649437-008
FS53	S	01-16-20 16:00	5 ft	649437-009
FS54	S	01-16-20 16:05	5 ft	649437-010
FS55	S	01-16-20 16:10	5 ft	649437-011
FS56	S	01-16-20 16:15	5 ft	649437-012

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 649437Report Date: 21-JAN-20
Date Received: 01/17/2020

Sample receipt non conformances and comments:Client provided sample times and sample depths VIA email. New version generated JK 01/21/20

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3113714 TPH by SW8015 Mod

Surrogate 1-Chlorooctane recovered above QC limits Data confirmed by re-analysis. Samples affected are: 7694639-1-BKS.

Batch: LBA-3113716 Chloride by EPA 300

Lab Sample ID 649437-011 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649437-001, -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.

Batch: LBA-3113725 BTEX by EPA 8021B

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



Certificate of Analysis Summary 649437

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649437-001	649437-002	649437-003	649437-004	649437-005	649437-006
	<i>Field Id:</i>	FS47	SW01	SW02	FS48	FS49	FS50
	<i>Depth:</i>	5- ft	1-6 ft	1-8 ft	5- ft	5- ft	5- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-16-20 13:10	Jan-16-20 14:00	Jan-16-20 14:15	Jan-16-20 14:50	Jan-16-20 15:00	Jan-16-20 15:45
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32
	<i>Analyzed:</i>	Jan-17-20 13:32	Jan-17-20 14:13	Jan-17-20 14:33	Jan-17-20 14:54	Jan-17-20 15:14	Jan-17-20 15:34
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
Toluene		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
Ethylbenzene		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
m,p-Xylenes		<0.00402 0.00402	<0.00396 0.00396	<0.00401 0.00401	<0.00397 0.00397	<0.00401 0.00401	<0.00396 0.00396
o-Xylene		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
Total Xylenes		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
Total BTEX		<0.00201 0.00201	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198
Chloride by EPA 300	<i>Extracted:</i>	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10
	<i>Analyzed:</i>	Jan-17-20 15:02	Jan-17-20 15:19	Jan-17-20 15:24	Jan-17-20 15:30	Jan-17-20 15:35	Jan-17-20 15:51
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		185 9.98	214 9.96	28.1 9.92	372 10.1	364 10.0	315 10.1
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00
	<i>Analyzed:</i>	Jan-17-20 15:42	Jan-17-20 16:24	Jan-17-20 16:24	Jan-17-20 16:46	Jan-17-20 16:46	Jan-17-20 17:07
	<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)		<50.2 50.2	<50.1 50.1	<50.0 50.0	<50.2 50.2	<50.2 50.2	<50.3 50.3
Diesel Range Organics (DRO)		<50.2 50.2	<50.1 50.1	<50.0 50.0	<50.2 50.2	<50.2 50.2	<50.3 50.3
Motor Oil Range Hydrocarbons (MRO)		<50.2 50.2	<50.1 50.1	<50.0 50.0	<50.2 50.2	<50.2 50.2	<50.3 50.3
Total GRO-DRO		<50.2 50.2	<50.1 50.1	<50.0 50.0	<50.2 50.2	<50.2 50.2	<50.3 50.3
Total TPH		<50.2 50.2	<50.1 50.1	<50.0 50.0	<50.2 50.2	<50.2 50.2	<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.

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Version: 1.9%

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649437

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649437-007	649437-008	649437-009	649437-010	649437-011	649437-012
	Field Id:	FS51	FS52	FS53	FS54	FS55	FS56
	Depth:	5- ft	5- ft	5- ft	5- ft	5- ft	5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-16-20 15:50	Jan-16-20 15:55	Jan-16-20 16:00	Jan-16-20 16:05	Jan-16-20 16:10	Jan-16-20 16:15
BTEX by EPA 8021B	Extracted:	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32	Jan-17-20 11:32
	Analyzed:	Jan-17-20 15:55	Jan-17-20 16:15	Jan-17-20 16:36	Jan-17-20 16:56	Jan-17-20 18:11	Jan-17-20 18:32
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
Toluene		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
Ethylbenzene		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
m,p-Xylenes		<0.00402 0.00402	<0.00404 0.00404	<0.00404 0.00404	<0.00403 0.00403	<0.00402 0.00402	<0.00402 0.00402
o-Xylene		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
Total Xylenes		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
Total BTEX		<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00201 0.00201
Chloride by EPA 300	Extracted:	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10
	Analyzed:	Jan-17-20 15:56	Jan-17-20 16:02	Jan-17-20 16:07	Jan-17-20 16:12	Jan-17-20 16:18	Jan-17-20 16:34
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		462 10.0	492 10.1	554 9.92	569 9.98	672 9.98	729 9.96
TPH by SW8015 Mod	Extracted:	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00
	Analyzed:	Jan-17-20 17:07	Jan-17-20 17:26	Jan-17-20 17:26	Jan-17-20 18:50	Jan-17-20 18:09	Jan-17-20 18:29
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<49.8 49.8	<50.0 50.0	<50.2 50.2
Diesel Range Organics (DRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<49.8 49.8	<50.0 50.0	<50.2 50.2
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<49.8 49.8	<50.0 50.0	<50.2 50.2
Total GRO-DRO		<50.1 50.1	<49.9 49.9	<50.2 50.2	<49.8 49.8	<50.0 50.0	<50.2 50.2
Total TPH		<50.1 50.1	<49.9 49.9	<50.2 50.2	<49.8 49.8	<50.0 50.0	<50.2 50.2

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.

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Version: 1.9%

Jessica Kramer

Jessica Kramer
Project Assistant



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS47**
Lab Sample Id: 649437-001

Matrix: Soil
Date Collected: 01.16.20 13.10

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	185	9.98	mg/kg	01.17.20 15.02		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

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	01.17.20 15.42	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 15.42	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 15.42	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 15.42	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 15.42	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	121	%	70-135	01.17.20 15.42	
o-Terphenyl	84-15-1	111	%	70-135	01.17.20 15.42	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS47**
 Lab Sample Id: 649437-001

Matrix: Soil
 Date Collected: 01.16.20 13.10

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 13.32	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 13.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.17.20 13.32		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.17.20 13.32		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW01**
Lab Sample Id: 649437-002

Matrix: Soil
Date Collected: 01.16.20 14.00

Date Received: 01.17.20 10.16
Sample Depth: 1 - 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	214	9.96	mg/kg	01.17.20 15.19		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.17.20 16.24	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.17.20 16.24	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.17.20 16.24	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.17.20 16.24	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.17.20 16.24	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.17.20 16.24	
o-Terphenyl	84-15-1	108	%	70-135	01.17.20 16.24	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW01**
 Lab Sample Id: 649437-002

Matrix: Soil
 Date Collected: 01.16.20 14.00

Date Received: 01.17.20 10.16
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.17.20 14.13	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.17.20 14.13	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.17.20 14.13		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.17.20 14.13		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW02** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-003 Date Collected: 01.16.20 14.15 Sample Depth: 1 - 8 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	28.1	9.92	mg/kg	01.17.20 15.24		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 16.24	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 16.24	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 16.24	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 16.24	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 16.24	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	01.17.20 16.24	
o-Terphenyl	84-15-1	106	%	70-135	01.17.20 16.24	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW02**
 Lab Sample Id: 649437-003

Matrix: Soil
 Date Collected: 01.16.20 14.15

Date Received: 01.17.20 10.16
 Sample Depth: 1 - 8 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.17.20 14.33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 14.33	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.17.20 14.33		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.17.20 14.33		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS48** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-004 Date Collected: 01.16.20 14.50 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	372	10.1	mg/kg	01.17.20 15.30		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 16.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.17.20 16.46	
o-Terphenyl	84-15-1	100	%	70-135	01.17.20 16.46	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS48**
 Lab Sample Id: 649437-004

Matrix: Soil
 Date Collected: 01.16.20 14.50

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.17.20 14.54	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.17.20 14.54	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.17.20 14.54		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.17.20 14.54		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS49** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-005 Date Collected: 01.16.20 15.00 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	364	10.0	mg/kg	01.17.20 15.35		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 16.46	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 16.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.17.20 16.46	
o-Terphenyl	84-15-1	101	%	70-135	01.17.20 16.46	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS49**
 Lab Sample Id: 649437-005

Matrix: Soil
 Date Collected: 01.16.20 15.00

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.17.20 15.14	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 15.14	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.17.20 15.14		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.17.20 15.14		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS50**
 Lab Sample Id: 649437-006

Matrix: Soil
 Date Collected: 01.16.20 15.45

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	315	10.1	mg/kg	01.17.20 15.51		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

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	01.17.20 17.07	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.17.20 17.07	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.17.20 17.07	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.17.20 17.07	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.17.20 17.07	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.17.20 17.07	
o-Terphenyl	84-15-1	104	%	70-135	01.17.20 17.07	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS50**
 Lab Sample Id: 649437-006

Matrix: Soil
 Date Collected: 01.16.20 15.45

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.17.20 15.34	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.17.20 15.34	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 15.34		
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.17.20 15.34		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS51**
 Lab Sample Id: 649437-007

Matrix: Soil
 Date Collected: 01.16.20 15.50

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	462	10.0	mg/kg	01.17.20 15.56		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.17.20 17.07	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.17.20 17.07	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.17.20 17.07	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.17.20 17.07	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.17.20 17.07	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.17.20 17.07	
o-Terphenyl	84-15-1	102	%	70-135	01.17.20 17.07	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS51**
 Lab Sample Id: 649437-007

Matrix: Soil
 Date Collected: 01.16.20 15.50

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 15.55	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 15.55	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.17.20 15.55		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 15.55		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS52 Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-008 Date Collected: 01.16.20 15.55 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	492	10.1	mg/kg	01.17.20 16.02		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.17.20 17.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.17.20 17.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.17.20 17.26	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.17.20 17.26	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.17.20 17.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	111	%	70-135	01.17.20 17.26	
o-Terphenyl	84-15-1	108	%	70-135	01.17.20 17.26	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS52
Lab Sample Id: 649437-008

Matrix: Soil
Date Collected: 01.16.20 15.55

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.17.20 16.15	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 16.15	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.17.20 16.15		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.17.20 16.15		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS53
Lab Sample Id: 649437-009

Matrix: Soil
Date Collected: 01.16.20 16.00

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	554	9.92	mg/kg	01.17.20 16.07		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

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	01.17.20 17.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 17.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 17.26	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 17.26	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 17.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	01.17.20 17.26	
o-Terphenyl	84-15-1	104	%	70-135	01.17.20 17.26	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS53**
 Lab Sample Id: 649437-009

Matrix: Soil
 Date Collected: 01.16.20 16.00

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.17.20 16.36	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 16.36	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.17.20 16.36		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 16.36		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS54**
 Lab Sample Id: 649437-010

Matrix: Soil
 Date Collected: 01.16.20 16.05

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	569	9.98	mg/kg	01.17.20 16.12		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

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	01.17.20 18.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.17.20 18.50	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.17.20 18.50	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.17.20 18.50	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.17.20 18.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.17.20 18.50	
o-Terphenyl	84-15-1	113	%	70-135	01.17.20 18.50	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS54**
 Lab Sample Id: 649437-010

Matrix: Soil
 Date Collected: 01.16.20 16.05

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.17.20 16.56	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 16.56	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.17.20 16.56		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.17.20 16.56		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS55 Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-011 Date Collected: 01.16.20 16.10 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	672	9.98	mg/kg	01.17.20 16.18		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 18.09	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 18.09	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 18.09	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 18.09	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 18.09	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.17.20 18.09	
o-Terphenyl	84-15-1	102	%	70-135	01.17.20 18.09	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS55
Lab Sample Id: 649437-011

Matrix: Soil
Date Collected: 01.16.20 16.10

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 18.11	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 18.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.17.20 18.11		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 18.11		



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS56** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649437-012 Date Collected: 01.16.20 16.15 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	729	9.96	mg/kg	01.17.20 16.34		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.17.20 18.29	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 18.29	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 18.29	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 18.29	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 18.29	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.17.20 18.29	
o-Terphenyl	84-15-1	104	%	70-135	01.17.20 18.29	



Certificate of Analytical Results 649437

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS56**
 Lab Sample Id: 649437-012

Matrix: Soil
 Date Collected: 01.16.20 16.15

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 11.32

Basis: Wet Weight

Seq Number: 3113725

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 18.32	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 18.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.17.20 18.32		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 18.32		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

MB Sample Id: 7694642-1-BLK

Matrix: Solid

LCS Sample Id: 7694642-1-BKS

Prep Method: E300P

Date Prep: 01.17.20

LCSD Sample Id: 7694642-1-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	254	102	90-110	1	20	mg/kg	01.17.20 14:41	

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

Parent Sample Id: 649437-001

Matrix: Soil

MS Sample Id: 649437-001 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649437-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	185	200	453	134	454	135	90-110	0	20	mg/kg	01.17.20 15:08	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

Parent Sample Id: 649437-011

Matrix: Soil

MS Sample Id: 649437-011 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649437-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	672	198	875	103	916	123	90-110	5	20	mg/kg	01.17.20 16:23	X

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

MB Sample Id: 7694639-1-BLK

Matrix: Solid

LCS Sample Id: 7694639-1-BKS

Prep Method: SW8015P

Date Prep: 01.17.20

LCSD Sample Id: 7694639-1-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	1150	115	961	96	70-135	18	35	mg/kg	01.17.20 15:21	
Diesel Range Organics (DRO)	<50.0	1000	1070	107	1060	106	70-135	1	35	mg/kg	01.17.20 15:21	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	92		136	**	108		70-135	%	01.17.20 15:21
o-Terphenyl	94		120		107		70-135	%	01.17.20 15:21

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

Matrix: Solid

MB Sample Id: 7694639-1-BLK

Prep Method: SW8015P

Date Prep: 01.17.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.17.20 15:21	

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

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

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

Parent Sample Id: 649437-001

Matrix: Soil

MS Sample Id: 649437-001 S

Prep Method: SW8015P

Date Prep: 01.17.20

MSD Sample Id: 649437-001 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)	<50.0	999	975	98	1070	106	70-135	9	35	mg/kg	01.17.20 16:04	
Diesel Range Organics (DRO)	<50.0	999	1090	109	1140	113	70-135	4	35	mg/kg	01.17.20 16:04	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	109		125		70-135	%	01.17.20 16:04
o-Terphenyl	110		111		70-135	%	01.17.20 16:04

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113725

MB Sample Id: 7694647-1-BLK

Matrix: Solid

LCS Sample Id: 7694647-1-BKS

Prep Method: SW5030B

Date Prep: 01.17.20

LCSD Sample Id: 7694647-1-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	0.100	100	0.106	106	70-130	6	35	mg/kg	01.17.20 12:11	
Toluene	<0.00200	0.100	0.0990	99	0.103	103	70-130	4	35	mg/kg	01.17.20 12:11	
Ethylbenzene	<0.00200	0.100	0.0975	98	0.0999	100	71-129	2	35	mg/kg	01.17.20 12:11	
m,p-Xylenes	<0.00400	0.200	0.201	101	0.205	103	70-135	2	35	mg/kg	01.17.20 12:11	
o-Xylene	<0.00200	0.100	0.0984	98	0.102	102	71-133	4	35	mg/kg	01.17.20 12:11	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		101		104		70-130	%	01.17.20 12:11
4-Bromofluorobenzene	100		98		99		70-130	%	01.17.20 12:11

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113725

Parent Sample Id: 649437-001

Matrix: Soil

MS Sample Id: 649437-001 S

Prep Method: SW5030B

Date Prep: 01.17.20

MSD Sample Id: 649437-001 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	0.100	0.0925	93	0.0893	90	70-130	4	35	mg/kg	01.17.20 13:12	
Toluene	<0.00200	0.100	0.0910	91	0.0856	86	70-130	6	35	mg/kg	01.17.20 13:12	
Ethylbenzene	0.000954	0.100	0.0895	89	0.0821	81	71-129	9	35	mg/kg	01.17.20 13:12	
m,p-Xylenes	0.000763	0.200	0.184	92	0.168	84	70-135	9	35	mg/kg	01.17.20 13:12	
o-Xylene	0.000582	0.100	0.0905	90	0.0831	83	71-133	9	35	mg/kg	01.17.20 13:12	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		104		70-130	%	01.17.20 13:12
4-Bromofluorobenzene	100		98		70-130	%	01.17.20 13:12

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: 649437

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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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	500 W. Mermaid St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Corpus Christi, NM 88220
Phone:	(432) 236-3849	Email:	jhill@ltenv.com, dmoir@ltenv.com
Project Name:	EMSU SWD Injection	Turn Around	
Project Number:	012919272	Routine	☐
P.O. Number:	11/3/19 SP-11 ckt	Rush:	3 days
Sampler's Name:	Jeremy Hill	Due Date:	1/31/2

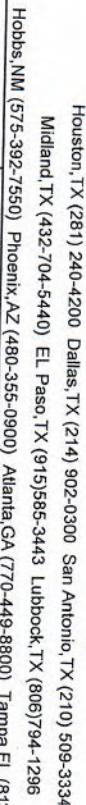
SAMPLE RECEIPT		Temp Blank:	Yes ☒ No ☐	Wet Ice:	Yes ☒ No ☐
Temperature (°C):	2.2	Thermometer ID	T-200007		
Received intact:	Yes ☒ No ☐	Correction Factor:	-0.2		
Cooler Custody Seals:	Yes ☒ No ☐	Total Containers:	12		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	ANALYSIS REQUEST													Work Order Notes
FS47	S	1/16/20			Number of Containers	1												
SW01	S				TPH (EPA 8015)	X												
SW02	S				BTEX (EPA 0=8021)	X												
FS48	S				Chloride (EPA 300.0)	X												
FS49	S																	
FS50	S																	
FS51	S																	
FS52	S																	
FS53	S																	
FS54	S																	

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
<i>[Signature]</i>	<i>[Signature]</i>	1/14/20 / 10:00 am	<i>[Signature]</i>	<i>[Signature]</i>	1/17/20 10:10



Chain of Custody

Work Order No: 6049437

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:	531 W. Merced St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	jhill@ltenv.com, dmoir@ltenv.com

Work Order Comments Program: UST/PST ☐ RP ☐ Trownfields ☐ RC ☐ \$perfund ☐ State of Project:	
Reporting Level II ☐ Level III ☐ ST/UST ☐ RP ☐ Level IV ☐	Deliverables: EDD ☐ ADaPT ☐ Other: ☐

[illegible]

Total	200.7 / 6010	200.8 / 6020:	
Circle Method(s) and Metal(s) to be analyzed			
	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

Received by: (Signature)		Relinquished by: (Signature)
Date/Time	Relinquished by: (Signature)	

Date/Time	Relinquished by: (Signature)	Received by: (Signature)
11-1-11		

[illegible][illegible]



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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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:	522 W. Marmel St
City, State ZIP:		Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:		(432) 236-3849	Email:	Jhill@ltenv.com, dmoir@ltenv.com

620-2000) www.xenco.com

Work Order Comments

Program: **UST/PST** ☐ RP ☐ Brownfields ☐ RC ☐ Superfund ☐

State of Project:

Reporting: Level II ☐ Level III ☐ ST/UST ☐ RP ☐ Level IV ☐

Deliverables: EDD ☐ ADaPT ☐ Other: ☐

Notes

Project Name:	EMSU SWD Injection	Turn Around
Project Number:	012919 272	Routine ☐
P.O. Number:	11/3/19 sp. 11 date	Rush: 3 day
Sampler's Name:	Jeremy Hill	Due Date: 1/21/20

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

[illegible]

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 Tl Sn U V Zn

TCLP / SPLP 6010: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl 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
1					2		
3					4		
5					6		

LT Environmental, Inc.
508 West Stevens Street



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.17.2020 10.16.00 AM

Work Order #: 649437

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)?	2.2
#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#:

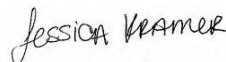
Checklist completed by:



Elizabeth McClellan

Date: 01.17.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.17.2020

Analytical Report 649439

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

EMSU SWD Injection

012919272

21-JAN-20

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)



21-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649439**

EMSU SWD Injection

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) 649439. 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. 649439 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 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
BH02	S	01-15-20 09:37	2 ft	649439-001
BH02A	S	01-15-20 10:16	6 ft	649439-002
FS20	S	01-15-20 13:57	4 ft	649439-003
FS21	S	01-15-20 14:31	5 ft	649439-004
FS22	S	01-15-20 14:34	5 ft	649439-005
FS23	S	01-15-20 14:38	5 ft	649439-006
FS24	S	01-15-20 14:42	5 ft	649439-007
FS25	S	01-16-20 10:04	5 ft	649439-008
FS26	S	01-16-20 10:14	5 ft	649439-009
FS27	S	01-16-20 10:19	5 ft	649439-010
FS28	S	01-16-20 10:22	5 ft	649439-011
FS29	S	01-16-20 10:25	5 ft	649439-012
FS30	S	01-16-20 11:13	5 ft	649439-013
FS31	S	01-16-20 11:19	5 ft	649439-014
FS32	S	01-16-20 11:24	5 ft	649439-015
FS33	S	01-16-20 11:28	5 ft	649439-016
FS34	S	01-16-20 11:31	5 ft	649439-017
FS35	S	01-16-20 12:12	5 ft	649439-018
FS36	S	01-16-20 12:17	5 ft	649439-019
FS37	S	01-16-20 12:21	5 ft	649439-020
FS38	S	01-16-20 12:25	5 ft	649439-021
FS39	S	01-16-20 12:28	5 ft	649439-022
FS40	S	01-16-20 12:32	5 ft	649439-023
FS41	S	01-16-20 13:21	5 ft	649439-024
FS42	S	01-16-20 13:24	5 ft	649439-025
FS43	S	01-16-20 13:28	5 ft	649439-026
FS44	S	01-16-20 13:34	5 ft	649439-027
FS45	S	01-16-20 13:36	5 ft	649439-028
FS46	S	01-16-20 13:41	5 ft	649439-029
SW03	S	01-16-20 14:51	5 ft	649439-030
SW04	S	01-16-20 14:56	5 ft	649439-031
SW05	S	01-16-20 15:00	5 ft	649439-032
SW06	S	01-16-20 15:02	5 ft	649439-033
SW07	S	01-16-20 15:06	5 ft	649439-034
SW08	S	01-16-20 15:10	5 ft	649439-035

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 649439Report Date: 21-JAN-20
Date Received: 01/17/2020

Sample receipt non conformances and comments:None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3113714 TPH by SW8015 Mod

Surrogate 1-Chlorooctane recovered above QC limits Data confirmed by re-analysis. Samples affected are: 7694639-1-BKS.

Batch: LBA-3113715 Chloride by EPA 300

Lab Sample ID 649439-019 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649439-009, -010, -011, -012, -013, -014, -015, -016, -017, -018, -019, -020, -021, -022, -023, -024, -025, -026, -027, -028.

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

Batch: LBA-3113721 TPH by SW8015 Mod

Surrogate 1-Chlorooctane, Surrogate o-Terphenyl recovered above QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 649439-029 S.

Batch: LBA-3113729 BTEX by EPA 8021B

Matrix Spike Duplicate was not spiked due to lab error. All other quality control spikes for batch 3113729 passed so the data meets method criteria and is reportable.

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

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 649439Report Date: 21-JAN-20
Date Received: 01/17/2020

Batch: LBA-3113735 BTEX by EPA 8021B

Benzene, Ethylbenzene, Toluene, m,p-Xylenes , o-Xylene Relative Percent Difference (RPD) between matrix spike and duplicate were above quality control limits.

Samples in the analytical batch are: 649439-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012, -013, -014, -015, -016, -017, -018, -019, -020

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

Lab Sample ID 649439-008 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD).

Benzene, Ethylbenzene, Toluene, m,p-Xylenes , o-Xylene recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649439-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012, -013, -014, -015, -016, -017, -018, -019, -020.

The Laboratory Control Sample for Toluene, m,p-Xylenes , Benzene, Ethylbenzene, o-Xylene is within laboratory Control Limits, therefore the data was accepted.



Certificate of Analysis Summary 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649439-001	649439-002	649439-003	649439-004	649439-005	649439-006
	Field Id:	BH02	BH02A	FS20	FS21	FS22	FS23
	Depth:	2- ft	6- ft	4- ft	5- ft	5- ft	5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-15-20 09:37	Jan-15-20 10:16	Jan-15-20 13:57	Jan-15-20 14:31	Jan-15-20 14:34	Jan-15-20 14:38
BTEX by EPA 8021B	Extracted:	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00
	Analyzed:	Jan-17-20 16:02	Jan-17-20 16:22	Jan-17-20 16:43	Jan-17-20 17:03	Jan-17-20 17:23	Jan-17-20 17:44
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
Toluene		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
Ethylbenzene		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
m,p-Xylenes		<0.00402 0.00402	<0.00404 0.00404	<0.00400 0.00400	<0.00403 0.00403	<0.00402 0.00402	<0.00400 0.00400
o-Xylene		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
Total Xylenes		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
Total BTEX		<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200
Chloride by EPA 300	Extracted:	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:10
	Analyzed:	Jan-17-20 16:39	Jan-17-20 16:56	Jan-17-20 17:02	Jan-17-20 17:07	Jan-17-20 17:13	Jan-17-20 17:18
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		<9.88 9.88	606 10.1	480 10.0	348 9.98	287 9.92	425 10.1
TPH by SW8015 Mod	Extracted:	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 13:00
	Analyzed:	Jan-17-20 18:50	Jan-17-20 19:31	Jan-17-20 19:51	Jan-17-20 20:11	Jan-17-20 20:31	Jan-17-20 20:51
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.8 49.8
Diesel Range Organics (DRO)		<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.8 49.8
Motor Oil Range Hydrocarbons (MRO)		<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.8 49.8
Total GRO-DRO		<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.8 49.8
Total TPH		<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.8 49.8

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 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649439-007	649439-008	649439-009	649439-010	649439-011	649439-012
	Field Id:	FS24	FS25	FS26	FS27	FS28	FS29
	Depth:	5- ft	5- ft	5- ft	5- ft	5- ft	5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-15-20 14:42	Jan-16-20 10:04	Jan-16-20 10:14	Jan-16-20 10:19	Jan-16-20 10:22	Jan-16-20 10:25
BTEX by EPA 8021B	Extracted:	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00
	Analyzed:	Jan-17-20 18:04	Jan-17-20 15:42	Jan-17-20 18:25	Jan-17-20 18:45	Jan-17-20 19:59	Jan-17-20 20:19
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	0.0388 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
Toluene		<0.00201 0.00201	0.0350 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
Ethylbenzene		<0.00201 0.00201	0.0320 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
m,p-Xylenes		<0.00402 0.00402	0.0627 0.00404	<0.00402 0.00402	<0.00400 0.00400	<0.00404 0.00404	<0.00397 0.00397
o-Xylene		<0.00201 0.00201	0.0306 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
Total Xylenes		<0.00201 0.00201	0.0933 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
Total BTEX		<0.00201 0.00201	0.199 0.00202	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198
Chloride by EPA 300	Extracted:	Jan-17-20 13:10	Jan-17-20 13:10	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17
	Analyzed:	Jan-17-20 17:23	Jan-17-20 17:29	Jan-17-20 18:01	Jan-17-20 18:17	Jan-17-20 18:23	Jan-17-20 18:29
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		302 10.0	177 9.98	90.5 10.1	149 9.98	117 9.92	260 9.98
TPH by SW8015 Mod	Extracted:	Jan-17-20 13:00	Jan-17-20 13:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00
	Analyzed:	Jan-17-20 21:11	Jan-17-20 21:31	Jan-17-20 23:11	Jan-18-20 00:10	Jan-18-20 00:30	Jan-18-20 00:50
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<50.3 50.3	<50.0 50.0	<50.1 50.1	<49.8 49.8	<50.3 50.3	<50.3 50.3
Diesel Range Organics (DRO)		<50.3 50.3	<50.0 50.0	<50.1 50.1	<49.8 49.8	<50.3 50.3	57.9 50.3
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.0 50.0	<50.1 50.1	<49.8 49.8	<50.3 50.3	<50.3 50.3
Total GRO-DRO		<50.3 50.3	<50.0 50.0	<50.1 50.1	<49.8 49.8	<50.3 50.3	57.9 50.3
Total TPH		<50.3 50.3	<50.0 50.0	<50.1 50.1	<49.8 49.8	<50.3 50.3	57.9 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 Analysis Summary 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649439-013	649439-014	649439-015	649439-016	649439-017	649439-018
	Field Id:	FS30	FS31	FS32	FS33	FS34	FS35
	Depth:	5- ft	5- ft	5- ft	5- ft	5- ft	5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-16-20 11:13	Jan-16-20 11:19	Jan-16-20 11:24	Jan-16-20 11:28	Jan-16-20 11:31	Jan-16-20 12:12
BTEX by EPA 8021B	Extracted:	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:00
	Analyzed:	Jan-17-20 20:40	Jan-17-20 21:00	Jan-17-20 21:20	Jan-17-20 21:41	Jan-17-20 22:01	Jan-17-20 22:21
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
Toluene		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
Ethylbenzene		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
m,p-Xylenes		<0.00397 0.00397	<0.00402 0.00402	<0.00398 0.00398	<0.00400 0.00400	<0.00398 0.00398	<0.00402 0.00402
o-Xylene		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
Total Xylenes		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
Total BTEX		<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201
Chloride by EPA 300	Extracted:	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17
	Analyzed:	Jan-17-20 18:35	Jan-17-20 18:53	Jan-17-20 18:58	Jan-17-20 19:04	Jan-17-20 19:10	Jan-17-20 19:16
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		180 9.88	125 10.1	105 10.1	107 9.98	158 9.94	98.6 10.1
TPH by SW8015 Mod	Extracted:	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00
	Analyzed:	Jan-18-20 01:09	Jan-18-20 01:29	Jan-18-20 01:49	Jan-18-20 02:09	Jan-18-20 02:28	Jan-18-20 02:48
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<50.2 50.2	<50.0 50.0	<50.3 50.3
Diesel Range Organics (DRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<50.2 50.2	<50.0 50.0	<50.3 50.3
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<49.9 49.9	<50.2 50.2	<50.2 50.2	<50.0 50.0	<50.3 50.3
Total GRO-DRO		<50.1 50.1	<49.9 49.9	<50.2 50.2	<50.2 50.2	<50.0 50.0	<50.3 50.3
Total TPH		<50.1 50.1	<49.9 49.9	<50.2 50.2	<50.2 50.2	<50.0 50.0	<50.3 50.3

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

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649439-019	649439-020	649439-021	649439-022	649439-023	649439-024
	<i>Field Id:</i>	FS36	FS37	FS38	FS39	FS40	FS41
	<i>Depth:</i>	5- ft	5- ft	5- ft	5- ft	5- ft	5- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-16-20 12:17	Jan-16-20 12:21	Jan-16-20 12:25	Jan-16-20 12:28	Jan-16-20 12:32	Jan-16-20 13:21
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-17-20 12:00	Jan-17-20 12:00	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32
	<i>Analyzed:</i>	Jan-17-20 22:42	Jan-17-20 23:02	Jan-18-20 01:28	Jan-18-20 01:48	Jan-18-20 02:08	Jan-18-20 02:29
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
Toluene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
Ethylbenzene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
m,p-Xylenes		<0.00401 0.00401	<0.00400 0.00400	<0.00404 0.00404	<0.00397 0.00397	<0.00403 0.00403	<0.00400 0.00400
o-Xylene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
Total Xylenes		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
Total BTEX		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00198 0.00198	<0.00202 0.00202	<0.00200 0.00200
Chloride by EPA 300	<i>Extracted:</i>	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17
	<i>Analyzed:</i>	Jan-17-20 19:22	Jan-17-20 19:39	Jan-17-20 19:45	Jan-17-20 20:03	Jan-17-20 20:09	Jan-17-20 20:14
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		114 9.98	173 10.1	36.8 10.1	39.9 9.98	37.2 9.94	418 9.98
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00
	<i>Analyzed:</i>	Jan-18-20 03:28	Jan-18-20 03:47	Jan-18-20 04:07	Jan-18-20 04:27	Jan-18-20 04:46	Jan-18-20 05:06
	<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	<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.2 50.2
Diesel Range Organics (DRO)		<49.9 49.9	<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.2 50.2
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.2 50.2
Total GRO-DRO		<49.9 49.9	<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.2 50.2
Total TPH		<49.9 49.9	<50.0 50.0	<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.2 50.2

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Jessica Kramer

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649439-025	649439-026	649439-027	649439-028	649439-029	649439-030
	Field Id:	FS42	FS43	FS44	FS45	FS46	SW03
	Depth:	5- ft	5- ft	5- ft	5- ft	5- ft	5- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-16-20 13:24	Jan-16-20 13:28	Jan-16-20 13:34	Jan-16-20 13:36	Jan-16-20 13:41	Jan-16-20 14:51
BTEX by EPA 8021B	Extracted:	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32
	Analyzed:	Jan-18-20 02:49	Jan-18-20 03:10	Jan-18-20 03:30	Jan-18-20 03:50	Jan-18-20 04:11	Jan-18-20 04:31
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
Toluene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
Ethylbenzene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
m,p-Xylenes		<0.00403 0.00403	<0.00398 0.00398	<0.00397 0.00397	<0.00399 0.00399	<0.00398 0.00398	<0.00398 0.00398
o-Xylene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
Total Xylenes		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
Total BTEX		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199
Chloride by EPA 300	Extracted:	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 13:17	Jan-17-20 16:00	Jan-17-20 16:00
	Analyzed:	Jan-17-20 20:20	Jan-17-20 20:26	Jan-17-20 20:32	Jan-17-20 20:38	Jan-17-20 21:13	Jan-17-20 21:31
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		326 9.94	465 9.96	572 9.98	388 10.0	162 10.1	447 9.98
TPH by SW8015 Mod	Extracted:	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:00	Jan-17-20 17:30	Jan-17-20 17:30
	Analyzed:	Jan-18-20 05:26	Jan-18-20 05:45	Jan-18-20 06:05	Jan-18-20 06:25	Jan-18-20 08:02	Jan-18-20 09:01
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.1 50.1	<50.2 50.2	<49.8 49.8
Diesel Range Organics (DRO)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.1 50.1	<50.2 50.2	<49.8 49.8
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.1 50.1	<50.2 50.2	<49.8 49.8
Total GRO-DRO		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.1 50.1	<50.2 50.2	<49.8 49.8
Total TPH		<50.3 50.3	<50.2 50.2	<50.3 50.3	<50.1 50.1	<50.2 50.2	<49.8 49.8

