

1RP-4789
DELINEATION REPORT
EMSU B Produced Water Release
Lea County, New Mexico

Latitude: N32° 34' 03.40"
Longitude: W103° 19' 13.08"

LAI Project No. 17-0176-01

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1.0 EXECUTIVE SUMMARY

This delineation report is submitted to the State of New Mexico Oil Conservation Division (OCD) on behalf of XTO Energy, Inc. (XTO) for a produced water release from a 10 inch cement lined steel line associated with the Eunice Monument South Unit (EMSU) B (Site) in Unit P (SE/4, SE/4), Section 14, Township 20 South, Range 36 East, in Lea County, New Mexico. The release of produced water was verbally reported to the OCD on June 9, 2017 and July 27, 2017. The initial C-141 was submitted to OCD District 1, on August 11, 2017. The C-141 reported that approximately 11,689 barrels (bbl) of produced water had been recovered but an accurate volume of the release was not known. XTO stated on the C-141 that XTO and Larson & Associates, Inc. (LAI) would determine the volume of the release in conjunction with the delineation. The OCD assigned the release remediation permit number 1RP-4789.

Between August 28, 2017 and September 1, 2017, LAI personnel qualitatively assessed the release by conducting electromagnetic (EM) terrain conductivity surveys. The EM surveys were performed with EM-31 and EM-34 conductivity meters over an area measuring about 24.1 acres and concluded that produced water had migrated horizontally about 450 feet east from the origin. The EM surveys also concluded that produced water had not migrated vertically into the Dockum Group (Triassic) between approximately 33 and 52 feet below ground surface (bgs).

Between October 6, 2017 and December 4, 2017, LAI personnel supervised collection of soil samples, installation of thirty-one (31) shallow borings (SB-1 through SB-31) completed as temporary piezometers and six (6) monitoring wells (MW-1 through MW-6). A layer of semi-permeable sandy clay underlies the Site between about 7 and 10 feet below ground surface (bgs). The thickness of the sandy clay unit was not determined since shallow borings terminated near the top of the unit. Produced water is present above the sandy clay unit with observed thickness from only a few inches to about 4.86 feet near the east central area of the release. The monitoring wells except MW-3 were drilled west (MW-1), north (MW-2), south (MW-4) and east (MW-5 and MW-6) of the Site. The monitoring wells penetrate the Blackwater Draw and Ogallala formations and terminate near at the underlying Triassic-age Dockum Group encountered between about 33 feet bgs at MW-1 (west) and 52 feet bgs at MW-5 (east). The Dockum Group is composed of claystone (shale), siltstone and sandstone with a collective thickness of about 300 feet thick. Groundwater was not observed during drilling or following monitoring well completion. Produced water was observed in well MW-5 about three (3) weeks following well completion and in monitoring well MW-6 about 4 days following well completion. The produced water thickness is approximately 13.28 feet and 6.48 feet in wells MW-5 and MW-6, respectively. A comparison of the laboratory analysis from the produced water to water samples collected from the piezometers and monitoring wells MW-5 and MW-6 concludes the water is chemically compatible to the produced water release from the pipe. The presence of produced water in the Ogallala sediments confirms that the sandy clay unit is semi permeable. Produced water above the sandy clay unit follows the slope of the

sandy clay unit to the east from the release. Produced water in the Ogallala formation flows southeast along the dip line and contact of the Dockum Group.

An estimate of the volume of the release was calculated based on the observed thickness of produced water in the piezometers on November 4, 2017 and assumptions concerning the porosity of the unconsolidated sand above the sandy clay unit. The estimated volume of the release is approximately 46,159 bbl. This volume coupled with the volume of produce water recovered (11,689 bbl) yields a total of approximately 57,848 bbl.

XTO proposes to install a recovery trench above the sandy clay unit beginning near the origin of the release and extending east about 450 feet. A 5-inch schedule 40 PVC continuously slotted screen or equivalent will be placed near the base of the trench to be excavated between approximately 8 feet bgs near the west end and 13 feet bgs near the east end. The screen will be surrounded with sand or gravel compatible with the screen openings and extend to about four (4) feet bgs. The sand will be covered with geotextile fabric to prevent fine material from filtering into the screen. A vertical PVC riser (cleanout) will connect to the west end of the PVC collection lateral. The east end of the PVC collection lateral will connect to a 24 inch diameter vertical sump where a submersible pump or equivalent will be installed for recovering produced water. Four (4) vertical recovery wells will be installed in a west to east through the release area beginning near the point of release and ending near the lease road in the vicinity of piezometer SB-20. The recovery wells will be completed with 4 inch schedule 40 threaded PVC and about 20 feet of factory slotted screen that will be positioned in the Ogallala formation above the Dockum Group. Produced water will be recovered with electric submersible pumps to recover produced water. XTO will continue to delineate the extent of produced water in the Ogallala formation southeast of MW-6. XTO will record the volume of produced water recovered and report to the OCD in an annual report.

2.0 INTRODUCTION

This delineation report is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of XTO Energy, Inc. (XTO) for a produced water release from a ten (10) inch cement-lined steel line associated with the Eunice Monument South Unit (EMSU) B (Site) in Lea County, New Mexico. The release occurred in Unit P (SE/4, SE/4), Section 14, Township 20 South and Range 36 East in Lea County, New Mexico. The Site is located approximately 500 feet southeast of EMSU B Well No. 890 (API 30-025-04266). The geodetic position is North 32° 34' 03.40" and West 103° 19' 13.08". Figure 1 presents a location and topographic map.

2.1 Background

On June 9 and July 27, 2017¹, XTO verbally reported the release to OCD District 1 in Hobbs, New Mexico. The release was caused by internal corrosion in the bottom of the 10 inch cement-lined steel line. The release was discovered by the lease operator on June 9, 2017. XTO personnel shut-in the wells, isolated the line and replaced the line segment. Vacuum trucks were dispatched to recover water that had accumulated on the surface and in the excavation where the line was replaced. A total of 11,689 barrels (bbl) of water was recovered from the surface and the excavation. The water recovered from the surface was believed to be produced water while the water recovered from the excavation was believed to be a mixture of both produced and fresh water. XTO estimated the affected area at 227,205 square feet (405 feet by 561 feet) or about 5.21 acres. On August 10, 2017, LAI personnel used a Trimble sub-meter hand held global position system (GPS) receiver to map the area of distressed vegetation and calculated the affected area at about 121,628 square feet or approximately 2.79 acres. On August 11, 2017, XTO submitted the initial C-141 and stated LAI would perform an initial evaluation and electromagnetic (EM) terrain conductivity surveys to assess the release and update the estimated loss volume. OCD assigned the release remediation permit number 1RP-4789. Figure 2 presents an aerial map showing the estimated affected area. Appendix A presents the initial C-141.

2.2 Physical Setting

The physical setting is as follows:

- Elevation is approximately 3,765 feet above mean sea level (amsl);
- Topography slopes gently toward the east;
- The nearest surface water feature is a seasonal playa located about 1,200 feet southwest of the Site;
- There is no direct connection with the Site to the seasonal playa;
- The soils are designated "Kermit soils and dune land, 0 to 12 percent slopes" and "Kermit-

¹XTO's form C-141, submitted on August 11, 2017, specifies that verbal notifications of the release were made by XTO on June 9 and June 28th. The June 28th date is incorrect. The verbal notifications were made on June 9 and July 27th.

Palomas fine sands, 0 to 12 percent slopes". The soils originated from calcareous sandy eolian deposits derived from reworking the underlying Pliocene-age Blackwater Draw and Ogallala formation formations, in descending order;

- The soils consist of a surface layer of fine sand about 8 inches thick underlain by fine sand to about 60 inches or about 5 feet and developed over cemented material (caliche);
- The description matches the soil observed at the Site;
- The upper geological unit is the Tertiary-age Blackwater Draw and Ogallala formations, in descending order, comprised of very fine to medium-grained quartz sand and gravel, with minor amount of silt and clay with indistinct to massive crossbeds;
- The Ogallala formation is underlain by clay, silty clay, shale and sandstone of the Chinle formation (Triassic) and is about 300 feet thick;
- The Chinle formation occurs at depths between about 75 and 100 feet below ground surface (bgs);
- The nearest water well is located about 2,000 feet northeast (hydraulically up gradient) in Unit I (NE/4, SE/4), Section 14, Township 20 South, Range 36 East;
- The well is inactive and had a reported depth to groundwater of approximately 30 feet bgs in 1981;
- The well was observed during a reconnaissance visit on September 6, 2017;
- Groundwater was not observed in monitoring wells drilled to the Triassic-age Dockum Group (shale) between encounter between approximately 33 feet bgs (MW-1) and 52 feet bgs (MW-5);
- The regional groundwater flow direction is east to southeast.

2.3 Remediation Action Levels

Remediation action levels (RRAL) were calculated for benzene, BTEX and TPH based on the following criteria established by the OCD in "Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993":

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

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

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

Depth to groundwater greater than 100 feet bgs requires delineation for chloride to 600 milligrams per kilogram and maintained a minimum of 5 feet farther in depth.

3.0 RELEASE DELINEATION

A delineation plan was submitted to the OCD District 1 on August 22, 2017 and approved on August 25, 2017. An interim delineation report (“1RP-4789, Interim Release Delineation Report, EMSU B Produced Water Spill”) was submitted to the OCD on September 26, 2017, following completion of electromagnetic (EM) surveys and proposed additional delineation activities including collection of soil sample and analysis and installation of monitoring wells. Appendix B presents OCD approval for the delineation plan.

3.1 EM Terrain Conductivity Surveys

Between August 28 and September 1, 2017, LAI personnel conducted electromagnetic (EM) terrain conductivity surveys using EM-31 and EM-34 instruments manufactured by Geonics Ltd., Mississauga, Ontario, Canada. Subsurface Interference was observed at the background location about 275 feet northwest of the Site during an initial EM survey on August 10, 2017; therefore a new background station was established about 125 feet west of the southwest corner of the surveyed area. The background EM values are compared to the surveyed EM values to establish areas of elevated terrain conductivity in response to elevated chloride in soil and groundwater. The EM method measures the electrical properties of soil and rock, which is influenced by the total dissolved solids (TDS) concentration of formation pore water and groundwater. The EM method utilizes current flow induced into the subsurface by a surface transmitter. The current generates an alternating magnetic field which creates a secondary magnetic field that is sensed by a receiver coil. The depth of exploration is determined by the spatial separation between the transmitter and receiver coils and the orientation of the coils (i.e., horizontal (HD) or vertical dipole (VD)). The EM-31 has maximum depth of exploration capabilities from 0 to about 9.8 feet bgs in the HD mode and 0 to 19.7 feet bgs in the VD mode. The EM-31 HD and VD readings from the Site represent conductivity values in unsaturated soil except near the release point where groundwater may be mounded. The EM-34 has maximum depth of exploration capabilities of 0 to 24.6 feet bgs (HD) and 0 to 49.2 feet bgs (VD) with the 10-meter coil separation and 0 to 49.2 feet (HD) and 0 to 98.4 feet (VD) with the 20-meter coil spacing. The maximum response of the EM-34 in the HD mode occurs near the surface and decreases with depth. The maximum response of the EM-34 in the VD mode occurs at a depth equal to approximately 75 percent of the exploration depth or about 36.9 and 73.8 feet bgs in the 10 and 20 meter coil separations, respectively.

EM measurements were collected over an area measuring approximately 700 x 1,500 feet or about 1,050,000 square feet or about 24.1 acres. The EM measurement stations were spaced about 100 feet apart and locations documented with the Trimble handheld GPS receiver. Conductivity measurements were collected with the EM-31 (HD and VD) and EM-34 10 meter and 20 meter (HD and VD). Figure 3 presents the EM measurement stations. Table 1 presents a summary of the EM-31 conductivity readings. Table 2 presents a summary of the EM-34 conductivity readings.

The EM-31HD, 0 to 9.8 feet bgs, background reading was 10.2 millimhos per meter (mmhos/m) which is equivalent to millisiemens per meter (mS/m). An area of EM-31HD readings between about 4 (40 mmhos/m) to greater than 9 times background (>100 mmhos/m) was observed in the area of the

release and extends to about 400 feet east of the release in the apparent groundwater flow direction. The area of elevated EM-31HD readings decreases to background or less about 450 feet east of the point of release. The area of EM-31HD readings, between about 2 and 9 times background, correlates well with the area of distressed vegetation mapped on August 10, 2017 and concludes the release has migrated less than about 500 feet from the point of release. EM-31HD readings greater than seven (7) times background were observed about 1,200 feet east of the point of release and appears to corresponds with a surface impact not associated with the release. An anomaly of EM-31HD readings greater than twice background was observed north and east of the EMSU "B" Well #890 and may be associated with an old spill. Figure 4 presents the EM-31HD conductivity map.

The EM-31VD, 0 to 19.7 feet bgs, background reading was 29.05 mmhos/m. The maximum EM-31VD reading (155.4 mmhos/m) occurs in the immediate vicinity of the release. EM-31VD readings between about 3 (80 mmhos/m) and 4 (120 mmhos) times background extend from the point of release to about 400 feet east of the point of release and concludes the release has migrated less than about 500 feet from the point of release. The area of elevated EM-31HD readings, between about 2 and 5 times background, correlates with the area of distressed vegetation mapped on August 10, 2017. Anomalies of EM-31VD readings greater than twice background were observed north and east of EMSU "B" Well #890. The anomalies do not appear to be associated with Well #890. Figure 5 presents the EM-31VD conductivity map.