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649439

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Jan-17-20 10:16 am

Report Date: 21-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649439-031	649439-032	649439-033	649439-034	649439-035	
	Field Id:	SW04	SW05	SW06	SW07	SW08	
	Depth:	5- ft	5- ft	5- ft	5- ft	5- ft	
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	
	Sampled:	Jan-16-20 14:56	Jan-16-20 15:00	Jan-16-20 15:02	Jan-16-20 15:06	Jan-16-20 15:10	
BTEX by EPA 8021B	Extracted:	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	Jan-17-20 12:32	
	Analyzed:	Jan-18-20 05:47	Jan-18-20 06:07	Jan-18-20 06:27	Jan-18-20 06:48	Jan-18-20 07:08	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Benzene		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
Toluene		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
Ethylbenzene		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
m,p-Xylenes		<0.00397 0.00397	<0.00397 0.00397	<0.00398 0.00398	<0.00398 0.00398	<0.00400 0.00400	
o-Xylene		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
Total Xylenes		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
Total BTEX		<0.00198 0.00198	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200	
Chloride by EPA 300	Extracted:	Jan-17-20 16:00	Jan-17-20 16:00	Jan-17-20 16:00	Jan-17-20 16:00	Jan-17-20 16:00	
	Analyzed:	Jan-17-20 21:37	Jan-17-20 21:43	Jan-17-20 21:49	Jan-17-20 22:06	Jan-17-20 22:12	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Chloride		547 10.0	390 10.0	165 10.0	102 10.0	373 10.1	
TPH by SW8015 Mod	Extracted:	Jan-17-20 17:30	Jan-17-20 17:30	Jan-17-20 17:30	Jan-17-20 17:30	Jan-17-20 17:30	
	Analyzed:	Jan-18-20 09:21	Jan-18-20 09:40	Jan-18-20 10:00	Jan-18-20 10:20	Jan-18-20 10:39	
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Gasoline Range Hydrocarbons (GRO)		<49.8 49.8	<49.8 49.8	<49.9 49.9	<50.0 50.0	<50.0 50.0	
Diesel Range Organics (DRO)		<49.8 49.8	<49.8 49.8	<49.9 49.9	<50.0 50.0	73.9 50.0	
Motor Oil Range Hydrocarbons (MRO)		<49.8 49.8	<49.8 49.8	<49.9 49.9	<50.0 50.0	<50.0 50.0	
Total GRO-DRO		<49.8 49.8	<49.8 49.8	<49.9 49.9	<50.0 50.0	73.9 50.0	
Total TPH		<49.8 49.8	<49.8 49.8	<49.9 49.9	<50.0 50.0	73.9 50.0	

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Jessica Kramer
Project Assistant



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **BH02** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-001 Date Collected: 01.15.20 09.37 Sample Depth: 2 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<9.88	9.88	mg/kg	01.17.20 16.39	U	1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 18.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 18.50	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 18.50	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 18.50	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 18.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.17.20 18.50	
o-Terphenyl	84-15-1	108	%	70-135	01.17.20 18.50	



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **BH02**
 Lab Sample Id: 649439-001

Matrix: Soil
 Date Collected: 01.15.20 09.37

Date Received: 01.17.20 10.16
 Sample Depth: 2 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 16.02	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 16.02	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.17.20 16.02		
1,4-Difluorobenzene	540-36-3	110	%	70-130	01.17.20 16.02		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **BH02A** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-002 Date Collected: 01.15.20 10.16 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	606	10.1	mg/kg	01.17.20 16.56		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.17.20 19.31	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.17.20 19.31	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.17.20 19.31	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.17.20 19.31	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.17.20 19.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.17.20 19.31	
o-Terphenyl	84-15-1	108	%	70-135	01.17.20 19.31	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **BH02A**
 Lab Sample Id: 649439-002

Matrix: Soil
 Date Collected: 01.15.20 10.16

Date Received: 01.17.20 10.16
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.17.20 16.22	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 16.22	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.17.20 16.22		
1,4-Difluorobenzene	540-36-3	99	%	70-130	01.17.20 16.22		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS20**
 Lab Sample Id: 649439-003

Matrix: Soil
 Date Collected: 01.15.20 13.57

Date Received: 01.17.20 10.16
 Sample Depth: 4 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	480	10.0	mg/kg	01.17.20 17.02		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 19.51	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 19.51	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 19.51	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 19.51	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 19.51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.17.20 19.51	
o-Terphenyl	84-15-1	106	%	70-135	01.17.20 19.51	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS20**
 Lab Sample Id: 649439-003

Matrix: Soil
 Date Collected: 01.15.20 13.57

Date Received: 01.17.20 10.16
 Sample Depth: 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.17.20 16.43	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 16.43	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	104	%	70-130	01.17.20 16.43		
1,4-Difluorobenzene	540-36-3	88	%	70-130	01.17.20 16.43		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS21**
Lab Sample Id: 649439-004

Matrix: Soil
Date Collected: 01.15.20 14.31

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	348	9.98	mg/kg	01.17.20 17.07		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 20.11	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 20.11	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 20.11	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 20.11	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 20.11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.17.20 20.11	
o-Terphenyl	84-15-1	110	%	70-135	01.17.20 20.11	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS21**
 Lab Sample Id: 649439-004

Matrix: Soil
 Date Collected: 01.15.20 14.31

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.17.20 17.03	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 17.03	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.17.20 17.03		
1,4-Difluorobenzene	540-36-3	110	%	70-130	01.17.20 17.03		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS22
Lab Sample Id: 649439-005

Matrix: Soil
Date Collected: 01.15.20 14.34

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	287	9.92	mg/kg	01.17.20 17.13		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 20.31	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 20.31	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 20.31	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 20.31	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 20.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.17.20 20.31	
o-Terphenyl	84-15-1	106	%	70-135	01.17.20 20.31	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS22**
 Lab Sample Id: 649439-005

Matrix: Soil
 Date Collected: 01.15.20 14.34

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 17.23	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 17.23	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.17.20 17.23		
1,4-Difluorobenzene	540-36-3	110	%	70-130	01.17.20 17.23		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS23** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-006 Date Collected: 01.15.20 14.38 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.10 Basis: Wet Weight
 Seq Number: 3113716

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	425	10.1	mg/kg	01.17.20 17.18		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 13.00 Basis: Wet Weight
 Seq Number: 3113714

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.17.20 20.51	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.17.20 20.51	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.17.20 20.51	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.17.20 20.51	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.17.20 20.51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	105	%	70-135	01.17.20 20.51	
o-Terphenyl	84-15-1	106	%	70-135	01.17.20 20.51	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS23**
 Lab Sample Id: 649439-006

Matrix: Soil
 Date Collected: 01.15.20 14.38

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.17.20 17.44	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 17.44	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.17.20 17.44		
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.17.20 17.44		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS24**
 Lab Sample Id: 649439-007

Matrix: Soil
 Date Collected: 01.15.20 14.42

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	302	10.0	mg/kg	01.17.20 17.23		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

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	01.17.20 21.11	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.17.20 21.11	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.17.20 21.11	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.17.20 21.11	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.17.20 21.11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.17.20 21.11	
o-Terphenyl	84-15-1	109	%	70-135	01.17.20 21.11	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS24**
 Lab Sample Id: 649439-007

Matrix: Soil
 Date Collected: 01.15.20 14.42

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 18.04	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 18.04	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.17.20 18.04		
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.17.20 18.04		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS25
Lab Sample Id: 649439-008

Matrix: Soil
Date Collected: 01.16.20 10.04

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113716

Date Prep: 01.17.20 13.10

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	177	9.98	mg/kg	01.17.20 17.29		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113714

Date Prep: 01.17.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.17.20 21.31	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.17.20 21.31	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.17.20 21.31	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.17.20 21.31	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.17.20 21.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	109	%	70-135	01.17.20 21.31	
o-Terphenyl	84-15-1	105	%	70-135	01.17.20 21.31	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS25** Matrix: **Soil** Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-008 Date Collected: 01.16.20 10.04 Sample Depth: 5 ft
 Analytical Method: BTEX by EPA 8021B Prep Method: SW5030B
 Tech: **MAB** % Moisture:
 Analyst: **MAB** Date Prep: 01.17.20 12.00 Basis: **Wet Weight**
 Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	0.0388	0.00202	mg/kg	01.17.20 15.42		1
Toluene	108-88-3	0.0350	0.00202	mg/kg	01.17.20 15.42		1
Ethylbenzene	100-41-4	0.0320	0.00202	mg/kg	01.17.20 15.42		1
m,p-Xylenes	179601-23-1	0.0627	0.00404	mg/kg	01.17.20 15.42		1
o-Xylene	95-47-6	0.0306	0.00202	mg/kg	01.17.20 15.42		1
Total Xylenes	1330-20-7	0.0933	0.00202	mg/kg	01.17.20 15.42		1
Total BTEX		0.199	0.00202	mg/kg	01.17.20 15.42		1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.17.20 15.42		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.17.20 15.42		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS26**
 Lab Sample Id: 649439-009

Matrix: Soil
 Date Collected: 01.16.20 10.14

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	90.5	10.1	mg/kg	01.17.20 18.01		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.17.20 23.11	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.17.20 23.11	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.17.20 23.11	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.17.20 23.11	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.17.20 23.11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	111	%	70-135	01.17.20 23.11	
o-Terphenyl	84-15-1	107	%	70-135	01.17.20 23.11	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS26**
 Lab Sample Id: 649439-009

Matrix: Soil
 Date Collected: 01.16.20 10.14

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 18.25	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 18.25	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.17.20 18.25		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.17.20 18.25		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS27
Lab Sample Id: 649439-010

Matrix: Soil
Date Collected: 01.16.20 10.19

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	149	9.98	mg/kg	01.17.20 18.17		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 00.10	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.18.20 00.10	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.18.20 00.10	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.18.20 00.10	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.18.20 00.10	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	119	%	70-135	01.18.20 00.10	
o-Terphenyl	84-15-1	118	%	70-135	01.18.20 00.10	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS27**
 Lab Sample Id: 649439-010

Matrix: Soil
 Date Collected: 01.16.20 10.19

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.17.20 18.45	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 18.45	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.17.20 18.45		
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.17.20 18.45		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS28** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-011 Date Collected: 01.16.20 10.22 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	117	9.92	mg/kg	01.17.20 18.23		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.18.20 00.30	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.18.20 00.30	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.18.20 00.30	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.18.20 00.30	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.18.20 00.30	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	111	%	70-135	01.18.20 00.30	
o-Terphenyl	84-15-1	111	%	70-135	01.18.20 00.30	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS28**
 Lab Sample Id: 649439-011

Matrix: Soil
 Date Collected: 01.16.20 10.22

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.17.20 19.59	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.17.20 19.59	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.17.20 19.59		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.17.20 19.59		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS29**
Lab Sample Id: 649439-012

Matrix: Soil
Date Collected: 01.16.20 10.25

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	260	9.98	mg/kg	01.17.20 18.29		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 00.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	57.9	50.3	mg/kg	01.18.20 00.50		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.18.20 00.50	U	1
Total GRO-DRO	PHC628	57.9	50.3	mg/kg	01.18.20 00.50		1
Total TPH	PHC635	57.9	50.3	mg/kg	01.18.20 00.50		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.18.20 00.50	
o-Terphenyl	84-15-1	111	%	70-135	01.18.20 00.50	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS29**
 Lab Sample Id: 649439-012

Matrix: Soil
 Date Collected: 01.16.20 10.25

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.17.20 20.19	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.17.20 20.19	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.17.20 20.19		
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.17.20 20.19		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS30**
Lab Sample Id: 649439-013

Matrix: Soil
Date Collected: 01.16.20 11.13

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	180	9.88	mg/kg	01.17.20 18.35		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.18.20 01.09	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.18.20 01.09	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.18.20 01.09	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.18.20 01.09	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.18.20 01.09	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	109	%	70-135	01.18.20 01.09	
o-Terphenyl	84-15-1	107	%	70-135	01.18.20 01.09	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS30**
 Lab Sample Id: 649439-013

Matrix: Soil
 Date Collected: 01.16.20 11.13

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.17.20 20.40	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.17.20 20.40	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.17.20 20.40		
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.17.20 20.40		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS31**
Lab Sample Id: 649439-014

Matrix: Soil
Date Collected: 01.16.20 11.19

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	125	10.1	mg/kg	01.17.20 18.53		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 01.29	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.18.20 01.29	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.18.20 01.29	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.18.20 01.29	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.18.20 01.29	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.18.20 01.29	
o-Terphenyl	84-15-1	108	%	70-135	01.18.20 01.29	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS31**
 Lab Sample Id: 649439-014

Matrix: Soil
 Date Collected: 01.16.20 11.19

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 21.00	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 21.00	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.17.20 21.00		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.17.20 21.00		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS32**
 Lab Sample Id: 649439-015

Matrix: Soil
 Date Collected: 01.16.20 11.24

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	105	10.1	mg/kg	01.17.20 18.58		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 01.49	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 01.49	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 01.49	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 01.49	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 01.49	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.18.20 01.49	
o-Terphenyl	84-15-1	109	%	70-135	01.18.20 01.49	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS32**
 Lab Sample Id: 649439-015

Matrix: Soil
 Date Collected: 01.16.20 11.24

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.17.20 21.20	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.17.20 21.20	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.17.20 21.20		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.17.20 21.20		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS33** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-016 Date Collected: 01.16.20 11.28 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	107	9.98	mg/kg	01.17.20 19.04		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.18.20 02.09	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 02.09	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 02.09	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 02.09	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 02.09	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.18.20 02.09	
o-Terphenyl	84-15-1	108	%	70-135	01.18.20 02.09	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS33**
 Lab Sample Id: 649439-016

Matrix: Soil
 Date Collected: 01.16.20 11.28

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.17.20 21.41	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 21.41	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.17.20 21.41		
1,4-Difluorobenzene	540-36-3	94	%	70-130	01.17.20 21.41		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS34**
Lab Sample Id: 649439-017

Matrix: Soil
Date Collected: 01.16.20 11.31

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	158	9.94	mg/kg	01.17.20 19.10		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.18.20 02.28	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.18.20 02.28	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.18.20 02.28	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.18.20 02.28	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.18.20 02.28	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.18.20 02.28	
o-Terphenyl	84-15-1	110	%	70-135	01.18.20 02.28	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS34**
 Lab Sample Id: 649439-017

Matrix: Soil
 Date Collected: 01.16.20 11.31

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.17.20 22.01	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.17.20 22.01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	110	%	70-130	01.17.20 22.01		
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.17.20 22.01		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS35** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-018 Date Collected: 01.16.20 12.12 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	98.6	10.1	mg/kg	01.17.20 19.16		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.18.20 02.48	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.18.20 02.48	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.18.20 02.48	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.18.20 02.48	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.18.20 02.48	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.18.20 02.48	
o-Terphenyl	84-15-1	107	%	70-135	01.18.20 02.48	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS35**
 Lab Sample Id: 649439-018

Matrix: Soil
 Date Collected: 01.16.20 12.12

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.17.20 22.21	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.17.20 22.21	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.17.20 22.21		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.17.20 22.21		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS36** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-019 Date Collected: 01.16.20 12.17 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	114	9.98	mg/kg	01.17.20 19.22		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.18.20 03.28	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.18.20 03.28	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.18.20 03.28	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.18.20 03.28	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.18.20 03.28	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.18.20 03.28	
o-Terphenyl	84-15-1	112	%	70-135	01.18.20 03.28	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS36**
 Lab Sample Id: 649439-019

Matrix: Soil
 Date Collected: 01.16.20 12.17

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.17.20 22.42	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 22.42	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.17.20 22.42		
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.17.20 22.42		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS37**
 Lab Sample Id: 649439-020

Matrix: Soil
 Date Collected: 01.16.20 12.21

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	173	10.1	mg/kg	01.17.20 19.39		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.18.20 03.47	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.18.20 03.47	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.18.20 03.47	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.18.20 03.47	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.18.20 03.47	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.18.20 03.47	
o-Terphenyl	84-15-1	111	%	70-135	01.18.20 03.47	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS37**
 Lab Sample Id: 649439-020

Matrix: Soil
 Date Collected: 01.16.20 12.21

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.00

Basis: Wet Weight

Seq Number: 3113735

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.17.20 23.02	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.17.20 23.02	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.17.20 23.02		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.17.20 23.02		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS38**
Lab Sample Id: 649439-021

Matrix: Soil
Date Collected: 01.16.20 12.25

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	36.8	10.1	mg/kg	01.17.20 19.45		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 04.07	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 04.07	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 04.07	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 04.07	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 04.07	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	109	%	70-135	01.18.20 04.07	
o-Terphenyl	84-15-1	111	%	70-135	01.18.20 04.07	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS38**
 Lab Sample Id: 649439-021

Matrix: Soil
 Date Collected: 01.16.20 12.25

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.18.20 01.28	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.18.20 01.28	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.18.20 01.28		
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.18.20 01.28		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS39**
Lab Sample Id: 649439-022

Matrix: Soil
Date Collected: 01.16.20 12.28

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	39.9	9.98	mg/kg	01.17.20 20.03		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.18.20 04.27	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.18.20 04.27	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.18.20 04.27	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.18.20 04.27	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.18.20 04.27	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.18.20 04.27	
o-Terphenyl	84-15-1	109	%	70-135	01.18.20 04.27	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS39**
 Lab Sample Id: 649439-022

Matrix: Soil
 Date Collected: 01.16.20 12.28

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.18.20 01.48	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.18.20 01.48	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.18.20 01.48		
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.18.20 01.48		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS40** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-023 Date Collected: 01.16.20 12.32 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	37.2	9.94	mg/kg	01.17.20 20.09		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.18.20 04.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 04.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 04.46	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 04.46	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 04.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.18.20 04.46	
o-Terphenyl	84-15-1	107	%	70-135	01.18.20 04.46	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS40**
 Lab Sample Id: 649439-023

Matrix: Soil
 Date Collected: 01.16.20 12.32

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: ELM

Analyst: MAB

Seq Number: 3113729

Date Prep: 01.17.20 12.32

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.18.20 02.08	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.18.20 02.08	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.18.20 02.08		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.18.20 02.08		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS41** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-024 Date Collected: 01.16.20 13.21 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	418	9.98	mg/kg	01.17.20 20.14		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.18.20 05.06	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 05.06	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 05.06	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 05.06	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 05.06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.18.20 05.06	
o-Terphenyl	84-15-1	109	%	70-135	01.18.20 05.06	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS41**
 Lab Sample Id: 649439-024

Matrix: Soil
 Date Collected: 01.16.20 13.21

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.18.20 02.29	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.18.20 02.29	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.18.20 02.29		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.18.20 02.29		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS42**
Lab Sample Id: 649439-025

Matrix: Soil
Date Collected: 01.16.20 13.24

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	326	9.94	mg/kg	01.17.20 20.20		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 05.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.18.20 05.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.18.20 05.26	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.18.20 05.26	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.18.20 05.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	107	%	70-135	01.18.20 05.26	
o-Terphenyl	84-15-1	110	%	70-135	01.18.20 05.26	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS42**
 Lab Sample Id: 649439-025

Matrix: Soil
 Date Collected: 01.16.20 13.24

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.18.20 02.49	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.18.20 02.49	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.18.20 02.49		
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.18.20 02.49		



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS43** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-026 Date Collected: 01.16.20 13.28 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	465	9.96	mg/kg	01.17.20 20.26		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.18.20 05.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 05.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 05.45	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 05.45	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 05.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.18.20 05.45	
o-Terphenyl	84-15-1	106	%	70-135	01.18.20 05.45	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS43**
 Lab Sample Id: 649439-026

Matrix: Soil
 Date Collected: 01.16.20 13.28

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.18.20 03.10	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.18.20 03.10	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.18.20 03.10		
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.18.20 03.10		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS44**
Lab Sample Id: 649439-027

Matrix: Soil
Date Collected: 01.16.20 13.34

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3113715

Date Prep: 01.17.20 13.17

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	572	9.98	mg/kg	01.17.20 20.32		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113717

Date Prep: 01.17.20 17.00

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	01.18.20 06.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.18.20 06.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.18.20 06.05	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.18.20 06.05	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.18.20 06.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	107	%	70-135	01.18.20 06.05	
o-Terphenyl	84-15-1	108	%	70-135	01.18.20 06.05	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS44**
 Lab Sample Id: 649439-027

Matrix: Soil
 Date Collected: 01.16.20 13.34

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.18.20 03.30	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.18.20 03.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.18.20 03.30		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.18.20 03.30		



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS45** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-028 Date Collected: 01.16.20 13.36 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.17.20 13.17 Basis: Wet Weight
 Seq Number: 3113715

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	388	10.0	mg/kg	01.17.20 20.38		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.00 Basis: Wet Weight
 Seq Number: 3113717

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.18.20 06.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.18.20 06.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.18.20 06.25	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.18.20 06.25	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.18.20 06.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.18.20 06.25	
o-Terphenyl	84-15-1	106	%	70-135	01.18.20 06.25	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS45**
 Lab Sample Id: 649439-028

Matrix: Soil
 Date Collected: 01.16.20 13.36

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.18.20 03.50	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.18.20 03.50	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	01.18.20 03.50		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.18.20 03.50		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS46** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-029 Date Collected: 01.16.20 13.41 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: ECA Date Prep: 01.17.20 16.00 Basis: Wet Weight
 Seq Number: 3113713

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	162	10.1	mg/kg	01.17.20 21.13		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.30 Basis: Wet Weight
 Seq Number: 3113721

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.18.20 08.02	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.18.20 08.02	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.18.20 08.02	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.18.20 08.02	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.18.20 08.02	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	01.18.20 08.02	
o-Terphenyl	84-15-1	105	%	70-135	01.18.20 08.02	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS46**
 Lab Sample Id: 649439-029

Matrix: Soil
 Date Collected: 01.16.20 13.41

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.18.20 04.11	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.18.20 04.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.18.20 04.11		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.18.20 04.11		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW03** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-030 Date Collected: 01.16.20 14.51 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: ECA Date Prep: 01.17.20 16.00 Basis: Wet Weight
 Seq Number: 3113713

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	447	9.98	mg/kg	01.17.20 21.31		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.30 Basis: Wet Weight
 Seq Number: 3113721

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.18.20 09.01	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.18.20 09.01	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.18.20 09.01	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.18.20 09.01	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.18.20 09.01	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	01.18.20 09.01	
o-Terphenyl	84-15-1	115	%	70-135	01.18.20 09.01	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW03**
 Lab Sample Id: 649439-030

Matrix: Soil
 Date Collected: 01.16.20 14.51

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.18.20 04.31	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.18.20 04.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.18.20 04.31		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.18.20 04.31		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW04**
Lab Sample Id: 649439-031

Matrix: Soil
Date Collected: 01.16.20 14.56

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: ECA

Seq Number: 3113713

Date Prep: 01.17.20 16.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	547	10.0	mg/kg	01.17.20 21.37		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113721

Date Prep: 01.17.20 17.30

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	01.18.20 09.21	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.18.20 09.21	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.18.20 09.21	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.18.20 09.21	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.18.20 09.21	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.18.20 09.21	
o-Terphenyl	84-15-1	112	%	70-135	01.18.20 09.21	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW04**
 Lab Sample Id: 649439-031

Matrix: Soil
 Date Collected: 01.16.20 14.56

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: ELM

Analyst: MAB

Seq Number: 3113729

Date Prep: 01.17.20 12.32

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.18.20 05.47	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.18.20 05.47	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.18.20 05.47		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.18.20 05.47		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW05**
 Lab Sample Id: 649439-032

Matrix: Soil
 Date Collected: 01.16.20 15.00

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: ECA

Seq Number: 3113713

Date Prep: 01.17.20 16.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	390	10.0	mg/kg	01.17.20 21.43		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113721

Date Prep: 01.17.20 17.30

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	01.18.20 09.40	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.18.20 09.40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.18.20 09.40	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.18.20 09.40	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.18.20 09.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.18.20 09.40	
o-Terphenyl	84-15-1	114	%	70-135	01.18.20 09.40	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW05**
 Lab Sample Id: 649439-032

Matrix: Soil
 Date Collected: 01.16.20 15.00

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.18.20 06.07	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.18.20 06.07	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.18.20 06.07		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.18.20 06.07		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW06** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-033 Date Collected: 01.16.20 15.02 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: ECA Date Prep: 01.17.20 16.00 Basis: Wet Weight
 Seq Number: 3113713

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	165	10.0	mg/kg	01.17.20 21.49		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.30 Basis: Wet Weight
 Seq Number: 3113721

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.18.20 10.00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.18.20 10.00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.18.20 10.00	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.18.20 10.00	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.18.20 10.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.18.20 10.00	
o-Terphenyl	84-15-1	112	%	70-135	01.18.20 10.00	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW06**
 Lab Sample Id: 649439-033

Matrix: Soil
 Date Collected: 01.16.20 15.02

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: ELM

Analyst: MAB

Seq Number: 3113729

Date Prep: 01.17.20 12.32

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.18.20 06.27	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.18.20 06.27	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.18.20 06.27		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.18.20 06.27		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW07**
Lab Sample Id: 649439-034

Matrix: Soil
Date Collected: 01.16.20 15.06

Date Received: 01.17.20 10.16
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: ECA

Seq Number: 3113713

Date Prep: 01.17.20 16.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	102	10.0	mg/kg	01.17.20 22.06		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113721

Date Prep: 01.17.20 17.30

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.18.20 10.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.18.20 10.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.18.20 10.20	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.18.20 10.20	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.18.20 10.20	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	01.18.20 10.20	
o-Terphenyl	84-15-1	115	%	70-135	01.18.20 10.20	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW07**
 Lab Sample Id: 649439-034

Matrix: Soil
 Date Collected: 01.16.20 15.06

Date Received: 01.17.20 10.16
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.18.20 06.48	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.18.20 06.48	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.18.20 06.48		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.18.20 06.48		



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW08** Matrix: Soil Date Received: 01.17.20 10.16
 Lab Sample Id: 649439-035 Date Collected: 01.16.20 15.10 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: ECA Date Prep: 01.17.20 16.00 Basis: Wet Weight
 Seq Number: 3113713

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	373	10.1	mg/kg	01.17.20 22.12		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.17.20 17.30 Basis: Wet Weight
 Seq Number: 3113721

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.18.20 10.39	U	1
Diesel Range Organics (DRO)	C10C28DRO	73.9	50.0	mg/kg	01.18.20 10.39		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.18.20 10.39	U	1
Total GRO-DRO	PHC628	73.9	50.0	mg/kg	01.18.20 10.39		1
Total TPH	PHC635	73.9	50.0	mg/kg	01.18.20 10.39		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.18.20 10.39	
o-Terphenyl	84-15-1	114	%	70-135	01.18.20 10.39	



Certificate of Analytical Results 649439

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW08**

Matrix: Soil

Date Received: 01.17.20 10.16

Lab Sample Id: 649439-035

Date Collected: 01.16.20 15.10

Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: ELM

% Moisture:

Analyst: MAB

Date Prep: 01.17.20 12.32

Basis: Wet Weight

Seq Number: 3113729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.18.20 07.08	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.18.20 07.08	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.18.20 07.08		
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.18.20 07.08		



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

MB Sample Id: 7694642-1-BLK

Matrix: Solid

LCS Sample Id: 7694642-1-BKS

Prep Method: E300P

Date Prep: 01.17.20

LCSD Sample Id: 7694642-1-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	254	102	90-110	1	20	mg/kg	01.17.20 14:41	

Analytical Method: Chloride by EPA 300

Seq Number: 3113715

MB Sample Id: 7694643-1-BLK

Matrix: Solid

LCS Sample Id: 7694643-1-BKS

Prep Method: E300P

Date Prep: 01.17.20

LCSD Sample Id: 7694643-1-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	264	106	90-110	3	20	mg/kg	01.17.20 17:50	

Analytical Method: Chloride by EPA 300

Seq Number: 3113713

MB Sample Id: 7694644-1-BLK

Matrix: Solid

LCS Sample Id: 7694644-1-BKS

Prep Method: E300P

Date Prep: 01.17.20

LCSD Sample Id: 7694644-1-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	260	104	90-110	1	20	mg/kg	01.17.20 21:01	

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

Parent Sample Id: 649437-001

Matrix: Soil

MS Sample Id: 649437-001 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649437-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	185	200	453	134	454	135	90-110	0	20	mg/kg	01.17.20 15:08	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113716

Parent Sample Id: 649437-011

Matrix: Soil

MS Sample Id: 649437-011 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649437-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	672	198	875	103	916	123	90-110	5	20	mg/kg	01.17.20 16:23	X

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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113715

Parent Sample Id: 649439-009

Matrix: Soil

MS Sample Id: 649439-009 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649439-009 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	90.5	200	305	107	339	124	90-110	11	20	mg/kg	01.17.20 18:06	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113715

Parent Sample Id: 649439-019

Matrix: Soil

MS Sample Id: 649439-019 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649439-019 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	114	198	328	108	329	108	90-110	0	20	mg/kg	01.17.20 19:28	

Analytical Method: Chloride by EPA 300

Seq Number: 3113713

Parent Sample Id: 649439-029

Matrix: Soil

MS Sample Id: 649439-029 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649439-029 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	162	200	381	110	380	109	90-110	0	20	mg/kg	01.17.20 21:19	

Analytical Method: Chloride by EPA 300

Seq Number: 3113713

Parent Sample Id: 649501-004

Matrix: Soil

MS Sample Id: 649501-004 S

Prep Method: E300P

Date Prep: 01.17.20

MSD Sample Id: 649501-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	61.5	200	277	108	276	107	90-110	0	20	mg/kg	01.17.20 22:41	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

MB Sample Id: 7694639-1-BLK

Matrix: Solid

LCS Sample Id: 7694639-1-BKS

Prep Method: SW8015P

Date Prep: 01.17.20

LCSD Sample Id: 7694639-1-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	1150	115	961	96	70-135	18	35	mg/kg	01.17.20 15:21	
Diesel Range Organics (DRO)	<50.0	1000	1070	107	1060	106	70-135	1	35	mg/kg	01.17.20 15:21	

Surrogate

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	92		136	**	108		70-135	%	01.17.20 15:21
o-Terphenyl	94		120		107		70-135	%	01.17.20 15:21

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113717

MB Sample Id: 7694691-1-BLK

Matrix: Solid

LCS Sample Id: 7694691-1-BKS

Prep Method: SW8015P

Date Prep: 01.17.20

LCSD Sample Id: 7694691-1-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	985	99	1010	101	70-135	3	35	mg/kg	01.17.20 22:31	
Diesel Range Organics (DRO)	<50.0	1000	1160	116	1130	113	70-135	3	35	mg/kg	01.17.20 22:31	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date	Flag		
1-Chlorooctane	109		123		130		70-135	%	01.17.20 22:31			
o-Terphenyl	111		120		120		70-135	%	01.17.20 22:31			

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113721

MB Sample Id: 7694697-1-BLK

Matrix: Solid

LCS Sample Id: 7694697-1-BKS

Prep Method: SW8015P

Date Prep: 01.17.20

LCSD Sample Id: 7694697-1-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	999	100	996	100	70-135	0	35	mg/kg	01.18.20 07:23	
Diesel Range Organics (DRO)	<50.0	1000	1170	117	1170	117	70-135	0	35	mg/kg	01.18.20 07:23	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date	Flag		
1-Chlorooctane	108		119		123		70-135	%	01.18.20 07:23			
o-Terphenyl	115		121		127		70-135	%	01.18.20 07:23			

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

Matrix: Solid

MB Sample Id: 7694639-1-BLK

Prep Method: SW8015P

Date Prep: 01.17.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.17.20 15:21	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113717

Matrix: Solid

MB Sample Id: 7694691-1-BLK

Prep Method: SW8015P

Date Prep: 01.17.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.17.20 22:11	

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

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

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113721

Matrix: Solid

Prep Method: SW8015P

Date Prep: 01.17.20

MB Sample Id: 7694697-1-BLK

Parameter

MB
Result

Units

Analysis
Date

Flag

Motor Oil Range Hydrocarbons (MRO)

<50.0

mg/kg

01.18.20 07:04

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113714

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.17.20

Parent Sample Id: 649437-001

MS Sample Id: 649437-001 S

MSD Sample Id: 649437-001 SD

Parameter

Parent
ResultSpike
AmountMS
ResultMS
%RecMSD
ResultMSD
%Rec

Limits

%RPD RPD Limit

Units

Analysis
Date

Flag

Gasoline Range Hydrocarbons (GRO)

<50.0

999

975

98

1070

106

70-135

9 35

mg/kg

01.17.20 16:04

Diesel Range Organics (DRO)

<50.0

999

1090

109

1140

113

70-135

4 35

mg/kg

01.17.20 16:04

Surrogate

MS
%RecMS
FlagMSD
%RecMSD
Flag

Limits

Units

Analysis
Date

1-Chlorooctane

109

125

70-135

%

01.17.20 16:04

o-Terphenyl

110

111

70-135

%

01.17.20 16:04

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113717

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.17.20

Parent Sample Id: 649439-009

MS Sample Id: 649439-009 S

MSD Sample Id: 649439-009 SD

Parameter

Parent
ResultSpike
AmountMS
ResultMS
%RecMSD
ResultMSD
%Rec

Limits

%RPD RPD Limit

Units

Analysis
Date

Flag

Gasoline Range Hydrocarbons (GRO)

<50.2

1000

1200

120

1060

106

70-135

12 35

mg/kg

01.20.20 11:25

Diesel Range Organics (DRO)

<50.2

1000

1240

124

1050

105

70-135

17 35

mg/kg

01.20.20 11:25

Surrogate

MS
%RecMS
FlagMSD
%RecMSD
Flag

Limits

Units

Analysis
Date

1-Chlorooctane

130

129

70-135

%

01.20.20 11:25

o-Terphenyl

124

121

70-135

%

01.20.20 11:25

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113721

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.17.20

Parent Sample Id: 649439-029

MS Sample Id: 649439-029 S

MSD Sample Id: 649439-029 SD

Parameter

Parent
ResultSpike
AmountMS
ResultMS
%RecMSD
ResultMSD
%Rec

Limits

%RPD RPD Limit

Units

Analysis
Date

Flag

Gasoline Range Hydrocarbons (GRO)

<50.2

1000

1180

118

1040

104

70-135

13 35

mg/kg

01.18.20 08:22

Diesel Range Organics (DRO)

<50.2

1000

1180

118

1050

105

70-135

12 35

mg/kg

01.18.20 08:22

Surrogate

MS
%RecMS
FlagMSD
%RecMSD
Flag

Limits

Units

Analysis
Date

1-Chlorooctane

142

**

126

70-135

%

01.18.20 08:22

o-Terphenyl

142

**

124

70-135

%

01.18.20 08:22

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113735

MB Sample Id: 7694648-1-BLK

Matrix: Solid

LCS Sample Id: 7694648-1-BKS

Prep Method: SW5030B

Date Prep: 01.17.20

LCSD Sample Id: 7694648-1-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	0.123	123	0.127	127	70-130	3	35	mg/kg	01.17.20 14:00	
Toluene	<0.00200	0.100	0.113	113	0.117	117	70-130	3	35	mg/kg	01.17.20 14:00	
Ethylbenzene	<0.00200	0.100	0.111	111	0.115	115	71-129	4	35	mg/kg	01.17.20 14:00	
m,p-Xylenes	<0.00400	0.200	0.217	109	0.225	113	70-135	4	35	mg/kg	01.17.20 14:00	
o-Xylene	<0.00200	0.100	0.108	108	0.113	113	71-133	5	35	mg/kg	01.17.20 14:00	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	107		110		109		70-130	%	01.17.20 14:00
4-Bromofluorobenzene	94		95		96		70-130	%	01.17.20 14:00

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113729

MB Sample Id: 7694704-1-BLK

Matrix: Solid

LCS Sample Id: 7694704-1-BKS

Prep Method: SW5030B

Date Prep: 01.17.20

LCSD Sample Id: 7694704-1-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	0.0927	93	0.0932	93	70-130	1	35	mg/kg	01.17.20 23:46	
Toluene	<0.00200	0.100	0.0894	89	0.0897	90	70-130	0	35	mg/kg	01.17.20 23:46	
Ethylbenzene	<0.00200	0.100	0.0862	86	0.0864	86	71-129	0	35	mg/kg	01.17.20 23:46	
m,p-Xylenes	<0.00400	0.200	0.178	89	0.178	89	70-135	0	35	mg/kg	01.17.20 23:46	
o-Xylene	<0.00200	0.100	0.0890	89	0.0891	89	71-133	0	35	mg/kg	01.17.20 23:46	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	102		103		102		70-130	%	01.17.20 23:46
4-Bromofluorobenzene	96		99		97		70-130	%	01.17.20 23:46