The EM-34 10m HD, 0 to 24.6 feet bgs, background reading was 20.9 mmhos/m. An area of elevated EM-34 10m HD readings about 4 times background (80 mmhos/m) extends from the point of release to 400 feet east of the point of release and suggest lateral dispersion of the release. The area of elevated EM-34 10m HD readings, between about 2 and 4 times background, correlates with the area of distressed vegetation mapped on August 10, 2017. However, the EM-34 10m HD readings conclude the release has not migrated over about 500 feet east of the point of release. An area of EM-34 10m HD readings greater than 2 times background was observed about 800 feet east of the point of release and is not associated with the release. Figure 6 presents the EM-34 10m HD conductivity map.

The EM-34 10m VD, 0 to 49.2 feet bgs, background reading was 31.4 mmhos/m. Several small anomalies of EM-34 10m VD readings greater than 3 times background (>100 mmhos/m) were observed. The EM-34 10m VD readings represent conductivity values from the upper part of the Triassic-age Dockum Group consisting mainly of shale and sandstone. The EM-34 10m VD about two times background extends from the point of release to about 400 feet east of the point of release and concludes the release is confined to unconsolidated sediments overlying the Dockum Group. Figure 7 presents the EM-34 10m VD conductivity map.

The EM-34 20m HD, 0 to 49.2 feet bgs, background reading was 40.4 mmhos/m. An area of EM-34 20m HD readings greater two times background or about 80 mmhos/m extends to about 100 feet east of the point of release. The EM-34 20m HD readings represent conductivity values near the base of the

unconsolidated sediments or near the top Dockum Group. The EM-34 20m HD readings greater than about 1.5 times background extend about 200 feet west from the point of release to about 450 feet east of the point of release. The EM-34 20m HD survey concludes the release has migrated east less than about 500 feet from the point of release. An anomaly of EM-34 20m HD readings greater from about 1.5 times background or about 60 mmhos/m to greater than 2.5 times background or about 100 mmhos/m was observed about 950 feet east of the Site and is does not appear to be associated with the release. Figure 8 presents the EM-34 20m HD conductivity map.

The EM-34 20m VD, 0 to 98.4 feet bgs, background reading was 49.1 mmhos/m. The EM-34 20m VD readings are in the Dockum Group (Triassic) consisting mainly of shale and sandstone. Several small anomalies with EM-34 20m VD reading ranging from about 1.5 (75 mmhos/m) to greater than 2 times background (>100 mmhos/m) were observed at various locations and do not appear to be associated with the release. Figure 9 presents the EM-34 20m VD conductivity map.

The results of the EM-31 HD/VD and EM-34 10m HD/VD and 20m HD/VD surveys qualitatively conclude the release has migrated east from the point of release about 450 feet in the apparent groundwater flow direction.

3.2 Soil Samples

Discrete soil samples were collected at approximately 2 and 4 feet bgs from the north, south, east and west sidewalls of the excavation made to repair the 10 inch pipe. Composite (5 spot) soil samples were collected from two (2) soil piles on the west and east side of the excavation. A soil sample was collected at 0 to 0.5 feet bgs from an area of hydrocarbons stained soil (S-1) about 100 feet northeast of the excavation. The samples were collected in laboratory containers and delivered under preservation and chain of custody to Permian Basin Environmental Lab in Midland, Texas. The laboratory analyzed the samples for benzene, toluene, ethylbenzene and xylene (BTEX) and total petroleum hydrocarbons (TPH), including gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) by EPA SW-846 Methods 8021B and 8015M, respectively. All soil samples were analyzed for chloride by EPA Method 300. Table 1 presents the laboratory analytical data summary. Appendix C presents the laboratory report.

BTEX was below the reporting limits (RL) and RRAL in all samples. TPH was below RL in all samples except S-1 which reported 2,925 milligrams per kilogram (mg/Kg) and east soil pile (composite) which reported 30.0 mg/Kg. The TPH in samples S-1 and east soil pile is below the RRAL of 5,000 mg/Kg. Chloride was less than the delineation limit (600 mg/Kg) except the east soil pile (composite) which reported 1,080 mg/Kg.

3.3 Soil Borings and Monitoring Wells

Between October 16, 2017 and December 4, 2017, thirty-one (31) soil borings (SB-1 through SB-31) and six (6) monitoring wells (MW-1 through MW-6) were installed at the Site for collecting soil samples, assessing the thickness and distribution of produced water and occurrence of groundwater.

Scarborough Drilling, Inc. (SDI), Lamesa, Texas, drilled twenty-two (22) borings SB-1 through SB-22 and the monitoring wells with an air rotary rig and used a jam tube sampler for collecting soil samples. LAI used direct push technology (DPT) and a stainless steel core barrel to collect soil samples from SB-23 through SB-31. Sandy clay was observed at all locations between about 7 and 10 feet bgs. The elevation of the sandy clay unit occurs between approximately 3,556.55 feet above mean sea level (MSL) at SB-1, located near the west side of the Site to about 3,550.24 feet AMSL at SB-15 located near the east side of the Site. The sandy clay unit slopes to the east. Figure 10 presents the soil boring locations and contour map for the sandy clay unit.

Produced water was observed above the sandy clay unit at all but the following locations: SB-17, SB-18, SB-19, SB-23, SB-24, SB-25, and SB-28 through SB-31. The borings terminated near the top of the sandy clay unit and were completed as shallow piezometers with threaded 1 and 2 inch diameter schedule 40 PVC casing and about 5 feet of factory slotted screen depending on location for assessing produced water thickness. Soil sampling terminated when produced water was encountered. The produced water column thickness varies with the greatest accumulation occurring at SB-15 (4.86 feet) near the east of the Site. The thickness of the produced water over the sandy clay unit is decreasing concluding that the sandy clay unit is semi-permeable. Movement of the produced water over the sandy clay unit is to the east at approximately 0.006 feet per foot and consistent with the slope of the sandy clay unit. Figure 11 shows the distribution and thickness of produced water on the sandy clay. Figure 12 presents a flow map for produced water on the sandy clay unit.

Scarborough installed six (6) monitoring wells west (MW-1), north (MW-2), south (MW-4) and east (MW-5 and MW-6) of the release. Monitoring well MW-3 was drilled to the top of the sandy clay unit near the center of the release and completed as a shallow piezometer. The monitoring wells, except MW-3, were drilled to the top of the Triassic-age Dockum Group between about 33 feet bgs (MW-1) and 52 feet bgs (MW-5). The elevation of the Dockum Group ranges from about 3,531.20 feet AMSL at MW-1 to about 3,508.30 feet AMSL at MW-5. The slope of the surface of the Dockum surface is from northwest to southeast at about 0.04 feet per foot. The Dockum Group is represented by the Chinle formation composed of mudstone, siltstone and sandstone with a collective thickness of about 300 feet. The monitoring wells were completed with threaded 2 inch schedule 40 PVC casing and about 20 feet of 0.01 inch factory slotted screen positioned near the contact with of the Chinle formation, as approved by Mr. Brad Billings with OCD (verbal communication). Geologic logs were prepared based on the Unified Soil Classification System (USCS). Drill cuttings will be placed on the ground adjacent to the borings. The piezometers and monitoring wells were surveyed by West Companies, Midland, Texas, for location and elevation. Groundwater was not observed in monitoring MW-1, MW-2 and MW-4. Produced water was observed in well MW-5 at about 40.72 feet bgs, on November 27, 2017. The produced water thickness in MW-5 is about 13.28 feet. Monitoring wells MW-6 was drilled on December 4, 2017. Produced water was observed at 46.52 feet bgs on December 8, 2017. The produced water thickness in MW-6 is about

6.48 feet. The produced water appears to be flowing to the southeast consistent with the dip of the Dockum Group. Figure 13 present a structure contour map for the Dockum Group.

Soil samples were collected in laboratory containers and delivered under preservation and chain of custody to Permian Basin Environmental Lab in Midland, Texas. The upper samples (0 to 1 feet) were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) and total petroleum hydrocarbons (TPH), including gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) by EPA SW-846 Methods 8021B and 8015M, respectively. All soil samples were analyzed for chloride by EPA Method 300. Table 2 presents the analytical laboratory data summary. Table 3 presents the piezometer and monitoring well completion and gauging summary details. Figure 10 presents the piezometer and monitoring well locations. Appendix C presents the laboratory reports. Appendix D presents the boring logs and completion diagrams. Appendix E presents photographs.

Referring to Table 2, BTEX and TPH were below the analytical method reporting limits and RRAL. Chloride was below the OCD delineation limit (600 mg/Kg) in all samples except MW-5 from 20 to 21 feet (719 mg/Kg). Chloride decreased below the delineation limit in the samples between 25 and 40 feet bgs.

3.4 Produced Water Samples

On October 23, 2017, in conjunction with collecting produced water samples from the piezometer, LAI personnel collected a sample of produced water, similar to that released from the pipeline, at the EMSU B water station located south of the Site. The produced water samples were collected from the piezometers with dedicated poly ethylene bailers and carefully poured into sample containers. LAI personnel collected produced water samples from piezometers SB-26 and SB-26 (November 27, 2017), and monitoring wells MW-5 (November 30, 2017) and MW-6 (December December 8, 2017). The samples were delivered under chain of custody and preservation to DHL Analytical, in Round Rock, Texas. The laboratory analyzed the samples for BTEX, anions (alkalinity, chloride and sulfate), cations (calcium, magnesium, sodium and potassium) and total dissolved solids (TDS). Table 4 presents the BTEX analytical data summary. Table 5 presents the cation, anion and TDS analytical data summary. Appendix C presents the laboratory reports.

Benzene ranged from not detected at the analytical method RL to 0.0470 micrograms per liter (µg/L) in MW-3 located near the center of the produced water release. Benzene was 0.207 µg/L in the produced water sample collected at the water station.

The maximum chloride concentration was 8,220 milligrams per liter (mg/L) in sample SB-16 located near north central area of the release. Chloride was 10,600 mg/L in the in the sample from the water station. The maximum TDS value was 19,300 mg/L in sample S-1 located west of the release. TDS was 20,000 mg/L in the sample from the water station. Produced water samples collected from the shallow piezometers and monitoring wells MW-5 and MW-6 is consistent with the produced water sample collected from the pipeline. The distribution of produced water closely matches the results of the EM

surveys. Figure 14 presents an isopleth map for chloride in produced water. Figure 15 presents an isopleths map for TDS in produced water.

3.5 *Estimated Volume Released*

The initial C-141 stated that 11,689 bbl of produced water was recovered from the excavation where the pipe was repaired. An estimate of the volume released was calculated based on thickness measurements from piezometers on November 4, 2017 and the following:

- Estimated porosity (void spaces) of the unconsolidated sand (0.65);
- Estimated thickness of produced water (based on field measurements); Estimated area of produced water thickness (based on contours); and
- Calculated volume in cubic feet.

The estimated volume of the release is 46,159 barrels (bbl) based on distribution and thickness of produced water over the sandy clay unit from November 4, 2017. This volume coupled with the recovered volume (11,689 bbl) yields approximately 57,848 bbl. Appendix F presents the calculations.

4.0 REMEDIATION PLAN

XTO proposes to initiate remediation for recovery of produced water above the sandy clay by installing a collection lateral through the area shown on Figure 16. The collection lateral will be constructed with 5 inch schedule 40 PCV 0.020 inch factory slotted screen or equivalent. The collection lateral will be installed in a trench estimated to be approximately 450 feet in length. The collection lateral will extend from the east side of the excavation near point of the release and terminate near piezometer SB-20. The collection lateral will be buried at a depth of about 8 feet bgs near the west end and about 13 feet bgs near the east end. A vertical PVC riser (cleanout) will be installed at the west end of the collection lateral. The east end of the collection lateral will connect to a 24 inch diameter vertical sump buried to a depth of about 18 feet bgs. An appropriately sized electrical submersible pump or equivalent will be installed near the bottom of the sump for recovering produced water. A poly flow line or equivalent will connect the pump to onsite collection tanks that be plumbed to the water station or off loaded into trucks for disposal in a OCD permitted Class II salt water disposal (SWD) well. The tanks will be equipped with level controls to prevent over topping and provide automatic shut down of the pump. Figure 16 shows the approximate location for the collection lateral

Four (4) recovery wells will be installed in a west to east line through the release area for recovering produced water from the underlying Ogallala formation and provide hydraulic control to reduce down gradient migration of produced water. The recovery wells will be constructed with 4 inch schedule 40 threaded PVC and about 20 feet of 0.02 inch factor slotted screen. A boring approximately 8.5 inches in diameter will be drilled to the top of the Dockum Group shale at about 52 feet bgs. The well screen will be positioned near the contact with the Dockum Group and surrounded

with graded silica sand to about 2 feet above the screens. Bentonite chips will be placed above the sand and extend to about 2 feet bgs. The wells will be equipped with appropriately sized electrical submersible pumps or equivalent for recovering produced water. A poly flow line or equivalent will connect the pumps to onsite collection tanks that be plumbed to the water station or off loaded into trucks for disposal in a OCD permitted Class II salt water disposal (SWD) well. The tanks will be equipped with level controls to prevent over topping and provide automatic shut down of the pumps. Figure 16 shows the approximate location for the recovery wells.

XTO will record the volume of produced water recovered and report to the OCD in an annual report. XTO will continue to delineate the extent of produced water in the Ogallala formation above the Dockum Group down gradient of MW-6.

TABLES

Table 1

Summary of EM-31 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release

September 1, 2017

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Station	HD (N-S) (mmhos/m)	HD (E-W) (mmhos/m)	HD (Avg) (mmhos/m)	VD (N-S) (mmhos/m)	VD (E-W) (mmhos/m)	VD (Avg) (mmhos/m)
Bkgrd	10.7	9.7	10.2	27.7	30.4	29.05
0-0	-4.5	-3.7		27.9	34	30.95
100-0	15.4	13.7	14.5	27.7	23.3	25.5
200-0	-3.4	6.5		31.7	30.4	31.05
300-0	16.8	15	15.9	60.5	49.6	55.05
400-0	2.8	8.6	5.7	31.3	31.1	31.2
500-0	13.5	14	13.75	24.6	25.2	24.9
600-0	11.9	14.2	13.05	30.7	29.8	30.25
700-0	0	10.8		47.7	39.3	43.5
800-0	9.4	12.7	11.05	28.8	29.3	29.05
900-0	17.6	19.5	18.55	40.6	47.7	44.15
1000-0	18.8	33.6	26.2	50.6	66.5	58.55
1100-0	21.5	26.4	23.95	63.9	64.1	64
1200-0	21	23.1	22.05	44.8	45.4	45.1
1300-0	13.4	19.5	16.45	55.2	54.4	54.8
1400-0	10.6	15	12.8	50.8	54.1	52.45
1500-0	19.2	18.9	19.05	32.8	33.5	33.15
1500-100	18	22.1	20.05	34.3	35.8	35.05
1400-100	16.9	18.3	17.6	54.6	60.7	57.65
1300-100	11.5	20.7	16.1	50.4	62	56.2
1200-100	10.3	17.1	13.7	47.6	48.9	48.25
1100-100	4.7	3.3	4	46.5	59	52.75
1000-100	-7.7	8.8		69.4	45.3	57.35
900-100	-6.2	9.3		64.7	60.5	62.6
800-100	13.5	18	15.75	45.3	47.1	46.2
700-100	4.5	11.2	7.85	2.6	77.9	40.25
600-100	6.6	-17		60	87.5	73.75
500-100	10.2	15.8	13	27.2	32.8	30
400-100	5.1	8.8	6.95	27.3	29.6	28.45
300-100	12	9.5	10.75	33	36	34.5
200-100	6.8	4.9	5.85	16.4	17.5	16.95
100-100	-24.3	-2.1		32	20.5	26.25
0-100	-18.5	3.6		48.7	24.6	36.65
0-200	-13.3	5.5		50.4	30.4	40.4
100-200	2.6	7.6	5.1	28.1	27.9	28
200-200	19.4	54.6	37	12.5	34.1	23.3
300-200	47	24.2	35.6	12.8	76.2	44.5
400-200	34.5	33.4	33.95	62.5	62.3	62.4
500-200	66.5	50.8	58.65	103.3	101.8	102.55
600-200	38.4	36.6	37.5	66.8	73.7	70.25

Table 1

Summary of EM-31 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release

Station	HD (N-S) (mmhos/m)	HD (E-W) (mmhos/m)	HD (Avg) (mmhos/m)	VD (N-S) (mmhos/m)	VD (E-W) (mmhos/m)	VD (Avg) (mmhos/m)
700-200	-18.6	-4.8		51.7	45.5	48.6
800-200	16.6	14.7	15.65	29.7	29	29.35
900-200	19.1	16.2	17.65	33.3	32.9	33.1
1000-200	11.6	8.5	10.05	34.3	39.8	37.05
1100-200	13.2	14.8	14	22.2	30.4	26.3
1200-200	9.3	12.4	10.85	36.6	37.1	36.85
1300-200	13.2	17.7	15.45	37	40.9	38.95
1400-200	15.8	19.8	17.8	39.3	54.9	47.1
1500-200	22.2	21	21.6	38.3	38.9	38.6
1500-300	24.5	22.1	23.3	46.3	55.6	50.95
1400-300	20.3	-16		55.4	77.7	66.55
1300-300	-4.5	3.1		54	56.5	55.25
1200-300	-11.6	-11.1		46.7	48	47.35
1100-300	-5.5	-8.1		43.9	43.1	43.5
1000-300	3.3	1.2	2.25	35.3	38.8	37.05
900-300	12	11.2	11.6	26	29.3	27.65
800-300	11.3	6.5	8.9	33.3	50.3	41.8
700-300	40.6	17.2	28.9	95.1	118.4	106.75
600-300	43.4	44.9	44.15	85.4	86.3	85.85
500-300	42.8	42.7	42.75	74.5	70.1	72.3
400-300	67.7	64.1	65.9	121.4	136.6	129
300-300	58.8	57	57.9	129.5	135.3	132.4
200-300	24.8	25.5	25.15	51	56.5	53.75
100-300	11.6	12.6	12.1	22.8	22.5	22.65
0-300	9.2	8.7	8.95	20	29.1	24.55
0-400	9.6	9.8	9.7	15.8	17.3	16.55
100-400	25.2	19.6	22.4	43.7	39.3	41.5
200-400	35.5	36.7	36.1	76.6	78.2	77.4
300-400	72	69.7	70.85	152.2	158.6	155.4
400-400	73.9	78.5	76.2	145.8	149.5	147.65
500-400	100.3	103.2	101.75	148.5	151.5	150
600-400	59.7	39.6	49.65	118.5	121	119.75
700-400	42.6	39.1	40.85	94.2	106.5	100.35
800-400	16.3	5.9	11.1	36.7	42.2	38.45
900-400	16.7	18.8	17.75	27	33.7	30.35
1000-400	8.2	7.3	7.75	30.5	38.8	34.65
1100-400	7.2	2.1	4.65	35.6	45.2	40.4
1200-400	17.1	19.7	18.4	42.4	47.3	44.85
1300-400	17.8	15	16.4	54.9	58.7	56.8
1400-400	22.9	24.9	23.9	50.4	53.7	52.05
1500-400	29.1	25.2	27.15	49.7	59	54.35

Table 1

Summary of EM-31 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release

Station	HD (N-S) (mmhos/m)	HD (E-W) (mmhos/m)	HD (Avg) (mmhos/m)	VD (N-S) (mmhos/m)	VD (E-W) (mmhos/m)	VD (Avg) (mmhos/m)
1500-500	160	10.6	85.3	193.3	24.3	108.8
1400-500	-73	-53.5	I	102.3	82.3	92.3
1300-500	11.3	7.4	9.35	57.2	70	63.6
1200-500	19.7	17.5	18.6	46.8	60.4	53.6
1100-500	13.2	7.9	10.55	40.5	51.6	46.05
1000-500	-10.7	-44	I	48.2	68	58.1
900-500	14.1	20.9	17.5	33.5	50.6	42.05
800-500	12.5	11.8	12.15	43.4	48.3	45.85
700-500	20.6	30	25.3	71.1	68.6	69.85
600-500	32.7	33.3	33	60.8	62.6	61.7
500-500	42.5	40.8	41.65	80.7	79.3	80
400-500	38.4	39	38.7	73.8	78.4	76.1
300-500	49.4	52.9	51.15	115.9	123.8	119.85
200-500	51.7	61.6	56.65	93.7	111.1	102.4
100-500	21.7	21	21.35	44.8	40.3	42.55
0-500	15.5	12	13.75	25.6	22.3	23.95
0-600	1.2	36.3	18.75	33	40.6	36.8
100-600	9.9	7.8	8.85	47.9	49.2	48.55
200-600	-5.1	-26.7	I	37.5	92	64.75
300-600	17.8	17.1	17.45	46.7	47.3	47
400-600	15.3	14.4	14.85	26	25.6	25.8
500-600	50	21.2	35.6	31.4	20.3	25.85
600-600	5.9	5.7	5.8	28.4	28.8	28.6
700-600	11.5	12.2	11.85	22.1	24	23.05
800-600	15.6	15.6	15.6	36.8	40.9	38.85
900-600	20.9	21.4	21.15	44.5	44.7	44.6
1000-600	34	19.2	26.6	42.5	44.1	43.3
1100-600	13.1	-10.7	I	45.3	76.5	60.9
1200-600	19.3	20.6	19.95	40.2	46.8	43.5
1300-600	27.4	27.2	27.3	49.7	49.1	49.4
1400-600	-0.3	-28	I	60.4	58.5	59.45
1500-600	62.2	22.4	42.3	66.2	105.4	85.8
1500-700	28.5	25.5	27	55.1	60.9	58
1400-700	22.3	20.5	21.4	41.7	39.1	40.4
1300-700	16.9	17.3	17.1	40.1	48.4	44.25
1200-700	11.4	11	11.2	47.5	52.1	49.8
1100-700	4.9	-10.5	I	53.6	68.3	60.95
1000-700	33.1	-18.6	I	66.5	89	77.75
900-700	2.2	5.7	3.95	50.2	67.8	59
800-700	10.4	7.1	8.75	44.8	47.6	46.2
700-700	12.7	14.4	13.55	31.6	30.2	30.9

Table 1

Summary of EM-31 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release

September 1, 2017

Page 4 of 4

Station	HD (N-S) (mmhos/m)	HD (E-W) (mmhos/m)	HD (Avg) (mmhos/m)	VD (N-S) (mmhos/m)	VD (E-W) (mmhos/m)	VD (Avg) (mmhos/m)
600-700	12.5	13.9	13.2	22.5	24	23.25
500-700	18.9	18.8	18.85	35	32.4	33.7
400-700	10	16.8	13.4	46.3	42.8	44.55
300-700	43	19.9	31.45	46.8	38.6	42.7
200-700	13.7	13.2	13.45	24.3	23.6	23.95
100-700	11.9	12.6	12.25	33.6	33.8	33.7
0-700	15.8	17.7	16.75	31	34.4	32.7

Notes:

I: Interference

Table 2

**Summary of EM-34 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release**

August 30 and 31, 2017

Page 1 of 4

Station	10 mHD (mmhos/m)	10 mVD (mmhos/m)	20 mHD (mmhos/m)	20 mVD (mmhos/m)	Comments
Bkgrd	20.9	31.4	40.4	49.1	
0-0	19.2	27.8	29.5	49.1	
100-0	19.6	22.4	33.5	29.1	
200-0	18.9	26.6	36.1	41.6	
300-0	20	-14.3	31.3	26.2	
400-0	15.5	28.7	36.9	52.9	
500-0	24.5	29.2	39.6	55	
600-0	25.7	35.6	42.2	56.6	
700-0	27	54.4	40.8	40.4	
800-0	22.6	34.4	37.2	61.5	
900-0	29.7	37.1	44.4	102.3	
1000-0	47.7	154.1	68.2	2.4	
1100-0	45.5	141.4	114.2	473(1000s)	
1200-0	42.6	63.1	59.2	95.7	
1300-0	42.9	61.7	49.4	81.6	
1400-0	45.2	64.5	59.4	67.3	
1500-0	39	42.1	62.3	94.5	
1500-100	45	77.8	52.4	43.7	
1400-100	44	52	64.4	67.6	
1300-100	42.4	51.1	60.4	57.9	
1200-100	42.4	59	67.7	57.3	
1100-100	36.7	49.8	60	67.9	
1000-100	34.8	42.5	54.7	57	
900-100	40.6	87.3	56	64.3	
800-100	39.7	54.3	49.7	63.5	
700-100	23.9	86.8	44.2	-53	on pipeline
600-100	34.4	119	60.7	58.4	
500-100	22.8	39.5	44.3	69.7	
400-100	24.9	32.4	31.3	60.1	
300-100	17.4	42.6	37.6	45.4	
200-100	16.2	28.5	33.1	54	
100-100	12.9	23.9	32.2	45.8	
0-100	12.6	17.6	28.3	41.4	
0-200	18.1	32.3	37.6	62.3	
100-200	18.2	38.8	33.4	92.3	Possible pipe
200-200	60.4	-66.1	37.4	-183	Running E-W
300-200	45.4	61	63.3	108.7	Near pipeline
400-200	59.7	73.4	64.2	48.5	
500-200	85.9	49.8	69.1	40.7	
600-200	49.1	56.2	53.1	59.3	
700-200	25.1	43	43.8	62.3	Natural Gas line