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113735

Parent Sample Id: 649439-008

Matrix: Soil

MS Sample Id: 649439-008 S

Prep Method: SW5030B

Date Prep: 01.17.20

MSD Sample Id: 649439-008 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	0.0388	0.100	0.0773	39	0.00312	0	70-130	184	35	mg/kg	01.17.20 14:40	XF
Toluene	0.0350	0.100	0.0704	35	0.00159	0	70-130	191	35	mg/kg	01.17.20 14:40	XF
Ethylbenzene	0.0320	0.100	0.0679	36	<0.00202	0	71-129	200	35	mg/kg	01.17.20 14:40	XF
m,p-Xylenes	0.0627	0.201	0.134	35	0.000939	0	70-135	197	35	mg/kg	01.17.20 14:40	XF
o-Xylene	0.0306	0.100	0.0663	36	<0.00202	0	71-133	200	35	mg/kg	01.17.20 14:40	XF

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	107		109		70-130	%	01.17.20 14:40
4-Bromofluorobenzene	98		100		70-130	%	01.17.20 14:40

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113729

Parent Sample Id: 649439-021

Matrix: Soil

MS Sample Id: 649439-021 S

Prep Method: SW5030B

Date Prep: 01.17.20

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Benzene	<0.00202	0.101	0.104	103	70-130	mg/kg	01.18.20 00:26	
Toluene	<0.00202	0.101	0.102	101	70-130	mg/kg	01.18.20 00:26	
Ethylbenzene	<0.00202	0.101	0.0988	98	71-129	mg/kg	01.18.20 00:26	
m,p-Xylenes	<0.00404	0.202	0.203	100	70-135	mg/kg	01.18.20 00:26	
o-Xylene	<0.00202	0.101	0.101	100	71-133	mg/kg	01.18.20 00:26	

Surrogate	MS %Rec	MS Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	104		70-130	%	01.18.20 00:26
4-Bromofluorobenzene	98		70-130	%	01.18.20 00:26

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

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, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (904) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 1649439

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Little
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Work Order Comments	
Program: UST/PT ☐ PRP ☐ Brownfields ☐ RRP ☐ Superfund ☐	
State of Project:	
Reporting Level: ☐ Level ☐ PST/UST ☐ TRRP ☐ Level ☐	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EMSD SMD Injection		Turn Around																		
Project Number:	012919272		Routine:																		
PO #:	11/3/19 spill date		Rush: 3 days																		
Sampler's Name:	Fatima Smith		Due Date:																		
SAMPLE RECEIPT				ANALYSIS REQUEST																	
Temperature (°C):	8.2	Temp Blank:	Yes No	Wet Ice:	Yes No																
Received In tact:	Yes No	Thermometer ID:	T-NM-007																		
Cooler Custody Seals:	Yes No	Correction Factor:	-0.2																		
Sample Custody Seals:	Yes No	Total Containers:	141535																		
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth																	
BH02	S	1/15/20	0937	21																	
BH02A		1/15/20	1016	61																	
ES20		1/15/20	1357	41																	
ES21		1/15/20	1431	51																	
ES22		1/15/20	1434	51																	
ES23		1/15/20	1438	51																	
ES24		1/15/20	1442	51																	
ES25		1/16/20	1004	51																	
ES26		1/16/20	1014	51																	
ES27		1/16/20	1019	51																	
					Number of Containers																
					TPH (EPA 8015)																
					BTEX (EPA 0-8021)																
					Chloride (EPA 300.0)																
					TAT starts the day received by the lab, if received by 4:30pm																
					Sample Comments																

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

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1 fatima	1/17/20/10:00 AM	2	1/17/20/10:00 AM	1/17/20/10:00 AM	1/17/20/10:00 AM
3		4			
5		6			



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) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 1049439

www.xenco.com Page 2 of 4

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Work Order Comments	
Program: UST/PS ☐ PRP ☐ Brownfields ☐ RRP ☐ Superfund ☐	
State of Project:	
Reporting Level: ☐ Level ☐ PST/UST ☐ TRRP ☐ Level ☐	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EM60 SMD Injection	Turn Around	☐
Project Number:	012919272	Routine:	☐
PO #:	11/3/19 spill date	Rush:	3 days
Sampler's Name:	Fatima Smith	Due Date:	
SAMPLE RECEIPT			
Temperature (°C):	Yes No ☒ Yes No Thermometer ID	Temp Blank:	Yes No ☒ Yes No
Received Intact:	Yes No ☒ Yes No	Wet Ice:	Yes No ☒ Yes No
Cooler Custody Seals:	Yes No ☒ Yes No	Correction Factor:	
Sample Custody Seals:	Yes No ☒ Yes No	Total Containers:	

ANALYSIS REQUEST		Work Order Notes	
Number of Containers		TAT starts the day received by the lab, if received by 4:30pm	
TPH (EPA 8015)	☒		
BTEX (EPA 0=8021)	☒		
Chloride (EPA 300.0)	☒		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH (EPA 8015)	BTEX (EPA 0=8021)	Chloride (EPA 300.0)	Sample Comments
FS228	S	1/16/20	1022	5'	1	☒	☒	☒	
FS229			1025						
FS30			1113						
FS31			1119						
FS32			1124						
FS33			1128						
FS34			1131						
FS35			1212						
FS36			1217						
FS37			1221						

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

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>[Signature]</i>	<i>[Signature]</i>	1/17/20 10:00 am	<i>[Signature]</i>	<i>[Signature]</i>	1/17/20 10:10



Chain of Custody

Work Order No: 1649439

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300, San Antonio, TX (210) 508-3334
 Midland, TX (432) 704-5440, EL Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 889-6701
 Atlanta, GA (770) 449-8800

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Litrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Program: ☐ PST ☐ PRP ☐ Brownfields ☐ RR ☐ Superfund State of Project: _____ Reporting Level: ☐ Level ☐ PST/US ☐ TRP ☐ Level Deliverables: EDD ☐ ADAPT ☐ Other: _____	
--	--

Project Name:	EMSU SWD Injection		Turn Around	ANALYSIS REQUEST																Work Order Notes
Project Number:	012919272		Routine:																	TAT starts the day received by the lab, if received by 4:30pm Sample Comments
PO #:	11/3/19 spill date		Rush: 3 days																	
Sampler's Name:	Fatima Smith		Due Date:																	
Temperature (°C):	Temp Blank:	Yes	No	Wet Ice:	Yes	No														
Received Inlet:	Yes	No	Correction Factor:																	
Cooler Custody Seals:	Yes	No	Total Containers:																	
Sample Custody Seals:	Yes	No																		
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth																
ES38	S	1/16/20	1225	5'																
ES39			1228																	
ES40			1232																	
ES41			1321																	
ES42			1324																	
ES43			1326																	
ES44			1334																	
ES45			1336																	
ES46			1341																	
SWOB			1451																	

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

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1 fatma	4/1/20	10:00 am	2 4/1/20	10:14	
3			4		
5			6		



Chain of Custody

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300, San Antonio, TX (210) 508-3334
 Midland, TX (432) 704-5440, EL Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1295
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 0049439

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@xenv.com, dmoir@xenv.com

Program: ☐ UST/PST ☐ PRP ☐ Brownfields ☐ RR ☐ Superfund State of Project:	
Reporting Level: ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4	Deliverables: ☐ EDD ☐ ADAPT ☐ Other:

Project Name:	EMBU SMD Injection	Turn Around	Routine: ☐
Project Number:	012919272	Rush: 3 days	Due Date:
PO #:	11/3/19 spill date		
Sampler's Name:	Fatima Smith		
SAMPLE RECEIPT			
Temperature (°C):	Yes No	Temp Blank:	Yes No
Received Inact:	Yes No	Wet Ice:	Yes No
Cooler Custody Seals:	Yes No	Thermometer ID:	
Sample Custody Seals:	Yes No	Correction Factor:	
	Yes No	Total Containers:	

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number	TPH (E	BTEX (	Chloride												Sample Comments
SW04	S	1/16/20	1450	5'	1	X	X	X												
SW05	S	1/16/20	1500																	
SW06	S	1/16/20	1502																	
SW07	S	1/16/20	1506																	
SW08	S	1/16/20	1510																	
fate																				

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
fatima	fatima	1/17/20 16:00 am	fatima	fatima	1/17/20 16:19

Analytical Report 649571

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

22-JAN-20

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)



22-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649571**

EMSU SWD Injection

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) 649571. 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. 649571 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 649571****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS 60	S	01-17-20 13:25	5 ft	649571-001
FS 63	S	01-17-20 13:40	5 ft	649571-002
SW18	S	01-17-20 14:45	8 ft	649571-003
SW19	S	01-17-20 14:50	5 ft	649571-004
SW20	S	01-17-20 14:55	5 ft	649571-005
SW21	S	01-17-20 15:05	5 ft	649571-006



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272
Work Order Number(s): 649571

Report Date: 22-JAN-20
Date Received: 01/20/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3113964 BTEX by EPA 8021B

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



Certificate of Analysis Summary 649571

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Mon Jan-20-20 09:00 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649571-001	649571-002	649571-003	649571-004	649571-005	649571-006
	<i>Field Id:</i>	FS 60	FS 63	SW18	SW19	SW20	SW21
	<i>Depth:</i>	5- ft	5- ft	8- ft	5- ft	5- ft	5- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-17-20 13:25	Jan-17-20 13:40	Jan-17-20 14:45	Jan-17-20 14:50	Jan-17-20 14:55	Jan-17-20 15:05
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39
	<i>Analyzed:</i>	Jan-21-20 01:06	Jan-21-20 01:26	Jan-21-20 01:47	Jan-21-20 02:07	Jan-21-20 02:27	Jan-21-20 02:48
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
Toluene		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
Ethylbenzene		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
m,p-Xylenes		<0.00404 0.00404	<0.00400 0.00400	<0.00402 0.00402	<0.00403 0.00403	<0.00403 0.00403	<0.00402 0.00402
o-Xylene		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
Total Xylenes		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
Total BTEX		<0.00202 0.00202	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201
Chloride by EPA 300	<i>Extracted:</i>	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29
	<i>Analyzed:</i>	Jan-20-20 14:40	Jan-20-20 14:51	Jan-20-20 14:56	Jan-20-20 15:02	Jan-20-20 15:07	Jan-20-20 15:12
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		247 9.92	239 9.98	57.2 10.1	85.4 9.92	139 10.1	101 9.92
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00
	<i>Analyzed:</i>	Jan-20-20 15:59	Jan-20-20 15:59	Jan-20-20 16:19	Jan-20-20 16:19	Jan-20-20 16:39	Jan-20-20 16:39
	<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)		<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.1 50.1	<50.1 50.1	<50.1 50.1
Diesel Range Organics (DRO)		<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.1 50.1	<50.1 50.1	<50.1 50.1
Motor Oil Range Hydrocarbons (MRO)		<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.1 50.1	<50.1 50.1	<50.1 50.1
Total GRO-DRO		<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.1 50.1	<50.1 50.1	<50.1 50.1
Total TPH		<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.1 50.1	<50.1 50.1	<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.

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Version: 1.9%

Jessica Kramer

Jessica Kramer
Project Assistant



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS 60**
 Lab Sample Id: 649571-001

Matrix: Soil
 Date Collected: 01.17.20 13.25

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	247	9.92	mg/kg	01.20.20 14.40		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 15.59	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 15.59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 15.59	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 15.59	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 15.59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.20.20 15.59	
o-Terphenyl	84-15-1	97	%	70-135	01.20.20 15.59	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS 60**
 Lab Sample Id: 649571-001

Matrix: Soil
 Date Collected: 01.17.20 13.25

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.21.20 01.06	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 01.06	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.21.20 01.06		
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.21.20 01.06		



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS 63** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649571-002 Date Collected: 01.17.20 13.40 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	239	9.98	mg/kg	01.20.20 14.51		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 15.59	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 15.59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 15.59	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 15.59	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 15.59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.20.20 15.59	
o-Terphenyl	84-15-1	100	%	70-135	01.20.20 15.59	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS 63**
 Lab Sample Id: 649571-002

Matrix: Soil
 Date Collected: 01.17.20 13.40

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113964

Date Prep: 01.20.20 13.39

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.21.20 01.26	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.21.20 01.26	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.21.20 01.26		
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.21.20 01.26		



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW18** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649571-003 Date Collected: 01.17.20 14.45 Sample Depth: 8 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	57.2	10.1	mg/kg	01.20.20 14.56		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.20.20 16.19	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 16.19	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 16.19	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 16.19	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 16.19	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.20.20 16.19	
o-Terphenyl	84-15-1	98	%	70-135	01.20.20 16.19	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW18**
 Lab Sample Id: 649571-003

Matrix: Soil
 Date Collected: 01.17.20 14.45

Date Received: 01.20.20 09.00
 Sample Depth: 8 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113964

Date Prep: 01.20.20 13.39

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.21.20 01.47	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.21.20 01.47	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.21.20 01.47		
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.21.20 01.47		



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW19** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649571-004 Date Collected: 01.17.20 14.50 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	85.4	9.92	mg/kg	01.20.20 15.02		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 16.19	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 16.19	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 16.19	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 16.19	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 16.19	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.20.20 16.19	
o-Terphenyl	84-15-1	102	%	70-135	01.20.20 16.19	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW19**
 Lab Sample Id: 649571-004

Matrix: Soil
 Date Collected: 01.17.20 14.50

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.21.20 02.07	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 02.07	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.21.20 02.07		
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.21.20 02.07		



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW20**
Lab Sample Id: 649571-005

Matrix: Soil
Date Collected: 01.17.20 14.55

Date Received: 01.20.20 09.00
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	139	10.1	mg/kg	01.20.20 15.07		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 16.39	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.20.20 16.39	
o-Terphenyl	84-15-1	101	%	70-135	01.20.20 16.39	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW20**
 Lab Sample Id: 649571-005

Matrix: Soil
 Date Collected: 01.17.20 14.55

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.21.20 02.27	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 02.27	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.21.20 02.27		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.21.20 02.27		



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW21**
Lab Sample Id: 649571-006

Matrix: Soil
Date Collected: 01.17.20 15.05

Date Received: 01.20.20 09.00
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	101	9.92	mg/kg	01.20.20 15.12		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 16.39	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 16.39	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 16.39	
o-Terphenyl	84-15-1	97	%	70-135	01.20.20 16.39	



Certificate of Analytical Results 649571

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW21**
 Lab Sample Id: 649571-006

Matrix: Soil
 Date Collected: 01.17.20 15.05

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.21.20 02.48	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.21.20 02.48	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.21.20 02.48		
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.21.20 02.48		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

MB Sample Id: 7694791-1-BLK

Matrix: Solid

LCS Sample Id: 7694791-1-BKS

Prep Method: E300P

Date Prep: 01.20.20

LCSD Sample Id: 7694791-1-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	236	94	90-110	8	20	mg/kg	01.20.20 13:47	

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

Parent Sample Id: 649562-001

Matrix: Soil

MS Sample Id: 649562-001 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649562-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	208	202	471	130	474	133	90-110	1	20	mg/kg	01.20.20 14:35	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

Parent Sample Id: 649573-002

Matrix: Soil

MS Sample Id: 649573-002 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649573-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	355	202	605	124	595	121	90-110	2	20	mg/kg	01.20.20 17:24	X

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

MB Sample Id: 7694728-1-BLK

Matrix: Solid

LCS Sample Id: 7694728-1-BKS

Prep Method: SW8015P

Date Prep: 01.20.20

LCSD Sample Id: 7694728-1-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	1090	109	1000	100	70-135	9	35	mg/kg	01.20.20 13:31	
Diesel Range Organics (DRO)	<50.0	1000	1210	121	1160	116	70-135	4	35	mg/kg	01.20.20 13:31	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	108		125		124		70-135	%	01.20.20 13:31
o-Terphenyl	112		120		124		70-135	%	01.20.20 13:31

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

Matrix: Solid

MB Sample Id: 7694728-1-BLK

Prep Method: SW8015P

Date Prep: 01.20.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.20.20 13:12	

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

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

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

Parent Sample Id: 649562-001

Matrix: Soil

MS Sample Id: 649562-001 S

Prep Method: SW8015P

Date Prep: 01.20.20

MSD Sample Id: 649562-001 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	1250	125	1230	123	70-135	2	35	mg/kg	01.20.20 15:01	
Diesel Range Organics (DRO)	<50.2	1000	1240	124	1170	117	70-135	6	35	mg/kg	01.20.20 15:01	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	133		129		70-135	%	01.20.20 15:01
o-Terphenyl	128		122		70-135	%	01.20.20 15:01

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113964

MB Sample Id: 7694838-1-BLK

Matrix: Solid

LCS Sample Id: 7694838-1-BKS

Prep Method: SW5030B

Date Prep: 01.20.20

LCSD Sample Id: 7694838-1-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	0.112	112	0.0972	97	70-130	14	35	mg/kg	01.20.20 18:54	
Toluene	<0.00200	0.100	0.103	103	0.0902	90	70-130	13	35	mg/kg	01.20.20 18:54	
Ethylbenzene	<0.00200	0.100	0.0999	100	0.0877	88	71-129	13	35	mg/kg	01.20.20 18:54	
m,p-Xylenes	<0.00400	0.200	0.196	98	0.173	87	70-135	12	35	mg/kg	01.20.20 18:54	
o-Xylene	<0.00200	0.100	0.0977	98	0.0869	87	71-133	12	35	mg/kg	01.20.20 18:54	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	104		106		104		70-130	%	01.20.20 18:54
4-Bromofluorobenzene	84		89		92		70-130	%	01.20.20 18:54

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113964

Parent Sample Id: 649573-008

Matrix: Soil

MS Sample Id: 649573-008 S

Prep Method: SW5030B

Date Prep: 01.20.20

MSD Sample Id: 649573-008 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	0.0612	61	0.106	106	70-130	54	35	mg/kg	01.20.20 19:35	XF
Toluene	<0.00200	0.0998	0.0742	74	0.0974	98	70-130	27	35	mg/kg	01.20.20 19:35	
Ethylbenzene	<0.00200	0.0998	0.0775	78	0.0952	96	71-129	20	35	mg/kg	01.20.20 19:35	
m,p-Xylenes	<0.00399	0.200	0.151	76	0.188	94	70-135	22	35	mg/kg	01.20.20 19:35	
o-Xylene	<0.00200	0.0998	0.0780	78	0.0940	94	71-133	19	35	mg/kg	01.20.20 19:35	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	94		108		70-130	%	01.20.20 19:35
4-Bromofluorobenzene	107		94		70-130	%	01.20.20 19:35

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

Work Order No.:

649571

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Page 1 of 1

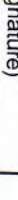
Work Order Comments	
Program: UST/PST State of Project: Reporting Level II Deliverables: EDD	☐ RP ☐ Growfields ☐ RC ☐ \$perfund ☐ Level III ☐ ST/UST ☐ RP ☐ Level IV ☐ ADaPT ☐ Other:

[illegible]

No.	Name
(EPA 8015)	
(EPA 0=8021)	
(EPA 300.0)	
TAT starts the day received by the lab if received by 4:00 PM	

[illegible][illegible]

Reinvoiced by: (Contract)

Requisitioned by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
		1/26/20 9:00am			1/20/20 9:00

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.20.2020 09.00.00 AM

Work Order #: 649571

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)?	2.2
#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#:

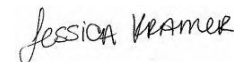
Checklist completed by:



Elizabeth McClellan

Date: 01.20.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.21.2020

Analytical Report 649573

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

EMSU SWD Injection

012919272

22-JAN-20

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)



22-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649573**

EMSU SWD Injection

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) 649573. 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. 649573 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 649573****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SW09	S	01-17-20 10:18	0 - 5 ft	649573-001
SW12	S	01-17-20 10:18	0 - 5 ft	649573-002
SW13	S	01-17-20 10:18	0 - 5 ft	649573-003
SW14	S	01-17-20 11:00	0 - 5 ft	649573-004
SW15	S	01-17-20 11:00	0 - 5 ft	649573-005
SW16	S	01-17-20 11:00	0 - 5 ft	649573-006
SW17	S	01-17-20 11:00	0 - 5 ft	649573-007
FS19	S	01-17-20 13:48	5 ft	649573-008
SW10	S	01-17-20 13:48	0 - 5 ft	649573-009
SW11	S	01-17-20 13:48	0 - 5 ft	649573-010
FS18	S	01-17-20 13:48	5 ft	649573-011
FS07	S	01-17-20 13:48	5 ft	649573-012
FS16	S	01-17-20 13:48	5 ft	649573-013
SW22	S	01-17-20 15:15	0 - 5 ft	649573-014
SW23	S	01-17-20 15:15	0 - 5 ft	649573-015
SW24	S	01-17-20 15:15	0 - 5 ft	649573-016
SW25	S	01-17-20 15:15	0 - 5 ft	649573-017
SW26	S	01-17-20 15:15	0 - 5 ft	649573-018
SW27	S	01-17-20 15:15	0 - 5 ft	649573-019

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 649573Report Date: 22-JAN-20
Date Received: 01/20/2020**Sample receipt non conformances and comments:****Sample receipt non conformances and comments per sample:**

None

Analytical non conformances and comments:

Batch: LBA-3113964 BTEX by EPA 8021B

Benzene Relative Percent Difference (RPD) between matrix spike and duplicate was above quality control limits.

Samples in the analytical batch are: 649573-001, -002, -003, -004, -005, -006, -007, -008, -009, -010

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

Lab Sample ID 649573-008 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD).

Benzene recovered below QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference.

Samples in the analytical batch are: 649573-001, -002, -003, -004, -005, -006, -007, -008, -009, -010.

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

Batch: LBA-3113977 Chloride by EPA 300

Lab Sample ID 649573-002 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD).

Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649573-001, -002, -003, -004, -005, -006, -007, -009, -010, -011.

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

Batch: LBA-3113985 Chloride by EPA 300

Lab Sample ID 649573-018 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD).

Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649573-008, -012, -013, -014, -015, -016, -017, -018, -019.

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

Batch: LBA-3113992 BTEX by EPA 8021B

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



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272

Work Order Number(s): 649573

Report Date: 22-JAN-20

Date Received: 01/20/2020



Certificate of Analysis Summary 649573

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Mon Jan-20-20 09:00 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649573-001	649573-002	649573-003	649573-004	649573-005	649573-006
	<i>Field Id:</i>	SW09	SW12	SW13	SW14	SW15	SW16
	<i>Depth:</i>	0-5 ft	0-5 ft	0-5 ft	0-5 ft	0-5 ft	0-5 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-17-20 10:18	Jan-17-20 10:18	Jan-17-20 10:18	Jan-17-20 11:00	Jan-17-20 11:00	Jan-17-20 11:00
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39
	<i>Analyzed:</i>	Jan-20-20 20:49	Jan-20-20 21:09	Jan-20-20 21:30	Jan-20-20 21:50	Jan-20-20 22:10	Jan-20-20 22:31
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
Toluene		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
Ethylbenzene		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
m,p-Xylenes		<0.00398 0.00398	<0.00398 0.00398	<0.00404 0.00404	<0.00403 0.00403	<0.00402 0.00402	<0.00404 0.00404
o-Xylene		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
Total Xylenes		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
Total BTEX		<0.00199 0.00199	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00202 0.00202
Chloride by EPA 300	<i>Extracted:</i>	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29
	<i>Analyzed:</i>	Jan-20-20 15:34	Jan-20-20 17:19	Jan-20-20 15:55	Jan-20-20 16:01	Jan-20-20 16:17	Jan-20-20 16:33
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		353 10.1	355 9.92	386 9.92	374 10.1	514 10.0	529 10.1
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00
	<i>Analyzed:</i>	Jan-20-20 16:59	Jan-20-20 17:18	Jan-20-20 17:18	Jan-20-20 17:38	Jan-20-20 17:38	Jan-20-20 17:58
	<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)		<50.3 50.3	<50.1 50.1	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Diesel Range Organics (DRO)		<50.3 50.3	<50.1 50.1	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.1 50.1	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Total GRO-DRO		<50.3 50.3	<50.1 50.1	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2
Total TPH		<50.3 50.3	<50.1 50.1	<50.3 50.3	<50.2 50.2	<50.2 50.2	<50.2 50.2

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649573

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Mon Jan-20-20 09:00 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649573-007	649573-008	649573-009	649573-010	649573-011	649573-012
	<i>Field Id:</i>	SW17	FS19	SW10	SW11	FS18	FS07
	<i>Depth:</i>	0-5 ft	5- ft	0-5 ft	0-5 ft	5- ft	5- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-17-20 11:00	Jan-17-20 13:48	Jan-17-20 13:48	Jan-17-20 13:48	Jan-17-20 13:48	Jan-17-20 13:48
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:39	Jan-20-20 13:06	Jan-20-20 13:06
	<i>Analyzed:</i>	Jan-20-20 22:51	Jan-20-20 23:11	Jan-20-20 23:32	Jan-20-20 23:52	Jan-20-20 23:14	Jan-21-20 00:29
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Toluene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Ethylbenzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
m,p-Xylenes		<0.00396 0.00396	<0.00400 0.00400	<0.00400 0.00400	<0.00402 0.00402	<0.00404 0.00404	<0.00399 0.00399
o-Xylene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Total Xylenes		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Total BTEX		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Chloride by EPA 300	<i>Extracted:</i>	Jan-20-20 09:29	Jan-20-20 09:49	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:29	Jan-20-20 09:49
	<i>Analyzed:</i>	Jan-20-20 17:35	Jan-20-20 19:03	Jan-20-20 17:40	Jan-20-20 17:46	Jan-20-20 17:51	Jan-20-20 19:08
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		334 10.1	79.7 10.2	176 10.1	86.0 9.96	99.3 10.0	436 10.0
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-20-20 13:00	Jan-20-20 17:36	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 13:00	Jan-20-20 17:36
	<i>Analyzed:</i>	Jan-20-20 17:58	Jan-20-20 19:17	Jan-20-20 18:18	Jan-20-20 18:18	Jan-20-20 18:38	Jan-20-20 19:57
	<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)		<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.9 49.9	<49.9 49.9	<50.3 50.3
Diesel Range Organics (DRO)		<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.9 49.9	<49.9 49.9	<50.3 50.3
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.9 49.9	<49.9 49.9	<50.3 50.3
Total GRO-DRO		<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.9 49.9	<49.9 49.9	<50.3 50.3
Total TPH		<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.9 49.9	<49.9 49.9	<50.3 50.3

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649573

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Mon Jan-20-20 09:00 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649573-013	649573-014	649573-015	649573-016	649573-017	649573-018
	<i>Field Id:</i>	FS16	SW22	SW23	SW24	SW25	SW26
	<i>Depth:</i>	5- ft	0-5 ft	0-5 ft	0-5 ft	0-5 ft	0-5 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-17-20 13:48	Jan-17-20 15:15	Jan-17-20 15:15	Jan-17-20 15:15	Jan-17-20 15:15	Jan-17-20 15:15
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-20-20 13:06	Jan-20-20 13:06	Jan-20-20 13:06	Jan-20-20 13:06	Jan-20-20 13:06	Jan-20-20 13:06
	<i>Analyzed:</i>	Jan-21-20 00:49	Jan-21-20 01:10	Jan-21-20 01:30	Jan-21-20 01:51	Jan-21-20 02:11	Jan-21-20 02:31
	<i>Units/RL:</i>	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	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
Toluene		<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
Ethylbenzene		<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
m,p-Xylenes		<0.00401 0.00401	<0.00404 0.00404	<0.00404 0.00404	<0.00401 0.00401	<0.00404 0.00404	<0.00404 0.00404
o-Xylene		<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
Total Xylenes		<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
Total BTEX		<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202	<0.00200 0.00200	<0.00202 0.00202	<0.00202 0.00202
Chloride by EPA 300	<i>Extracted:</i>	Jan-20-20 09:49	Jan-20-20 09:49	Jan-20-20 09:49	Jan-20-20 09:49	Jan-20-20 09:49	Jan-20-20 09:49
	<i>Analyzed:</i>	Jan-20-20 19:14	Jan-20-20 19:19	Jan-20-20 19:35	Jan-20-20 19:41	Jan-20-20 20:13	Jan-20-20 20:18
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		226 9.92	186 10.1	133 9.96	360 10.0	388 10.0	382 9.96
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-20-20 17:36	Jan-20-20 17:36	Jan-20-20 17:36	Jan-20-20 17:36	Jan-20-20 17:36	Jan-20-20 17:36
	<i>Analyzed:</i>	Jan-20-20 19:57	Jan-20-20 20:17	Jan-20-20 20:17	Jan-20-20 20:36	Jan-20-20 20:36	Jan-20-20 20:56
	<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)		<50.1 50.1	<50.1 50.1	<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.8 49.8
Diesel Range Organics (DRO)		<50.1 50.1	<50.1 50.1	<50.1 50.1	53.4 50.2	<50.2 50.2	<49.8 49.8
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<50.1 50.1	<50.1 50.1	<50.2 50.2	<50.2 50.2	<49.8 49.8
Total GRO-DRO		<50.1 50.1	<50.1 50.1	<50.1 50.1	53.4 50.2	<50.2 50.2	<49.8 49.8
Total TPH		<50.1 50.1	<50.1 50.1	<50.1 50.1	53.4 50.2	<50.2 50.2	<49.8 49.8

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649573

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Mon Jan-20-20 09:00 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649573-019					
	Field Id:	SW27					
	Depth:	0-5 ft					
	Matrix:	SOIL					
	Sampled:	Jan-17-20 15:15					
BTEX by EPA 8021B	Extracted:	Jan-20-20 13:06					
	Analyzed:	Jan-21-20 02:52					
	Units/RL:	mg/kg RL					
Benzene		<0.00201 0.00201					
Toluene		<0.00201 0.00201					
Ethylbenzene		<0.00201 0.00201					
m,p-Xylenes		<0.00402 0.00402					
o-Xylene		<0.00201 0.00201					
Total Xylenes		<0.00201 0.00201					
Total BTEX		<0.00201 0.00201					
Chloride by EPA 300	Extracted:	Jan-20-20 09:49					
	Analyzed:	Jan-20-20 20:45					
	Units/RL:	mg/kg RL					
Chloride		111 10.0					
TPH by SW8015 Mod	Extracted:	Jan-20-20 17:36					
	Analyzed:	Jan-20-20 20:56					
	Units/RL:	mg/kg RL					
Gasoline Range Hydrocarbons (GRO)		<50.1 50.1					
Diesel Range Organics (DRO)		<50.1 50.1					
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1					
Total GRO-DRO		<50.1 50.1					
Total TPH		<50.1 50.1					

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Jessica Kramer
Project Assistant



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW09**
Lab Sample Id: 649573-001

Matrix: Soil
Date Collected: 01.17.20 10.18

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	353	10.1	mg/kg	01.20.20 15.34		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 16.59	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.20.20 16.59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.20.20 16.59	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.20.20 16.59	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.20.20 16.59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 16.59	
o-Terphenyl	84-15-1	96	%	70-135	01.20.20 16.59	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW09**
 Lab Sample Id: 649573-001

Matrix: Soil
 Date Collected: 01.17.20 10.18

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113964

Date Prep: 01.20.20 13.39

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.20.20 20.49	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.20.20 20.49	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.20.20 20.49		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.20.20 20.49		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW12**
Lab Sample Id: 649573-002

Matrix: Soil
Date Collected: 01.17.20 10.18

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	355	9.92	mg/kg	01.20.20 17.19		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 17.18	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 17.18	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 17.18	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 17.18	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 17.18	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	89	%	70-135	01.20.20 17.18	
o-Terphenyl	84-15-1	90	%	70-135	01.20.20 17.18	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW12**
 Lab Sample Id: 649573-002

Matrix: Soil
 Date Collected: 01.17.20 10.18

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113964

Date Prep: 01.20.20 13.39

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.20.20 21.09	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.20.20 21.09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.20.20 21.09		
4-Bromofluorobenzene	460-00-4	91	%	70-130	01.20.20 21.09		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW13** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-003 Date Collected: 01.17.20 10.18 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	386	9.92	mg/kg	01.20.20 15.55		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.20.20 17.18	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.20.20 17.18	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.20.20 17.18	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.20.20 17.18	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.20.20 17.18	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 17.18	
o-Terphenyl	84-15-1	98	%	70-135	01.20.20 17.18	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW13**
 Lab Sample Id: 649573-003

Matrix: Soil
 Date Collected: 01.17.20 10.18

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.20.20 21.30	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.20.20 21.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.20.20 21.30		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.20.20 21.30		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW14**
Lab Sample Id: 649573-004

Matrix: Soil
Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	374	10.1	mg/kg	01.20.20 16.01		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 17.38	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 17.38	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.20.20 17.38	
o-Terphenyl	84-15-1	93	%	70-135	01.20.20 17.38	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW14**
 Lab Sample Id: 649573-004

Matrix: Soil
 Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.20.20 21.50	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.20.20 21.50	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.20.20 21.50		
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.20.20 21.50		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW15**
Lab Sample Id: 649573-005

Matrix: Soil
Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	514	10.0	mg/kg	01.20.20 16.17		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 17.38	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 17.38	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 17.38	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 17.38	
o-Terphenyl	84-15-1	98	%	70-135	01.20.20 17.38	



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW15**
 Lab Sample Id: 649573-005

Matrix: Soil
 Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113964

Date Prep: 01.20.20 13.39

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.20.20 22.10	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.20.20 22.10	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.20.20 22.10		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.20.20 22.10		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW16**
Lab Sample Id: 649573-006

Matrix: Soil
Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	529	10.1	mg/kg	01.20.20 16.33		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 17.58	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 17.58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 17.58	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 17.58	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 17.58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.20.20 17.58	
o-Terphenyl	84-15-1	92	%	70-135	01.20.20 17.58	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW16**
 Lab Sample Id: 649573-006

Matrix: Soil
 Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.20.20 22.31	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.20.20 22.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.20.20 22.31		
1,4-Difluorobenzene	540-36-3	108	%	70-130	01.20.20 22.31		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW17** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-007 Date Collected: 01.17.20 11.00 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	334	10.1	mg/kg	01.20.20 17.35		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 17.58	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 17.58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 17.58	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 17.58	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 17.58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 17.58	
o-Terphenyl	84-15-1	98	%	70-135	01.20.20 17.58	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW17**
 Lab Sample Id: 649573-007

Matrix: Soil
 Date Collected: 01.17.20 11.00

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.20.20 22.51	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.20.20 22.51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.20.20 22.51		
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.20.20 22.51		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS19** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-008 Date Collected: 01.17.20 13.48 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	79.7	10.2	mg/kg	01.20.20 19.03		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.20.20 19.17	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 19.17	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 19.17	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 19.17	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 19.17	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.20.20 19.17	
o-Terphenyl	84-15-1	103	%	70-135	01.20.20 19.17	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS19**
 Lab Sample Id: 649573-008

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.20.20 23.11	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.20.20 23.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.20.20 23.11		
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.20.20 23.11		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW10** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-009 Date Collected: 01.17.20 13.48 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.29 Basis: Wet Weight
 Seq Number: 3113977

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	176	10.1	mg/kg	01.20.20 17.40		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 13.00 Basis: Wet Weight
 Seq Number: 3113862

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.20.20 18.18	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 18.18	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 18.18	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 18.18	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 18.18	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.20.20 18.18	
o-Terphenyl	84-15-1	95	%	70-135	01.20.20 18.18	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW10**
 Lab Sample Id: 649573-009

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.20.20 23.32	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.20.20 23.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.20.20 23.32		
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.20.20 23.32		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW11**
Lab Sample Id: 649573-010

Matrix: Soil
Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	86.0	9.96	mg/kg	01.20.20 17.46		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 18.18	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.20.20 18.18	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.20.20 18.18	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.20.20 18.18	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.20.20 18.18	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.20.20 18.18	
o-Terphenyl	84-15-1	100	%	70-135	01.20.20 18.18	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW11**
 Lab Sample Id: 649573-010

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.39

Basis: Wet Weight

Seq Number: 3113964

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.20.20 23.52	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.20.20 23.52	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.20.20 23.52		
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.20.20 23.52		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS18**
Lab Sample Id: 649573-011

Matrix: Soil
Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113977

Date Prep: 01.20.20 09.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	99.3	10.0	mg/kg	01.20.20 17.51		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113862