Table 2

**Summary of EM-34 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release**

August 30 and 31, 2017

Page 2 of 4

Station	10 mHD (mmhos/m)	10 mVD (mmhos/m)	20 mHD (mmhos/m)	20 mVD (mmhos/m)	Comments
800-200	32.7	44.5	49.2	62.2	
900-200	27.3	53.6	44.2	47.3	
1000-200	29	47.2	47.8	54.8	
1100-200	28.4	42.3	44.2	48.8	
1200-200	30	43.5	50.1	56.7	
1300-200	35.8	42.1	51.4	71.8	
1400-200	45.9	67.7	65.8	45.1	
1500-200	45.6	58.1	62.8	70.2	
1500-300	49	46.8	63.6	50.6	Pipeline Running N-S
1400-300	41.3	54.7	54.8	63.1	
1300-300	35.2	40.7	61.3	64.8	
1200-300	29.8	43.5	45.3	48.7	
1100-300	27	39.2	49.2	75.9	
1000-300	24.6	28.6	47.2	51.2	
900-300	16.7	32.6	43.9	66.7	
800-300	26.7	43.4	47.1	51.5	
700-300	81.8	77.3	80.1	35.7	
600-300	75.4	67.8	68.2	51.6	
500-300	60.8	96.9	71.3	79.5	
400-300	83.4	85.2	90.6	45.4	
300-300	81.8	34	82	24.7	
200-300	52.3	121.1	70.2	18	
100-300	23.9	31.4	42.3	60.6	
0-300	19.1	32.5	37.6	52.5	
0-400	15.4	12	35.1	39.5	
100-400	32.2	39.1	46.3	48.4	
200-400	35.4	115.2	71.8	40.7	
300-400	87.8	-15.8	77.1	-5.1	
400-400	94	35.3	80.6	30.4	
500-400	87.7	73	78.3	60.1	
600-400	80.9	38.7	69.3	34.2	
700-400	69.7	72.6	74	44	
800-400	25.3	32	47.3	66.4	
900-400	29.5	33.5	44.3	49.2	
1000-400	21.3	37.3	42	45	
1100-400	24.4	37.6	45.5	56.4	
1200-400	40.4	43.6	64.6	49.2	
1300-400	48	63.3	68.7	47.9	
1400-400	50.4	67	75.5	63.8	
1500-400	46.1	45.5	72.9	76.2	
1500-500	45.8	63.8	61.1	66	

Table 2

**Summary of EM-34 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release**

August 30 and 31, 2017

Page 3 of 4

Station	10 mHD (mmhos/m)	10 mVD (mmhos/m)	20 mHD (mmhos/m)	20 mVD (mmhos/m)	Comments
1400-500	1	1	78	43.8	
1300-500	47.5	69.2	67.2	78.8	
1200-500	44.2	64.6	71.2	78.2	
1100-500	35.8	47.4	57.2	65.4	
1000-500	28.7	45.3	44.3	35	
900-500	30.6	38.1	44.7	45.6	
800-500	31.2	49.6	36.8	89.4	
700-500	38.5	22.6	50.7	50	
600-500	70.5	89.3	71.5	59.9	
500-500	65.8	76.4	72.4	75.8	
400-500	54.7	55.2	67.5	51.2	
300-500	71.1	8.8	83.7	39.5	
200-500	77.8	65.4	69.1	65.7	
100-500	35.4	27.3	47.6	107.7	
0-500	23.2	34.6	43.2	52.3	
0-600	107.2	99.4	59.3	113.5	Pipeline
100-600	28.2	8.8	48.1	34.5	
200-600	30.4	40.6	47.4	73.3	
300-600	25.4	-6.9	42.6	45.8	
400-600	27.5	43.3	44.7	36.9	
500-600	26.4	-8.3	48.3	44.2	
600-600	23.8	27.6	39.1	52.3	
700-600	20.4	29.1	38	51.2	
800-600	17.8	26.7	32.5	77.2	
900-600	45.2	42.8	63.3	66.2	
1000-600	44	58.1	58.52	67.2	
1100-600	48.3	49.4	57.5	62.5	
1200-600	39.2	65.4	57.4	71.3	
1300-600	48.8	45.4	72.5	47.6	
1400-600	46.7	45.4	69.2	77.3	
1500-600	44.8	46.2	77	78.1	
1500-700	44.3	44.1	71.5	84.5	
1400-700	44.1	60.8	68.3	66.9	
1300-700	39.1	49.5	65.5	73.8	
1200-700	44.1	38.3	65.6	83.6	
1100-700	44.8	57.9	67	66.6	
1000-700	42.4	58.8	61.7	113.3	
900-700	25.2	66.7	34.1	118.1	
800-700	33.9	41.6	52.5	43.2	
700-700	27.8	36.3	47.5	64.2	
600-700	26.7	31.4	42.9	51.1	

Table 2

**Summary of EM-34 Terrain Conductivity Readings
XTO Energy, Inc., EMSU B Produced Water Release
August 30 and 31, 2017**

Page 4 of 4

Station	10 mHD (mmhos/m)	10 mVD (mmhos/m)	20 mHD (mmhos/m)	20 mVD (mmhos/m)	Comments
500-700	31.7	29.7	44.6	50.3	Pipeline
400-700	30.8	56.9	55.2	86.7	
300-700	28.3	-0.7	44.1	30.5	
200-700	26.8	23.4	42.5	58.1	
100-700	23.5	-57.2	45.9	25.3	
0-700	31.8	43.8	51	65.2	

Notes:

I: Interference

Table 3
1RP-4789
Excavation and Soil Sample Analytical Data Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Page 1 of 1

Sample	Collection Date	Depth (Feet)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:								5,000	*600
Spill Area Soil Sample									
S-1	10/17/2017	0 - 1	<0.0206	<0.1442	<129	2,390	535	2,925	1.91
Excavation Soil Samples									
	10/18/2017	4	<0.00110	<0.0077	<27.5	<27.5	<27.5	<27.5	389
West	10/18/2017	2	<0.00110	<0.0077	<27.5	<27.5	<27.5	<27.5	1.99
	10/18/2017	4	<0.00111	<0.00777	<27.8	<27.8	<27.8	<27.8	95.5
South	10/18/2017	2	<0.00104	<0.00728	<26.0	<26.0	<26.0	<26.0	2.22
	10/18/2017	4	<0.00105	<0.00737	<26.3	<26.3	<26.3	<26.3	8.72
North	10/18/2017	2	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	1.78
	10/18/2017	4	<0.00123	<0.00863	<30.9	<30.9	<30.9	<30.9	4.48
Soil Pile Samples									
West	10/18/2017	--	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	11.7
East	10/18/2017	--	<0.0206	<0.1442	<25.8	30.0	<25.8	30.0	1,080

Notes: Laboratory analysis performed by Permian Basin Environmental Lab, Midland, Texas, by SW-846 Method 8021B (BTEX), Method 8015M (GRO, DRO and ORO) and Method 300 (chloride).

Depth in feet below ground surface (bgs)

mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)

--: No data available (no sample in sampler)

*: OCD delineation limit

Table 4

1RP-4789

Soil Boring and Monitoring Well Soil Samples Analytical Data Summary

XTO Energy, Inc., EMSU B Produced Water Release

Lea County, New Mexico

Page 1 of 4

Sample	Collection Date	Depth (Feet)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:								5,000	*600
Soil Boring									
SB-1	10/17/2017	0 - 1	<0.00128	<0.00895	<32.1	<32.1	<32.1	<32.1	<1.28
	10/17/2017	3 - 4	--	--	--	--	--	--	<1.15
	10/17/2017	5 - 6	--	--	--	--	--	--	<1.27
	10/17/2017	7 - 8	--	--	--	--	--	--	454
SB-2	10/18/2017	0 - 1	<0.00128	<0.00896	<32.1	<32.1	<32.1	<32.1	31.4
	10/18/2017	3 - 4	--	--	--	--	--	--	<1.27
	10/18/2017	5 - 6	--	--	--	--	--	--	12.0
SB-3	10/18/2017	0 - 1	<0.0217	<0.1521	<27.2	<27.2	<27.2	<27.2	<1.09
	10/18/2017	3 - 4	--	--	--	--	--	--	<1.03
	10/18/2017	5 - 6	--	--	--	--	--	--	9.78
SB-4	10/18/2017	0 - 1	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	17.0
	10/18/2017	3 - 4	--	--	--	--	--	--	2.32
	10/18/2017	5 - 6	--	--	--	--	--	--	42.7
SB-5	10/18/2017	0 - 1	<0.00114	<0.02938	<28.4	<28.4	<28.4	<28.4	3.61
	10/18/2017	3 - 4	--	--	--	--	--	--	7.70
	10/18/2017	5 - 6	--	--	--	--	--	--	5.08
SB-6	10/18/2017	0 - 1	<0.00122	<0.00854	<30.5	<30.5	<30.5	<30.5	13.4
	10/18/2017	3 - 4	--	--	--	--	--	--	64.6
	10/18/2017	5 - 6	--	--	--	--	--	--	26.6
SB-7	10/19/2017	0 - 1	<0.00108	<0.00754	<26.9	<26.9	<26.9	<26.9	4.69
	10/19/2017	3 - 4	--	--	--	--	--	--	53.4
	10/19/2017	5 - 6	--	--	--	--	--	--	38.8
SB-8	10/19/2017	0 - 1	<0.00105	<0.00737	<26.3	<26.3	<26.3	<26.3	9.66
	10/19/2017	3 - 4	--	--	--	--	--	--	8.16
	10/19/2017	5 - 6	--	--	--	--	--	--	21.1

Table 4

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Soil Boring and Monitoring Well Soil Samples Analytical Data Summary

XTO Energy, Inc., EMSU B Produced Water Release

Lea County, New Mexico

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Sample	Collection Date	Depth (Feet)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:								1,000	*600
SB-9	10/19/2017	0 - 1	<0.00108	<0.00754	<26.9	<26.9	<26.9	<26.9	58.3
	10/19/2017	3 - 4	--	--	--	--	--	--	12.4
SB-10	10/19/2017	0 - 1	<0.00106	<0.00744	<26.6	<26.6	<26.6	<26.6	73.0
	10/19/2017	3 - 4	--	--	--	--	--	--	64.1
	10/19/2017	5 - 6	--	--	--	--	--	--	64.2
SB-11	10/19/2017	0 - 1	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	31.8
	10/19/2017	3 - 4	--	--	--	--	--	--	78.6
	10/19/2017	5 - 6	--	--	--	--	--	--	22.0
SB-12	10/19/2017	0 - 1	<0.00101	<0.00707	<25.3	<25.3	<25.3	<25.3	<1.01
	10/19/2017	3 - 4	--	--	--	--	--	--	7.75
	10/19/2017	5 - 6	--	--	--	--	--	--	10.6
SB-13	10/19/2017	0 - 1	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	24.5
	10/19/2017	3 - 4	--	--	--	--	--	--	<1.03
	10/19/2017	5 - 6	--	--	--	--	--	--	32.7
	10/19/2017	7 - 8	--	--	--	--	--	--	108
SB-14	10/19/2017	0 - 1	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	4.23
	10/19/2017	3 - 4	--	--	--	--	--	--	35.6
	10/19/2017	5 - 6	--	--	--	--	--	--	<1.04
SB-15	10/19/2017	0 - 1	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	12.0
	10/19/2017	3 - 4	--	--	--	--	--	--	62.8
	10/19/2017	5 - 6	--	--	--	--	--	--	13.1
SB-16	10/20/2017	0 - 1	<0.00103	<0.00721	<25.8	<25.8	<25.8	<25.8	22.3
	10/20/2017	3 - 4	<0.00106	<0.00744	<26.6	<26.6	<26.6	<26.6	<1.06
	10/20/2017	5 - 6	--	--	--	--	--	--	4.27
	10/20/2017	7 - 8	--	--	--	--	--	--	<1.04
SB-17	10/20/2017	0 - 1	<0.00104	<0.00728	<26.0	<26.0	<26.0	<26.0	2.35
	10/20/2017	3 - 4	--	--	--	--	--	--	24.2
	10/20/2017	5 - 6	--	--	--	--	--	--	33.3

Table 4

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Soil Boring and Monitoring Well Soil Samples Analytical Data Summary

XTO Energy, Inc., EMSU B Produced Water Release

Lea County, New Mexico

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Sample	Collection Date	Depth (Feet)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:								1,000	*600
SB-18	10/20/2017	0 - 1	<0.00114	<0.00796	<28.4	<28.4	<28.4	<28.4	1.40
	10/20/2017	3 - 4	--	--	--	--	--	--	<1.11
	10/20/2017	5 - 6	--	--	--	--	--	--	<1.04
SB-19	10/18/2017	0 - 1	<0.0260	<0.1818	<32.5	<32.5	<32.5	<32.5	15.7
	10/18/2017	3 - 4	--	--	--	--	--	--	<1.23
	10/18/2017	5 - 6	--	--	--	--	--	--	5.91
	10/18/2017	7 - 8	--	--	--	--	--	--	54.2
	10/18/2017	9 - 10	--	--	--	--	--	--	129
SB-20	10/20/2017	0 - 1	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	<1.02
	10/20/2017	3 - 4	--	--	--	--	--	--	90.1
	10/20/2017	5 - 6	--	--	--	--	--	--	<1.03
SB-21	10/20/2017	0 - 1	<0.00102	<0.00714	<25.5	<25.5	<25.5	<25.5	<1.02
	10/20/2017	3 - 4	--	--	--	--	--	--	<1.18
	10/20/2017	5 - 6	--	--	--	--	--	--	2.14
SB-22	10/20/2017	0 - 1	<0.00101	<0.00707	<25.3	<25.3	<25.3	<25.3	<1.01
	10/20/2017	3 - 4	--	--	--	--	--	--	<1.05
	10/20/2017	5 - 6	--	--	--	--	--	--	<1.27
Monitoring Well									
MW-1	10/16/2017	0 - 1	--	--	--	--	--	--	7.71
	10/16/2017	5 - 6	--	--	--	--	--	--	<1.05
	10/16/2017	10 - 11	--	--	--	--	--	--	909
	10/16/2017	15 - 16	--	--	--	--	--	--	43.6
	10/16/2017	20 - 21	--	--	--	--	--	--	57.5
	10/16/2017	25 - 26	--	--	--	--	--	--	151
	10/16/2017	30 - 31	--	--	--	--	--	--	85.5
MW-2	10/17/2017	0 - 1	--	--	--	--	--	--	<1.03
	10/17/2017	5 - 6	--	--	--	--	--	--	<1.09
	10/17/2017	10 - 11	--	--	--	--	--	--	23.8
	10/17/2017	15 - 16	--	--	--	--	--	--	81.4
	10/17/2017	20 - 21	--	--	--	--	--	--	60.7
	10/17/2017	25 - 26	--	--	--	--	--	--	17.1