Date Prep: 01.20.20 13.00

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	01.20.20 18.38	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.20.20 18.38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.20.20 18.38	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.20.20 18.38	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.20.20 18.38	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.20.20 18.38	
o-Terphenyl	84-15-1	95	%	70-135	01.20.20 18.38	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS18**
 Lab Sample Id: 649573-011

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.20.20 23.14	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.20.20 23.14	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.20.20 23.14		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.20.20 23.14		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS07** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-012 Date Collected: 01.17.20 13.48 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	436	10.0	mg/kg	01.20.20 19.08		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.20.20 19.57	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.20.20 19.57	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.20.20 19.57	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.20.20 19.57	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.20.20 19.57	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.20.20 19.57	
o-Terphenyl	84-15-1	102	%	70-135	01.20.20 19.57	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS07**
 Lab Sample Id: 649573-012

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.21.20 00.29	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.21.20 00.29	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	98	%	70-130	01.21.20 00.29		
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.21.20 00.29		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS16** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-013 Date Collected: 01.17.20 13.48 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	226	9.92	mg/kg	01.20.20 19.14		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 19.57	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 19.57	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 19.57	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 19.57	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 19.57	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.20.20 19.57	
o-Terphenyl	84-15-1	100	%	70-135	01.20.20 19.57	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS16**
 Lab Sample Id: 649573-013

Matrix: Soil
 Date Collected: 01.17.20 13.48

Date Received: 01.20.20 09.00
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113992

Date Prep: 01.20.20 13.06

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.21.20 00.49	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.21.20 00.49	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.21.20 00.49		
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.21.20 00.49		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW22**
Lab Sample Id: 649573-014

Matrix: Soil
Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113985

Date Prep: 01.20.20 09.49

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	186	10.1	mg/kg	01.20.20 19.19		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113865

Date Prep: 01.20.20 17.36

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 20.17	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	132	%	70-135	01.20.20 20.17	
o-Terphenyl	84-15-1	131	%	70-135	01.20.20 20.17	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW22**
 Lab Sample Id: 649573-014

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.21.20 01.10	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 01.10	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.21.20 01.10		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.21.20 01.10		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW23**
Lab Sample Id: 649573-015

Matrix: Soil
Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113985

Date Prep: 01.20.20 09.49

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	133	9.96	mg/kg	01.20.20 19.35		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113865

Date Prep: 01.20.20 17.36

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 20.17	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 20.17	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.20.20 20.17	
o-Terphenyl	84-15-1	102	%	70-135	01.20.20 20.17	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW23**
 Lab Sample Id: 649573-015

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.21.20 01.30	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 01.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.21.20 01.30		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.21.20 01.30		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW24** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-016 Date Collected: 01.17.20 15.15 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	360	10.0	mg/kg	01.20.20 19.41		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.20.20 20.36	U	1
Diesel Range Organics (DRO)	C10C28DRO	53.4	50.2	mg/kg	01.20.20 20.36		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 20.36	U	1
Total GRO-DRO	PHC628	53.4	50.2	mg/kg	01.20.20 20.36		1
Total TPH	PHC635	53.4	50.2	mg/kg	01.20.20 20.36		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	123	%	70-135	01.20.20 20.36	
o-Terphenyl	84-15-1	121	%	70-135	01.20.20 20.36	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW24**
 Lab Sample Id: 649573-016

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.21.20 01.51	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.21.20 01.51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.21.20 01.51		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.21.20 01.51		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW25**
Lab Sample Id: 649573-017

Matrix: Soil
Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3113985

Date Prep: 01.20.20 09.49

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	388	10.0	mg/kg	01.20.20 20.13		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3113865

Date Prep: 01.20.20 17.36

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	01.20.20 20.36	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.20.20 20.36	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.20.20 20.36	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.20.20 20.36	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.20.20 20.36	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	123	%	70-135	01.20.20 20.36	
o-Terphenyl	84-15-1	126	%	70-135	01.20.20 20.36	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW25**
 Lab Sample Id: 649573-017

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: JHB

Analyst: JHB

Seq Number: 3113992

Date Prep: 01.20.20 13.06

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.21.20 02.11	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 02.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.21.20 02.11		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.21.20 02.11		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW26** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-018 Date Collected: 01.17.20 15.15 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	382	9.96	mg/kg	01.20.20 20.18		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.20.20 20.56	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.20.20 20.56	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.20.20 20.56	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.20.20 20.56	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.20.20 20.56	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.20.20 20.56	
o-Terphenyl	84-15-1	107	%	70-135	01.20.20 20.56	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW26**
 Lab Sample Id: 649573-018

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.21.20 02.31	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.21.20 02.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.21.20 02.31		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.21.20 02.31		



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW27** Matrix: Soil Date Received: 01.20.20 09.00
 Lab Sample Id: 649573-019 Date Collected: 01.17.20 15.15 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.20.20 09.49 Basis: Wet Weight
 Seq Number: 3113985

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	111	10.0	mg/kg	01.20.20 20.45		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.20.20 17.36 Basis: Wet Weight
 Seq Number: 3113865

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.20.20 20.56	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.20.20 20.56	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.20.20 20.56	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.20.20 20.56	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.20.20 20.56	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	129	%	70-135	01.20.20 20.56	
o-Terphenyl	84-15-1	132	%	70-135	01.20.20 20.56	



Certificate of Analytical Results 649573

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW27**
 Lab Sample Id: 649573-019

Matrix: Soil
 Date Collected: 01.17.20 15.15

Date Received: 01.20.20 09.00
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.20.20 13.06

Basis: Wet Weight

Seq Number: 3113992

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.21.20 02.52	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.21.20 02.52	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.21.20 02.52		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.21.20 02.52		



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

MB Sample Id: 7694791-1-BLK

Matrix: Solid

LCS Sample Id: 7694791-1-BKS

Prep Method: E300P

Date Prep: 01.20.20

LCSD Sample Id: 7694791-1-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	236	94	90-110	8	20	mg/kg	01.20.20 13:47	

Analytical Method: Chloride by EPA 300

Seq Number: 3113985

MB Sample Id: 7694792-1-BLK

Matrix: Solid

LCS Sample Id: 7694792-1-BKS

Prep Method: E300P

Date Prep: 01.20.20

LCSD Sample Id: 7694792-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	1.39	250	252	101	252	101	90-110	0	20	mg/kg	01.20.20 18:13	

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

Parent Sample Id: 649562-001

Matrix: Soil

MS Sample Id: 649562-001 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649562-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	208	202	471	130	474	133	90-110	1	20	mg/kg	01.20.20 14:35	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113977

Parent Sample Id: 649573-002

Matrix: Soil

MS Sample Id: 649573-002 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649573-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	355	202	605	124	595	121	90-110	2	20	mg/kg	01.20.20 17:24	X

Analytical Method: Chloride by EPA 300

Seq Number: 3113985

Parent Sample Id: 649573-008

Matrix: Soil

MS Sample Id: 649573-008 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649573-008 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	79.7	193	333	131	316	122	90-110	5	20	mg/kg	01.20.20 18:53	X

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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3113985

Parent Sample Id: 649573-018

Matrix: Soil

MS Sample Id: 649573-018 S

Prep Method: E300P

Date Prep: 01.20.20

MSD Sample Id: 649573-018 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	382	202	679	147	701	159	90-110	3	20	mg/kg	01.20.20 20:34	X

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

MB Sample Id: 7694728-1-BLK

Matrix: Solid

LCS Sample Id: 7694728-1-BKS

Prep Method: SW8015P

Date Prep: 01.20.20

LCSD Sample Id: 7694728-1-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	1090	109	1000	100	70-135	9	35	mg/kg	01.20.20 13:31	
Diesel Range Organics (DRO)	<50.0	1000	1210	121	1160	116	70-135	4	35	mg/kg	01.20.20 13:31	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	108		125		124		70-135	%	01.20.20 13:31
o-Terphenyl	112		120		124		70-135	%	01.20.20 13:31

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113865

MB Sample Id: 7694760-1-BLK

Matrix: Solid

LCS Sample Id: 7694760-1-BKS

Prep Method: SW8015P

Date Prep: 01.20.20

LCSD Sample Id: 7694760-1-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	1050	105	1100	110	70-135	5	35	mg/kg	01.20.20 18:57	
Diesel Range Organics (DRO)	<50.0	1000	1060	106	1060	106	70-135	0	35	mg/kg	01.20.20 18:57	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	102		121		118		70-135	%	01.20.20 18:57
o-Terphenyl	100		114		114		70-135	%	01.20.20 18:57

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

Matrix: Solid

MB Sample Id: 7694728-1-BLK

Prep Method: SW8015P

Date Prep: 01.20.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.20.20 13:12	

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

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

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113865

Matrix: Solid

Prep Method: SW8015P

Date Prep: 01.20.20

MB Sample Id: 7694760-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.20.20 18:57	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113862

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.20.20

Parent Sample Id: 649562-001

MS Sample Id: 649562-001 S

MSD Sample Id: 649562-001 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	1250	125	1230	123	70-135	2	35	mg/kg	01.20.20 15:01	
Diesel Range Organics (DRO)	<50.2	1000	1240	124	1170	117	70-135	6	35	mg/kg	01.20.20 15:01	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	133		129		70-135	%	01.20.20 15:01
o-Terphenyl	128		122		70-135	%	01.20.20 15:01

Analytical Method: TPH by SW8015 Mod

Seq Number: 3113865

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.20.20

Parent Sample Id: 649573-008

MS Sample Id: 649573-008 S

MSD Sample Id: 649573-008 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	1100	110	1080	108	70-135	2	35	mg/kg	01.20.20 19:37	
Diesel Range Organics (DRO)	<49.9	997	1230	123	1090	109	70-135	12	35	mg/kg	01.20.20 19:37	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	119		121		70-135	%	01.20.20 19:37
o-Terphenyl	108		114		70-135	%	01.20.20 19:37

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.
EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113992

MB Sample Id: 7694831-1-BLK

Matrix: Solid

LCS Sample Id: 7694831-1-BKS

Prep Method: SW5030B

Date Prep: 01.20.20

LCSD Sample Id: 7694831-1-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	0.0978	98	0.0937	94	70-130	4	35	mg/kg	01.20.20 18:14	
Toluene	<0.00200	0.100	0.0943	94	0.0910	91	70-130	4	35	mg/kg	01.20.20 18:14	
Ethylbenzene	<0.00200	0.100	0.0915	92	0.0884	88	71-129	3	35	mg/kg	01.20.20 18:14	
m,p-Xylenes	<0.00400	0.200	0.189	95	0.183	92	70-135	3	35	mg/kg	01.20.20 18:14	
o-Xylene	<0.00200	0.100	0.0932	93	0.0905	91	71-133	3	35	mg/kg	01.20.20 18:14	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		102		101		70-130	%	01.20.20 18:14
4-Bromofluorobenzene	97		98		95		70-130	%	01.20.20 18:14

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113964

MB Sample Id: 7694838-1-BLK

Matrix: Solid

LCS Sample Id: 7694838-1-BKS

Prep Method: SW5030B

Date Prep: 01.20.20

LCSD Sample Id: 7694838-1-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	0.112	112	0.0972	97	70-130	14	35	mg/kg	01.20.20 18:54	
Toluene	<0.00200	0.100	0.103	103	0.0902	90	70-130	13	35	mg/kg	01.20.20 18:54	
Ethylbenzene	<0.00200	0.100	0.0999	100	0.0877	88	71-129	13	35	mg/kg	01.20.20 18:54	
m,p-Xylenes	<0.00400	0.200	0.196	98	0.173	87	70-135	12	35	mg/kg	01.20.20 18:54	
o-Xylene	<0.00200	0.100	0.0977	98	0.0869	87	71-133	12	35	mg/kg	01.20.20 18:54	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	104		106		104		70-130	%	01.20.20 18:54
4-Bromofluorobenzene	84		89		92		70-130	%	01.20.20 18:54

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113992

Parent Sample Id: 649562-001

Matrix: Soil

MS Sample Id: 649562-001 S

Prep Method: SW5030B

Date Prep: 01.20.20

MSD Sample Id: 649562-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00199	0.0994	0.0800	80	0.0954	96	70-130	18	35	mg/kg	01.20.20 18:55	
Toluene	<0.00199	0.0994	0.0777	78	0.0924	93	70-130	17	35	mg/kg	01.20.20 18:55	
Ethylbenzene	<0.00199	0.0994	0.0749	75	0.0897	90	71-129	18	35	mg/kg	01.20.20 18:55	
m,p-Xylenes	<0.000749	0.199	0.155	78	0.185	93	70-135	18	35	mg/kg	01.20.20 18:55	
o-Xylene	<0.00199	0.0994	0.0767	77	0.0921	93	71-133	18	35	mg/kg	01.20.20 18:55	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		104		70-130	%	01.20.20 18:55
4-Bromofluorobenzene	99		98		70-130	%	01.20.20 18:55

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3113964

Parent Sample Id: 649573-008

Matrix: Soil

MS Sample Id: 649573-008 S

Prep Method: SW5030B

Date Prep: 01.20.20

MSD Sample Id: 649573-008 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	0.0612	61	0.106	106	70-130	54	35	mg/kg	01.20.20 19:35	XF
Toluene	<0.00200	0.0998	0.0742	74	0.0974	98	70-130	27	35	mg/kg	01.20.20 19:35	
Ethylbenzene	<0.00200	0.0998	0.0775	78	0.0952	96	71-129	20	35	mg/kg	01.20.20 19:35	
m,p-Xylenes	<0.00399	0.200	0.151	76	0.188	94	70-135	22	35	mg/kg	01.20.20 19:35	
o-Xylene	<0.00200	0.0998	0.0780	78	0.0940	94	71-133	19	35	mg/kg	01.20.20 19:35	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	94		108		70-130	%	01.20.20 19:35
4-Bromofluorobenzene	107		94		70-130	%	01.20.20 19:35

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

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, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 1049573

www.xenco.com Page 1 of 2

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Work Order Comments	
Program: UST/PS ☐ PRP ☐ Brownfields ☐ RRD ☐ Superfund ☐	
State of Project:	
Reporting Level: ☐ Level ☐ PST/UST ☐ TRRP ☐ Level ☐	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EMSU SMD Injection		Turn Around
Project Number:	012919272	Routine:	☐
PO #:	11/3/19 spill date	Rush:	3 days
Sampler's Name:	Fatima Smith	Due Date:	
SAMPLE RECEIPT		Temp Blank:	☒ No ☐ Yes
Temperature (°C):	22.2	Thermometer ID	T-1114-004
Received Intact:	☒ No ☐ Yes	Correction Factor:	-0.2
Cooler Custody Seals:	Yes ☒ No ☐ N/A	Total Containers:	19
Sample Custody Seals:	Yes ☒ No ☐ N/A		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number	TPH (EP	BTEX (E	Chloride	Sample Comments										
SW09	S	1/17/20	1018	0-5	1	X	X	X											
SW12			1052	0-5															
SW13			1055	0-5															
SW14			1100	0-5															
SW15			1123	0-5															
SW16			1126	0-5															
SW17			1130	0-5															
FS19			1348	5															
SW10			1352	0-5															
SW11			1354	0-5															

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
1 fatima	1 fatima	11/20/20 9:00am	2 fatima	2 fatima	11/20/20 9:00
3			4		
5			6		



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) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: U49573www.xenco.com Page 2 of 2

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@ltenv.com, dmoir@ltenv.com

Program: ☐ UST/PS ☐ PRP ☐ Brownfields ☐ RR ☐ Superfund State of Project:	
Reporting Level: ☐ Level ☐ PST/US ☐ TRR ☐ Level ☐ HV	Deliverables: EDD ☐ ADAPT ☐ Other:

Project Name:	EMSU SWD Injection		Turn Around	ANALYSIS REQUEST												Work Order Notes
Project Number:	012919272		Routine: ☐													TAT starts the day received by the lab, if received by 4:30pm
PO #:	11/3/19 spill clate		Rush: 3 days													
Sampler's Name:	Fatima Smith		Due Date:													Sample Comments
SAMPLE RECEIPT			Temp Blank: Yes ☐ No ☒	Wet Ice: Yes ☐ No ☒												
Temperature (°C):			Thermometer ID:													
Received Inact:	Yes ☐ No ☒		Correction Factor:													
Cooler Custody Seals:	Yes ☐ No ☒		Total Containers:													
Sample Custody Seals:	Yes ☐ No ☒															
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth												
FS19	S	1/17/20	1422	5												
FS07			1448	5												
FS16			1451	5												
SW22			1515	0-5												
SW23			1518	0-5												
SW24			1521	0-5												
SW25			1523	0-5												
SW26			1525	0-5												
SW27			1555	0-5												

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
<i>[Signature]</i>	<i>[Signature]</i>	1/20/20 9:00am	<i>[Signature]</i>	<i>[Signature]</i>	1/20/20 9:00

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.20.2020 09.00.00 AM

Work Order #: 649573

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)?	2.2
#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#:

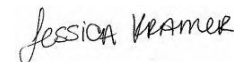
Checklist completed by:



Elizabeth McClellan

Date: 01.20.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.21.2020

Analytical Report 649716

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

22-JAN-20

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)



22-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649716**

EMSU SWD Injection

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) 649716. 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. 649716 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 649716****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS55A	S	01-20-20 10:35	6 ft	649716-001
FS57	S	01-20-20 10:40	6 ft	649716-002
FS58	S	01-20-20 10:45	6 ft	649716-003
FS59	S	01-20-20 10:50	6 ft	649716-004
FS61	S	01-20-20 10:55	6 ft	649716-005
FS62	S	01-20-20 11:00	6 ft	649716-006
FS64	S	01-20-20 11:30	6 ft	649716-007
FS65	S	01-20-20 11:35	6 ft	649716-008
SW28	S	01-20-20 11:40	1 - 6 ft	649716-009
SW29	S	01-20-20 13:00	1 - 4 ft	649716-010
FS66	S	01-20-20 13:45	5 ft	649716-011
FS67	S	01-20-20 13:50	5 ft	649716-012
FS68	S	01-20-20 13:55	5 ft	649716-013

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**Project ID: 012919272
Work Order Number(s): 649716Report Date: 22-JAN-20
Date Received: 01/21/2020

Sample receipt non conformances and comments:Per clients email, corrected sample 001 from FS55 to FS55A. New version generated JK 01/22/20

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114024 BTEX by EPA 8021B

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

Batch: LBA-3114035 Chloride by EPA 300

Lab Sample ID 649787-004 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649716-001, -002, -003, -004, -005, -006, -007, -008.

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

Batch: LBA-3114036 Inorganic Anions by EPA 300

Lab Sample ID 649716-011 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 649716-009, -010, -011, -012, -013.

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



Certificate of Analysis Summary 649716

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Tue Jan-21-20 10:15 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649716-001	649716-002	649716-003	649716-004	649716-005	649716-006
	<i>Field Id:</i>	FS55A	FS57	FS58	FS59	FS61	FS62
	<i>Depth:</i>	6- ft	6- ft	6- ft	6- ft	6- ft	6- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-20-20 10:35	Jan-20-20 10:40	Jan-20-20 10:45	Jan-20-20 10:50	Jan-20-20 10:55	Jan-20-20 11:00
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00
	<i>Analyzed:</i>	Jan-22-20 00:18	Jan-22-20 00:39	Jan-22-20 00:59	Jan-22-20 01:19	Jan-22-20 01:40	Jan-22-20 02:00
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
Toluene		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
Ethylbenzene		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
m,p-Xylenes		<0.00400 0.00400	<0.00398 0.00398	<0.00404 0.00404	<0.00403 0.00403	<0.00402 0.00402	<0.00396 0.00396
o-Xylene		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
Total Xylenes		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
Total BTEX		<0.00200 0.00200	<0.00199 0.00199	<0.00202 0.00202	<0.00202 0.00202	<0.00201 0.00201	<0.00198 0.00198
Chloride by EPA 300	<i>Extracted:</i>	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 14:29
	<i>Analyzed:</i>	Jan-22-20 00:13	Jan-22-20 00:40	Jan-22-20 00:46	Jan-22-20 00:51	Jan-22-20 00:56	Jan-22-20 01:02
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		363 9.98	421 10.1	268 9.92	248 10.0	83.3 10.1	64.1 9.96
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00
	<i>Analyzed:</i>	Jan-21-20 13:49	Jan-21-20 14:09	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 14:49	Jan-21-20 14:49
	<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	<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.3 50.3	<50.0 50.0
Diesel Range Organics (DRO)		<49.9 49.9	<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.3 50.3	<50.0 50.0
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.3 50.3	<50.0 50.0
Total GRO-DRO		<49.9 49.9	<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.3 50.3	<50.0 50.0
Total TPH		<49.9 49.9	<50.2 50.2	<50.1 50.1	<50.2 50.2	<50.3 50.3	<50.0 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

Version: 1.9%

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649716

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Tue Jan-21-20 10:15 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649716-007	649716-008	649716-009	649716-010	649716-011	649716-012
	<i>Field Id:</i>	FS64	FS65	SW28	SW29	FS66	FS67
	<i>Depth:</i>	6- ft	6- ft	1-6 ft	1-4 ft	5- ft	5- ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-20-20 11:30	Jan-20-20 11:35	Jan-20-20 11:40	Jan-20-20 13:00	Jan-20-20 13:45	Jan-20-20 13:50
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00	Jan-21-20 12:00
	<i>Analyzed:</i>	Jan-22-20 02:21	Jan-22-20 02:41	Jan-22-20 03:01	Jan-22-20 03:22	Jan-22-20 03:42	Jan-22-20 04:03
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
Toluene		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
Ethylbenzene		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
m,p-Xylenes		<0.00398 0.00398	<0.00399 0.00399	<0.00397 0.00397	<0.00399 0.00399	<0.00402 0.00402	<0.00402 0.00402
o-Xylene		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
Total Xylenes		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
Total BTEX		<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201	<0.00201 0.00201
Chloride by EPA 300	<i>Extracted:</i>	Jan-21-20 14:29	Jan-21-20 14:29	Jan-21-20 16:45	Jan-21-20 16:45	Jan-21-20 16:45	Jan-21-20 16:45
	<i>Analyzed:</i>	Jan-22-20 01:07	Jan-22-20 01:12	Jan-22-20 02:01	Jan-22-20 02:06	Jan-22-20 01:45	Jan-22-20 02:12
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		265 10.1	398 10.1	377 9.92	173 10.1	249 9.92	343 10.0
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00	Jan-21-20 11:00
	<i>Analyzed:</i>	Jan-21-20 15:08	Jan-21-20 15:08	Jan-21-20 15:28	Jan-21-20 15:28	Jan-21-20 16:00	Jan-21-20 16:20
	<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)		<50.3 50.3	<50.1 50.1	<50.0 50.0	<50.0 50.0	<50.3 50.3	<49.8 49.8
Diesel Range Organics (DRO)		<50.3 50.3	<50.1 50.1	<50.0 50.0	<50.0 50.0	<50.3 50.3	<49.8 49.8
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.1 50.1	<50.0 50.0	<50.0 50.0	<50.3 50.3	<49.8 49.8
Total GRO-DRO		<50.3 50.3	<50.1 50.1	<50.0 50.0	<50.0 50.0	<50.3 50.3	<49.8 49.8
Total TPH		<50.3 50.3	<50.1 50.1	<50.0 50.0	<50.0 50.0	<50.3 50.3	<49.8 49.8

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Version: 1.9%

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 649716

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Tue Jan-21-20 10:15 am

Report Date: 22-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	649716-013					
	Field Id:	FS68					
	Depth:	5- ft					
	Matrix:	SOIL					
	Sampled:	Jan-20-20 13:55					
BTEX by EPA 8021B	Extracted:	Jan-21-20 12:00					
	Analyzed:	Jan-22-20 04:23					
	Units/RL:	mg/kg RL					
Benzene		<0.00198 0.00198					
Toluene		<0.00198 0.00198					
Ethylbenzene		<0.00198 0.00198					
m,p-Xylenes		<0.00397 0.00397					
o-Xylene		<0.00198 0.00198					
Total Xylenes		<0.00198 0.00198					
Total BTEX		<0.00198 0.00198					
Chloride by EPA 300	Extracted:	Jan-21-20 16:45					
	Analyzed:	Jan-22-20 09:29					
	Units/RL:	mg/kg RL					
Chloride		380 10.1					
TPH by SW8015 Mod	Extracted:	Jan-21-20 11:00					
	Analyzed:	Jan-21-20 16:20					
	Units/RL:	mg/kg RL					
Gasoline Range Hydrocarbons (GRO)		<50.2 50.2					
Diesel Range Organics (DRO)		<50.2 50.2					
Motor Oil Range Hydrocarbons (MRO)		<50.2 50.2					
Total GRO-DRO		<50.2 50.2					
Total TPH		<50.2 50.2					

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Version: 1.0%

Jessica Kramer
Project Assistant



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS55A** Matrix: Soil Date Received: 01.21.20 10.15
 Lab Sample Id: 649716-001 Date Collected: 01.20.20 10.35 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.21.20 14.29 Basis: Wet Weight
 Seq Number: 3114035

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	363	9.98	mg/kg	01.22.20 00.13		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.21.20 11.00 Basis: Wet Weight
 Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.21.20 13.49	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.21.20 13.49	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.21.20 13.49	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.21.20 13.49	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.21.20 13.49	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	105	%	70-135	01.21.20 13.49	
o-Terphenyl	84-15-1	103	%	70-135	01.21.20 13.49	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS55A**
 Lab Sample Id: 649716-001

Matrix: Soil
 Date Collected: 01.20.20 10.35

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.22.20 00.18	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.22.20 00.18	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.22.20 00.18		
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.22.20 00.18		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS57
Lab Sample Id: 649716-002

Matrix: Soil
Date Collected: 01.20.20 10.40

Date Received: 01.21.20 10.15
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114035

Date Prep: 01.21.20 14.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	421	10.1	mg/kg	01.22.20 00.40		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

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	01.21.20 14.09	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.21.20 14.09	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.21.20 14.09	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.21.20 14.09	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.21.20 14.09	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.21.20 14.09	
o-Terphenyl	84-15-1	102	%	70-135	01.21.20 14.09	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS57
Lab Sample Id: 649716-002

Matrix: Soil
Date Collected: 01.20.20 10.40

Date Received: 01.21.20 10.15
Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.22.20 00.39	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.22.20 00.39	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.20 00.39		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.22.20 00.39		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS58**
Lab Sample Id: 649716-003

Matrix: Soil
Date Collected: 01.20.20 10.45

Date Received: 01.21.20 10.15
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114035

Date Prep: 01.21.20 14.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	268	9.92	mg/kg	01.22.20 00.46		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.21.20 14.29	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.21.20 14.29	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.21.20 14.29	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.21.20 14.29	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.21.20 14.29	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.21.20 14.29	
o-Terphenyl	84-15-1	91	%	70-135	01.21.20 14.29	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS58**
 Lab Sample Id: 649716-003

Matrix: Soil
 Date Collected: 01.20.20 10.45

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.22.20 00.59	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.22.20 00.59	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.22.20 00.59		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.22.20 00.59		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS59**
Lab Sample Id: 649716-004

Matrix: Soil
Date Collected: 01.20.20 10.50

Date Received: 01.21.20 10.15
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114035

Date Prep: 01.21.20 14.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	248	10.0	mg/kg	01.22.20 00.51		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

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	01.21.20 14.29	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.21.20 14.29	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.21.20 14.29	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.21.20 14.29	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.21.20 14.29	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.21.20 14.29	
o-Terphenyl	84-15-1	101	%	70-135	01.21.20 14.29	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS59**
 Lab Sample Id: 649716-004

Matrix: Soil
 Date Collected: 01.20.20 10.50

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.22.20 01.19	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.22.20 01.19	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.22.20 01.19		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.20 01.19		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS61** Matrix: Soil Date Received: 01.21.20 10.15
 Lab Sample Id: 649716-005 Date Collected: 01.20.20 10.55 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.21.20 14.29 Basis: Wet Weight
 Seq Number: 3114035

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	83.3	10.1	mg/kg	01.22.20 00.56		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.21.20 11.00 Basis: Wet Weight
 Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.21.20 14.49	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.21.20 14.49	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.21.20 14.49	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.21.20 14.49	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.21.20 14.49	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.21.20 14.49	
o-Terphenyl	84-15-1	93	%	70-135	01.21.20 14.49	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS61**
 Lab Sample Id: 649716-005

Matrix: Soil
 Date Collected: 01.20.20 10.55

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.22.20 01.40	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.22.20 01.40	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	99	%	70-130	01.22.20 01.40		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.22.20 01.40		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS62**
 Lab Sample Id: 649716-006

Matrix: Soil
 Date Collected: 01.20.20 11.00

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114035

Date Prep: 01.21.20 14.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	64.1	9.96	mg/kg	01.22.20 01.02		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.21.20 14.49	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.21.20 14.49	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.21.20 14.49	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.21.20 14.49	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.21.20 14.49	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	01.21.20 14.49	
o-Terphenyl	84-15-1	101	%	70-135	01.21.20 14.49	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS62**
 Lab Sample Id: 649716-006

Matrix: Soil
 Date Collected: 01.20.20 11.00

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.22.20 02.00	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.22.20 02.00	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.22.20 02.00		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.20 02.00		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS64**
Lab Sample Id: 649716-007

Matrix: Soil
Date Collected: 01.20.20 11.30

Date Received: 01.21.20 10.15
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114035

Date Prep: 01.21.20 14.29

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	265	10.1	mg/kg	01.22.20 01.07		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

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	01.21.20 15.08	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.21.20 15.08	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.21.20 15.08	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.21.20 15.08	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.21.20 15.08	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	107	%	70-135	01.21.20 15.08	
o-Terphenyl	84-15-1	101	%	70-135	01.21.20 15.08	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS64**
 Lab Sample Id: 649716-007

Matrix: Soil
 Date Collected: 01.20.20 11.30

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.22.20 02.21	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.22.20 02.21	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.22.20 02.21		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.22.20 02.21		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS65** Matrix: Soil Date Received: 01.21.20 10.15
 Lab Sample Id: 649716-008 Date Collected: 01.20.20 11.35 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.21.20 14.29 Basis: Wet Weight
 Seq Number: 3114035

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	398	10.1	mg/kg	01.22.20 01.12		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.21.20 11.00 Basis: Wet Weight
 Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.21.20 15.08	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.21.20 15.08	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.21.20 15.08	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.21.20 15.08	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.21.20 15.08	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	01.21.20 15.08	
o-Terphenyl	84-15-1	103	%	70-135	01.21.20 15.08	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS65**
 Lab Sample Id: 649716-008

Matrix: Soil
 Date Collected: 01.20.20 11.35

Date Received: 01.21.20 10.15
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.22.20 02.41	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.22.20 02.41	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.22.20 02.41		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.20 02.41		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW28**

Matrix: Soil

Date Received: 01.21.20 10.15

Lab Sample Id: 649716-009

Date Collected: 01.20.20 11.40

Sample Depth: 1 - 6 ft

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 16.45

Basis: Wet Weight

Seq Number: 3114036

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	377	9.92	mg/kg	01.22.20 02.01		1

Analytical Method: TPH by SW8015 Mod

Prep Method: SW8015P

Tech: DTH

% Moisture:

Analyst: DTH

Date Prep: 01.21.20 11.00

Basis: Wet Weight

Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.21.20 15.28	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.21.20 15.28	
o-Terphenyl	84-15-1	99	%	70-135	01.21.20 15.28	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW28**
 Lab Sample Id: 649716-009

Matrix: Soil
 Date Collected: 01.20.20 11.40

Date Received: 01.21.20 10.15
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.22.20 03.01	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.22.20 03.01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.22.20 03.01		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.22.20 03.01		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW29** Matrix: Soil Date Received: 01.21.20 10.15
 Lab Sample Id: 649716-010 Date Collected: 01.20.20 13.00 Sample Depth: 1 - 4 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.21.20 16.45 Basis: Wet Weight
 Seq Number: 3114036

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	173	10.1	mg/kg	01.22.20 02.06		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.21.20 11.00 Basis: Wet Weight
 Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.21.20 15.28	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.21.20 15.28	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.21.20 15.28	
o-Terphenyl	84-15-1	101	%	70-135	01.21.20 15.28	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW29**
 Lab Sample Id: 649716-010

Matrix: Soil
 Date Collected: 01.20.20 13.00

Date Received: 01.21.20 10.15
 Sample Depth: 1 - 4 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.22.20 03.22	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.22.20 03.22	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.22.20 03.22		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.22.20 03.22		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS66**
Lab Sample Id: 649716-011

Matrix: Soil
Date Collected: 01.20.20 13.45

Date Received: 01.21.20 10.15
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114036

Date Prep: 01.21.20 16.45

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	249	9.92	mg/kg	01.22.20 01.45		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

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	01.21.20 16.00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.21.20 16.00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.21.20 16.00	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.21.20 16.00	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.21.20 16.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.21.20 16.00	
o-Terphenyl	84-15-1	104	%	70-135	01.21.20 16.00	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS66**
 Lab Sample Id: 649716-011

Matrix: Soil
 Date Collected: 01.20.20 13.45

Date Received: 01.21.20 10.15
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.22.20 03.42	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.22.20 03.42	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.22.20 03.42		
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.22.20 03.42		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS67** Matrix: Soil Date Received: 01.21.20 10.15
 Lab Sample Id: 649716-012 Date Collected: 01.20.20 13.50 Sample Depth: 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: JHB % Moisture:
 Analyst: JHB Date Prep: 01.21.20 16.45 Basis: Wet Weight
 Seq Number: 3114036

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	343	10.0	mg/kg	01.22.20 02.12		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.21.20 11.00 Basis: Wet Weight
 Seq Number: 3114012

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.21.20 16.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.21.20 16.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.21.20 16.20	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.21.20 16.20	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.21.20 16.20	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	109	%	70-135	01.21.20 16.20	
o-Terphenyl	84-15-1	98	%	70-135	01.21.20 16.20	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS67**
 Lab Sample Id: 649716-012

Matrix: Soil
 Date Collected: 01.20.20 13.50

Date Received: 01.21.20 10.15
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.22.20 04.03	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.22.20 04.03	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.20 04.03		
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.22.20 04.03		



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS68**
Lab Sample Id: 649716-013

Matrix: Soil
Date Collected: 01.20.20 13.55

Date Received: 01.21.20 10.15
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: JHB

Analyst: JHB

Seq Number: 3114036

Date Prep: 01.21.20 16.45

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	380	10.1	mg/kg	01.22.20 09.29		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114012

Date Prep: 01.21.20 11.00

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	01.21.20 16.20	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.21.20 16.20	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.21.20 16.20	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.21.20 16.20	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.21.20 16.20	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.21.20 16.20	
o-Terphenyl	84-15-1	101	%	70-135	01.21.20 16.20	



Certificate of Analytical Results 649716

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS68**
 Lab Sample Id: 649716-013

Matrix: Soil
 Date Collected: 01.20.20 13.55

Date Received: 01.21.20 10.15
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: JHB

% Moisture:

Analyst: JHB

Date Prep: 01.21.20 12.00

Basis: Wet Weight

Seq Number: 3114024

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.22.20 04.23	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.22.20 04.23	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.22.20 04.23		
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.22.20 04.23		



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114036

MB Sample Id: 7694916-1-BLK

Matrix: Solid

LCS Sample Id: 7694916-1-BKS

Prep Method: E300P

Date Prep: 01.21.20

LCSD Sample Id: 7694916-1-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	258	103	257	103	90-110	0	20	mg/kg	01.22.20 01:34	

Analytical Method: Chloride by EPA 300

Seq Number: 3114035

MB Sample Id: 7694913-1-BLK

Matrix: Solid

LCS Sample Id: 7694913-1-BKS

Prep Method: E300P

Date Prep: 01.21.20

LCSD Sample Id: 7694913-1-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	258	103	257	103	90-110	0	20	mg/kg	01.21.20 22:36	

Analytical Method: Chloride by EPA 300

Seq Number: 3114035

Parent Sample Id: 649716-001

Matrix: Soil

MS Sample Id: 649716-001 S

Prep Method: E300P

Date Prep: 01.21.20

MSD Sample Id: 649716-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	363	199	613	126	616	126	90-110	0	20	mg/kg	01.22.20 00:29	X

Analytical Method: Chloride by EPA 300

Seq Number: 3114036

Parent Sample Id: 649716-011

Matrix: Soil

MS Sample Id: 649716-011 S

Prep Method: E300P

Date Prep: 01.21.20

MSD Sample Id: 649716-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	249	201	492	121	534	143	90-110	8	20	mg/kg	01.22.20 01:50	X

Analytical Method: Chloride by EPA 300

Seq Number: 3114035

Parent Sample Id: 649787-004

Matrix: Soil

MS Sample Id: 649787-004 S

Prep Method: E300P

Date Prep: 01.21.20

MSD Sample Id: 649787-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	351	199	530	90	456	52	90-110	15	20	mg/kg	01.21.20 22:52	X

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114012

MB Sample Id: 7694888-1-BLK

Matrix: Solid

LCS Sample Id: 7694888-1-BKS

Prep Method: SW8015P

Date Prep: 01.21.20

LCSD Sample Id: 7694888-1-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	1100	110	1100	110	70-135	0	35	mg/kg	01.21.20 13:30	
Diesel Range Organics (DRO)	<50.0	1000	1200	120	1160	116	70-135	3	35	mg/kg	01.21.20 13:30	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	101		116		121		70-135	%	01.21.20 13:30
o-Terphenyl	102		107		116		70-135	%	01.21.20 13:30

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114012

Matrix: Solid

MB Sample Id: 7694888-1-BLK

Prep Method: SW8015P

Date Prep: 01.21.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.21.20 13:10	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114012

Matrix: Soil

Parent Sample Id: 649716-001

MS Sample Id: 649716-001 S

Prep Method: SW8015P

Date Prep: 01.21.20

MSD Sample Id: 649716-001 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)	<49.9	998	1230	123	1170	117	70-135	5	35	mg/kg	01.21.20 13:49	
Diesel Range Organics (DRO)	<49.9	998	1250	125	1150	115	70-135	8	35	mg/kg	01.21.20 13:49	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	129		118		70-135	%	01.21.20 13:49
o-Terphenyl	130		115		70-135	%	01.21.20 13:49

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114024

MB Sample Id: 7694905-1-BLK

Matrix: Solid

LCS Sample Id: 7694905-1-BKS

Prep Method: SW5030B

Date Prep: 01.21.20

LCSD Sample Id: 7694905-1-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	0.0916	92	0.0913	91	70-130	0	35	mg/kg	01.21.20 22:22	
Toluene	<0.00200	0.100	0.0894	89	0.0889	89	70-130	1	35	mg/kg	01.21.20 22:22	
Ethylbenzene	<0.00200	0.100	0.0872	87	0.0867	87	71-129	1	35	mg/kg	01.21.20 22:22	
m,p-Xylenes	<0.00400	0.200	0.180	90	0.179	90	70-135	1	35	mg/kg	01.21.20 22:22	
o-Xylene	<0.00200	0.100	0.0894	89	0.0889	89	71-133	1	35	mg/kg	01.21.20 22:22	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		101		101		70-130	%	01.21.20 22:22
4-Bromofluorobenzene	96		97		99		70-130	%	01.21.20 22:22

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114024

Parent Sample Id: 649716-001

Matrix: Soil

MS Sample Id: 649716-001 S

Prep Method: SW5030B

Date Prep: 01.21.20

MSD Sample Id: 649716-001 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	0.102	101	0.0957	96	70-130	6	35	mg/kg	01.21.20 23:03	
Toluene	<0.00202	0.101	0.100	99	0.0938	94	70-130	6	35	mg/kg	01.21.20 23:03	
Ethylbenzene	<0.00202	0.101	0.0983	97	0.0924	93	71-129	6	35	mg/kg	01.21.20 23:03	
m,p-Xylenes	<0.000760	0.202	0.203	100	0.191	96	70-135	6	35	mg/kg	01.21.20 23:03	
o-Xylene	<0.00202	0.101	0.100	99	0.0939	94	71-133	6	35	mg/kg	01.21.20 23:03	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		103		70-130	%	01.21.20 23:03
4-Bromofluorobenzene	98		97		70-130	%	01.21.20 23:03

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



Chain of Custody

Work Order No: 649714

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	500 W. Mermaid St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88226
Phone:	(432) 236-3849	Email:	jhill@ltenv.com, dmoir@ltenv.com
Project Name:	EMSU SWD Injection	Turn Around	
Project Number:	012919072	Routine	☐
P.O. Number:	113/2419 Sp. H date	Rush:	3 days
Sampler's Name:	Jeremy Hill	Due Date:	1/13/20
SAMPLE RECEIPT			
Temperature (°C):	2.0	Temp Blank:	Yes ☒ No ☐
Received In tact:	Yes ☒ No ☐	Thermometer ID	T-NM-084
Cooler Custody Seals:	Yes ☒ No ☐	Correction Factor:	-0.2
Sample Custody Seals:	Yes ☒ No ☐	Total Containers:	13
ANALYSIS REQUEST			
Number of Containers			
TPH (EPA 8015)			
BTEX (EPA 0-8021)			
Chloride (EPA 300.0)			
Work Order Notes			
TAT starts the day received by the lab, if received by 4:30pm			
Sample Comments			
Composite			

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH (EPA 8015)	BTEX (EPA 0-8021)	Chloride (EPA 300.0)	Analysis Request	Work Order Notes
FS55	S	1/20/20	1035	6'	1	X	X	X		
FS57	S		1640	6'						
FS58	S		1645	6'						
FS59	S		1650	6'						
FS61	S		1055	6'						
FS62	S		1100	6'						
FS64	S		1130	6'						
FS65	S		1135	6'						
SW28	S		1140	1-6'						
SW29	S		1300	1-4'						

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
		12/26/19 10:00am			12/20/19 10:15

Work Order No.:

2017/09/26

Page 2 of 2

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

[illegible]

	TAT starts the day received by the lab, if received by 4:30pm
--	---

[illegible]

8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn Ii V Zn

1631 / 2451 / 7470 / 7471 · Hs

Service. Xerco 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 Xerco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xerco, but not analyzed. These terms will be enforced unless previously negotiated in writing. Signature of this document by the undersigned constitutes a valid purchase order from client company to Xerco. Its affiliates and subcontractors. It assigns standard terms and conditions of sale to all clients.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
		1/21/20 10:00am			1/21/20 10:15

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.21.2020 10.15.00 AM

Work Order #: 649716

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
#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#:

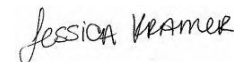
Checklist completed by:



Elizabeth McClellan

Date: 01.21.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.22.2020



Analytical Report 649828

for

LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

01.23.2020

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)



01.23.2020

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **649828**

EMSU SWD Injection

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) 649828. 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. 649828 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

A Small Business and Minority Company

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

**Sample Cross Reference 649828****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SW30	S	01.21.2020 10:05	1 - 5 ft	649828-001
SW31	S	01.21.2020 10:10	1 - 5 ft	649828-002
SW32	S	01.21.2020 10:15	1 - 5.5 ft	649828-003
SW33	S	01.21.2020 10:20	1 - 6 ft	649828-004
SW34	S	01.21.2020 10:25	1 - 5 ft	649828-005
SW35	S	01.21.2020 10:30	1 - 5 ft	649828-006



CASE NARRATIVE

Client Name: *LT Environmental, Inc.*

Project Name: *EMSU SWD Injection*

Project ID: 012919272
Work Order Number(s): 649828

Report Date: 01.23.2020
Date Received: 01.22.2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114158 BTEX by EPA 8021B

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



Certificate of Analysis Summary 649828

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Wed 01.22.2020 09:45

Report Date: 01.23.2020 14:02

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	649828-001	649828-002	649828-003	649828-004	649828-005	649828-006
	<i>Field Id:</i>	SW30	SW31	SW32	SW33	SW34	SW35
	<i>Depth:</i>	1-5 ft	1-5 ft	1-5.5 ft	1-6 ft	1-5 ft	1-5 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	01.21.2020 10:05	01.21.2020 10:10	01.21.2020 10:15	01.21.2020 10:20	01.21.2020 10:25	01.21.2020 10:30
BTEX by EPA 8021B	<i>Extracted:</i>	01.23.2020 10:56	01.23.2020 10:56	01.23.2020 10:56	01.23.2020 10:56	01.23.2020 10:56	01.23.2020 10:56
	<i>Analyzed:</i>	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
Toluene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
Ethylbenzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
m,p-Xylenes		<0.00396 0.00396	<0.00399 0.00399	<0.00400 0.00400	<0.00396 0.00396	<0.00401 0.00401	<0.00402 0.00402
o-Xylene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
Total Xylenes		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
Total BTEX		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200	<0.00201 0.00201
Chloride by EPA 300	<i>Extracted:</i>	01.23.2020 07:33	01.23.2020 07:33	01.23.2020 07:33	01.23.2020 07:33	01.23.2020 07:33	01.23.2020 07:33
	<i>Analyzed:</i>	01.23.2020 09:00	01.23.2020 09:16	01.23.2020 09:22	01.23.2020 09:33	01.23.2020 09:37	01.23.2020 09:53
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		444 9.94	312 9.88	402 9.98	286 10.0	284 10.0	120 10.1
TPH by SW8015 Mod	<i>Extracted:</i>	01.22.2020 13:30	01.22.2020 13:30	01.22.2020 13:30	01.22.2020 13:30	01.22.2020 13:30	01.22.2020 13:30
	<i>Analyzed:</i>	*** ** *	*** ** *	*** ** *	*** ** *	01.22.2020 13:36	01.22.2020 13:56
	<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)		<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.0 50.0	<49.9 49.9
Diesel Range Organics (DRO)		<50.1 50.1	282 50.2	133 50.2	<50.2 50.2	<50.0 50.0	<49.9 49.9
Motor Oil Range Hydrocarbons (MRO)		<50.1 50.1	<50.2 50.2	<50.2 50.2	<50.2 50.2	<50.0 50.0	<49.9 49.9
Total GRO-DRO		<50.1 50.1	282 50.2	133 50.2	<50.2 50.2	<50.0 50.0	<49.9 49.9
Total TPH		<50.1 50.1	282 50.2	133 50.2	<50.2 50.2	<50.0 50.0	<49.9 49.9

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

Jessica Kramer
Project Assistant



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW30** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-001 Date Collected: 01.21.2020 10:05 Sample Depth: 1 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	444	9.94	mg/kg	01.23.2020 09:00		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.22.2020 11:00	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.22.2020 11:00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.22.2020 11:00	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.22.2020 11:00	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.22.2020 11:00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	108	%	70-135	01.22.2020 11:00	
o-Terphenyl	84-15-1	99	%	70-135	01.22.2020 11:00	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW30**
Lab Sample Id: 649828-001

Matrix: Soil
Date Collected: 01.21.2020 10:05

Date Received: 01.22.2020 09:45
Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: MAB

Analyst: MAB

Seq Number: 3114158

Prep Method: SW5030B

% Moisture:

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.22.2020 23:06	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.22.2020 23:06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.22.2020 23:06	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.22.2020 23:06	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW31** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-002 Date Collected: 01.21.2020 10:10 Sample Depth: 1 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	312	9.88	mg/kg	01.23.2020 09:16		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.22.2020 11:20	U	1
Diesel Range Organics (DRO)	C10C28DRO	282	50.2	mg/kg	01.22.2020 11:20		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.22.2020 11:20	U	1
Total GRO-DRO	PHC628	282	50.2	mg/kg	01.22.2020 11:20		1
Total TPH	PHC635	282	50.2	mg/kg	01.22.2020 11:20		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	104	%	70-135	01.22.2020 11:20	
o-Terphenyl	84-15-1	107	%	70-135	01.22.2020 11:20	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW31**
 Lab Sample Id: 649828-002

Matrix: Soil
 Date Collected: 01.21.2020 10:10

Date Received: 01.22.2020 09:45
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Seq Number: 3114158

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.22.2020 23:27	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.22.2020 23:27	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.22.2020 23:27		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.22.2020 23:27		



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW32** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-003 Date Collected: 01.21.2020 10:15 Sample Depth: 1 - 5.5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	402	9.98	mg/kg	01.23.2020 09:22		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.22.2020 12:49	U	1
Diesel Range Organics (DRO)	C10C28DRO	133	50.2	mg/kg	01.22.2020 12:49		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.22.2020 12:49	U	1
Total GRO-DRO	PHC628	133	50.2	mg/kg	01.22.2020 12:49		1
Total TPH	PHC635	133	50.2	mg/kg	01.22.2020 12:49		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.22.2020 12:49	
o-Terphenyl	84-15-1	103	%	70-135	01.22.2020 12:49	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW32**
 Lab Sample Id: 649828-003

Matrix: Soil
 Date Collected: 01.21.2020 10:15

Date Received: 01.22.2020 09:45
 Sample Depth: 1 - 5.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Seq Number: 3114158

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.22.2020 23:47	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.22.2020 23:47	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	117	%	70-130	01.22.2020 23:47	
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.22.2020 23:47	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW33** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-004 Date Collected: 01.21.2020 10:20 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	286	10.0	mg/kg	01.23.2020 09:33		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.22.2020 13:08	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.22.2020 13:08	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.22.2020 13:08	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.22.2020 13:08	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.22.2020 13:08	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.22.2020 13:08	
o-Terphenyl	84-15-1	102	%	70-135	01.22.2020 13:08	



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW33**
 Lab Sample Id: 649828-004

Matrix: Soil
 Date Collected: 01.21.2020 10:20

Date Received: 01.22.2020 09:45
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Seq Number: 3114158

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.23.2020 00:07	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.2020 00:07	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	112	%	70-130	01.23.2020 00:07		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.2020 00:07		



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW34** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-005 Date Collected: 01.21.2020 10:25 Sample Depth: 1 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	284	10.0	mg/kg	01.23.2020 09:37		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.22.2020 13:36	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.22.2020 13:36	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.22.2020 13:36	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.22.2020 13:36	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.22.2020 13:36	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	104	%	70-135	01.22.2020 13:36	
o-Terphenyl	84-15-1	102	%	70-135	01.22.2020 13:36	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW34**
 Lab Sample Id: 649828-005

Matrix: Soil
 Date Collected: 01.21.2020 10:25

Date Received: 01.22.2020 09:45
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Seq Number: 3114158

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.23.2020 00:28	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.2020 00:28	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	94	%	70-130	01.23.2020 00:28		
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.23.2020 00:28		



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW35** Matrix: Soil Date Received: 01.22.2020 09:45
 Lab Sample Id: 649828-006 Date Collected: 01.21.2020 10:30 Sample Depth: 1 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.2020 07:33 Basis: Wet Weight
 Seq Number: 3114175

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	120	10.1	mg/kg	01.23.2020 09:53		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.22.2020 13:30 Basis: Wet Weight
 Seq Number: 3114163

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.22.2020 13:56	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.22.2020 13:56	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.22.2020 13:56	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.22.2020 13:56	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.22.2020 13:56	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	01.22.2020 13:56	
o-Terphenyl	84-15-1	100	%	70-135	01.22.2020 13:56	



Certificate of Analytical Results 649828

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW35**
 Lab Sample Id: 649828-006

Matrix: Soil
 Date Collected: 01.21.2020 10:30

Date Received: 01.22.2020 09:45
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.2020 10:56

Basis: Wet Weight

Seq Number: 3114158

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.23.2020 00:48	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.23.2020 00:48	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.2020 00:48	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.23.2020 00:48	



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114175

MB Sample Id: 7695005-1-BLK

Matrix: Solid

LCS Sample Id: 7695005-1-BKS

Prep Method: E300P

Date Prep: 01.23.2020

LCSD Sample Id: 7695005-1-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	254	102	256	102	90-110	1	20	mg/kg	01.23.2020 08:49	

Analytical Method: Chloride by EPA 300

Seq Number: 3114175

Parent Sample Id: 649828-001

Matrix: Soil

MS Sample Id: 649828-001 S

Prep Method: E300P

Date Prep: 01.23.2020

MSD Sample Id: 649828-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	444	200	639	98	636	96	90-110	0	20	mg/kg	01.23.2020 09:06	

Analytical Method: Chloride by EPA 300

Seq Number: 3114175

Parent Sample Id: 649938-001

Matrix: Soil

MS Sample Id: 649938-001 S

Prep Method: E300P

Date Prep: 01.23.2020

MSD Sample Id: 649938-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	90.4	200	304	107	304	107	90-110	0	20	mg/kg	01.23.2020 10:25	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114163

MB Sample Id: 7694967-1-BLK

Matrix: Solid

LCS Sample Id: 7694967-1-BKS

Prep Method: SW8015P

Date Prep: 01.22.2020

LCSD Sample Id: 7694967-1-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	1250	125	1150	115	70-135	8	35	mg/kg	01.22.2020 10:41	
Diesel Range Organics (DRO)	<50.0	1000	1200	120	1170	117	70-135	3	35	mg/kg	01.22.2020 10:41	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	100		125		123		70-135	%	01.22.2020 10:41
o-Terphenyl	103		114		115		70-135	%	01.22.2020 10:41

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114163

Matrix: Solid

MB Sample Id: 7694967-1-BLK

Prep Method: SW8015P

Date Prep: 01.22.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.22.2020 10:21	

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.
EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114163

Parent Sample Id: 649828-001

Matrix: Soil

MS Sample Id: 649828-001 S

Prep Method: SW8015P

Date Prep: 01.22.2020

MSD Sample Id: 649828-001 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)	<49.8	995	1280	129	1270	127	70-135	1	35	mg/kg	01.22.2020 11:00	
Diesel Range Organics (DRO)	<49.8	995	1300	131	1210	121	70-135	7	35	mg/kg	01.22.2020 11:00	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	135		130		70-135	%	01.22.2020 11:00
o-Terphenyl	128		112		70-135	%	01.22.2020 11:00

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114158

MB Sample Id: 7695003-1-BLK

Matrix: Solid

LCS Sample Id: 7695003-1-BKS

Prep Method: SW5030B

Date Prep: 01.23.2020

LCSD Sample Id: 7695003-1-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	0.103	103	0.107	107	70-130	4	35	mg/kg	01.22.2020 21:24	
Toluene	<0.00200	0.100	0.100	100	0.103	103	70-130	3	35	mg/kg	01.22.2020 21:24	
Ethylbenzene	<0.00200	0.100	0.0976	98	0.0988	99	71-129	1	35	mg/kg	01.22.2020 21:24	
m,p-Xylenes	<0.00400	0.200	0.201	101	0.203	102	70-135	1	35	mg/kg	01.22.2020 21:24	
o-Xylene	<0.00200	0.100	0.0993	99	0.101	101	71-133	2	35	mg/kg	01.22.2020 21:24	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		102		103		70-130	%	01.22.2020 21:24
4-Bromofluorobenzene	93		97		96		70-130	%	01.22.2020 21:24

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114158

Parent Sample Id: 649828-001

Matrix: Soil

MS Sample Id: 649828-001 S

Prep Method: SW5030B

Date Prep: 01.23.2020

MSD Sample Id: 649828-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00201	0.100	0.110	110	0.109	108	70-130	1	35	mg/kg	01.22.2020 22:05	
Toluene	<0.00201	0.100	0.108	108	0.106	105	70-130	2	35	mg/kg	01.22.2020 22:05	
Ethylbenzene	<0.00201	0.100	0.104	104	0.102	101	71-129	2	35	mg/kg	01.22.2020 22:05	
m,p-Xylenes	<0.00402	0.201	0.217	108	0.213	106	70-135	2	35	mg/kg	01.22.2020 22:05	
o-Xylene	<0.00201	0.100	0.107	107	0.105	104	71-133	2	35	mg/kg	01.22.2020 22:05	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		101		70-130	%	01.22.2020 22:05
4-Bromofluorobenzene	101		98		70-130	%	01.22.2020 22:05

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) 509-3333
Midland, TX (432-704-5440) El Paso, TX (915) 585-3443 Lubbock, TX (806) 794-1296
Phoenix, AZ (480-355-0900) Atlanta, GA (770-449-8800) Tampa, FL (813) 281-2811
Hobbs, NM (575-392-7550)

Work Order No: 1029028

www.xenco.com Page 1 of

Chain of Custody

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:	532 W. Mermod St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	2815bnd, NM 88220
Phone:	(432) 236-3849	Email:	jhlitt@ltenv.com, dmoir@ltenv.com

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

ANALYSIS REQUEST										Work Order Notes
Project Name:	FMSU SWD Injection					Turn Around				
Project Number:	012919372					Routine				☐
P.O. Number:	11/3/19 spill clean					Rush:				24 hr
Sampler's Name:	Jeremy Hill					Due Date:				1/23/20
SAMPLE RECEIPT										
Temperature (°C):	0.4		Temp Blank:		☒ Yes	☐ No	Wet Ice:		☒ Yes	☐ No
Received Intact:	☒ Yes		No		Thermometer ID					
Cooler Custody Seals:	Yes		☒ No		T-NM 207					
Sample Custody Seals:	Yes		☒ No		Correction Factor:				-0.2	
					Total Containers:				6	
Number of Containers										
EPA 8015)										
EPA 0-8021)										
le (EPA 300.0)										
TAT starts the day received by the lab, if received by 4:30pm										

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number	TPH (E)	BTEX (C)	Chloride	Sample Comments
SW30	S	1/31/20	1005	1-5'	1	X	X	X	deposits
SW31	S		1010	1-5'					
SW32	S		1015	1-5.5'					
SW33	S		1020	1-6'					
SW34	S		1025	1-5'					
SW35	S		1030	1-5'					

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 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 attesting relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions for the 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
		11/22/20 9:00am			1/22/20 0945

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.22.2020 09.45.00 AM

Work Order #: 649828

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)?	.4
#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#:

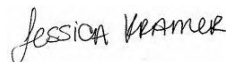
Checklist completed by:



Elizabeth McClellan

Date: 01.22.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.22.2020

Analytical Report 650035

**for
LT Environmental, Inc.**

Project Manager: Dan Moir

EMSU SWD Injection

012919272

24-JAN-20

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)



24-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **650035**

EMSU SWD Injection

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) 650035. 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. 650035 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 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS69	S	01-22-20 09:35	5 ft	650035-001
FS56 A	S	01-22-20 12:15	6 ft	650035-002
FS70A	S	01-22-20 13:00	6 ft	650035-003
FS71A	S	01-22-20 13:05	6 ft	650035-004
FS72A	S	01-22-20 13:10	6 ft	650035-005
FS73A	S	01-22-20 13:15	6 ft	650035-006
FS74	S	01-22-20 10:00	5 ft	650035-007
FS75	S	01-22-20 10:55	7 ft	650035-008
FS76	S	01-22-20 11:00	5 ft	650035-009
SW36	S	01-22-20 11:05	1 - 7 ft	650035-010
SW37	S	01-22-20 13:20	1 - 6 ft	650035-011
SW38	S	01-22-20 11:15	1 - 5 ft	650035-012
SW39	S	01-22-20 11:20	1 - 5 ft	650035-013
FS77	S	01-22-20 14:20	6 ft	650035-014
FS78	S	01-22-20 14:25	6 ft	650035-015
FS79	S	01-22-20 14:30	6 ft	650035-016
FS80	S	01-22-20 14:35	6 ft	650035-017
FS81	S	01-22-20 14:40	6 ft	650035-018
FS82	S	01-22-20 14:45	6 ft	650035-019
SW40	S	01-22-20 15:30	1 - 6 ft	650035-020
SW41	S	01-22-20 15:35	1 - 6 ft	650035-021
SW42	S	01-22-20 15:40	1 - 6 ft	650035-022
SW43	S	01-22-20 15:45	1 - 7 ft	650035-023
SW44	S	01-22-20 15:50	1 - 7 ft	650035-024



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272
Work Order Number(s): 650035

Report Date: 24-JAN-20
Date Received: 01/23/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114272 BTEX by EPA 8021B

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

Batch: LBA-3114282 BTEX by EPA 8021B

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



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	650035-001	650035-002	650035-003	650035-004	650035-005	650035-006
	Field Id:	FS69	FS56 A	FS70A	FS71A	FS72A	FS73A
	Depth:	5- ft	6- ft	6- ft	6- ft	6- ft	6- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-22-20 09:35	Jan-22-20 12:15	Jan-22-20 13:00	Jan-22-20 13:05	Jan-22-20 13:10	Jan-22-20 13:15
BTEX by EPA 8021B	Extracted:	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00
	Analyzed:	Jan-23-20 15:30	Jan-23-20 15:50	Jan-23-20 16:11	Jan-23-20 16:31	Jan-23-20 16:52	Jan-23-20 17:12
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
Toluene		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
Ethylbenzene		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
m,p-Xylenes		<0.00398 0.00398	<0.00400 0.00400	<0.00398 0.00398	<0.00398 0.00398	<0.00397 0.00397	<0.00398 0.00398
o-Xylene		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
Total Xylenes		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
Total BTEX		<0.00199 0.00199	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00198 0.00198	<0.00199 0.00199
Chloride by EPA 300	Extracted:	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00
	Analyzed:	Jan-23-20 13:55	Jan-23-20 14:02	Jan-23-20 14:10	Jan-23-20 14:18	Jan-23-20 14:26	Jan-23-20 14:34
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		337 9.96	259 9.98	215 9.98	202 10.1	235 9.92	224 10.0

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 Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650035-001		650035-002		650035-003		650035-004		650035-005		650035-006	
	<i>Field Id:</i>	FS69		FS56 A		FS70A		FS71A		FS72A		FS73A	
	<i>Depth:</i>	5- ft		6- ft		6- ft		6- ft		6- ft		6- ft	
	<i>Matrix:</i>	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	<i>Sampled:</i>	Jan-22-20 09:35		Jan-22-20 12:15		Jan-22-20 13:00		Jan-22-20 13:05		Jan-22-20 13:10		Jan-22-20 13:15	
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15	
	<i>Analyzed:</i>	Jan-23-20 13:24		Jan-23-20 13:44		Jan-23-20 14:04		Jan-23-20 14:04		Jan-23-20 14:24		Jan-23-20 14:24	
	<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	<49.9	49.9	<49.8	49.8	<49.8	49.8	<50.0	50.0
Diesel Range Organics (DRO)		<49.8	49.8	<50.1	50.1	<49.9	49.9	<49.8	49.8	<49.8	49.8	<50.0	50.0
Motor Oil Range Hydrocarbons (MRO)		<49.8	49.8	<50.1	50.1	<49.9	49.9	<49.8	49.8	<49.8	49.8	<50.0	50.0
Total GRO-DRO		<49.8	49.8	<50.1	50.1	<49.9	49.9	<49.8	49.8	<49.8	49.8	<50.0	50.0
Total TPH		<49.8	49.8	<50.1	50.1	<49.9	49.9	<49.8	49.8	<49.8	49.8	<50.0	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

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	650035-007	650035-008	650035-009	650035-010	650035-011	650035-012
	Field Id:	FS74	FS75	FS76	SW36	SW37	SW38
	Depth:	5- ft	7- ft	5- ft	1-7 ft	1-6 ft	1-5 ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-22-20 10:00	Jan-22-20 10:55	Jan-22-20 11:00	Jan-22-20 11:05	Jan-22-20 13:20	Jan-22-20 11:15
BTEX by EPA 8021B	Extracted:	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00
	Analyzed:	Jan-23-20 17:32	Jan-23-20 17:53	Jan-23-20 18:13	Jan-23-20 18:34	Jan-23-20 19:49	Jan-23-20 20:09
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
Toluene		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
Ethylbenzene		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
m,p-Xylenes		<0.00402 0.00402	<0.00404 0.00404	<0.00398 0.00398	<0.00399 0.00399	<0.00397 0.00397	<0.00401 0.00401
o-Xylene		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
Total Xylenes		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
Total BTEX		<0.00201 0.00201	<0.00202 0.00202	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198	<0.00200 0.00200
Chloride by EPA 300	Extracted:	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00
	Analyzed:	Jan-23-20 14:41	Jan-23-20 14:47	Jan-23-20 14:52	Jan-23-20 15:26	Jan-23-20 15:32	Jan-23-20 15:38
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		197 10.1	502 9.96	193 10.1	151 10.1	175 10.1	32.6 10.0

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650035-007		650035-008		650035-009		650035-010		650035-011		650035-012	
	<i>Field Id:</i>	FS74		FS75		FS76		SW36		SW37		SW38	
	<i>Depth:</i>	5- ft		7- ft		5- ft		1-7 ft		1-6 ft		1-5 ft	
	<i>Matrix:</i>	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	<i>Sampled:</i>	Jan-22-20 10:00		Jan-22-20 10:55		Jan-22-20 11:00		Jan-22-20 11:05		Jan-22-20 13:20		Jan-22-20 11:15	
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15	
	<i>Analyzed:</i>	Jan-23-20 14:45		Jan-23-20 14:45		Jan-23-20 15:05		Jan-23-20 15:05		Jan-23-20 15:25		Jan-23-20 15:45	
	<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)		<50.0	50.0	<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.3	50.3	<50.0	50.0
Diesel Range Organics (DRO)		<50.0	50.0	<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.3	50.3	<50.0	50.0
Motor Oil Range Hydrocarbons (MRO)		<50.0	50.0	<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.3	50.3	<50.0	50.0
Total GRO-DRO		<50.0	50.0	<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.3	50.3	<50.0	50.0
Total TPH		<50.0	50.0	<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.3	50.3	<50.0	50.0

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	650035-013	650035-014	650035-015	650035-016	650035-017	650035-018
	Field Id:	SW39	FS77	FS78	FS79	FS80	FS81
	Depth:	1-5 ft	6- ft	6- ft	6- ft	6- ft	6- ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-22-20 11:20	Jan-22-20 14:20	Jan-22-20 14:25	Jan-22-20 14:30	Jan-22-20 14:35	Jan-22-20 14:40
BTEX by EPA 8021B	Extracted:	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:00
	Analyzed:	Jan-23-20 20:30	Jan-23-20 20:50	Jan-23-20 21:11	Jan-23-20 21:31	Jan-23-20 21:51	Jan-23-20 22:12
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
Toluene		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
Ethylbenzene		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
m,p-Xylenes		<0.00396 0.00396	<0.00398 0.00398	<0.00399 0.00399	<0.00399 0.00399	<0.00399 0.00399	<0.00399 0.00399
o-Xylene		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
Total Xylenes		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
Total BTEX		<0.00198 0.00198	<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200	<0.00200 0.00200
Chloride by EPA 300	Extracted:	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00
	Analyzed:	Jan-23-20 15:43	Jan-23-20 15:49	Jan-23-20 15:54	Jan-23-20 16:00	Jan-23-20 16:06	Jan-23-20 16:45
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		149 10.0	135 9.98	40.0 9.94	212 9.98	225 9.88	366 10.0

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650035-013		650035-014		650035-015		650035-016		650035-017		650035-018	
	<i>Field Id:</i>	SW39		FS77		FS78		FS79		FS80		FS81	
	<i>Depth:</i>	1-5 ft		6- ft		6- ft		6- ft		6- ft		6- ft	
	<i>Matrix:</i>	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	<i>Sampled:</i>	Jan-22-20 11:20		Jan-22-20 14:20		Jan-22-20 14:25		Jan-22-20 14:30		Jan-22-20 14:35		Jan-22-20 14:40	
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 12:15	
	<i>Analyzed:</i>	Jan-23-20 15:45		Jan-23-20 16:05		Jan-23-20 16:05		Jan-23-20 16:25		Jan-23-20 16:25		Jan-23-20 16:45	
	<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)		<50.0	50.0	<50.2	50.2	<50.0	50.0	<49.8	49.8	<49.8	49.8	<50.2	50.2
Diesel Range Organics (DRO)		<50.0	50.0	<50.2	50.2	<50.0	50.0	<49.8	49.8	<49.8	49.8	<50.2	50.2
Motor Oil Range Hydrocarbons (MRO)		<50.0	50.0	<50.2	50.2	<50.0	50.0	<49.8	49.8	<49.8	49.8	<50.2	50.2
Total GRO-DRO		<50.0	50.0	<50.2	50.2	<50.0	50.0	<49.8	49.8	<49.8	49.8	<50.2	50.2
Total TPH		<50.0	50.0	<50.2	50.2	<50.0	50.0	<49.8	49.8	<49.8	49.8	<50.2	50.2

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	650035-019	650035-020	650035-021	650035-022	650035-023	650035-024
	Field Id:	FS82	SW40	SW41	SW42	SW43	SW44
	Depth:	6- ft	1-6 ft	1-6 ft	1-6 ft	1-7 ft	1-7 ft
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Jan-22-20 14:45	Jan-22-20 15:30	Jan-22-20 15:35	Jan-22-20 15:40	Jan-22-20 15:45	Jan-22-20 15:50
BTEX by EPA 8021B	Extracted:	Jan-23-20 12:00	Jan-23-20 12:00	Jan-23-20 12:30	Jan-23-20 12:30	Jan-23-20 12:30	Jan-23-20 12:30
	Analyzed:	Jan-23-20 22:32	Jan-23-20 22:53	Jan-23-20 15:20	Jan-23-20 15:41	Jan-23-20 16:01	Jan-23-20 16:21
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
Toluene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
Ethylbenzene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
m,p-Xylenes		<0.00396 0.00396	<0.00401 0.00401	<0.00399 0.00399	<0.00398 0.00398	<0.00399 0.00399	<0.00396 0.00396
o-Xylene		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
Total Xylenes		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
Total BTEX		<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00200 0.00200	<0.00198 0.00198
Chloride by EPA 300	Extracted:	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00	Jan-23-20 13:00
	Analyzed:	Jan-23-20 17:01	Jan-23-20 17:06	Jan-23-20 17:11	Jan-23-20 17:16	Jan-23-20 17:32	Jan-23-20 17:37
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		369 9.98	54.8 10.0	172 10.0	11.2 10.1	215 9.94	42.5 9.98

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Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650035

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 11:45 am

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650035-019		650035-020		650035-021		650035-022		650035-023		650035-024	
	<i>Field Id:</i>	FS82		SW40		SW41		SW42		SW43		SW44	
	<i>Depth:</i>	6- ft		1-6 ft		1-6 ft		1-6 ft		1-7 ft		1-7 ft	
	<i>Matrix:</i>	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	<i>Sampled:</i>	Jan-22-20 14:45		Jan-22-20 15:30		Jan-22-20 15:35		Jan-22-20 15:40		Jan-22-20 15:45		Jan-22-20 15:50	
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 12:15		Jan-23-20 12:15		Jan-23-20 16:30		Jan-23-20 16:30		Jan-23-20 16:30		Jan-23-20 16:30	
	<i>Analyzed:</i>	Jan-23-20 16:45		Jan-23-20 17:05		Jan-23-20 17:46		Jan-23-20 18:26		Jan-23-20 18:26		Jan-23-20 18:46	
	<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	<50.2	50.2	<49.8	49.8	<50.2	50.2	<50.3	50.3	<50.2	50.2
Diesel Range Organics (DRO)		<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.2	50.2	<50.3	50.3	<50.2	50.2
Motor Oil Range Hydrocarbons (MRO)		<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.2	50.2	<50.3	50.3	<50.2	50.2
Total GRO-DRO		<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.2	50.2	<50.3	50.3	<50.2	50.2
Total TPH		<49.9	49.9	<50.2	50.2	<49.8	49.8	<50.2	50.2	<50.3	50.3	<50.2	50.2

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Jessica Kramer
Project Assistant



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS69**
Lab Sample Id: 650035-001