Table 4

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Soil Boring and Monitoring Well Soil Samples Analytical Data Summary

XTO Energy, Inc., EMSU B Produced Water Release

Lea County, New Mexico

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Sample	Collection Date	Depth (Feet)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:								5,000	*600
	10/17/2017	30 - 31	--	--	--	--	--	--	74.5
	10/17/2017	35 - 36	--	--	--	--	--	--	162
MW-3	10/20/2017	0 - 1	--	--	--	--	--	--	27.1
	10/20/2017	3 - 4	--	--	--	--	--	--	--
	10/20/2017	5 - 6	--	--	--	--	--	--	30.5
MW-4	10/18/2017	0 - 1	--	--	--	--	--	--	9.51
	10/18/2017	5 - 6	--	--	--	--	--	--	1.82
	10/18/2017	10 - 11	--	--	--	--	--	--	6.60
	10/18/2017	15 - 16	--	--	--	--	--	--	110
	10/18/2017	20 - 21	--	--	--	--	--	--	61.1
	10/18/2017	25 - 26	--	--	--	--	--	--	51.7
	10/18/2017	30 - 31	--	--	--	--	--	--	253
	10/18/2017	35 - 36	--	--	--	--	--	--	204
	10/18/2017	40 - 41	--	--	--	--	--	--	88.9
	10/18/2017	45 - 46	--	--	--	--	--	--	111
	10/18/2017	50 - 51	--	--	--	--	--	--	74.3
MW-5	10/17/2017	0 - 1	--	--	--	--	--	--	--
	10/17/2017	5 - 6	--	--	--	--	--	--	--
	10/17/2017	0 - 1	--	--	--	--	--	--	--
	10/17/2017	5 - 6	--	--	--	--	--	--	--
	10/17/2017	10 - 11	--	--	--	--	--	--	599
	10/17/2017	15 - 16	--	--	--	--	--	--	525
	10/17/2017	20 - 21	--	--	--	--	--	--	719
	10/17/2017	25 - 26	--	--	--	--	--	--	254
	10/17/2017	30 - 31	--	--	--	--	--	--	235
	10/17/2017	35 - 36	--	--	--	--	--	--	230
	10/17/2017	40 - 41	--	--	--	--	--	--	538

Notes: Laboratory analysis performed by Permian Basin Environmental Lab, Midland, Texas, by SW-846 Method 8021B (BTEX), Method 8015M (GRO, DRO and ORO) and Method 300 (chloride).

Depth in feet below ground surface (bgs)

mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)

--: No data available (no sample in sampler)

*: OCD delineation limit

Table 5
1RP-4789
Piezometer and Monitoring Well Completion and Gauging Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
Piezometers												
SB-1	10/16/2018	13.75	10.75	2	3,563.55	2.75 - 7.23	3.00	3,566.19	10/19/2017	11.02	8.02	2.73
									10/20/2017	11.02	8.02	2.73
									10/23/2017	12.35	9.35	1.40
									10/25/2017	11.11	8.11	2.64
									11/27/2017	11.54	8.54	2.21
									12/04/2017	11.64	8.64	2.11
SB-2	10/18/2017	10.45	10.45	2	3,560.99	2.45 - 7.25	3.00	3,563.66	10/19/2017	8.36	5.36	2.09
									10/20/2017	8.36	5.36	2.09
									10/23/2017	8.46	5.46	1.99
									10/25/2017	8.52	5.52	1.93
									11/27/2017	9.02	6.02	1.43
									12/04/2017	9.33	6.33	1.12
SB-3	10/18/2017	14.19	14.00	2	3,563.22	6.19 - 10.99	3.00	3,565.97	10/19/2017	11.20	8.20	2.99
									10/20/2017	11.20	8.20	2.99
									10/23/2017	11.26	8.26	2.93
									10/25/2017	11.34	8.34	2.85
									11/27/2017	11.78	8.78	2.41
									12/04/2017	11.89	8.89	2.30
SB-4	10/18/2017	14.14	14.00	2	3,563.50	6.14 - 10.94	3.00	3,566.23	10/19/2017	11.34	8.34	2.80
									10/20/2017	11.34	8.34	2.80
									10/23/2017	11.40	8.40	2.74
									10/25/2017	11.47	8.47	2.67
									11/27/2017	11.96	8.96	2.18
									12/04/2017	12.05	9.05	2.09
SB-5	10/18/2017	13.57	14.00	2	3,563.60	5.57 - 10.37	3.00	3,566.36	10/19/2017	11.28	8.28	2.29
									10/20/2017	11.30	8.30	2.27
									10/23/2017	11.37	8.37	2.20
									10/25/2017	11.43	8.43	2.14
									11/27/2017	11.91	8.91	1.66
									12/04/2017	12.04	9.04	1.53
SB-6	10/19/2017	11.21	11.00	2	3,562.01	3.21 - 8.01	3.00	3,564.72	10/19/2017	9.38	6.38	1.83
									10/20/2017	9.40	6.40	1.81
									10/23/2017	9.76	6.76	1.45

Table 5
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Piezometer and Monitoring Well Completion and Gauging Summary
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Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
									10/25/2017 11/27/2017 12/04/2017	9.58 10.16 10.28	6.58 7.16 7.28	1.63 1.05 0.93
SB-7	10/19/2017	14.15	11.00	2	3,563.50	6.15 - 10.95	3.00	3,566.22	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	11.47 11.47 11.52 11.90 12.02 12.10	8.47 8.47 8.52 8.90 9.02 9.10	2.68 2.68 2.63 2.25 2.13 2.05
SB-8	10/19/2017	9.30	8.00	2	3,559.82	1.30 - 6.10	3.00	3,562.58	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	7.80 7.82 7.89 7.95 8.43 8.52	4.80 4.82 4.89 4.95 5.43 5.52	1.50 1.48 1.41 1.35 0.87 0.78
SB-9	10/19/2017	8.65	8.00	2	3,559.52	0.65 - 5.45	3.00	3,562.15	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	7.17 7.20 7.31 7.34 7.86 7.96	4.17 4.20 4.31 4.34 4.86 4.96	1.48 1.45 1.34 1.31 0.79 0.69
SB-10	10/19/2017	10.82	7.82	2	3,562.21	2.82 - 7.62	3.00	3,563.96	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	8.75 8.78 8.86 8.95 9.57 9.69	5.75 5.78 5.86 5.95 6.57 6.69	2.07 2.04 1.96 1.87 1.25 1.13
SB-11	10/19/2017	10.49	7.49	2	3,562.09	5.49 - 10.29	2.50	3,564.39	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	9.12 9.08 9.17 9.24 9.90 9.93	6.62 6.58 6.67 6.74 6.90 6.93	0.87 0.91 0.82 0.75 0.59 0.56

Table 5
1RP-4789
Piezometer and Monitoring Well Completion and Gauging Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
SB-12	10/19/2017	12.50	9.50	2	3,561.84	4.50 - 9.30	3.00	3,564.66	10/19/2017	9.91	6.91	2.59
									10/20/2017	9.94	6.94	2.56
									10/23/2017	10.05	7.05	2.45
									10/25/2017	10.09	7.09	2.41
									11/27/2017	10.59	7.59	1.91
									12/04/2017	10.69	7.69	1.81
SB-13	10/19/2017	12.25	9.25	2	3,562.78	4.25 - 9.05	3.00	3,565.63	10/19/2017	11.50	8.50	0.75
									10/20/2017	11.51	8.51	0.74
									10/23/2017	11.60	8.60	0.65
									10/25/2017	11.70	8.70	0.55
									11/27/2017	11.98	8.98	0.27
									12/04/2017	11.99	8.99	0.26
SB-14	10/19/2017	14.50	11.50	2	3,561.58	6.50 - 11.30	3.00	3,564.22	10/19/2017	9.94	6.94	4.56
									10/20/2017	9.89	6.89	4.61
									10/23/2017	9.98	6.98	4.52
									10/25/2017	10.08	7.08	4.42
									11/27/2017	10.68	7.68	3.82
									12/04/2017	10.82	7.82	3.68
SB-15	10/19/2017	14.55	11.55	2	3,560.24	6.55 - 11.35	3.00	3,563.20	10/19/2017	Dry	Dry	Dry
									10/20/2017	8.91	5.91	5.64
									10/23/2017	9.02	6.02	5.53
									10/25/2017	9.12	6.12	5.43
									11/27/2017	9.69	6.69	4.86
									12/04/2017	9.82	6.82	4.73
SB-16	10/20/2017	13.28	10.28	2	3,562.21	5.28 - 10.08	3.00	3,565.21	10/20/2017	11.55	8.55	1.73
									10/23/2017	11.65	8.65	1.63
									10/25/2017	11.70	8.70	1.58
									11/27/2017	12.11	9.11	1.17
									12/04/2017	12.18	9.18	1.10
SB-17	10/20/2017	10.39	7.39	2	3,559.40	2.39 - 7.19	3.00	3,562.00	10/20/2017	Dry	Dry	Dry
									10/23/2017	Dry	Dry	Dry
									10/25/2017	Dry	Dry	Dry
									11/27/2017	Dry	Dry	Dry
									12/04/2017	Dry	Dry	Dry

Table 5
1RP-4789
Piezometer and Monitoring Well Completion and Gauging Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
SB-18	10/20/2017	14.43	11.43	2	3,559.77	6.43 - 11.23	3.00		10/20/2017	Dry	Dry	Dry
									10/23/2017 10/25/2017 11/27/2017 12/04/2017	Dry Dry Dry Dry	Dry Dry Dry Dry	Dry Dry Dry Dry
SB-19	10/18/2017	11.08	8.00	2	3,560.32	3.08 - 7.88	2.35	3,562.94	10/19/2017 10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	Dry Dry Dry Dry Dry Dry	Dry Dry Dry Dry Dry Dry	Dry Dry Dry Dry Dty Dry
SB-20	10/20/2017	11.97	11.00	2	3,560.01	3.97 - 8.77	3.00	3,562.90	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	Dry 10.35 10.43 11.26 11.41	Dry 7.35 7.43 8.26 8.41	Dry 1.62 1.54 0.71 0.56
SB-21	10/20/2017	12.86	11.00	2	3,560.76	4.86 - 9.66	3.00	3,563.42	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	10.60 10.58 10.98 11.13 11.33	7.60 7.58 7.98 8.13 8.33	2.26 2.28 1.88 1.73 1.53
SB-22	10/20/2017	11.61	8.61	2	3,561.00	3.61 - 8.47	3.00	3,563.62	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	Dry 10.84 10.70 11.27 11.35	Dry 7.84 7.70 8.27 8.35	Dry 0.77 0.91 0.34 0.26
SB-23	12/04/2017	12.01	10.51	1	--	4.40 - 9.40	3.00	--	12/04/2017	Dry	Dry	Dry
*SB-24	12/04/2017	11.00	11	--	--	--	--	--	12/04/2017	Dry	Dry	Dry
SB-25	11/20/2017	13.10	11.00	1		4.73 - 9.73	3.00		11/27/2017 12/04/2017	Dry Dry	Dry Dry	Dry Dry

Table 5
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Piezometer and Monitoring Well Completion and Gauging Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
SB-26	11/21/2017	12.75	9.75	1		3.61 - 8.47	3.00		11/27/2017 12/04/2017	11.40 11.44	8.40 8.44	1.35 1.31
SB-27	11/21/2017	9.61	10.5	1		1.64 - 6.64	3.00		11/27/2017 12/04/2017	8.00 7.24	5.00 4.24	1.61 2.37
SB-28	11/20/2017	14.70	11.70	1		6.33 - 11.33	3.00		11/27/2017 12/04/2017	Dry Dry	Dry Dry	Dry Dry
SB-29	11/20/2017	12.83	9.83	1		4.46 - 9.46	3.00		11/27/2017 12/04/2017	Dry Dry	Dry Dry	Dry Dry
SB-30	11/20/2017	13.75	10.75	1		5.38 - 10.38	3.00		11/27/2017 12/04/2017	Dry Dry	Dry Dry	Dry Dry
SB-31	11/20/2017	13.33	10.33	1		4.96 - 9.96	3.00		11/27/2017 12/04/2017	Dry Dry	Dry Dry	Dry Dry
Monitoring Wells												
MW-1	10/16/2018	35.00	37	2	3564.2	14.08 - 34.24	3.00	3,566.79	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/4/2017	Dry Dry Dry Dry Dry	Dry Dry Dry Dry Dry	-- -- -- -- --
MW-2	10/17/2017	38.75	38.75	2	3559.9	14.00 - 35.24	3.00	3,562.54	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/04/2017	-- Dry Dry Dry Dry	-- Dry Dry Dry Dry	-- -- -- -- --
MW-3	10/19/2017	6.59	8.00	2	3559.5	1.55 - 6.39	3.00	3,562.15	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/4/2017	7.21 7.22 7.31 7.93 8.03	4.21 4.22 4.31 4.93 5.03	3,554.94 3,554.93 3,554.84 3,554.22 3,554.12
MW-4	10/18/2017	51.00	51	2	3561.9	27.09 - 46.74	3.00	3,564.74	10/20/2017 10/23/2017	-- --	-- --	-- --

Table 5
1RP-4789
Piezometer and Monitoring Well Completion and Gauging Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Well Information									Groundwater Data			
Boring ID	Date Drilled	Well Depth (Feet TOC)	Drilled Depth (Feet BGS)	Well Diameter (inches)	Surface Elevation (Feet AMSL)	Screen Interval (Feet BGS)	Casing Stickup (Feet)	TOC Elevation (Feet AMSL)	Date Gauged	Depth to Water (feet TOC)	Depth to Water (feet BGS)	Water Column Height (feet)
									10/25/2017 11/27/2017 12/4/2017	Dry Dry Dry	Dry Dry Dry	-- -- --
MW-5	10/17/2017	57.00	58	2	3560.3	35.11 - 54.76	3.00	3,563.02	10/20/2017 10/23/2017 10/25/2017 11/27/2017 12/4/2017	Dry Dry Dry 43.72 43.72	Dry Dry Dry 40.72 40.72	-- -- -- 3,519.30 3,519.30
MW-6	12/4/2017	56.00	55	2	--	30.37 - 50.12	3.00	--	12/4/2017 12/8/2017	Dry 49.52	Dry 46.52	-- --

Notes: borings SB-1 through SB-22 and monitoring wells MW-1 through MW-6 drilled and completed by Scarborough Drilling, Inc., Lamesa, Texas, using schedule 40 threaded PVC casing and screen. Bborings SB-24 through SB-31 completed as shallow piezometers by Larson & Associates, Inc., using 1-inch schedule 40 threaded PVC casing and screen.

bgs - below ground surface

TOC - top of casing

Elevations are above mean sea level referenced to 1984 Geodetic Datum.

Table 6
1RP-4789
Produced Water Sample Organic Analytical Data Summary
XTO Eneergy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Page 1 of 1

Boring	Date	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Xlenes (µg/L)
Produced Water	10/23/2017	0.207	0.100	0.413	0.366
MW-3	10/23/2017	0.0470	0.0361	<0.000600	0.0675
MW-5	11/30/2017	<0.000800	<0.00200	<0.00200	<0.00200
MW-6	12/08/2017	<0.00100	<0.00100	<0.00100	<0.00300
SB-1	10/23/2017	0.00108	0.000858	<0.000600	0.00312
SB-2	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-3	10/23/2017	0.0395	0.0253	<0.000600	0.0476
SB-4	10/23/2017	0.00976	0.00503	<0.000600	0.0102
SB-5	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-6	10/23/2017	0.00149	0.00065	<0.000600	0.00120
SB-7	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-8	10/23/2017	0.012	0.0109	<0.000600	0.0209
SB-9	10/23/2017	0.00146	0.00299	<0.000600	0.00676
SB-10	10/23/2017	0.000931	0.000416	<0.000600	0.000447
SB-11	10/23/2017	0.0459	0.0208	<0.000600	0.0401
SB-12	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-13	10/23/2017	0.00412	0.0042	<0.000600	0.00999
Sb-14	10/23/2017	0.00219	<0.000300	<0.000600	0.00130
SB-15	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-16	10/23/2017	0.00883	0.00466	<0.000600	0.0105
SB-17	10/23/2017	Dry	Dry	Dry	Dry
SB-18	10/23/2017	Dry	Dry	Dry	Dry
SB-19	10/23/2017	Dry	Dry	Dry	Dry
SB-20	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-21	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-22	10/23/2017	<0.000300	<0.000300	<0.000600	<0.000300
SB-23	11/27/2017	Dry	Dry	Dry	Dry
SB-24	11/27/2017	Dry	Dry	Dry	Dry
SB-25	11/27/2017	Dry	Dry	Dry	Dry
SB-26	11/27/2017	<0.000800	<0.00200	<0.00200	<0.00200
SB-27	11/27/2017	<0.000800	<0.00200	<0.00200	<0.00200
SB-28	11/27/2017	Dry	Dry	Dry	Dry
SB-29	11/27/2017	Dry	Dry	Dry	Dry
SB-30	11/27/2017	Dry	Dry	Dry	Dry
SB-31	11/27/2017	Dry	Dry	Dry	Dry

Notes: analysis performed by DHL Analytical, Round Rock, Texas and Permian Basin Environmental Lab, Midland, Texas.

µg/L: micrograms per liter equivalent to parts per billion

Table 7
1RP-4789
Produced Water Sample Inorganic Analytical Data Summary
XTO Energy, Inc., EMSU B Produced Water Release
Lea County, New Mexico

Page 1 of 1

Boring	Date	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Alkalinity (mg/L)	TDS (mg/L)
Produced Water	10/23/2017	717	402	224	5,560	10,600	951	1,190	20,000
MW-3	10/23/2017	713	320	91.3	4,580	7,180	1,760	722	15,900
MW-5	11/30/2017	711	493	46.6	1,870	3,320	3,540	191	11,200
MW-6	12/07/2017	577	447	77.7	2,330	3,400	3,610	160	10,600
SB-1	10/23/2017	1,060	446	144	4,770	7,770	4,220	392	19,300
SB-2	10/23/2017	1,290	259	36.3	4,730	7,420	1,520	687	16,900
SB-3	10/23/2017	896	405	150	4,920	6,990	3,720	562	18,400
SB-4	10/23/2017	851	325	78.2	4,650	7,920	1,620	845	16,400
SB-5	10/23/2017	937	243	71.4	3,670	7,380	666	528	18,300
SB-6	10/23/2017	934	247	31.5	4,010	7,110	1,660	718	14,000
SB-7	10/23/2017	919	309	107	3,500	6,120	2,730	176	14,000
SB-8	10/23/2017	391	150	50	2,860	4,760	476	612	9,940
SB-9	10/23/2017	949	211	78.4	4,640	7,380	1,540	496	16,100
SB-10	10/23/2017	714	332	122	4,820	7,940	1,460	894	16,400
SB-11	10/23/2017	798	359	152	4,650	7,680	2,750	267	17,900
SB-12	10/23/2017	1,500	359	23.4	3,290	6,970	1,940	229	14,900
SB-13	10/23/2017	442	187	164	2,850	3,770	2,560	269	7,600
Sb-14	10/23/2017	702	249	163	4,260	6,900	1,370	547	15,500
SB-15	10/23/2017	705	163	23.4	2,970	5,060	1,310	409	10,800
SB-16	10/23/2017	1,120	332	44.4	4,390	8,220	1,890	703	16,500
SB-17	10/23/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-18	10/23/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-19	10/23/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-20	10/23/2017	448	102	36.3	2,340	3,860	667	516	7,880
SB-21	10/23/2017	1,310	285	34.6	4,210	7,950	1,250	744	16,700
SB-22	10/23/2017	869	274	70.9	4,010	4,680	4,070	337	15,500
SB-23	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-24	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-25	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-26	11/27/2017	1,060	367	58.9	4,390	6,740	1,810	449	15,700
SB-27	11/27/2017	1,230	189	22.9	654	3,390	207	84	6,540
SB-28	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-29	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-30	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SB-31	11/27/2017	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Notes: analysis performed by DHL Analytical, Inc., Round Rock, Texas and Permian Basin Environmental Lab, Midland, Texas
mg/L: milligrams per liter
equivalent to parts per million

FIGURES

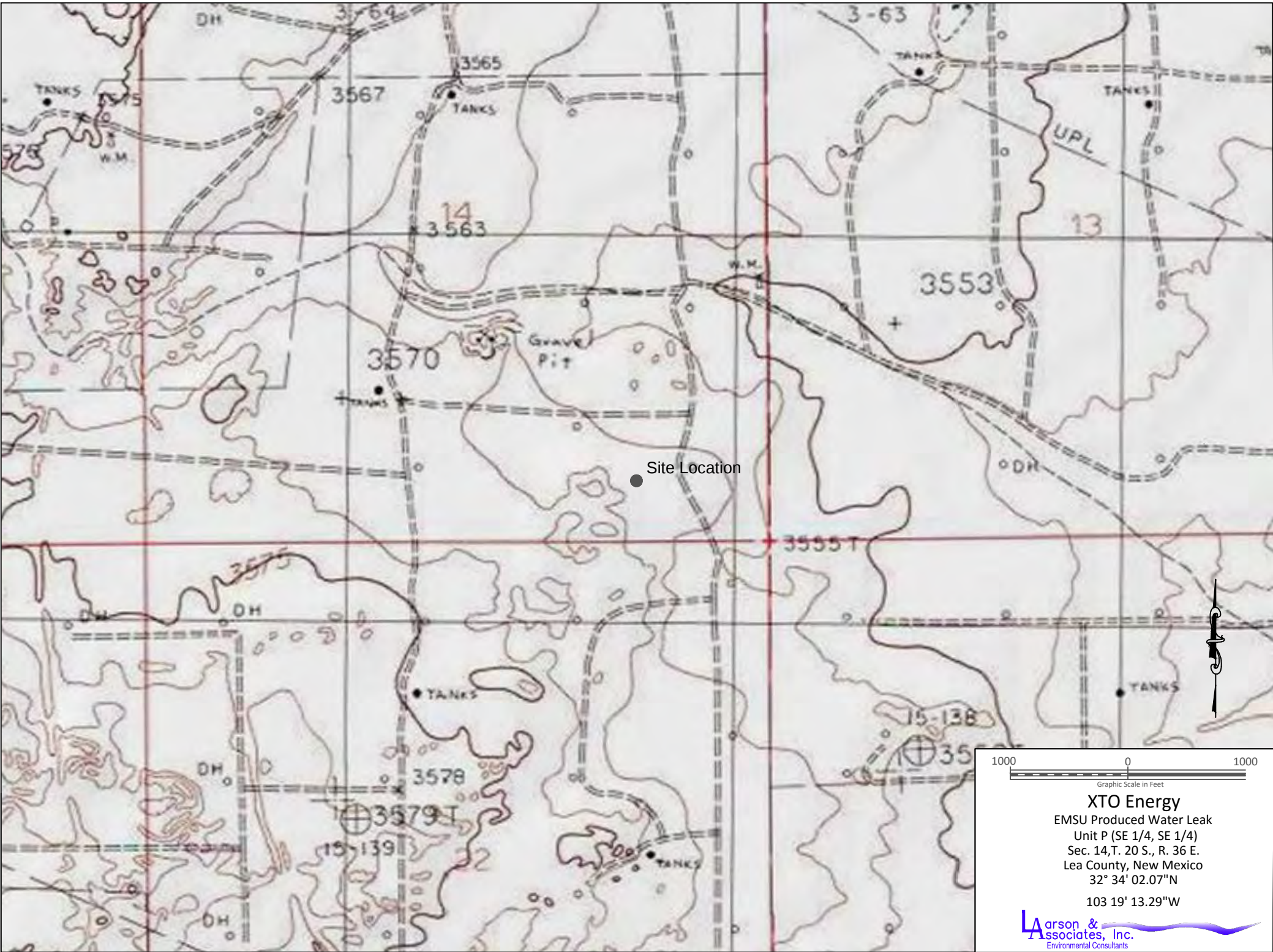
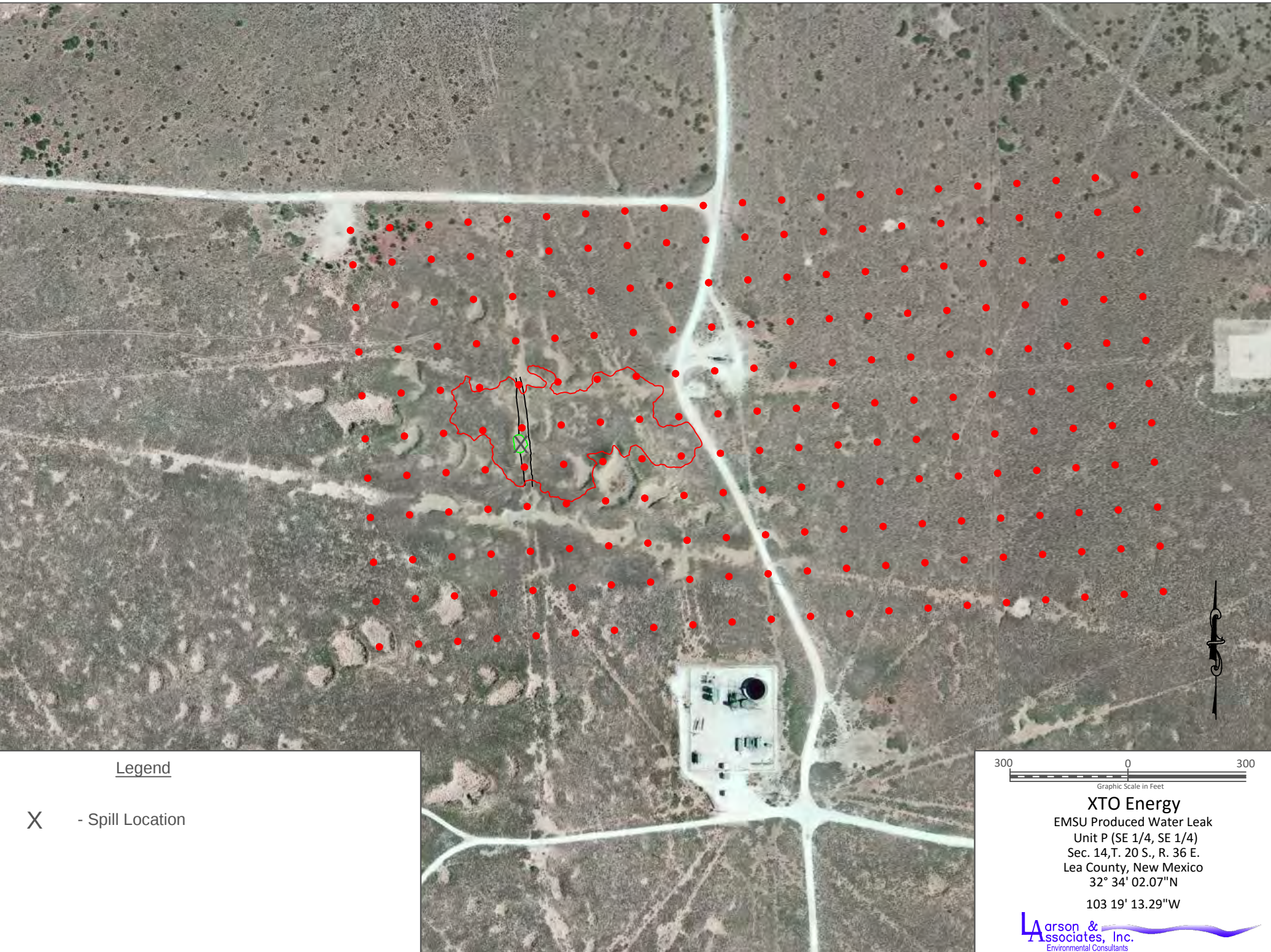