Matrix: Soil
Date Collected: 01.22.20 09.35

Date Received: 01.23.20 11.45
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	337	9.96	mg/kg	01.23.20 13.55		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 13.24	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 13.24	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 13.24	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 13.24	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 13.24	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.23.20 13.24	
o-Terphenyl	84-15-1	96	%	70-135	01.23.20 13.24	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS69**
 Lab Sample Id: 650035-001

Matrix: Soil
 Date Collected: 01.22.20 09.35

Date Received: 01.23.20 11.45
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 15.30	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 15.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.20 15.30		
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.23.20 15.30		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS56 A**
 Lab Sample Id: 650035-002

Matrix: Soil
 Date Collected: 01.22.20 12.15

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	259	9.98	mg/kg	01.23.20 14.02		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 13.44	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 13.44	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 13.44	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 13.44	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 13.44	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.23.20 13.44	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 13.44	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS56 A**
 Lab Sample Id: 650035-002

Matrix: Soil
 Date Collected: 01.22.20 12.15

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	01.23.20 15.50	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 15.50	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.20 15.50		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 15.50		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS70A**
Lab Sample Id: 650035-003

Matrix: Soil
Date Collected: 01.23.20 13.00

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	215	9.98	mg/kg	01.23.20 14.10		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 14.04	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 14.04	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 14.04	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 14.04	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 14.04	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 14.04	
o-Terphenyl	84-15-1	93	%	70-135	01.23.20 14.04	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS70A**
 Lab Sample Id: 650035-003

Matrix: Soil
 Date Collected: 01.22.20 13.00

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 16.11	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 16.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	94	%	70-130	01.23.20 16.11		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.23.20 16.11		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS71A**
Lab Sample Id: 650035-004

Matrix: Soil
Date Collected: 01.22.20 13.05

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	202	10.1	mg/kg	01.23.20 14.18		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 14.04	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 14.04	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 14.04	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 14.04	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 14.04	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.23.20 14.04	
o-Terphenyl	84-15-1	96	%	70-135	01.23.20 14.04	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS71A**
 Lab Sample Id: 650035-004

Matrix: Soil
 Date Collected: 01.22.20 13.05

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 16.31	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 16.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.23.20 16.31		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 16.31		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS72A**
Lab Sample Id: 650035-005

Matrix: Soil
Date Collected: 01.23.20 13.10

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	235	9.92	mg/kg	01.23.20 14.26		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 14.24	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 14.24	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 14.24	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 14.24	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 14.24	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.23.20 14.24	
o-Terphenyl	84-15-1	91	%	70-135	01.23.20 14.24	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS72A**
 Lab Sample Id: 650035-005

Matrix: Soil
 Date Collected: 01.22.20 13.10

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.23.20 16.52	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 16.52	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.23.20 16.52		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.23.20 16.52		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS73A**
 Lab Sample Id: 650035-006

Matrix: Soil
 Date Collected: 01.23.20 13.15

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	224	10.0	mg/kg	01.23.20 14.34		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 14.24	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 14.24	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 14.24	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 14.24	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 14.24	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.23.20 14.24	
o-Terphenyl	84-15-1	97	%	70-135	01.23.20 14.24	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS73A**
 Lab Sample Id: 650035-006

Matrix: Soil
 Date Collected: 01.22.20 13.15

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 17.12	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 17.12	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.23.20 17.12		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 17.12		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS74**
Lab Sample Id: 650035-007

Matrix: Soil
Date Collected: 01.22.20 10.00

Date Received: 01.23.20 11.45
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	197	10.1	mg/kg	01.23.20 14.41		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 14.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 14.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 14.45	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 14.45	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 14.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.23.20 14.45	
o-Terphenyl	84-15-1	93	%	70-135	01.23.20 14.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS74**
 Lab Sample Id: 650035-007

Matrix: Soil
 Date Collected: 01.22.20 10.00

Date Received: 01.23.20 11.45
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.23.20 17.32	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.23.20 17.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 17.32		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 17.32		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS75** Matrix: **Soil** Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-008 Date Collected: 01.22.20 10.55 Sample Depth: 7 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: **MAB** % Moisture:
 Analyst: **MAB** Date Prep: 01.23.20 13.00 Basis: **Wet Weight**
 Seq Number: 3114258

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	502	9.96	mg/kg	01.23.20 14.47		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: **DTH** % Moisture:
 Analyst: **DTH** Date Prep: 01.23.20 12.15 Basis: **Wet Weight**
 Seq Number: 3114233

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.23.20 14.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 14.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 14.45	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 14.45	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 14.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.23.20 14.45	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 14.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS75**
 Lab Sample Id: 650035-008

Matrix: Soil
 Date Collected: 01.22.20 10.55

Date Received: 01.23.20 11.45
 Sample Depth: 7 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.23.20 17.53	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.23.20 17.53	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 17.53		
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.23.20 17.53		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS76**
Lab Sample Id: 650035-009

Matrix: Soil
Date Collected: 01.22.20 11.00

Date Received: 01.23.20 11.45
Sample Depth: 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	193	10.1	mg/kg	01.23.20 14.52		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 15.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 15.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 15.05	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 15.05	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 15.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	92	%	70-135	01.23.20 15.05	
o-Terphenyl	84-15-1	86	%	70-135	01.23.20 15.05	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS76**
 Lab Sample Id: 650035-009

Matrix: Soil
 Date Collected: 01.22.20 11.00

Date Received: 01.23.20 11.45
 Sample Depth: 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 18.13	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 18.13	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 18.13		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.20 18.13		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW36** Matrix: Soil Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-010 Date Collected: 01.22.20 11.05 Sample Depth: 1 - 7 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 13.00 Basis: Wet Weight
 Seq Number: 3114258

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	151	10.1	mg/kg	01.23.20 15.26		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 12.15 Basis: Wet Weight
 Seq Number: 3114233

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.23.20 15.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 15.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 15.05	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 15.05	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 15.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-135	01.23.20 15.05	
o-Terphenyl	84-15-1	92	%	70-135	01.23.20 15.05	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW36**
 Lab Sample Id: 650035-010

Matrix: Soil
 Date Collected: 01.22.20 11.05

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 7 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 18.34	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 18.34	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.23.20 18.34		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.23.20 18.34		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW37**
Lab Sample Id: 650035-011

Matrix: Soil
Date Collected: 01.22.20 13.20

Date Received: 01.23.20 11.45
Sample Depth: 1 - 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	175	10.1	mg/kg	01.23.20 15.32		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 15.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.23.20 15.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.23.20 15.25	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.23.20 15.25	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.23.20 15.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	93	%	70-135	01.23.20 15.25	
o-Terphenyl	84-15-1	93	%	70-135	01.23.20 15.25	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW37**
 Lab Sample Id: 650035-011

Matrix: Soil
 Date Collected: 01.22.20 13.20

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.23.20 19.49	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 19.49	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 19.49		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.20 19.49		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW38**
 Lab Sample Id: 650035-012

Matrix: Soil
 Date Collected: 01.22.20 11.15

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	32.6	10.0	mg/kg	01.23.20 15.38		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 15.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.23.20 15.45	
o-Terphenyl	84-15-1	111	%	70-135	01.23.20 15.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW38**
 Lab Sample Id: 650035-012

Matrix: Soil
 Date Collected: 01.22.20 11.15

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.23.20 20.09	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 20.09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.23.20 20.09		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 20.09		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW39**
Lab Sample Id: 650035-013

Matrix: Soil
Date Collected: 01.22.20 11.20

Date Received: 01.23.20 11.45
Sample Depth: 1 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	149	10.0	mg/kg	01.23.20 15.43		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 15.45	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 15.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	91	%	70-135	01.23.20 15.45	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 15.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW39**
 Lab Sample Id: 650035-013

Matrix: Soil
 Date Collected: 01.22.20 11.20

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Tech: MAB

Analyst: MAB

Seq Number: 3114272

Date Prep: 01.23.20 12.00

Prep Method: SW5030B

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.23.20 20.30	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 20.30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 20.30		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 20.30		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: FS77
Lab Sample Id: 650035-014

Matrix: Soil
Date Collected: 01.22.20 14.20

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	135	9.98	mg/kg	01.23.20 15.49		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 16.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 16.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 16.05	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 16.05	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 16.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 16.05	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 16.05	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS77**
 Lab Sample Id: 650035-014

Matrix: Soil
 Date Collected: 01.22.20 14.20

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 20.50	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 20.50	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.23.20 20.50		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.23.20 20.50		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS78** Matrix: Soil Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-015 Date Collected: 01.22.20 14.25 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 13.00 Basis: Wet Weight
 Seq Number: 3114258

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	40.0	9.94	mg/kg	01.23.20 15.54		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 12.15 Basis: Wet Weight
 Seq Number: 3114233

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 16.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 16.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 16.05	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 16.05	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 16.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	91	%	70-135	01.23.20 16.05	
o-Terphenyl	84-15-1	91	%	70-135	01.23.20 16.05	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS78**
 Lab Sample Id: 650035-015

Matrix: Soil
 Date Collected: 01.22.20 14.25

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 21.11	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 21.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.23.20 21.11		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.23.20 21.11		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS79**
Lab Sample Id: 650035-016

Matrix: Soil
Date Collected: 01.22.20 14.30

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	212	9.98	mg/kg	01.23.20 16.00		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 16.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 16.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	109	%	70-135	01.23.20 16.25	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 16.25	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS79**
 Lab Sample Id: 650035-016

Matrix: Soil
 Date Collected: 01.22.20 14.30

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 21.31	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 21.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	01.23.20 21.31		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 21.31		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS80**
Lab Sample Id: 650035-017

Matrix: Soil
Date Collected: 01.23.20 14.35

Date Received: 01.23.20 11.45
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114258

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	225	9.88	mg/kg	01.23.20 16.06		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 16.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 16.25	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 16.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.23.20 16.25	
o-Terphenyl	84-15-1	103	%	70-135	01.23.20 16.25	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS80**
 Lab Sample Id: 650035-017

Matrix: Soil
 Date Collected: 01.22.20 14.35

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 21.51	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 21.51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 21.51		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.23.20 21.51		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS81** Matrix: Soil Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-018 Date Collected: 01.22.20 14.40 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 13.00 Basis: Wet Weight
 Seq Number: 3114261

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	366	10.0	mg/kg	01.23.20 16.45		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 12.15 Basis: Wet Weight
 Seq Number: 3114233

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.23.20 16.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 16.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 16.45	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 16.45	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 16.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 16.45	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 16.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS81**
 Lab Sample Id: 650035-018

Matrix: Soil
 Date Collected: 01.22.20 14.40

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 22.12	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 22.12	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 22.12		
4-Bromofluorobenzene	460-00-4	104	%	70-130	01.23.20 22.12		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS82**
 Lab Sample Id: 650035-019

Matrix: Soil
 Date Collected: 01.22.20 14.45

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114261

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	369	9.98	mg/kg	01.23.20 17.01		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114233

Date Prep: 01.23.20 12.15

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	01.23.20 16.45	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 16.45	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 16.45	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 16.45	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 16.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.23.20 16.45	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 16.45	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS82**
 Lab Sample Id: 650035-019

Matrix: Soil
 Date Collected: 01.22.20 14.45

Date Received: 01.23.20 11.45
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.23.20 22.32	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 22.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	01.23.20 22.32		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.23.20 22.32		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW40** Matrix: Soil Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-020 Date Collected: 01.22.20 15.30 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 13.00 Basis: Wet Weight
 Seq Number: 3114261

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	54.8	10.0	mg/kg	01.23.20 17.06		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 12.15 Basis: Wet Weight
 Seq Number: 3114233

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.23.20 17.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 17.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 17.05	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 17.05	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 17.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	104	%	70-135	01.23.20 17.05	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 17.05	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW40**
 Lab Sample Id: 650035-020

Matrix: Soil
 Date Collected: 01.22.20 15.30

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.00

Basis: Wet Weight

Seq Number: 3114272

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.23.20 22.53	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 22.53	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.23.20 22.53		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.23.20 22.53		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW41**
Lab Sample Id: 650035-021

Matrix: Soil
Date Collected: 01.22.20 15.35

Date Received: 01.23.20 11.45
Sample Depth: 1 - 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114261

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	172	10.0	mg/kg	01.23.20 17.11		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

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	01.23.20 17.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 17.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 17.46	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 17.46	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 17.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.23.20 17.46	
o-Terphenyl	84-15-1	111	%	70-135	01.23.20 17.46	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW41**
 Lab Sample Id: 650035-021

Matrix: Soil
 Date Collected: 01.22.20 15.35

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.30

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 15.20	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 15.20	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 15.20		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 15.20		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW42**
Lab Sample Id: 650035-022

Matrix: Soil
Date Collected: 01.22.20 15.40

Date Received: 01.23.20 11.45
Sample Depth: 1 - 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114261

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	11.2	10.1	mg/kg	01.23.20 17.16		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

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	01.23.20 18.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 18.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 18.26	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 18.26	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 18.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 18.26	
o-Terphenyl	84-15-1	93	%	70-135	01.23.20 18.26	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW42**
 Lab Sample Id: 650035-022

Matrix: Soil
 Date Collected: 01.22.20 15.40

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.30

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 15.41	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 15.41	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 15.41		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 15.41		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW43**
 Lab Sample Id: 650035-023

Matrix: Soil
 Date Collected: 01.22.20 15.45

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 7 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114261

Date Prep: 01.23.20 13.00

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	215	9.94	mg/kg	01.23.20 17.32		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

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	01.23.20 18.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.23.20 18.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.23.20 18.26	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.23.20 18.26	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.23.20 18.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.23.20 18.26	
o-Terphenyl	84-15-1	100	%	70-135	01.23.20 18.26	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW43**
 Lab Sample Id: 650035-023

Matrix: Soil
 Date Collected: 01.22.20 15.45

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 7 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.30

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 16.01	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 16.01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 16.01		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 16.01		



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW44** Matrix: Soil Date Received: 01.23.20 11.45
 Lab Sample Id: 650035-024 Date Collected: 01.22.20 15.50 Sample Depth: 1 - 7 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 13.00 Basis: Wet Weight
 Seq Number: 3114261

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	42.5	9.98	mg/kg	01.23.20 17.37		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.23.20 18.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 18.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 18.46	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 18.46	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 18.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 18.46	
o-Terphenyl	84-15-1	94	%	70-135	01.23.20 18.46	



Certificate of Analytical Results 650035

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW44**
 Lab Sample Id: 650035-024

Matrix: Soil
 Date Collected: 01.22.20 15.50

Date Received: 01.23.20 11.45
 Sample Depth: 1 - 7 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 12.30

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.23.20 16.21	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 16.21	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 16.21		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 16.21		



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114258

MB Sample Id: 7695008-1-BLK

Matrix: Solid

LCS Sample Id: 7695008-1-BKS

Prep Method: E300P

Date Prep: 01.23.20

LCSD Sample Id: 7695008-1-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	249	100	251	100	90-110	1	20	mg/kg	01.23.20 11:46	

Analytical Method: Chloride by EPA 300

Seq Number: 3114261

MB Sample Id: 7695074-1-BLK

Matrix: Solid

LCS Sample Id: 7695074-1-BKS

Prep Method: E300P

Date Prep: 01.23.20

LCSD Sample Id: 7695074-1-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	247	99	248	99	90-110	0	20	mg/kg	01.23.20 16:33	

Analytical Method: Chloride by EPA 300

Seq Number: 3114258

Parent Sample Id: 649936-005

Matrix: Soil

MS Sample Id: 649936-005 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 649936-005 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	11.0	202	216	101	216	101	90-110	0	20	mg/kg	01.23.20 12:02	

Analytical Method: Chloride by EPA 300

Seq Number: 3114258

Parent Sample Id: 650035-009

Matrix: Soil

MS Sample Id: 650035-009 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650035-009 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	193	201	401	103	400	103	90-110	0	20	mg/kg	01.23.20 14:58	

Analytical Method: Chloride by EPA 300

Seq Number: 3114261

Parent Sample Id: 650035-018

Matrix: Soil

MS Sample Id: 650035-018 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650035-018 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	366	201	569	101	571	101	90-110	0	20	mg/kg	01.23.20 16:50	

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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114261

Parent Sample Id: 650041-004

Matrix: Soil

MS Sample Id: 650041-004 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650041-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	5.75	202	210	101	209	101	90-110	0	20	mg/kg	01.23.20 18:03	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114233

MB Sample Id: 7695061-1-BLK

Matrix: Solid

LCS Sample Id: 7695061-1-BKS

Prep Method: SW8015P

Date Prep: 01.23.20

LCSD Sample Id: 7695061-1-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	1320	132	1220	122	70-135	8	35	mg/kg	01.23.20 12:54	
Diesel Range Organics (DRO)	<50.0	1000	1320	132	1260	126	70-135	5	35	mg/kg	01.23.20 12:54	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	100		126		115		70-135	%	01.23.20 12:54
o-Terphenyl	99		120		113		70-135	%	01.23.20 12:54

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

MB Sample Id: 7695066-1-BLK

Matrix: Solid

LCS Sample Id: 7695066-1-BKS

Prep Method: SW8015P

Date Prep: 01.23.20

LCSD Sample Id: 7695066-1-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	1230	123	1110	111	70-135	10	35	mg/kg	01.23.20 17:25	
Diesel Range Organics (DRO)	<50.0	1000	1250	125	1080	108	70-135	15	35	mg/kg	01.23.20 17:25	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		127		129		70-135	%	01.23.20 17:25
o-Terphenyl	92		115		103		70-135	%	01.23.20 17:25

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114233

Matrix: Solid

MB Sample Id: 7695061-1-BLK

Prep Method: SW8015P

Date Prep: 01.23.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.23.20 12:34	

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Solid

Prep Method: SW8015P

Date Prep: 01.23.20

MB Sample Id: 7695066-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.23.20 17:25	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114233

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.23.20

Parent Sample Id: 650035-001

MS Sample Id: 650035-001 S

MSD Sample Id: 650035-001 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)	<50.0	999	1260	126	1340	134	70-135	6	35	mg/kg	01.23.20 13:24	
Diesel Range Organics (DRO)	<50.0	999	1290	129	1280	128	70-135	1	35	mg/kg	01.23.20 13:24	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	128		123		70-135	%	01.23.20 13:24
o-Terphenyl	115		109		70-135	%	01.23.20 13:24

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Soil

Prep Method: SW8015P

Date Prep: 01.23.20

Parent Sample Id: 650035-021

MS Sample Id: 650035-021 S

MSD Sample Id: 650035-021 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)	<50.0	1000	1080	108	1040	104	70-135	4	35	mg/kg	01.23.20 18:06	
Diesel Range Organics (DRO)	<50.0	1000	1050	105	1060	106	70-135	1	35	mg/kg	01.23.20 18:06	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	120		120		70-135	%	01.23.20 18:06
o-Terphenyl	109		115		70-135	%	01.23.20 18:06

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114272

MB Sample Id: 7695069-1-BLK

Matrix: Solid

LCS Sample Id: 7695069-1-BKS

Prep Method: SW5030B

Date Prep: 01.23.20

LCSD Sample Id: 7695069-1-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	0.114	114	0.106	106	70-130	7	35	mg/kg	01.23.20 13:48	
Toluene	<0.00200	0.100	0.109	109	0.103	103	70-130	6	35	mg/kg	01.23.20 13:48	
Ethylbenzene	<0.00200	0.100	0.105	105	0.100	100	71-129	5	35	mg/kg	01.23.20 13:48	
m,p-Xylenes	<0.00400	0.200	0.216	108	0.206	103	70-135	5	35	mg/kg	01.23.20 13:48	
o-Xylene	<0.00200	0.100	0.107	107	0.102	102	71-133	5	35	mg/kg	01.23.20 13:48	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	100		103		103		70-130	%	01.23.20 13:48
4-Bromofluorobenzene	97		94		97		70-130	%	01.23.20 13:48

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114282

MB Sample Id: 7695070-1-BLK

Matrix: Solid

LCS Sample Id: 7695070-1-BKS

Prep Method: SW5030B

Date Prep: 01.23.20

LCSD Sample Id: 7695070-1-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	0.116	116	0.123	123	70-130	6	35	mg/kg	01.23.20 13:38	
Toluene	<0.00200	0.100	0.106	106	0.112	112	70-130	6	35	mg/kg	01.23.20 13:38	
Ethylbenzene	<0.00200	0.100	0.104	104	0.107	107	71-129	3	35	mg/kg	01.23.20 13:38	
m,p-Xylenes	<0.00400	0.200	0.202	101	0.210	105	70-135	4	35	mg/kg	01.23.20 13:38	
o-Xylene	<0.00200	0.100	0.100	100	0.106	106	71-133	6	35	mg/kg	01.23.20 13:38	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	106		105		109		70-130	%	01.23.20 13:38
4-Bromofluorobenzene	91		84		94		70-130	%	01.23.20 13:38

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114272

Parent Sample Id: 650035-001

Matrix: Soil

MS Sample Id: 650035-001 S

Prep Method: SW5030B

Date Prep: 01.23.20

MSD Sample Id: 650035-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00198	0.0992	0.118	119	0.125	125	70-130	6	35	mg/kg	01.23.20 14:29	
Toluene	<0.00198	0.0992	0.114	115	0.123	123	70-130	8	35	mg/kg	01.23.20 14:29	
Ethylbenzene	<0.00198	0.0992	0.110	111	0.120	120	71-129	9	35	mg/kg	01.23.20 14:29	
m,p-Xylenes	<0.00397	0.198	0.226	114	0.247	124	70-135	9	35	mg/kg	01.23.20 14:29	
o-Xylene	<0.00198	0.0992	0.111	112	0.121	121	71-133	9	35	mg/kg	01.23.20 14:29	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	102		102		70-130	%	01.23.20 14:29
4-Bromofluorobenzene	97		93		70-130	%	01.23.20 14:29

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.

EMSU SWD Injection

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114282

Parent Sample Id: 650035-021

Matrix: Soil

MS Sample Id: 650035-021 S

Prep Method: SW5030B

Date Prep: 01.23.20

MSD Sample Id: 650035-021 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00198	0.0992	0.0907	91	0.0946	95	70-130	4	35	mg/kg	01.23.20 14:19	
Toluene	<0.00198	0.0992	0.0869	88	0.0827	83	70-130	5	35	mg/kg	01.23.20 14:19	
Ethylbenzene	<0.00198	0.0992	0.0832	84	0.0890	89	71-129	7	35	mg/kg	01.23.20 14:19	
m,p-Xylenes	<0.00397	0.198	0.188	95	0.170	85	70-135	10	35	mg/kg	01.23.20 14:19	
o-Xylene	<0.00198	0.0992	0.0882	89	0.0838	84	71-133	5	35	mg/kg	01.23.20 14:19	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	108		109		70-130	%	01.23.20 14:19
4-Bromofluorobenzene	93		92		70-130	%	01.23.20 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



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

Chain of Custody

Work Order No: 1650035

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	533 W. Merand St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	jhlill@ltenv.com, dmoir@ltenv.com

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

Project Name:	EMSU SWD Injection	Turn Around	
Project Number:	012919273	Routine	☐
P.O. Number:	11/3/19 50.11 drk	Rush:	24hr
Sampler's Name:	Jeremy Hill	Due Date:	1/24/20

SAMPLE RECEIPT	Temp Blank:	Yes ☒ No ☐	Wet Ice:	Yes ☒ No ☐
	Temperature (°C):	1.0	Thermometer ID	
	Received Intact:	Yes ☒ No ☐	Correction Factor:	
	Cooler Custody Seals:	Yes ☒ No ☐	Total Containers:	

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers				TPH (EPA 8015)	BTEX (EPA 0-8021)	Chloride (EPA 300.0)	ANALYSIS REQUEST	Work Order Notes
					1	2	3	4					
F369	S	1/23/20	0935	5'									
F356A	S			6'									
F370A	S			6'									
F371A	S			6'									
F372A	S			6'									
F373A	S			6'									
F374	S			5'									
F375	S			7'									
F376	S			5'									
SW36	S			1-7'									

SAMPLE COMMENTS	TAT starts the day received by the lab, if received by 4:30pm
	Sample Comments

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
<i>[Signature]</i>	<i>[Signature]</i>	1/23/20 11:00am	<i>[Signature]</i>	<i>[Signature]</i>	1/23/20 11:45



Chain of Custody

Work Order No: 1650035

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

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Page 2 of 3

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	500 W. McLeod St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Lubbock, NM 88020
Phone:	(432) 236-3849	Email:	jhill@ltenv.com, dmoir@ltenv.com

Project Name:	EMSO SWD Injection	Turn Around	
Project Number:	012919122	Routine	☐
P.O. Number:	11/3/14 5p. 4 det	Rush:	24 hr
Sampler's Name:	Jeremy Hill	Due Date:	1/24/20

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

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	ANALYSIS REQUEST										Work Order Notes
					Number of Containers	TPH (EPA 8015)	BTEX (EPA 0=8021)	Chloride (EPA 300.0)							
SW 37	S	1/23/20	13:20	1-6'	1	X	X	X							
SW 38	S		11:15	1-5'											
SW 31	S		11:20	1-5'											
FS 77	S		14:20	6'											
FS 78	S		14:25	6'											
FS 74	S		14:30	6'											
FS 80	S		14:35	6'											
FS 81	S		14:40	6'											
FS 82	S		14:45	6'											
SW 40	S		15:30	1-6'											

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

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
<i>[Signature]</i>	<i>[Signature]</i>	1/23/20 11:00am	<i>[Signature]</i>	<i>[Signature]</i>	1/23/20 11:45

Work Order No: 65005

Page 3 of 3

Work Order Comments	
Program: UST/PST	☐ RP ☐ Growfields ☐ RC ☐ \$perfund ☐
State of Project:	
Reporting: Level II	☐ Level III ☐ ST/UST ☐ RP ☐ Level IV ☐
Deliverables: EDD	☐ ADaPT ☐ Other: ☐

[illegible][illegible]

1631 / 245.1 / 7470 / 7471 : Hg

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
		1/23/26 11:00am			1/23/26 11:45

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.23.2020 11.45.00 AM

Work Order #: 650035

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)?	1
#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)?	Yes
#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#:

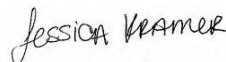
Checklist completed by:



Elizabeth McClellan

Date: 01.23.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.24.2020

Analytical Report 650111

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

24-JAN-20

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)



24-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **650111**

EMSU SWD Injection

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) 650111. 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. 650111 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 650111****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SW45	S	01-23-20 09:12	0 - 6 ft	650111-001
SW46	S	01-23-20 09:14	0 - 6 ft	650111-002
SW47	S	01-23-20 09:16	0 - 6 ft	650111-003
SW48	S	01-23-20 09:20	0 - 6 ft	650111-004
SW49	S	01-23-20 09:22	0 - 6 ft	650111-005
SW50	S	01-23-20 09:25	0 - 6 ft	650111-006
SW54	S	01-23-20 10:22	0 - 5 ft	650111-007
SW55	S	01-23-20 10:25	0 - 5 ft	650111-008
SW56	S	01-23-20 10:26	0 - 5 ft	650111-009
SW57	S	01-23-20 10:29	0 - 5 ft	650111-010

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**

Project ID: 012919272
Work Order Number(s): 650111

Report Date: 24-JAN-20
Date Received: 01/23/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114263 Chloride by EPA 300

Lab Sample ID 650121-004 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 650111-001, -002, -003, -004, -005, -006, -007, -008, -009, -010.

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

Batch: LBA-3114282 BTEX by EPA 8021B

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



Certificate of Analysis Summary 650111

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 01:39 pm

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650111-001	650111-002	650111-003	650111-004	650111-005	650111-006
	<i>Field Id:</i>	SW45	SW46	SW47	SW48	SW49	SW50
	<i>Depth:</i>	0-6 ft	0-6 ft	0-6 ft	0-6 ft	0-6 ft	0-6 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-23-20 09:12	Jan-23-20 09:14	Jan-23-20 09:16	Jan-23-20 09:20	Jan-23-20 09:22	Jan-23-20 09:25
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00
	<i>Analyzed:</i>	Jan-23-20 19:58	Jan-23-20 20:18	Jan-23-20 20:39	Jan-23-20 20:59	Jan-23-20 21:20	Jan-23-20 21:40
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
Toluene		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
Ethylbenzene		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
m,p-Xylenes		<0.00399 0.00399	<0.00397 0.00397	<0.00397 0.00397	<0.00402 0.00402	<0.00398 0.00398	<0.00396 0.00396
o-Xylene		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
Total Xylenes		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
Total BTEX		<0.00200 0.00200	<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00198 0.00198
Chloride by EPA 300	<i>Extracted:</i>	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30
	<i>Analyzed:</i>	Jan-23-20 20:14	Jan-23-20 20:20	Jan-23-20 20:25	Jan-23-20 20:31	Jan-23-20 20:47	Jan-23-20 20:53
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		355 9.90	401 9.98	447 9.90	318 9.98	171 10.0	666 9.94
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30
	<i>Analyzed:</i>	Jan-23-20 19:06	Jan-23-20 19:26	Jan-23-20 19:26	Jan-23-20 19:46	Jan-23-20 19:46	Jan-23-20 20:06
	<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	<50.1 50.1	<50.1 50.1	<50.1 50.1	<49.9 49.9
Diesel Range Organics (DRO)		<49.8 49.8	<50.1 50.1	90.7 50.1	<50.1 50.1	<50.1 50.1	<49.9 49.9
Motor Oil Range Hydrocarbons (MRO)		<49.8 49.8	<50.1 50.1	<50.1 50.1	<50.1 50.1	<50.1 50.1	<49.9 49.9
Total GRO-DRO		<49.8 49.8	<50.1 50.1	90.7 50.1	<50.1 50.1	<50.1 50.1	<49.9 49.9
Total TPH		<49.8 49.8	<50.1 50.1	90.7 50.1	<50.1 50.1	<50.1 50.1	<49.9 49.9

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 650111

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 01:39 pm

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650111-007	650111-008	650111-009	650111-010		
	<i>Field Id:</i>	SW54	SW55	SW56	SW57		
	<i>Depth:</i>	0-5 ft	0-5 ft	0-5 ft	0-5 ft		
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL		
	<i>Sampled:</i>	Jan-23-20 10:22	Jan-23-20 10:25	Jan-23-20 10:26	Jan-23-20 10:29		
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00	Jan-23-20 14:00		
	<i>Analyzed:</i>	Jan-23-20 22:00	Jan-23-20 22:21	Jan-23-20 22:41	Jan-23-20 23:01		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Benzene		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
Toluene		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
Ethylbenzene		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
m,p-Xylenes		<0.00398 0.00398	<0.00399 0.00399	<0.00399 0.00399	<0.00397 0.00397		
o-Xylene		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
Total Xylenes		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
Total BTEX		<0.00199 0.00199	<0.00200 0.00200	<0.00200 0.00200	<0.00198 0.00198		
Chloride by EPA 300	<i>Extracted:</i>	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30		
	<i>Analyzed:</i>	Jan-23-20 20:59	Jan-23-20 21:04	Jan-23-20 21:21	Jan-23-20 21:26		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Chloride		279 9.98	279 9.90	83.2 9.98	15.2 9.96		
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30		
	<i>Analyzed:</i>	Jan-23-20 20:26	Jan-23-20 20:26	Jan-23-20 20:46	Jan-23-20 20:46		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Gasoline Range Hydrocarbons (GRO)		<49.9 49.9	<50.1 50.1	<49.8 49.8	<49.9 49.9		
Diesel Range Organics (DRO)		<49.9 49.9	<50.1 50.1	<49.8 49.8	<49.9 49.9		
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<50.1 50.1	<49.8 49.8	<49.9 49.9		
Total GRO-DRO		<49.9 49.9	<50.1 50.1	<49.8 49.8	<49.9 49.9		
Total TPH		<49.9 49.9	<50.1 50.1	<49.8 49.8	<49.9 49.9		

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

Jessica Kramer
Project Assistant



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW45** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-001 Date Collected: 01.23.20 09.12 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	355	9.90	mg/kg	01.23.20 20.14		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.23.20 19.06	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 19.06	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 19.06	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 19.06	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 19.06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	105	%	70-135	01.23.20 19.06	
o-Terphenyl	84-15-1	97	%	70-135	01.23.20 19.06	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW45**
 Lab Sample Id: 650111-001

Matrix: Soil
 Date Collected: 01.23.20 09.12

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 19.58	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 19.58	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.23.20 19.58		
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.23.20 19.58		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW46** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-002 Date Collected: 01.23.20 09.14 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	401	9.98	mg/kg	01.23.20 20.20		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 19.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	01.23.20 19.26	
o-Terphenyl	84-15-1	92	%	70-135	01.23.20 19.26	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW46**
 Lab Sample Id: 650111-002

Matrix: Soil
 Date Collected: 01.23.20 09.14

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.23.20 20.18	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 20.18	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	01.23.20 20.18		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 20.18		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW47** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-003 Date Collected: 01.23.20 09.16 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	447	9.90	mg/kg	01.23.20 20.25		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	90.7	50.1	mg/kg	01.23.20 19.26		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 19.26	U	1
Total GRO-DRO	PHC628	90.7	50.1	mg/kg	01.23.20 19.26		1
Total TPH	PHC635	90.7	50.1	mg/kg	01.23.20 19.26		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 19.26	
o-Terphenyl	84-15-1	99	%	70-135	01.23.20 19.26	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW47**
 Lab Sample Id: 650111-003

Matrix: Soil
 Date Collected: 01.23.20 09.16

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.23.20 20.39	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 20.39	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	108	%	70-130	01.23.20 20.39		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.23.20 20.39		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW48** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-004 Date Collected: 01.23.20 09.20 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	318	9.98	mg/kg	01.23.20 20.31		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 19.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.23.20 19.46	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 19.46	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW48**
 Lab Sample Id: 650111-004

Matrix: Soil
 Date Collected: 01.23.20 09.20

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.23.20 20.59	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.23.20 20.59	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 20.59		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 20.59		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW49** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-005 Date Collected: 01.23.20 09.22 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	171	10.0	mg/kg	01.23.20 20.47		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 19.46	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 19.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.23.20 19.46	
o-Terphenyl	84-15-1	100	%	70-135	01.23.20 19.46	



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW49**
 Lab Sample Id: 650111-005

Matrix: Soil
 Date Collected: 01.23.20 09.22

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 21.20	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 21.20	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.23.20 21.20		
4-Bromofluorobenzene	460-00-4	89	%	70-130	01.23.20 21.20		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW50** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-006 Date Collected: 01.23.20 09.25 Sample Depth: 0 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	666	9.94	mg/kg	01.23.20 20.53		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.23.20 20.06	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 20.06	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 20.06	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 20.06	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 20.06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 20.06	
o-Terphenyl	84-15-1	100	%	70-135	01.23.20 20.06	



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LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW50**
 Lab Sample Id: 650111-006

Matrix: Soil
 Date Collected: 01.23.20 09.25

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	01.23.20 21.40	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 21.40	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.23.20 21.40		
4-Bromofluorobenzene	460-00-4	90	%	70-130	01.23.20 21.40		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW54** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-007 Date Collected: 01.23.20 10.22 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	279	9.98	mg/kg	01.23.20 20.59		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.23.20 20.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 20.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 20.26	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 20.26	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 20.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-135	01.23.20 20.26	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 20.26	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW54**
 Lab Sample Id: 650111-007

Matrix: Soil
 Date Collected: 01.23.20 10.22

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	01.23.20 22.00	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
Total BTEX		<0.00199	0.00199	mg/kg	01.23.20 22.00	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 22.00		
1,4-Difluorobenzene	540-36-3	108	%	70-130	01.23.20 22.00		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW55**
Lab Sample Id: 650111-008

Matrix: Soil
Date Collected: 01.23.20 10.25

Date Received: 01.23.20 13.39
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114263

Date Prep: 01.23.20 17.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	279	9.90	mg/kg	01.23.20 21.04		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 20.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 20.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 20.26	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 20.26	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 20.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	104	%	70-135	01.23.20 20.26	
o-Terphenyl	84-15-1	102	%	70-135	01.23.20 20.26	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW55**
 Lab Sample Id: 650111-008

Matrix: Soil
 Date Collected: 01.23.20 10.25

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 22.21	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 22.21	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 22.21		
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 22.21		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW56** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650111-009 Date Collected: 01.23.20 10.26 Sample Depth: 0 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114263

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	83.2	9.98	mg/kg	01.23.20 21.21		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	01.23.20 20.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	01.23.20 20.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	01.23.20 20.46	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	01.23.20 20.46	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	01.23.20 20.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	92	%	70-135	01.23.20 20.46	
o-Terphenyl	84-15-1	92	%	70-135	01.23.20 20.46	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW56**
 Lab Sample Id: 650111-009

Matrix: Soil
 Date Collected: 01.23.20 10.26

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.23.20 22.41	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.23.20 22.41	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 22.41		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.23.20 22.41		



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW57**
Lab Sample Id: 650111-010

Matrix: Soil
Date Collected: 01.23.20 10.29

Date Received: 01.23.20 13.39
Sample Depth: 0 - 5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114263

Date Prep: 01.23.20 17.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	15.2	9.96	mg/kg	01.23.20 21.26		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

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	01.23.20 20.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 20.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 20.46	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 20.46	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 20.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-135	01.23.20 20.46	
o-Terphenyl	84-15-1	100	%	70-135	01.23.20 20.46	



Certificate of Analytical Results 650111

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW57**
 Lab Sample Id: 650111-010

Matrix: Soil
 Date Collected: 01.23.20 10.29

Date Received: 01.23.20 13.39
 Sample Depth: 0 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 14.00

Basis: Wet Weight

Seq Number: 3114282

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.23.20 23.01	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.23.20 23.01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	01.23.20 23.01		
1,4-Difluorobenzene	540-36-3	109	%	70-130	01.23.20 23.01		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114263

MB Sample Id: 7695075-1-BLK

Matrix: Solid

LCS Sample Id: 7695075-1-BKS

Prep Method: E300P

Date Prep: 01.23.20

LCSD Sample Id: 7695075-1-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	245	98	246	98	90-110	0	20	mg/kg	01.23.20 19:35	

Analytical Method: Chloride by EPA 300

Seq Number: 3114263

Parent Sample Id: 650111-008

Matrix: Soil

MS Sample Id: 650111-008 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650111-008 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	279	198	497	110	497	111	90-110	0	20	mg/kg	01.23.20 21:10	X

Analytical Method: Chloride by EPA 300

Seq Number: 3114263

Parent Sample Id: 650121-004

Matrix: Soil

MS Sample Id: 650121-004 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650121-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	202	200	399	99	401	100	90-110	1	20	mg/kg	01.23.20 19:52	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

MB Sample Id: 7695066-1-BLK

Matrix: Solid

LCS Sample Id: 7695066-1-BKS

Prep Method: SW8015P

Date Prep: 01.23.20

LCSD Sample Id: 7695066-1-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	1230	123	1110	111	70-135	10	35	mg/kg	01.23.20 17:25	
Diesel Range Organics (DRO)	<50.0	1000	1250	125	1080	108	70-135	15	35	mg/kg	01.23.20 17:25	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		127		129		70-135	%	01.23.20 17:25
o-Terphenyl	92		115		103		70-135	%	01.23.20 17:25

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Solid

MB Sample Id: 7695066-1-BLK

Prep Method: SW8015P

Date Prep: 01.23.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.23.20 17:25	

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Parent Sample Id: 650035-021

Matrix: Soil

MS Sample Id: 650035-021 S

Prep Method: SW8015P

Date Prep: 01.23.20

MSD Sample Id: 650035-021 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)	<50.0	1000	1080	108	1040	104	70-135	4	35	mg/kg	01.23.20 18:06	
Diesel Range Organics (DRO)	<50.0	1000	1050	105	1060	106	70-135	1	35	mg/kg	01.23.20 18:06	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	120		120		70-135	%	01.23.20 18:06
o-Terphenyl	109		115		70-135	%	01.23.20 18:06

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114282

MB Sample Id: 7695070-1-BLK

Matrix: Solid

LCS Sample Id: 7695070-1-BKS

Prep Method: SW5030B

Date Prep: 01.23.20

LCSD Sample Id: 7695070-1-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	0.116	116	0.123	123	70-130	6	35	mg/kg	01.23.20 13:38	
Toluene	<0.00200	0.100	0.106	106	0.112	112	70-130	6	35	mg/kg	01.23.20 13:38	
Ethylbenzene	<0.00200	0.100	0.104	104	0.107	107	71-129	3	35	mg/kg	01.23.20 13:38	
m,p-Xylenes	<0.00400	0.200	0.202	101	0.210	105	70-135	4	35	mg/kg	01.23.20 13:38	
o-Xylene	<0.00200	0.100	0.100	100	0.106	106	71-133	6	35	mg/kg	01.23.20 13:38	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	106		105		109		70-130	%	01.23.20 13:38
4-Bromofluorobenzene	91		84		94		70-130	%	01.23.20 13:38

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114282

Parent Sample Id: 650035-021

Matrix: Soil

MS Sample Id: 650035-021 S

Prep Method: SW5030B

Date Prep: 01.23.20

MSD Sample Id: 650035-021 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00198	0.0992	0.0907	91	0.0946	95	70-130	4	35	mg/kg	01.23.20 14:19	
Toluene	<0.00198	0.0992	0.0869	88	0.0827	83	70-130	5	35	mg/kg	01.23.20 14:19	
Ethylbenzene	<0.00198	0.0992	0.0832	84	0.0890	89	71-129	7	35	mg/kg	01.23.20 14:19	
m,p-Xylenes	<0.00397	0.198	0.188	95	0.170	85	70-135	10	35	mg/kg	01.23.20 14:19	
o-Xylene	<0.00198	0.0992	0.0882	89	0.0838	84	71-133	5	35	mg/kg	01.23.20 14:19	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	108		109		70-130	%	01.23.20 14:19
4-Bromofluorobenzene	93		92		70-130	%	01.23.20 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



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) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 620-2000, Tallahassee, FL (904) 756-0747, Delray Beach, FL (561) 889-6701
 Atlanta, GA (770) 449-8900

Work Order No:

650111

www.xenco.com Page 1 of 1

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fsmith@xenv.com, dmoir@xenv.com

Work Order Comments	
Program: UST/PST ☐ PRP ☐ Brownfields ☐ RRC ☐ Superfund ☐	
State of Project:	
Reporting Level: ☐ Level ☐ PST/UST ☐ TRRP ☐ Level ☐	
Deliverables: EDD ☐ ADAPT ☐ Other:	

Project Name:	EMBU SMD Injection	Turn Around	
Project Number:	012919272	Rush: ☐	
PO #:	11/3/19 spill date	Rush: 24hrs	
Sampler's Name:	Falina Smith	Due Date:	
SAMPLE RECEIPT	Temp Blank: ☒ No ☐ Yes	Wet Ice: ☒ No ☐ Yes	
Temperature (°C):	2.2	Thermometer ID	T-NM-009
Received Inact:	☒ No ☐ Yes	Correction Factor:	-0.2
Cooler Custody Seals:	Yes ☒ No ☐ N/A	Total Containers:	10
Sample Custody Seals:	Yes ☒ No ☐ N/A		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	ANALYSIS REQUEST																Work Order Notes	
SW45	S	1/23/20	0912	0-6'																		
SW46			0914	0-6'	X	X	X															
SW47			0916	0-6'																		
SW48			0920	0-6'																		
SW49			0922	0-6'																		
SW50			0925	0-6'																		
SW54			1022	0-5'																		
SW55			1025	0-5'																		
SW56			1026	0-5'																		
SW57			1029	0-5'																		

TAT starts the day received by the lab, if received by 4:30pm

Sample Comments

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
1 <i>[Signature]</i>	<i>[Signature]</i>	1/23/20 13:39	2		
3			4		
5			6		

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.23.2020 01:39.00 PM

Work Order #: 650111

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)?	2.2
#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#:

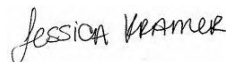
Checklist completed by:



Elizabeth McClellan

Date: 01.23.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.24.2020

Analytical Report 650114

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

24-JAN-20

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)



24-JAN-20

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

Reference: XENCO Report No(s): **650114**
EMSU SWD Injection
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) 650114. 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. 650114 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 650114****LT Environmental, Inc., Arvada, CO**

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS83	S	01-23-20 09:20	6 ft	650114-001
FS84	S	01-23-20 09:25	6 ft	650114-002
FS85	S	01-23-20 09:30	6 ft	650114-003
SW51	S	01-23-20 09:35	1 - 7 ft	650114-004
SW52	S	01-23-20 09:40	1 - 6 ft	650114-005
SW53	S	01-23-20 09:45	1 - 6 ft	650114-006
FS86	S	01-23-20 10:30	6 ft	650114-007
FS87	S	01-23-20 10:35	6 ft	650114-008
SW58	S	01-23-20 10:40	1 - 6 ft	650114-009
SW59	S	01-23-20 10:45	1 - 6 ft	650114-010



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272
Work Order Number(s): 650114

Report Date: 24-JAN-20
Date Received: 01/23/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114260 TPH by SW8015 Mod

Lab Sample ID 650114-006 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Diesel Range Organics (DRO) recovered above QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 650114-006, -007, -008, -009, -010. The Laboratory Control Sample for Diesel Range Organics (DRO) is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3114285 BTEX by EPA 8021B

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



Certificate of Analysis Summary 650114

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 01:39 pm

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650114-001	650114-002	650114-003	650114-004	650114-005	650114-006
	<i>Field Id:</i>	FS83	FS84	FS85	SW51	SW52	SW53
	<i>Depth:</i>	6- ft	6- ft	6- ft	1-7 ft	1-6 ft	1-6 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Jan-23-20 09:20	Jan-23-20 09:25	Jan-23-20 09:30	Jan-23-20 09:35	Jan-23-20 09:40	Jan-23-20 09:45
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00
	<i>Analyzed:</i>	Jan-24-20 02:10	Jan-24-20 02:31	Jan-24-20 02:51	Jan-24-20 03:11	Jan-24-20 03:32	Jan-24-20 03:52
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
Toluene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
Ethylbenzene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
m,p-Xylenes		<0.00401 0.00401	<0.00402 0.00402	<0.00401 0.00401	<0.00402 0.00402	<0.00403 0.00403	<0.00397 0.00397
o-Xylene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
Total Xylenes		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
Total BTEX		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00202 0.00202	<0.00198 0.00198
Chloride by EPA 300	<i>Extracted:</i>	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30
	<i>Analyzed:</i>	Jan-23-20 22:55	Jan-23-20 23:01	Jan-23-20 23:06	Jan-23-20 23:12	Jan-23-20 23:28	Jan-23-20 23:34
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		411 10.1	168 10.1	442 10.0	105 9.92	327 9.98	230 9.90
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 16:30	Jan-23-20 17:30
	<i>Analyzed:</i>	Jan-23-20 21:06	Jan-23-20 21:06	Jan-23-20 21:26	Jan-23-20 21:26	Jan-23-20 21:46	Jan-23-20 22:26
	<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)		<50.3 50.3	<50.1 50.1	<49.9 49.9	<49.9 49.9	<50.0 50.0	<49.9 49.9
Diesel Range Organics (DRO)		<50.3 50.3	<50.1 50.1	<49.9 49.9	<49.9 49.9	<50.0 50.0	<49.9 49.9
Motor Oil Range Hydrocarbons (MRO)		<50.3 50.3	<50.1 50.1	<49.9 49.9	<49.9 49.9	<50.0 50.0	<49.9 49.9
Total GRO-DRO		<50.3 50.3	<50.1 50.1	<49.9 49.9	<49.9 49.9	<50.0 50.0	<49.9 49.9
Total TPH		<50.3 50.3	<50.1 50.1	<49.9 49.9	<49.9 49.9	<50.0 50.0	<49.9 49.9

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

Jessica Kramer
Project Assistant



Certificate of Analysis Summary 650114

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu Jan-23-20 01:39 pm

Report Date: 24-JAN-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	650114-007	650114-008	650114-009	650114-010		
	<i>Field Id:</i>	FS86	FS87	SW58	SW59		
	<i>Depth:</i>	6- ft	6- ft	1-6 ft	1-6 ft		
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL		
	<i>Sampled:</i>	Jan-23-20 10:30	Jan-23-20 10:35	Jan-23-20 10:40	Jan-23-20 10:45		
BTEX by EPA 8021B	<i>Extracted:</i>	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00	Jan-23-20 18:00		
	<i>Analyzed:</i>	Jan-24-20 04:13	Jan-24-20 04:33	Jan-24-20 04:53	Jan-24-20 05:14		
	<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	<0.00202 0.00202	<0.00200 0.00200		
Toluene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200		
Ethylbenzene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200		
m,p-Xylenes		<0.00401 0.00401	<0.00401 0.00401	<0.00403 0.00403	<0.00399 0.00399		
o-Xylene		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200		
Total Xylenes		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200		
Total BTEX		<0.00200 0.00200	<0.00200 0.00200	<0.00202 0.00202	<0.00200 0.00200		
Chloride by EPA 300	<i>Extracted:</i>	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30		
	<i>Analyzed:</i>	Jan-23-20 23:40	Jan-23-20 23:46	Jan-23-20 23:52	Jan-24-20 08:18		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Chloride		272 10.0	215 9.94	258 10.0	204 9.86		
TPH by SW8015 Mod	<i>Extracted:</i>	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30	Jan-23-20 17:30		
	<i>Analyzed:</i>	Jan-23-20 23:05	Jan-23-20 23:05	Jan-23-20 23:25	Jan-23-20 23:25		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Gasoline Range Hydrocarbons (GRO)		<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.3 50.3		
Diesel Range Organics (DRO)		<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.3 50.3		
Motor Oil Range Hydrocarbons (MRO)		<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.3 50.3		
Total GRO-DRO		<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.3 50.3		
Total TPH		<50.2 50.2	<50.0 50.0	<50.2 50.2	<50.3 50.3		

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

Jessica Kramer
Project Assistant



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS83** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-001 Date Collected: 01.23.20 09.20 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	411	10.1	mg/kg	01.23.20 22.55		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.23.20 21.06	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.23.20 21.06	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.23.20 21.06	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.23.20 21.06	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.23.20 21.06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	01.23.20 21.06	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 21.06	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS83**
 Lab Sample Id: 650114-001

Matrix: Soil
 Date Collected: 01.23.20 09.20

Date Received: 01.23.20 13.39
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.24.20 02.10	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.24.20 02.10	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	102	%	70-130	01.24.20 02.10		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.24.20 02.10		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS84**
Lab Sample Id: 650114-002

Matrix: Soil
Date Collected: 01.23.20 09.25

Date Received: 01.23.20 13.39
Sample Depth: 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114266

Date Prep: 01.23.20 17.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	168	10.1	mg/kg	01.23.20 23.01		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

Prep Method: SW8015P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.1	50.1	mg/kg	01.23.20 21.06	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.1	50.1	mg/kg	01.23.20 21.06	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.23.20 21.06	U	1
Total GRO-DRO	PHC628	<50.1	50.1	mg/kg	01.23.20 21.06	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.23.20 21.06	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	105	%	70-135	01.23.20 21.06	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 21.06	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS84**
 Lab Sample Id: 650114-002

Matrix: Soil
 Date Collected: 01.23.20 09.25

Date Received: 01.23.20 13.39
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.24.20 02.31	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.24.20 02.31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.24.20 02.31		
4-Bromofluorobenzene	460-00-4	96	%	70-130	01.24.20 02.31		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS85** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-003 Date Collected: 01.23.20 09.30 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	442	10.0	mg/kg	01.23.20 23.06		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 21.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	01.23.20 21.26	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 21.26	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS85**
 Lab Sample Id: 650114-003

Matrix: Soil
 Date Collected: 01.23.20 09.30

Date Received: 01.23.20 13.39
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.24.20 02.51	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.24.20 02.51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.24.20 02.51		
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.24.20 02.51		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW51**
Lab Sample Id: 650114-004

Matrix: Soil
Date Collected: 01.23.20 09.35

Date Received: 01.23.20 13.39
Sample Depth: 1 - 7 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114266

Date Prep: 01.23.20 17.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	105	9.92	mg/kg	01.23.20 23.12		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3114256

Date Prep: 01.23.20 16.30

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	01.23.20 21.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 21.26	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 21.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.23.20 21.26	
o-Terphenyl	84-15-1	99	%	70-135	01.23.20 21.26	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW51**
 Lab Sample Id: 650114-004

Matrix: Soil
 Date Collected: 01.23.20 09.35

Date Received: 01.23.20 13.39
 Sample Depth: 1 - 7 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.24.20 03.11	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.24.20 03.11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.24.20 03.11		
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.24.20 03.11		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW52** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-005 Date Collected: 01.23.20 09.40 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	327	9.98	mg/kg	01.23.20 23.28		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 16.30 Basis: Wet Weight
 Seq Number: 3114256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 21.46	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 21.46	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 21.46	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 21.46	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 21.46	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	01.23.20 21.46	
o-Terphenyl	84-15-1	101	%	70-135	01.23.20 21.46	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW52**
 Lab Sample Id: 650114-005

Matrix: Soil
 Date Collected: 01.23.20 09.40

Date Received: 01.23.20 13.39
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.24.20 03.32	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.24.20 03.32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.24.20 03.32		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.24.20 03.32		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW53** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-006 Date Collected: 01.23.20 09.45 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	230	9.90	mg/kg	01.23.20 23.34		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114260

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.9	49.9	mg/kg	01.23.20 22.26	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	01.23.20 22.26	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.23.20 22.26	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	01.23.20 22.26	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	01.23.20 22.26	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.23.20 22.26	
o-Terphenyl	84-15-1	105	%	70-135	01.23.20 22.26	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW53**
 Lab Sample Id: 650114-006

Matrix: Soil
 Date Collected: 01.23.20 09.45

Date Received: 01.23.20 13.39
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	01.24.20 03.52	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
Total BTEX		<0.00198	0.00198	mg/kg	01.24.20 03.52	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.24.20 03.52		
4-Bromofluorobenzene	460-00-4	97	%	70-130	01.24.20 03.52		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS86** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-007 Date Collected: 01.23.20 10.30 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	272	10.0	mg/kg	01.23.20 23.40		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114260

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.23.20 23.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 23.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 23.05	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 23.05	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 23.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	100	%	70-135	01.23.20 23.05	
o-Terphenyl	84-15-1	95	%	70-135	01.23.20 23.05	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS86**
 Lab Sample Id: 650114-007

Matrix: Soil
 Date Collected: 01.23.20 10.30

Date Received: 01.23.20 13.39
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.24.20 04.13	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.24.20 04.13	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.24.20 04.13		
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.24.20 04.13		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS87** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-008 Date Collected: 01.23.20 10.35 Sample Depth: 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	215	9.94	mg/kg	01.23.20 23.46		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114260

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.0	50.0	mg/kg	01.23.20 23.05	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.0	50.0	mg/kg	01.23.20 23.05	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.23.20 23.05	U	1
Total GRO-DRO	PHC628	<50.0	50.0	mg/kg	01.23.20 23.05	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	01.23.20 23.05	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	105	%	70-135	01.23.20 23.05	
o-Terphenyl	84-15-1	104	%	70-135	01.23.20 23.05	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS87**
 Lab Sample Id: 650114-008

Matrix: Soil
 Date Collected: 01.23.20 10.35

Date Received: 01.23.20 13.39
 Sample Depth: 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	01.24.20 04.33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.24.20 04.33	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.24.20 04.33		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.24.20 04.33		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW58** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-009 Date Collected: 01.23.20 10.40 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	258	10.0	mg/kg	01.23.20 23.52		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114260

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.2	50.2	mg/kg	01.23.20 23.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.2	50.2	mg/kg	01.23.20 23.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.23.20 23.25	U	1
Total GRO-DRO	PHC628	<50.2	50.2	mg/kg	01.23.20 23.25	U	1
Total TPH	PHC635	<50.2	50.2	mg/kg	01.23.20 23.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.23.20 23.25	
o-Terphenyl	84-15-1	99	%	70-135	01.23.20 23.25	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW58**
 Lab Sample Id: 650114-009

Matrix: Soil
 Date Collected: 01.23.20 10.40

Date Received: 01.23.20 13.39
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.24.20 04.53	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.24.20 04.53	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	01.24.20 04.53		
1,4-Difluorobenzene	540-36-3	102	%	70-130	01.24.20 04.53		



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW59** Matrix: Soil Date Received: 01.23.20 13.39
 Lab Sample Id: 650114-010 Date Collected: 01.23.20 10.45 Sample Depth: 1 - 6 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114266

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	204	9.86	mg/kg	01.24.20 08.18		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 01.23.20 17.30 Basis: Wet Weight
 Seq Number: 3114260

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<50.3	50.3	mg/kg	01.23.20 23.25	U	1
Diesel Range Organics (DRO)	C10C28DRO	<50.3	50.3	mg/kg	01.23.20 23.25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.23.20 23.25	U	1
Total GRO-DRO	PHC628	<50.3	50.3	mg/kg	01.23.20 23.25	U	1
Total TPH	PHC635	<50.3	50.3	mg/kg	01.23.20 23.25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	101	%	70-135	01.23.20 23.25	
o-Terphenyl	84-15-1	98	%	70-135	01.23.20 23.25	



Certificate of Analytical Results 650114

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW59**
 Lab Sample Id: 650114-010

Matrix: Soil
 Date Collected: 01.23.20 10.45

Date Received: 01.23.20 13.39
 Sample Depth: 1 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 01.23.20 18.00

Basis: Wet Weight

Seq Number: 3114285

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	01.24.20 05.14	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
Total BTEX		<0.00200	0.00200	mg/kg	01.24.20 05.14	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	98	%	70-130	01.24.20 05.14		
1,4-Difluorobenzene	540-36-3	101	%	70-130	01.24.20 05.14		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114266

MB Sample Id: 7695076-1-BLK

Matrix: Solid

LCS Sample Id: 7695076-1-BKS

Prep Method: E300P

Date Prep: 01.23.20

LCSD Sample Id: 7695076-1-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	246	98	247	99	90-110	0	20	mg/kg	01.23.20 22:27	

Analytical Method: Chloride by EPA 300

Seq Number: 3114266

Parent Sample Id: 650114-010

Matrix: Soil

MS Sample Id: 650114-010 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650114-010 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	204	200	405	101	406	101	90-110	0	20	mg/kg	01.23.20 23:59	

Analytical Method: Chloride by EPA 300

Seq Number: 3114266

Parent Sample Id: 650125-008

Matrix: Soil

MS Sample Id: 650125-008 S

Prep Method: E300P

Date Prep: 01.23.20

MSD Sample Id: 650125-008 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	13.0	200	211	99	212	100	90-110	0	20	mg/kg	01.23.20 22:44	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

MB Sample Id: 7695066-1-BLK

Matrix: Solid

LCS Sample Id: 7695066-1-BKS

Prep Method: SW8015P

Date Prep: 01.23.20

LCSD Sample Id: 7695066-1-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	1230	123	1110	111	70-135	10	35	mg/kg	01.23.20 17:25	
Diesel Range Organics (DRO)	<50.0	1000	1250	125	1080	108	70-135	15	35	mg/kg	01.23.20 17:25	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		127		129		70-135	%	01.23.20 17:25
o-Terphenyl	92		115		103		70-135	%	01.23.20 17:25

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114260

MB Sample Id: 7695067-1-BLK

Matrix: Solid

LCS Sample Id: 7695067-1-BKS

Prep Method: SW8015P

Date Prep: 01.23.20

LCSD Sample Id: 7695067-1-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	1270	127	1210	121	70-135	5	35	mg/kg	01.23.20 22:06	
Diesel Range Organics (DRO)	<50.0	1000	1270	127	1120	112	70-135	13	35	mg/kg	01.23.20 22:06	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	93		124		120		70-135	%	01.23.20 22:06
o-Terphenyl	98		117		100		70-135	%	01.23.20 22:06

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Solid

MB Sample Id: 7695066-1-BLK

Prep Method: SW8015P

Date Prep: 01.23.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.23.20 17:25	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Solid

MB Sample Id: 7695067-1-BLK

Prep Method: SW8015P

Date Prep: 01.23.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.23.20 22:06	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114256

Matrix: Soil

Parent Sample Id: 650035-021

MS Sample Id: 650035-021 S

Prep Method: SW8015P

Date Prep: 01.23.20

MSD Sample Id: 650035-021 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)	<50.0	1000	1080	108	1040	104	70-135	4	35	mg/kg	01.23.20 18:06	
Diesel Range Organics (DRO)	<50.0	1000	1050	105	1060	106	70-135	1	35	mg/kg	01.23.20 18:06	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	120		120		70-135	%	01.23.20 18:06
o-Terphenyl	109		115		70-135	%	01.23.20 18:06

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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3114260

Parent Sample Id: 650114-006

Matrix: Soil

MS Sample Id: 650114-006 S

Prep Method: SW8015P

Date Prep: 01.23.20

MSD Sample Id: 650114-006 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	1210	121	1220	122	70-135	1	35	mg/kg	01.23.20 22:46	
Diesel Range Organics (DRO)	<50.2	1000	1360	136	1260	126	70-135	8	35	mg/kg	01.23.20 22:46	X

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	130		133		70-135	%	01.23.20 22:46
o-Terphenyl	116		123		70-135	%	01.23.20 22:46

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114285

MB Sample Id: 7695072-1-BLK

Matrix: Solid

LCS Sample Id: 7695072-1-BKS

Prep Method: SW5030B

Date Prep: 01.23.20

LCSD Sample Id: 7695072-1-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	0.0983	98	0.0965	97	70-130	2	35	mg/kg	01.24.20 00:28	
Toluene	<0.00200	0.100	0.0949	95	0.0932	93	70-130	2	35	mg/kg	01.24.20 00:28	
Ethylbenzene	<0.00200	0.100	0.0917	92	0.0900	90	71-129	2	35	mg/kg	01.24.20 00:28	
m,p-Xylenes	<0.00400	0.200	0.188	94	0.185	93	70-135	2	35	mg/kg	01.24.20 00:28	
o-Xylene	<0.00200	0.100	0.0940	94	0.0927	93	71-133	1	35	mg/kg	01.24.20 00:28	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	100		102		102		70-130	%	01.24.20 00:28
4-Bromofluorobenzene	95		94		98		70-130	%	01.24.20 00:28

Analytical Method: BTEX by EPA 8021B

Seq Number: 3114285

Parent Sample Id: 650114-001

Matrix: Soil

MS Sample Id: 650114-001 S

Prep Method: SW5030B

Date Prep: 01.23.20

MSD Sample Id: 650114-001 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	0.100	0.0851	85	0.0881	89	70-130	3	35	mg/kg	01.24.20 01:09	
Toluene	<0.00200	0.100	0.0817	82	0.0848	85	70-130	4	35	mg/kg	01.24.20 01:09	
Ethylbenzene	<0.00200	0.100	0.0780	78	0.0812	82	71-129	4	35	mg/kg	01.24.20 01:09	
m,p-Xylenes	<0.00401	0.200	0.161	81	0.168	84	70-135	4	35	mg/kg	01.24.20 01:09	
o-Xylene	<0.00200	0.100	0.0794	79	0.0828	83	71-133	4	35	mg/kg	01.24.20 01:09	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	102		103		70-130	%	01.24.20 01:09
4-Bromofluorobenzene	95		96		70-130	%	01.24.20 01:09

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) 509-3334
Midland, TX (432-704-5440) EL Paso, TX (915) 555-3443 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)

Chain of Custody

Work Order No: 1050114

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	520 W. Merced St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Culbuck, NM 88220
Phone:	(432) 236-3849	Email:	jhlittlell@xtenv.com, dmoir@ltenv.com

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

Project Name:	EMSU SW Intention	Turn Around	
Project Number:	012919172	Routine	☐
P.O. Number:	11/3/14 Spill date	Rush:	24 hr
Sampler's Name:	Jeremy Hill	Due Date:	1/24/20
SAMPLE RECEIPT	Temp Blank:	Yes	No
Temperature (°C):	2.2	Thermometer ID	
Received intact:	Yes	Correction Factor:	-0.2
Cooler Custody Seals:	Yes	Total Containers:	10
Sample Custody Seals:	Yes		

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH (EPA 8015)	BTEX (EPA 0-8021)	Chloride (EPA 300.0)	ANALYSIS REQUEST	Work Order Notes
FS 83	S	1/23/20	0930	6'	1	X	X	X		
FS 84	S		0935	6'						
FS 85	S		0930	6'						
SW 51	S		0935	1-7'						
SW 52	S		0940	1-6'						
SW 53	S		0945	1-6'						
FS 86	S		1030	6'						
FS 87	S		1035	6'						
SW 58	S		1040	1-6'						
SW 59	S		1045	1-6'						

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
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

Circle Method(s) and Metal(s) to be analyzed

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
1 <i>[Signature]</i>	2 <i>[Signature]</i>	1/23/20 13:39	4 <i>[Signature]</i>	6 <i>[Signature]</i>	

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.23.2020 01:39.00 PM

Work Order #: 650114

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)?	2.2
#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#:

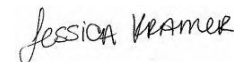
Checklist completed by:



Elizabeth McClellan

Date: 01.23.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.24.2020

Analytical Report 650756

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919218

31-JAN-20

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)



31-JAN-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **650756**

EMSU SWD Injection

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) 650756. 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. 650756 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.

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



Sample Cross Reference 650756

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
WS01	W	01-24-20 10:30	2 In	650756-001



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919218
Work Order Number(s): 650756

Report Date: 31-JAN-20
Date Received: 01/29/2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3114954 Chloride by EPA 300

Lab Sample ID 650756-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 650756-001.

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



Certificate of Analysis Summary 650756

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919218

Contact: Dan Moir

Project Location:

Date Received in Lab: Wed Jan-29-20 02:54 pm

Report Date: 31-JAN-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	650756-001					
	Field Id:	WS01					
	Depth:	2 In					
	Matrix:	WATER					
	Sampled:	Jan-24-20 10:30					
BTEX by EPA 8021B SUB: T104704400-19-19	Extracted:	Jan-30-20 13:00					
	Analyzed:	Jan-31-20 12:13					
	Units/RL:	mg/L RL					
	Benzene	<0.00200 0.00200					
	Toluene	<0.00200 0.00200					
	Ethylbenzene	0.00332 0.00200					
	m,p-Xylenes	0.0104 0.00400					
	o-Xylene	0.00633 0.00200					
	Total Xylenes	0.0167 0.00200					
	Total BTEX	0.0201 0.00200					
Chloride by EPA 300	Extracted:	Jan-29-20 17:52					
	Analyzed:	Jan-30-20 10:41					
	Units/RL:	mg/L RL					
Chloride		6510 100					

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

Version: 1.0%

Jessica Kramer
Project Assistant



Certificate of Analytical Results 650756

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **WS01**
Lab Sample Id: 650756-001

Matrix: Water
Date Collected: 01.24.20 10.30

Date Received: 01.29.20 14.54
Sample Depth: 2 In

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3114954

Date Prep: 01.29.20 17.52

Prep Method: E300P

% Moisture:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	6510	100	mg/L	01.30.20 10.41		200

Analytical Method: BTEX by EPA 8021B

Tech: KTL

Analyst: KTL

Seq Number: 3115120

Date Prep: 01.30.20 13.00

Prep Method: SW5030B

% Moisture:

SUB: T104704400-19-19

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/L	01.31.20 12.13	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/L	01.31.20 12.13	U	1
Ethylbenzene	100-41-4	0.00332	0.00200	mg/L	01.31.20 12.13		1
m,p-Xylenes	179601-23-1	0.0104	0.00400	mg/L	01.31.20 12.13		1
o-Xylene	95-47-6	0.00633	0.00200	mg/L	01.31.20 12.13		1
Total Xylenes	1330-20-7	0.0167	0.00200	mg/L	01.31.20 12.13		1
Total BTEX		0.0201	0.00200	mg/L	01.31.20 12.13		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	117	%	70-130	01.31.20 12.13	
4-Bromofluorobenzene	460-00-4	92	%	70-130	01.31.20 12.13	



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.
EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3114954

MB Sample Id: 7695511-1-BLK

Matrix: Water

LCS Sample Id: 7695511-1-BKS

Prep Method: E300P

Date Prep: 01.29.20

LCSD Sample Id: 7695511-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	25.0	26.0	104	26.1	104	90-110	0	20	mg/L	01.30.20 09:50	

Analytical Method: Chloride by EPA 300

Seq Number: 3114954

Parent Sample Id: 650756-001

Matrix: Water

MS Sample Id: 650756-001 S

Prep Method: E300P

Date Prep: 01.29.20

MSD Sample Id: 650756-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	6510	20.0	6420	0	6390	0	90-110	0	20	mg/L	01.30.20 10:47	X

Analytical Method: BTEX by EPA 8021B

Seq Number: 3115120

MB Sample Id: 7695580-1-BLK

Matrix: Water

LCS Sample Id: 7695580-1-BKS

Prep Method: SW5030B

Date Prep: 01.30.20

LCSD Sample Id: 7695580-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.000408	0.100	0.104	104	0.103	103	70-130	1	25	mg/L	01.31.20 09:54	
Toluene	<0.000367	0.100	0.0988	99	0.0990	99	70-130	0	25	mg/L	01.31.20 09:54	
Ethylbenzene	<0.000657	0.100	0.0934	93	0.0940	94	70-130	1	25	mg/L	01.31.20 09:54	
m,p-Xylenes	<0.000630	0.200	0.185	93	0.185	93	70-130	0	25	mg/L	01.31.20 09:54	
o-Xylene	<0.000642	0.100	0.0930	93	0.0932	93	70-130	0	25	mg/L	01.31.20 09:54	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	106		112		108		70-130	%	01.31.20 09:54
4-Bromofluorobenzene	71		94		88		70-130	%	01.31.20 09:54

Analytical Method: BTEX by EPA 8021B

Seq Number: 3115120

Parent Sample Id: 650756-001

Matrix: Water

MS Sample Id: 650756-001 S

Prep Method: SW5030B

Date Prep: 01.30.20

MSD Sample Id: 650756-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.000408	0.100	0.113	113	0.101	101	70-130	11	25	mg/L	01.31.20 10:34	
Toluene	<0.000367	0.100	0.107	107	0.0946	95	70-130	12	25	mg/L	01.31.20 10:34	
Ethylbenzene	0.00332	0.100	0.103	100	0.0911	88	70-130	12	25	mg/L	01.31.20 10:34	
m,p-Xylenes	0.0104	0.200	0.208	99	0.183	86	70-130	13	25	mg/L	01.31.20 10:34	
o-Xylene	0.00633	0.100	0.106	100	0.0932	87	70-130	13	25	mg/L	01.31.20 10:34	

Surrogate

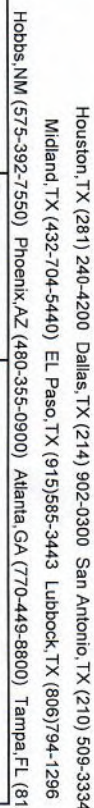
	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	112		112		70-130	%	01.31.20 10:34
4-Bromofluorobenzene	92		88		70-130	%	01.31.20 10:34

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



Chain of Custody

Work Order No: 650756

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:	522 W. Mermod St.
City, State ZIP:		Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:		(432) 236-3849	Email:	jhlill@ltenv.com, dmoir@ltenv.com

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

[illegible]



Inter-Office Shipment

Page 1 of 1

IOS Number **57143**

Date/Time: 01/29/20 16:03

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.:

E-Mail: jessica.kramer@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
650756-001	W	WS01	01/24/20 10:30	SW8021B	BTEX by EPA 8021B	01/30/20	02/07/20	JKR	BZ BZME EBZ XYLENES	

Inter Office Shipment or Sample Comments:

Relinquished By:

Elizabeth McClellan

Date Relinquished: 01/29/2020

Received By:

Brianna Teel

Date Received: 01/30/2020 11:12

Cooler Temperature: 0.6



Inter Office Report- Sample Receipt Checklist

Sent To: Midland

IOS #: 57143

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used :

Sent By: Elizabeth McClellan

Date Sent: 01/29/2020 04:03 PM

Received By: Brianna Teel

Date Received: 01/30/2020 11:12 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	.6
#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: 01/30/2020

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: LT Environmental, Inc.