Figure 1 - Topographic Map

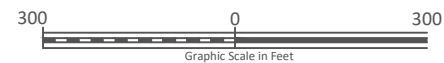


Figure 2 - Aerial Map



Legend

X - Spill Location



XTO Energy
EMSU Produced Water Leak
Unit P (SE 1/4, SE 1/4)
Sec. 14, T. 20 S., R. 36 E.
Lea County, New Mexico
32° 34' 02.07" N
103 19' 13.29" W

Larson & Associates, Inc.
Environmental Consultants

Figure 3 - Site Map

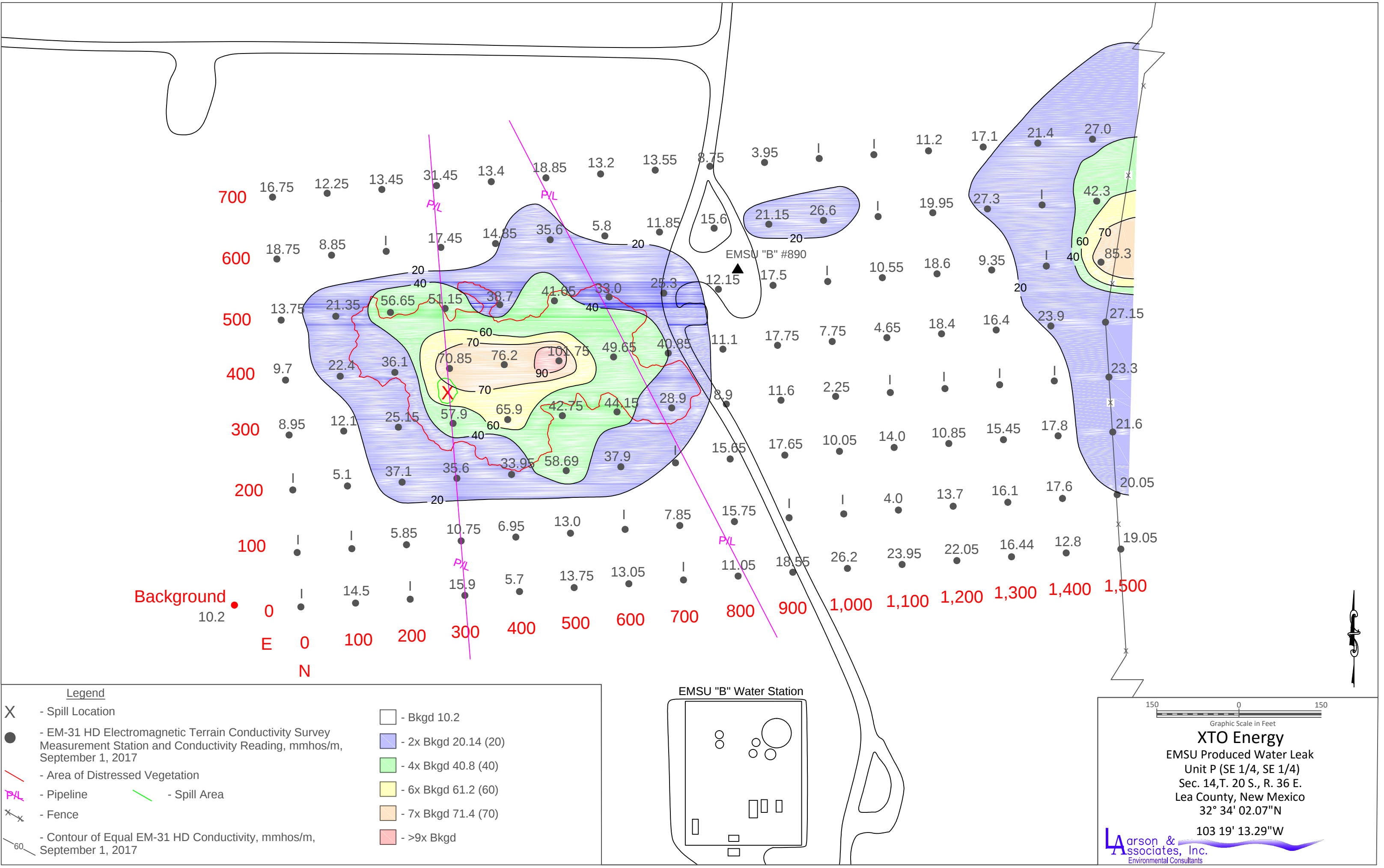


Figure 4 - EM-31 HD Conductivity Map, September 1, 2017

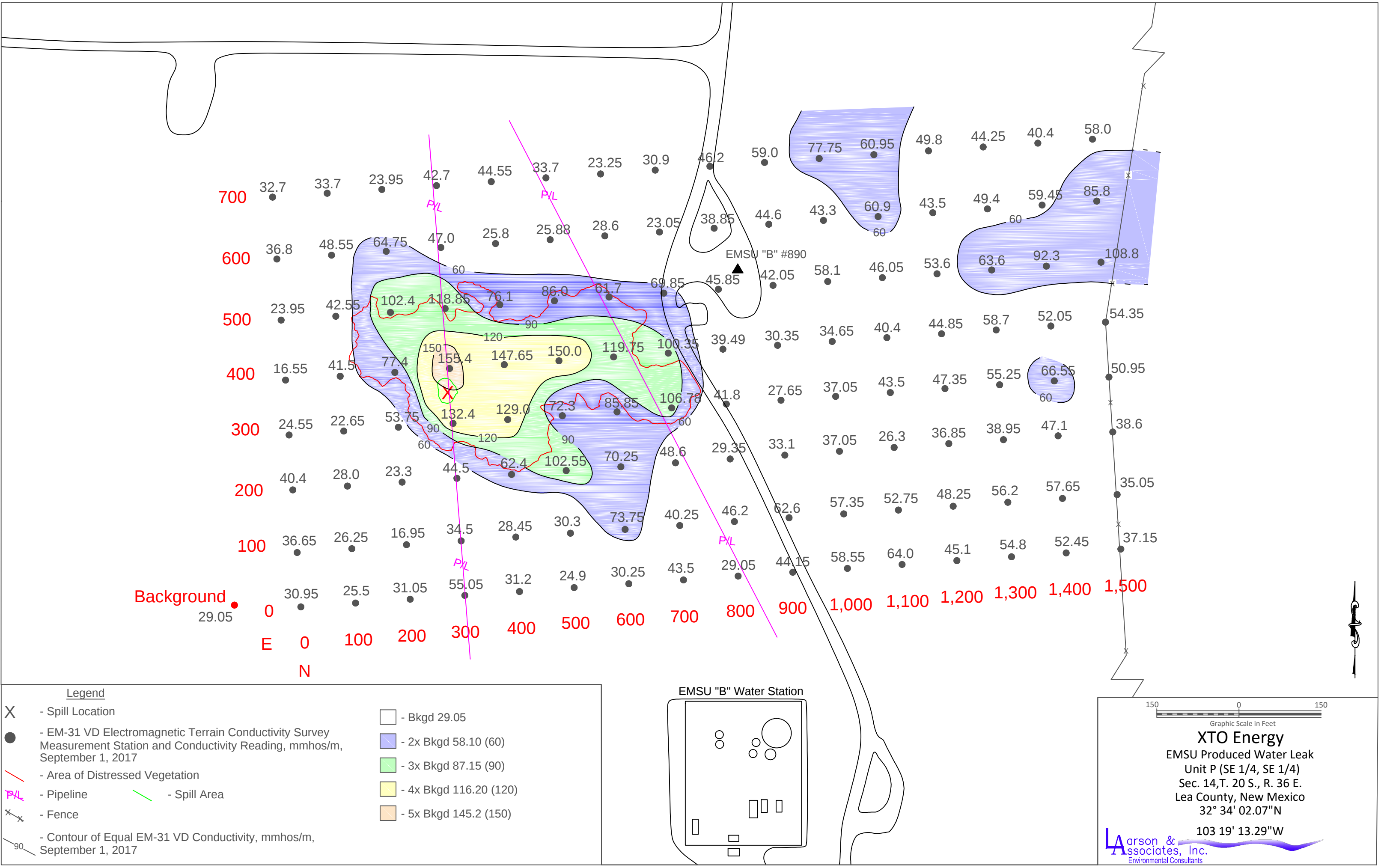