Date/ Time Received: 01.29.2020 02.54.00 PM

Work Order #: 650756

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)?	.8
#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)?	Yes BTEX subbed to Midland.
#18 Water VOC samples have zero headspace?	Yes

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

Analyst:

PH Device/Lot#:

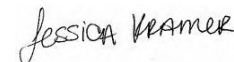
Checklist completed by:



Elizabeth McClellan

Date: 01.29.2020

Checklist reviewed by:



Jessica Kramer

Date: 01.30.2020

Analytical Report 652493

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSUSWD Injection

012919272

19-FEB-20

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)



19-FEB-20

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **652493**

EMSUSWD Injection

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) 652493. 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. 652493 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 652493****LT Environmental, Inc., Arvada, CO**

EMSUSWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SW60	S	02-14-20 10:06	1 - 5 ft	652493-001
SW61	S	02-14-20 10:08	1 - 5.5 ft	652493-002
FS75A	S	02-14-20 10:25	8.05 ft	652493-003
SW62	S	02-14-20 10:56	0 - 6 ft	652493-004



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSUSWD Injection

Project ID: 012919272
Work Order Number(s): 652493

Report Date: 19-FEB-20
Date Received: 02/14/2020

Sample receipt non conformances and comments:

V1.001 - Revision Corrected sample names per client request (email) JK 02/19/20

SW31 --> SW60

SW32 --> SW61

SW50 --> SW62

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3116666 BTEX by EPA 8021B

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



Certificate of Analysis Summary 652493

LT Environmental, Inc., Arvada, CO

Project Name: EMSUSWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Feb-14-20 02:30 pm

Report Date: 19-FEB-20

Project Manager: Jessica Kramer

<i>Analysis Requested</i>	<i>Lab Id:</i>	652493-001	652493-002	652493-003	652493-004		
	<i>Field Id:</i>	SW60	SW61	FS75A	SW62		
	<i>Depth:</i>	1-5 ft	1-5.5 ft	8.05- ft	0-6 ft		
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL		
	<i>Sampled:</i>	Feb-14-20 10:06	Feb-14-20 10:08	Feb-14-20 10:25	Feb-14-20 10:56		
BTEX by EPA 8021B	<i>Extracted:</i>	Feb-14-20 17:09	Feb-14-20 17:09	Feb-14-20 17:09	Feb-14-20 17:09		
	<i>Analyzed:</i>	Feb-15-20 02:57	Feb-15-20 03:18	Feb-15-20 03:38	Feb-15-20 03:58		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Benzene		<0.00952 0.00952	<0.00952 0.00952	<0.00200 0.00200	<0.00980 0.00980		
Toluene		<0.00952 0.00952	<0.00952 0.00952	<0.00200 0.00200	<0.00980 0.00980		
Ethylbenzene		<0.00952 0.00952	<0.00952 0.00952	<0.00200 0.00200	<0.00980 0.00980		
m,p-Xylenes		<0.0190 0.0190	<0.0190 0.0190	<0.00401 0.00401	<0.0196 0.0196		
o-Xylene		<0.00952 0.00952	0.0166 0.00952	<0.00200 0.00200	<0.00980 0.00980		
Total Xylenes		<0.00952 0.00952	0.0166 0.00952	<0.00200 0.00200	<0.00980 0.00980		
Total BTEX		<0.00952 0.00952	0.0166 0.00952	<0.00200 0.00200	<0.00980 0.00980		
Chloride by EPA 300	<i>Extracted:</i>	Feb-14-20 16:30	Feb-14-20 16:30	Feb-14-20 16:30	Feb-14-20 16:30		
	<i>Analyzed:</i>	Feb-14-20 20:06	Feb-14-20 20:12	Feb-14-20 20:18	Feb-14-20 20:24		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Chloride		365 9.94	105 9.96	777 9.98	184 9.94		
TPH by SW8015 Mod	<i>Extracted:</i>	Feb-14-20 17:00	Feb-14-20 17:00	Feb-14-20 17:00	Feb-14-20 17:00		
	<i>Analyzed:</i>	Feb-15-20 00:56	Feb-14-20 21:59	Feb-14-20 21:59	Feb-14-20 22:19		
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL		
Gasoline Range Hydrocarbons (GRO)		<49.8 49.8	<49.8 49.8	<49.8 49.8	<49.9 49.9		
Diesel Range Organics (DRO)		430 49.8	<49.8 49.8	<49.8 49.8	<49.9 49.9		
Motor Oil Range Hydrocarbons (MRO)		<49.8 49.8	<49.8 49.8	<49.8 49.8	<49.9 49.9		
Total GRO-DRO		430 49.8	<49.8 49.8	<49.8 49.8	<49.9 49.9		
Total TPH		430 49.8	<49.8 49.8	<49.8 49.8	<49.9 49.9		

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

Version: 1.9%

Jessica Kramer
Project Assistant



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW60** Matrix: Soil Date Received: 02.14.20 14.30
 Lab Sample Id: 652493-001 Date Collected: 02.14.20 10.06 Sample Depth: 1 - 5 ft
 Analytical Method: Chloride by EPA 300 Prep Method: E300P
 Tech: MAB % Moisture:
 Analyst: MAB Date Prep: 02.14.20 16.30 Basis: Wet Weight
 Seq Number: 3116675

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	365	9.94	mg/kg	02.14.20 20.06		1

Analytical Method: TPH by SW8015 Mod Prep Method: SW8015P
 Tech: DTH % Moisture:
 Analyst: DTH Date Prep: 02.14.20 17.00 Basis: Wet Weight
 Seq Number: 3116690

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<49.8	49.8	mg/kg	02.15.20 00.56	U	1
Diesel Range Organics (DRO)	C10C28DRO	430	49.8	mg/kg	02.15.20 00.56		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	02.15.20 00.56	U	1
Total GRO-DRO	PHC628	430	49.8	mg/kg	02.15.20 00.56		1
Total TPH	PHC635	430	49.8	mg/kg	02.15.20 00.56		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-135	02.15.20 00.56	
o-Terphenyl	84-15-1	107	%	70-135	02.15.20 00.56	



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW60**
 Lab Sample Id: 652493-001

Matrix: Soil
 Date Collected: 02.14.20 10.06

Date Received: 02.14.20 14.30
 Sample Depth: 1 - 5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.14.20 17.09

Basis: Wet Weight

Seq Number: 3116666

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
Toluene	108-88-3	<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
Ethylbenzene	100-41-4	<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
m,p-Xylenes	179601-23-1	<0.0190	0.0190	mg/kg	02.15.20 02.57	U	1
o-Xylene	95-47-6	<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
Total Xylenes	1330-20-7	<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
Total BTEX		<0.00952	0.00952	mg/kg	02.15.20 02.57	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	94	%	70-130	02.15.20 02.57		
1,4-Difluorobenzene	540-36-3	109	%	70-130	02.15.20 02.57		



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW61**
Lab Sample Id: 652493-002

Matrix: Soil
Date Collected: 02.14.20 10.08

Date Received: 02.14.20 14.30
Sample Depth: 1 - 5.5 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3116675

Date Prep: 02.14.20 16.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	105	9.96	mg/kg	02.14.20 20.12		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3116690

Date Prep: 02.14.20 17.00

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	02.14.20 21.59	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	02.14.20 21.59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	102	%	70-135	02.14.20 21.59	
o-Terphenyl	84-15-1	114	%	70-135	02.14.20 21.59	



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW61**
 Lab Sample Id: 652493-002

Matrix: Soil
 Date Collected: 02.14.20 10.08

Date Received: 02.14.20 14.30
 Sample Depth: 1 - 5.5 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.14.20 17.09

Basis: Wet Weight

Seq Number: 3116666

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00952	0.00952	mg/kg	02.15.20 03.18	U	1
Toluene	108-88-3	<0.00952	0.00952	mg/kg	02.15.20 03.18	U	1
Ethylbenzene	100-41-4	<0.00952	0.00952	mg/kg	02.15.20 03.18	U	1
m,p-Xylenes	179601-23-1	<0.0190	0.0190	mg/kg	02.15.20 03.18	U	1
o-Xylene	95-47-6	0.0166	0.00952	mg/kg	02.15.20 03.18		1
Total Xylenes	1330-20-7	0.0166	0.00952	mg/kg	02.15.20 03.18		1
Total BTEX		0.0166	0.00952	mg/kg	02.15.20 03.18		1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	96	%	70-130	02.15.20 03.18		
1,4-Difluorobenzene	540-36-3	109	%	70-130	02.15.20 03.18		



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **FS75A**
 Lab Sample Id: 652493-003

Matrix: Soil
 Date Collected: 02.14.20 10.25

Date Received: 02.14.20 14.30
 Sample Depth: 8.05 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3116675

Date Prep: 02.14.20 16.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	777	9.98	mg/kg	02.14.20 20.18		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3116690

Date Prep: 02.14.20 17.00

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	02.14.20 21.59	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	02.14.20 21.59	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	02.14.20 21.59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-135	02.14.20 21.59	
o-Terphenyl	84-15-1	103	%	70-135	02.14.20 21.59	



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **FS75A**
 Lab Sample Id: 652493-003

Matrix: Soil
 Date Collected: 02.14.20 10.25

Date Received: 02.14.20 14.30
 Sample Depth: 8.05 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.14.20 17.09

Basis: Wet Weight

Seq Number: 3116666

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	02.15.20 03.38	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
Total BTEX		<0.00200	0.00200	mg/kg	02.15.20 03.38	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	95	%	70-130	02.15.20 03.38		
1,4-Difluorobenzene	540-36-3	109	%	70-130	02.15.20 03.38		



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW62**
Lab Sample Id: 652493-004

Matrix: Soil
Date Collected: 02.14.20 10.56

Date Received: 02.14.20 14.30
Sample Depth: 0 - 6 ft

Analytical Method: Chloride by EPA 300

Tech: MAB

Analyst: MAB

Seq Number: 3116675

Date Prep: 02.14.20 16.30

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	184	9.94	mg/kg	02.14.20 20.24		1

Analytical Method: TPH by SW8015 Mod

Tech: DTH

Analyst: DTH

Seq Number: 3116690

Date Prep: 02.14.20 17.00

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	02.14.20 22.19	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	02.14.20 22.19	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	02.14.20 22.19	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	02.14.20 22.19	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	02.14.20 22.19	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	89	%	70-135	02.14.20 22.19	
o-Terphenyl	84-15-1	100	%	70-135	02.14.20 22.19	



Certificate of Analytical Results 652493

LT Environmental, Inc., Arvada, CO

EMSUSWD Injection

Sample Id: **SW62**
 Lab Sample Id: 652493-004

Matrix: Soil
 Date Collected: 02.14.20 10.56

Date Received: 02.14.20 14.30
 Sample Depth: 0 - 6 ft

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: MAB

% Moisture:

Analyst: MAB

Date Prep: 02.14.20 17.09

Basis: Wet Weight

Seq Number: 3116666

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
Toluene	108-88-3	<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
Ethylbenzene	100-41-4	<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
m,p-Xylenes	179601-23-1	<0.0196	0.0196	mg/kg	02.15.20 03.58	U	1
o-Xylene	95-47-6	<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
Total Xylenes	1330-20-7	<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
Total BTEX		<0.00980	0.00980	mg/kg	02.15.20 03.58	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	109	%	70-130	02.15.20 03.58		
4-Bromofluorobenzene	460-00-4	96	%	70-130	02.15.20 03.58		



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.
EMSUSWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3116675

MB Sample Id: 7696717-1-BLK

Matrix: Solid

LCS Sample Id: 7696717-1-BKS

Prep Method: E300P

Date Prep: 02.14.20

LCSD Sample Id: 7696717-1-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	259	104	259	104	90-110	0	20	mg/kg	02.14.20 19:30	

Analytical Method: Chloride by EPA 300

Seq Number: 3116675

Parent Sample Id: 652447-009

Matrix: Soil

MS Sample Id: 652447-009 S

Prep Method: E300P

Date Prep: 02.14.20

MSD Sample Id: 652447-009 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	5910	202	6090	89	6110	99	90-110	0	20	mg/kg	02.14.20 20:59	X

Analytical Method: Chloride by EPA 300

Seq Number: 3116675

Parent Sample Id: 652491-001

Matrix: Soil

MS Sample Id: 652491-001 S

Prep Method: E300P

Date Prep: 02.14.20

MSD Sample Id: 652491-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	16.5	200	224	104	226	105	90-110	1	20	mg/kg	02.14.20 19:48	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3116690

MB Sample Id: 7696775-1-BLK

Matrix: Solid

LCS Sample Id: 7696775-1-BKS

Prep Method: SW8015P

Date Prep: 02.14.20

LCSD Sample Id: 7696775-1-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	890	89	882	88	70-135	1	35	mg/kg	02.14.20 21:00	
Diesel Range Organics (DRO)	<50.0	1000	942	94	1020	102	70-135	8	35	mg/kg	02.14.20 21:00	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		106		112		70-135	%	02.14.20 21:00
o-Terphenyl	100		105		107		70-135	%	02.14.20 21:00

Analytical Method: TPH by SW8015 Mod

Seq Number: 3116690

Matrix: Solid

MB Sample Id: 7696775-1-BLK

Prep Method: SW8015P

Date Prep: 02.14.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	02.17.20 10:51	

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.

EMSUSWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3116690

Parent Sample Id: 652491-001

Matrix: Soil

MS Sample Id: 652491-001 S

Prep Method: SW8015P

Date Prep: 02.14.20

MSD Sample Id: 652491-001 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)	<49.9	997	926	93	905	91	70-135	2	35	mg/kg	02.14.20 21:19	
Diesel Range Organics (DRO)	<49.9	997	1050	105	995	100	70-135	5	35	mg/kg	02.14.20 21:19	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	115		109		70-135	%	02.14.20 21:19
o-Terphenyl	111		115		70-135	%	02.14.20 21:19

Analytical Method: BTEX by EPA 8021B

Seq Number: 3116666

MB Sample Id: 7696733-1-BLK

Matrix: Solid

LCS Sample Id: 7696733-1-BKS

Prep Method: SW5030B

Date Prep: 02.14.20

LCSD Sample Id: 7696733-1-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	0.109	109	0.106	106	70-130	3	35	mg/kg	02.14.20 23:13	
Toluene	<0.00200	0.100	0.0984	98	0.0970	97	70-130	1	35	mg/kg	02.14.20 23:13	
Ethylbenzene	<0.00200	0.100	0.0934	93	0.0922	92	71-129	1	35	mg/kg	02.14.20 23:13	
m,p-Xylenes	<0.00400	0.200	0.182	91	0.180	90	70-135	1	35	mg/kg	02.14.20 23:13	
o-Xylene	<0.00200	0.100	0.0929	93	0.0919	92	71-133	1	35	mg/kg	02.14.20 23:13	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	110		108		109		70-130	%	02.14.20 23:13
4-Bromofluorobenzene	94		90		90		70-130	%	02.14.20 23:13

Analytical Method: BTEX by EPA 8021B

Seq Number: 3116666

Parent Sample Id: 652450-011

Matrix: Soil

MS Sample Id: 652450-011 S

Prep Method: SW5030B

Date Prep: 02.14.20

MSD Sample Id: 652450-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00199	0.0994	0.115	116	0.105	105	70-130	9	35	mg/kg	02.14.20 23:54	
Toluene	<0.00199	0.0994	0.106	107	0.0972	97	70-130	9	35	mg/kg	02.14.20 23:54	
Ethylbenzene	0.000931	0.0994	0.102	102	0.0938	93	71-129	8	35	mg/kg	02.14.20 23:54	
m,p-Xylenes	0.000772	0.199	0.199	100	0.183	91	70-135	8	35	mg/kg	02.14.20 23:54	
o-Xylene	<0.00199	0.0994	0.101	102	0.0940	94	71-133	7	35	mg/kg	02.14.20 23:54	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	108		108		70-130	%	02.14.20 23:54
4-Bromofluorobenzene	93		94		70-130	%	02.14.20 23:54

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

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

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

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300, San Antonio, TX (210) 508-3334
 Midland, TX (432) 704-5440, El Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
 Tampa, FL (813) 820-2000, Tallahassee, FL (850) 756-0747, Delray Beach, FL (561) 689-6701
 Atlanta, GA (770) 449-8800

Work Order No: 652493

www.xenco.com Page 1 of 1

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	jsmith@ltenv.com, dmoir@ltenv.com

Program: ☐ UST/PST ☐ PRF ☐ Brownfield ☐ RR ☐ Superfund ☐ State of Project:	
Reporting Level: ☐ Level ☐ PST/US ☐ TRF ☐ Level ☐	Deliverables: EDD ☐ ADAPT ☐ Other: ☐

Project Name:	EMSU SMD Injection	Turn Around	☐
Project Number:	012919272	Rush: 24 hrs	☐
PO #:		Due Date:	
Sampler's Name:	Fatima Smith		
SAMPLE RECEIPT			
Temperature (°C):	1.4	Temp Blank:	☐ Yes ☒ No
Received Intact:	☒ Yes ☐ No	Thermometer ID:	TMM007
Cooler Custody Seals:	☒ Yes ☐ No	Correction Factor:	-0.2
Sample Custody Seals:	☒ Yes ☐ No	Total Containers:	4

Sample Identification					Matrix	Date Sampled	Time Sampled	Depth	Number	TPH (EPA)	BTEX (EPA)	Chloride	lab, if received by 4:30pm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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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
[Signature]	[Signature]	2/14/20 14:30	[Signature]	[Signature]	



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) 794-1296
Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199, Phoenix, AZ (480) 355-0900
Tampa, FL (813) 620-2000, Tallahassee, FL (850) 758-0747, Delray Beach, FL (561) 893-6701
Atlanta, GA (770) 449-8800

Work Order No: 652493

Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littrell
Company Name:	LT Environmental, Inc., Permian Office	Company Name:	XTO Energy, Inc.
Address:	3300 North A Street	Address:	3104 E Greene St
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	fmith@ltenv.com, dmoir@ltenv.com
Project Name:	EM80SMD Injection	Turn Around	
Project Number:	012919272	Routine:	☐
PO #:		Rush: 24 hrs	
Sampler's Name:	Fatima Smith	Due Date:	
SAMPLE RECEIPT			
Temperature (°C):	1.4	Temp Blank:	☒ Yes ☐ No
Received Intact:	☒ Yes ☐ No	Wet Ice:	☒ Yes ☐ No
Cooler Custody Seals:	☒ Yes ☐ No	Thermometer ID:	7111007
Sample Custody Seals:	☒ Yes ☐ No	Correction Factor:	-0.2
		Total Containers:	4

Project Number:		012919272		Turn Around	
PO #:				Routine: ☐	
Sampler's Name:		Fatima Smith		Rush: 24 hrs	
SAMPLE RECEIPT		Temp Blank:		Due Date:	
Temperature (°C):		1.4		Yes ☒ No ☐	
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 of Containers	
				TPH (EPA 8015)	
				BTEX (EPA 0-8021)	
				Chloride (EPA 300.0)	

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 \$8 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
fatima		2/14/20 14:30			



Analytical Report 653163

for

LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

02.21.2020

Collected By: Client



**1211 W. Florida Ave
Midland TX 79701**

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)



02.21.2020

Project Manager: **Dan Moir**

LT Environmental, Inc.

4600 W. 60th Avenue

Arvada, CO 80003

Reference: XENCO Report No(s): **653163**

EMSU SWD Injection

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) 653163. 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. 653163 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 653163

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FS75B	S	02.20.2020 11:10	- 9.5	653163-001

**CASE NARRATIVE****Client Name: LT Environmental, Inc.****Project Name: EMSU SWD Injection**

Project ID: 012919272
Work Order Number(s): 653163

Report Date: 02.21.2020
Date Received: 02.20.2020

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3117148 BTEX by EPA 8021B

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

Surrogate 4-Bromofluorobenzene recovered below QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 653163-001.

Lab Sample ID 652387-019 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Ethylbenzene, o-Xylene recovered below QC limits in the Matrix Spike. Benzene, Toluene, m,p-Xylenes recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference.

The Laboratory Control Sample for Toluene, Benzene, m,p-Xylenes, Ethylbenzene, o-Xylene is within laboratory Control Limits, therefore the data was accepted.



Certificate of Analysis Summary 653163

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Thu 02.20.2020 14:58

Report Date: 02.21.2020 16:18

Project Manager: Jessica Kramer

Analysis Requested	Lab Id: 653163-001 Field Id: FS75B Depth: 9.5 Matrix: SOIL Sampled: 02.20.2020 11:10					
BTEX by EPA 8021B	Extracted: 02.20.2020 16:00 Analyzed: 02.20.2020 17:11 Units/RL: mg/kg RL					
Benzene	<0.00197 0.00197					
Toluene	<0.00197 0.00197					
Ethylbenzene	<0.00197 0.00197					
m,p-Xylenes	<0.00394 0.00394					
o-Xylene	<0.00197 0.00197					
Total Xylenes	<0.00197 0.00197					
Total BTEX	<0.00197 0.00197					
Chloride by EPA 300	Extracted: 02.20.2020 17:45 Analyzed: 02.20.2020 19:05 Units/RL: mg/kg RL					
Chloride	460 4.97					
TPH by SW8015 Mod	Extracted: 02.21.2020 08:00 Analyzed: 02.21.2020 10:38 Units/RL: mg/kg RL					
Gasoline Range Hydrocarbons (GRO)	<49.9 49.9					
Diesel Range Organics (DRO)	<49.9 49.9					
Motor Oil Range Hydrocarbons (MRO)	<49.9 49.9					
Total GRO-DRO	<49.9 49.9					
Total TPH	<49.9 49.9					

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 653163

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS75B**
Lab Sample Id: 653163-001

Matrix: Soil
Date Collected: 02.20.2020 11:10

Date Received: 02.20.2020 14:58
Sample Depth: 9.5

Analytical Method: Chloride by EPA 300

Tech: CHE

Analyst: CHE

Seq Number: 3117195

Date Prep: 02.20.2020 17:45

Prep Method: E300P

% Moisture:

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	460	4.97	mg/kg	02.20.2020 19:05		1

Analytical Method: TPH by SW8015 Mod

Tech: DVM

Analyst: ARM

Seq Number: 3117254

Date Prep: 02.21.2020 08:00

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	02.21.2020 10:38	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.9	49.9	mg/kg	02.21.2020 10:38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	02.21.2020 10:38	U	1
Total GRO-DRO	PHC628	<49.9	49.9	mg/kg	02.21.2020 10:38	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	02.21.2020 10:38	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-135	02.21.2020 10:38	
o-Terphenyl	84-15-1	97	%	70-135	02.21.2020 10:38	



Certificate of Analytical Results 653163

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **FS75B**
 Lab Sample Id: 653163-001

Matrix: Soil
 Date Collected: 02.20.2020 11:10

Date Received: 02.20.2020 14:58
 Sample Depth: 9.5

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5030B

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 02.20.2020 16:00

Basis: Wet Weight

Seq Number: 3117148

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
Toluene	108-88-3	<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
Ethylbenzene	100-41-4	<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
m,p-Xylenes	179601-23-1	<0.00394	0.00394	mg/kg	02.20.2020 17:11	U	1
o-Xylene	95-47-6	<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
Total Xylenes	1330-20-7	<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
Total BTEX		<0.00197	0.00197	mg/kg	02.20.2020 17:11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	64	%	70-130	02.20.2020 17:11	**	
1,4-Difluorobenzene	540-36-3	86	%	70-130	02.20.2020 17:11		



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.

EMSU SWD Injection

Analytical Method: Chloride by EPA 300

Seq Number: 3117195

MB Sample Id: 7697136-1-BLK

Matrix: Solid

LCS Sample Id: 7697136-1-BKS

Prep Method: E300P

Date Prep: 02.20.2020

LCSD Sample Id: 7697136-1-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	250	100	247	99	90-110	1	20	mg/kg	02.20.2020 18:53	

Analytical Method: Chloride by EPA 300

Seq Number: 3117195

Parent Sample Id: 653163-001

Matrix: Soil

MS Sample Id: 653163-001 S

Prep Method: E300P

Date Prep: 02.20.2020

MSD Sample Id: 653163-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	460	249	684	90	686	91	90-110	0	20	mg/kg	02.20.2020 19:11	

Analytical Method: Chloride by EPA 300

Seq Number: 3117195

Parent Sample Id: 653165-011

Matrix: Soil

MS Sample Id: 653165-011 S

Prep Method: E300P

Date Prep: 02.20.2020

MSD Sample Id: 653165-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	8.27	251	253	98	252	97	90-110	0	20	mg/kg	02.20.2020 20:36	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117254

MB Sample Id: 7697152-1-BLK

Matrix: Solid

LCS Sample Id: 7697152-1-BKS

Prep Method: SW8015P

Date Prep: 02.21.2020

LCSD Sample Id: 7697152-1-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	1050	105	1010	101	70-135	4	20	mg/kg	02.21.2020 10:00	
Diesel Range Organics (DRO)	<15.0	1000	1160	116	1100	110	70-135	5	20	mg/kg	02.21.2020 10:00	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	84		122		120		70-135	%	02.21.2020 10:00
o-Terphenyl	84		115		113		70-135	%	02.21.2020 10:00

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117254

Matrix: Solid

MB Sample Id: 7697152-1-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	02.21.2020 09:41	

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.
EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3117254

Parent Sample Id: 653163-001

Matrix: Soil

MS Sample Id: 653163-001 S

Prep Method: SW8015P

Date Prep: 02.21.2020

MSD Sample Id: 653163-001 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	999	833	83	955	96	70-135	14	20	mg/kg	02.21.2020 10:57	
Diesel Range Organics (DRO)	21.9	999	907	89	1040	102	70-135	14	20	mg/kg	02.21.2020 10:57	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	107		123		70-135	%	02.21.2020 10:57
o-Terphenyl	92		104		70-135	%	02.21.2020 10:57

Analytical Method: BTEX by EPA 8021B

Seq Number: 3117148

MB Sample Id: 7697070-1-BLK

Matrix: Solid

LCS Sample Id: 7697070-1-BKS

Prep Method: SW5030B

Date Prep: 02.20.2020

LCSD Sample Id: 7697070-1-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	0.107	107	0.107	107	70-130	0	35	mg/kg	02.20.2020 07:07	
Toluene	<0.00200	0.100	0.0941	94	0.0962	96	70-130	2	35	mg/kg	02.20.2020 07:07	
Ethylbenzene	<0.00200	0.100	0.0920	92	0.0951	95	70-130	3	35	mg/kg	02.20.2020 07:07	
m,p-Xylenes	<0.00400	0.200	0.168	84	0.176	88	70-130	5	35	mg/kg	02.20.2020 07:07	
o-Xylene	<0.00200	0.100	0.0836	84	0.0875	88	70-130	5	35	mg/kg	02.20.2020 07:07	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	95		97		97		70-130	%	02.20.2020 07:07
4-Bromofluorobenzene	95		85		87		70-130	%	02.20.2020 07:07

Analytical Method: BTEX by EPA 8021B

Seq Number: 3117148

Parent Sample Id: 652387-019

Matrix: Soil

MS Sample Id: 652387-019 S

Prep Method: SW5030B

Date Prep: 02.20.2020

MSD Sample Id: 652387-019 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	0.0558	56	0.0617	61	70-130	10	35	mg/kg	02.20.2020 07:48	X
Toluene	<0.00200	0.0998	0.0580	58	0.0651	64	70-130	12	35	mg/kg	02.20.2020 07:48	X
Ethylbenzene	<0.00200	0.0998	0.0693	69	0.0758	75	70-130	9	35	mg/kg	02.20.2020 07:48	X
m,p-Xylenes	<0.00399	0.200	0.0577	29	0.0672	33	70-130	15	35	mg/kg	02.20.2020 07:48	X
o-Xylene	<0.00200	0.0998	0.0667	67	0.0711	70	70-130	6	35	mg/kg	02.20.2020 07:48	X

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	96		99		70-130	%	02.20.2020 07:48
4-Bromofluorobenzene	88		87		70-130	%	02.20.2020 07:48

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: 653163

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) 565-3443 Lubbock, TX (806) 794-1296
Phoenix, AZ (602) 392-7550 Atlanta, GA (770) 449-3800 Tampa, FL (813) 291-1111
Hobbs, NM (575) 392-7550

Page 1 of 1
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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	3104 East Green Street
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	khenny@ltenv.com, dmoir@ltenv.com

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

Project Name:		EMSU SWID Injection										Turn Around	
Project Number:		012919272										Routine ☐	
P.O. Number:												Rush: 24h	
Sampler's Name:		Kaleb Henry										Due Date:	
SAMPLE RECEIPT		Temp Blank:		Yes ☒ No ☐		Wet Ice:		Yes ☒ No ☐					
Temperature (°C):		3.2				Thermometer ID							
Received Intact:		Yes ☒ No ☐											
Cooler Custody Seals:		Yes ☒ No ☐				Correction Factor:							
Sample Custody Seals:		Yes ☒ No ☐				Total Containers:							
Number of Containers												Work Order Notes	
PA 8015)													
PA 0=8021)													
(EPA 300.0)													
												TAT starts the day received by the lab, if received by 4:30pm	

[illegible]

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 SiO ₂ 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 Xencro, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xencro 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 Xencro. A minimum charge of \$76.00 will be applied to each project and a charge of \$5 for each sample submitted to Xencro, 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>	2/20/20 1458			2/20/2020 1458

Analytical Report 657197

for
LT Environmental, Inc.

Project Manager: Dan Moir

EMSU SWD Injection

012919272

30-MAR-20

Collected By: Client



**1211 W. Florida Ave
Midland TX 79701**

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)



30-MAR-20

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

Reference: XENCO Report No(s): **657197**
EMSU SWD Injection
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) 657197. 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. 657197 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 Manager

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 657197

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SW63	S	03-27-20 12:35	1 - 5	657197-001



CASE NARRATIVE

Client Name: LT Environmental, Inc.

Project Name: EMSU SWD Injection

Project ID: 012919272
Work Order Number(s): 657197

Report Date: 30-MAR-20
Date Received: 03/27/2020

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None



Certificate of Analysis Summary 657197

LT Environmental, Inc., Arvada, CO

Project Name: EMSU SWD Injection

Project Id: 012919272

Contact: Dan Moir

Project Location:

Date Received in Lab: Fri Mar-27-20 04:30 pm

Report Date: 30-MAR-20

Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	657197-001					
	Field Id:	SW63					
	Depth:	1-5					
	Matrix:	SOIL					
	Sampled:	Mar-27-20 12:35					
TPH by SW8015 Mod	Extracted:	Mar-28-20 11:00					
	Analyzed:	Mar-29-20 04:35					
	Units/RL:	mg/kg RL					
Gasoline Range Hydrocarbons (GRO)		<49.8 49.8					
Diesel Range Organics (DRO)		<49.8 49.8					
Motor Oil Range Hydrocarbons (MRO)		<49.8 49.8					
Total GRO-DRO		<49.8 49.8					
Total TPH		<49.8 49.8					

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.

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Version: 1.0%

Jessica Kramer
Project Manager



Certificate of Analytical Results 657197

LT Environmental, Inc., Arvada, CO

EMSU SWD Injection

Sample Id: **SW63**
 Lab Sample Id: 657197-001

Matrix: Soil
 Date Collected: 03.27.20 12.35

Date Received: 03.27.20 16.30
 Sample Depth: 1 - 5

Analytical Method: TPH by SW8015 Mod

Tech: DVM

Analyst: ARM

Seq Number: 3121308

Date Prep: 03.28.20 11.00

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	03.29.20 04.35	U	1
Diesel Range Organics (DRO)	C10C28DRO	<49.8	49.8	mg/kg	03.29.20 04.35	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	03.29.20 04.35	U	1
Total GRO-DRO	PHC628	<49.8	49.8	mg/kg	03.29.20 04.35	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	03.29.20 04.35	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1-Chlorooctane	111-85-3	95	%	70-135	03.29.20 04.35		
o-Terphenyl	84-15-1	104	%	70-135	03.29.20 04.35		



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.

EMSU SWD Injection

Analytical Method: TPH by SW8015 Mod

Seq Number: 3121308

MB Sample Id: 7699993-1-BLK

Matrix: Solid

LCS Sample Id: 7699993-1-BKS

Prep Method: SW8015P

Date Prep: 03.28.20

LCSD Sample Id: 7699993-1-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	1100	110	1090	109	70-135	1	20	mg/kg	03.28.20 22:20	
Diesel Range Organics (DRO)	<50.0	1000	1190	119	1180	118	70-135	1	20	mg/kg	03.28.20 22:20	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	101		115		110		70-135	%	03.28.20 22:20
o-Terphenyl	116		114		121		70-135	%	03.28.20 22:20

Analytical Method: TPH by SW8015 Mod

Seq Number: 3121308

Matrix: Solid

MB Sample Id: 7699993-1-BLK

Prep Method: SW8015P

Date Prep: 03.28.20

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	03.28.20 21:59	

Analytical Method: TPH by SW8015 Mod

Seq Number: 3121308

Matrix: Soil

Parent Sample Id: 656937-101

MS Sample Id: 656937-101 S

Prep Method: SW8015P

Date Prep: 03.28.20

MSD Sample Id: 656937-101 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	1050	105	1060	106	70-135	1	20	mg/kg	03.28.20 23:23	
Diesel Range Organics (DRO)	<49.9	997	1180	118	1240	124	70-135	5	20	mg/kg	03.28.20 23:23	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	98		99		70-135	%	03.28.20 23:23
o-Terphenyl	109		98		70-135	%	03.28.20 23:23

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. = $\text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

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

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)

Work Order No:

157147

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Project Manager:	Dan Moir	Bill to: (if different)	Kyle Littlell
Company Name:	LT Environmental, Inc., Permian office	Company Name:	XTO Energy
Address:	3300 North A Street	Address:	3104 East Green Street
City, State ZIP:	Midland, TX 79705	City, State ZIP:	Carlsbad, NM 88220
Phone:	(432) 236-3849	Email:	khenry@ltenv.com, dmoir@ltenv.com

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

Project Name:	EMSU SWD Injection	Turn Around											Work Order Notes		
Project Number:	012919272	Routine											TAT starts the day received by the lab, if received by 4:30pm		
P.O. Number:		Rush: 24h													
Sampler's Name:	Kaleb Henry	Due Date:													
SAMPLE RECEIPT			Temp Blank:	Yes	No	Wet Ice:	Yes	No							
Temperature (°C):	6.5/10.0	Thermometer ID:											Sample Comments		
Received Intact:	Yes	No													
Cooler Custody Seals:	Yes	No	N/A	Correction Factor:	FC5										
Sample Custody Seals:	Yes	No	N/A	Total Containers:											
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers										
SW43	S	3/21/20	1235	1-5	2	X	TPH (EPA 8015)	BTEX (EPA 0-8021)	Chloride (EPA 300.0)						
															Composite

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		TCCLP / SPLP 6010: 8RCRA		Sb		As	Ba	Be	B	Cd	Ca	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
1	2	3/21/2020	2		
3	4	1/23/20	4		
5	6		6		