Figure 5 - EM-31 VD Conductivity Map, September 1, 2017

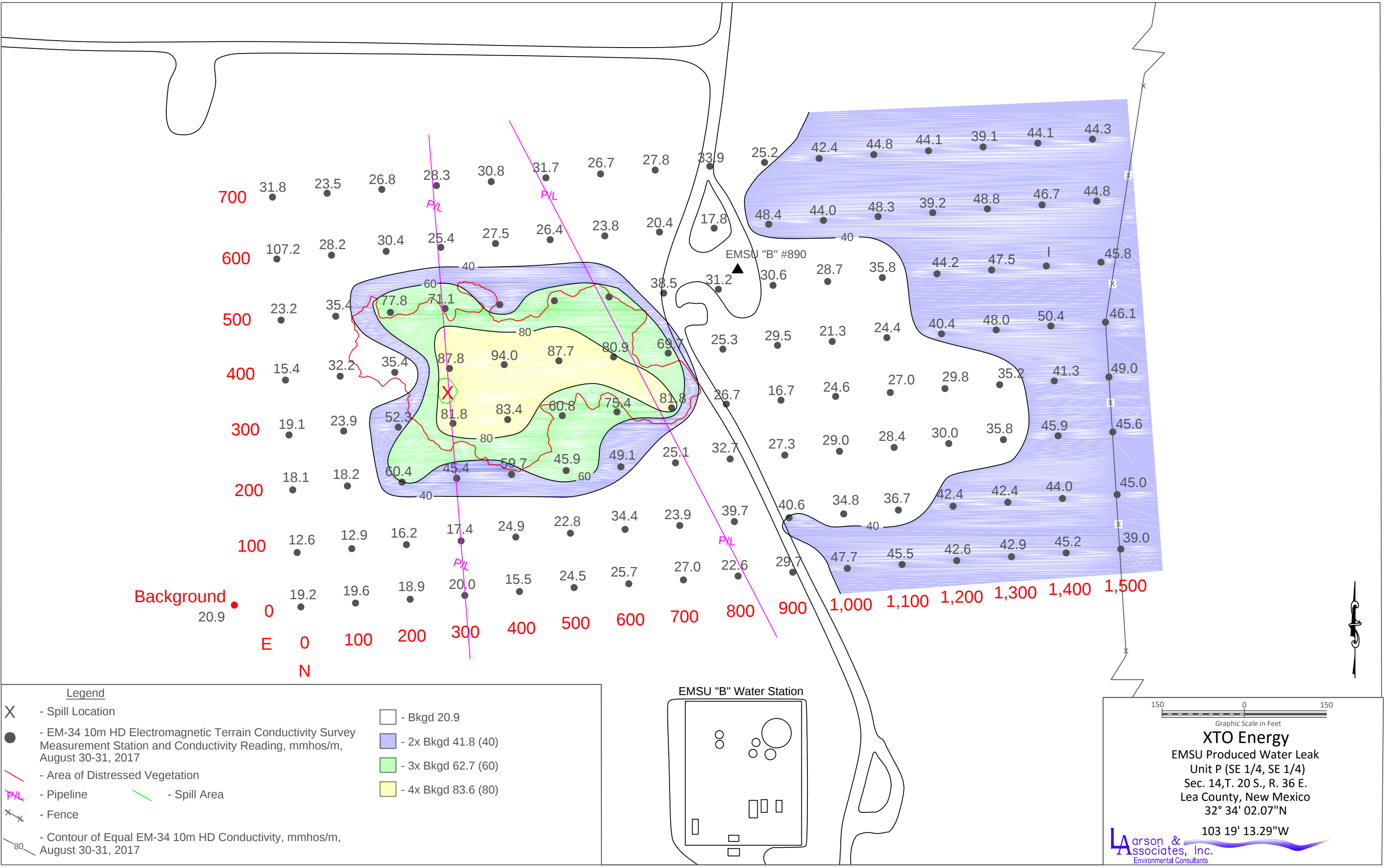


Figure 6 - EM-34 10m HD Conductivity Map, August 30-31, 2017

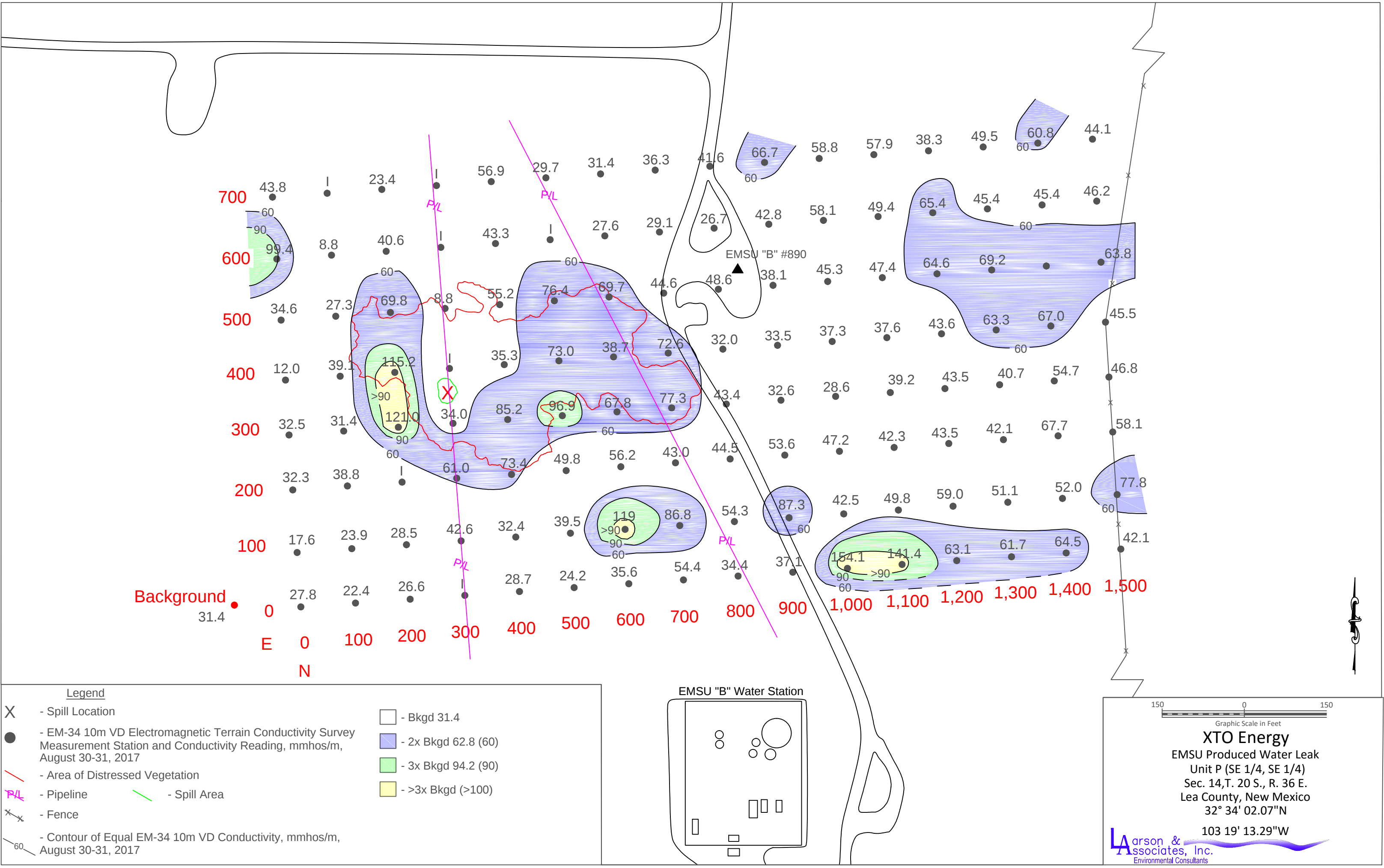


Figure 7 - EM-34 10m VD Conductivity Map, August 30-31, 2017

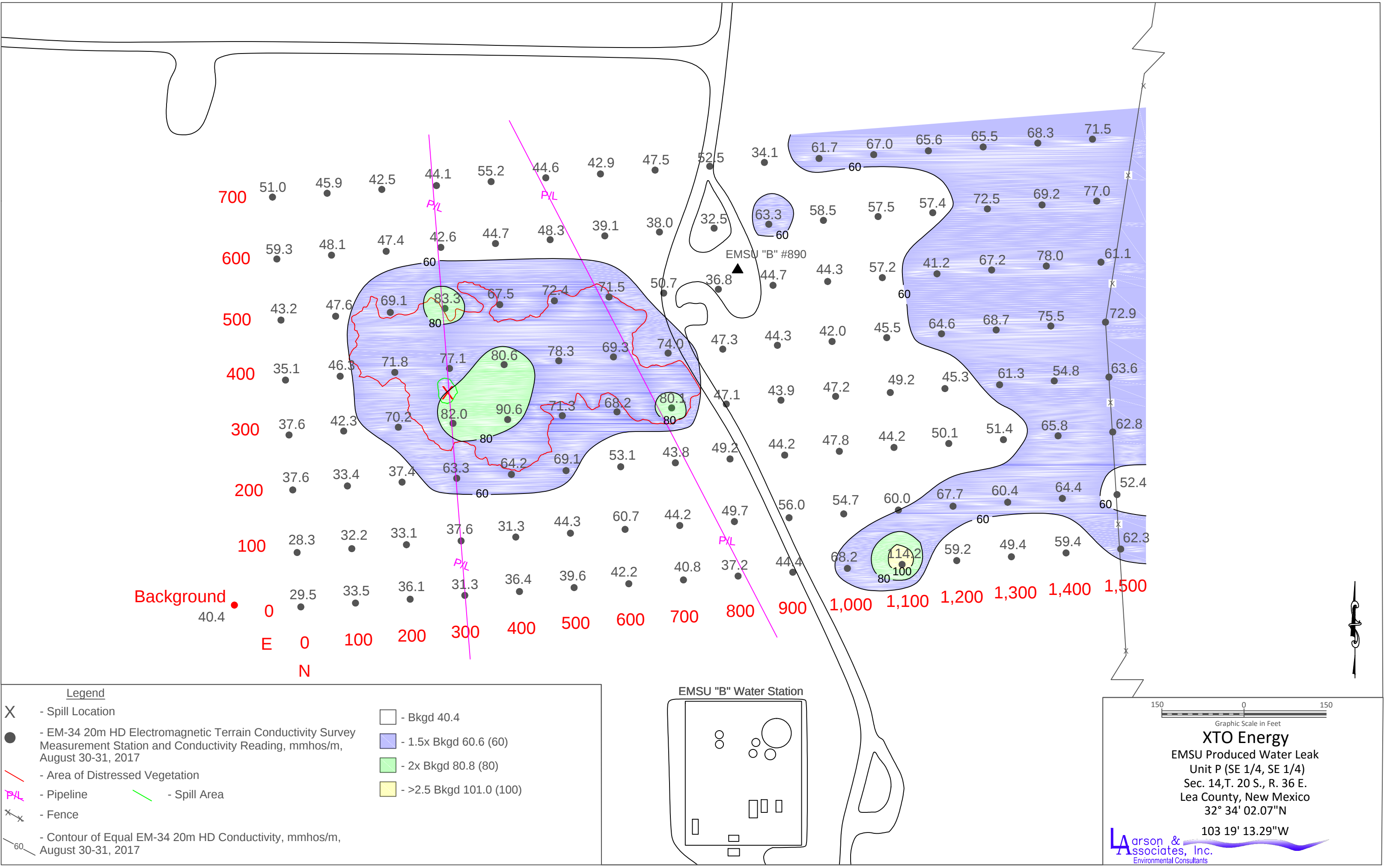


Figure 8 - EM-34 20m HD Conductivity Map, August 30-31, 2017



Figure 9 - EM-34 20m VD Conductivity Map, August 30-31, 2017

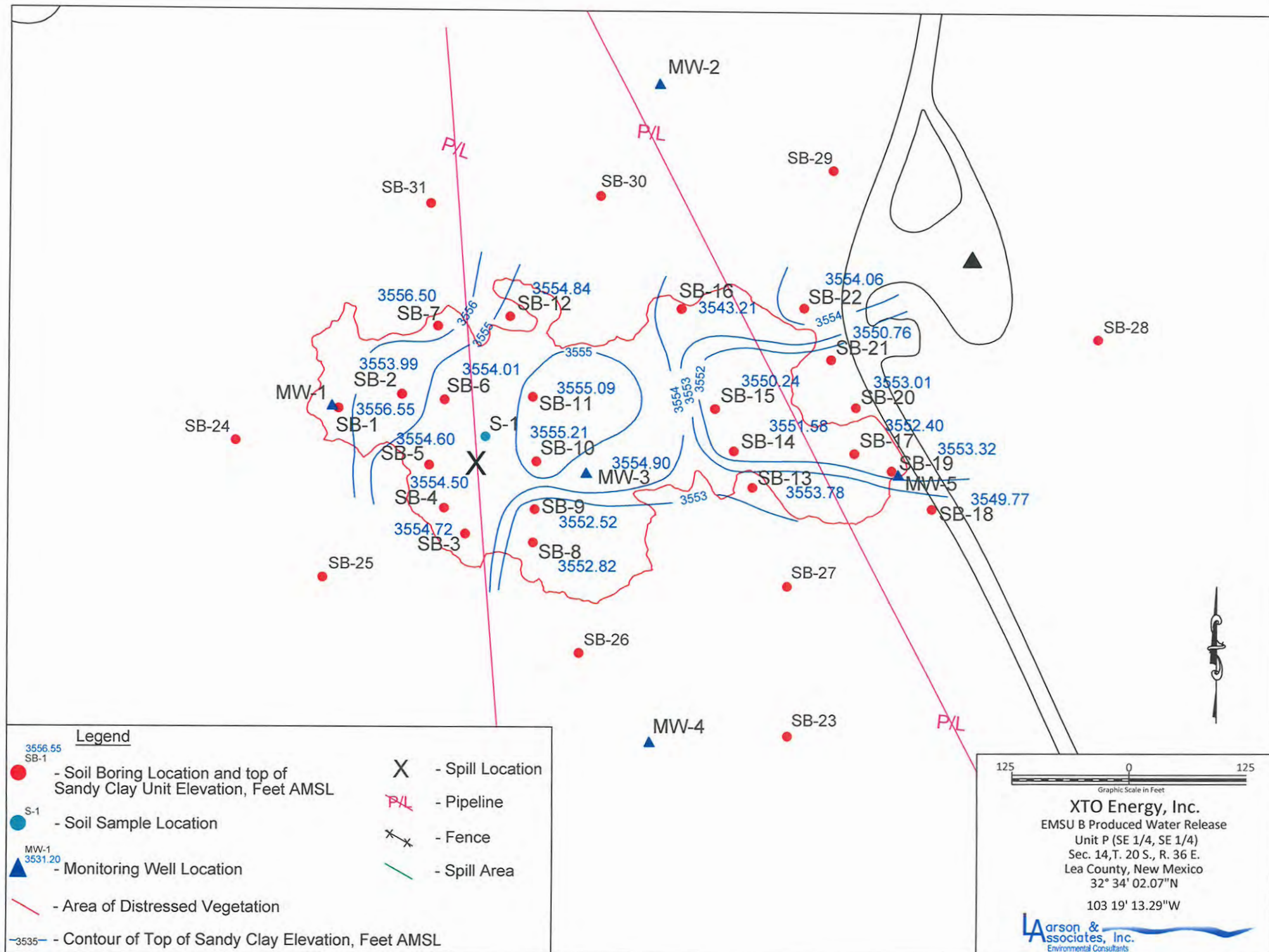
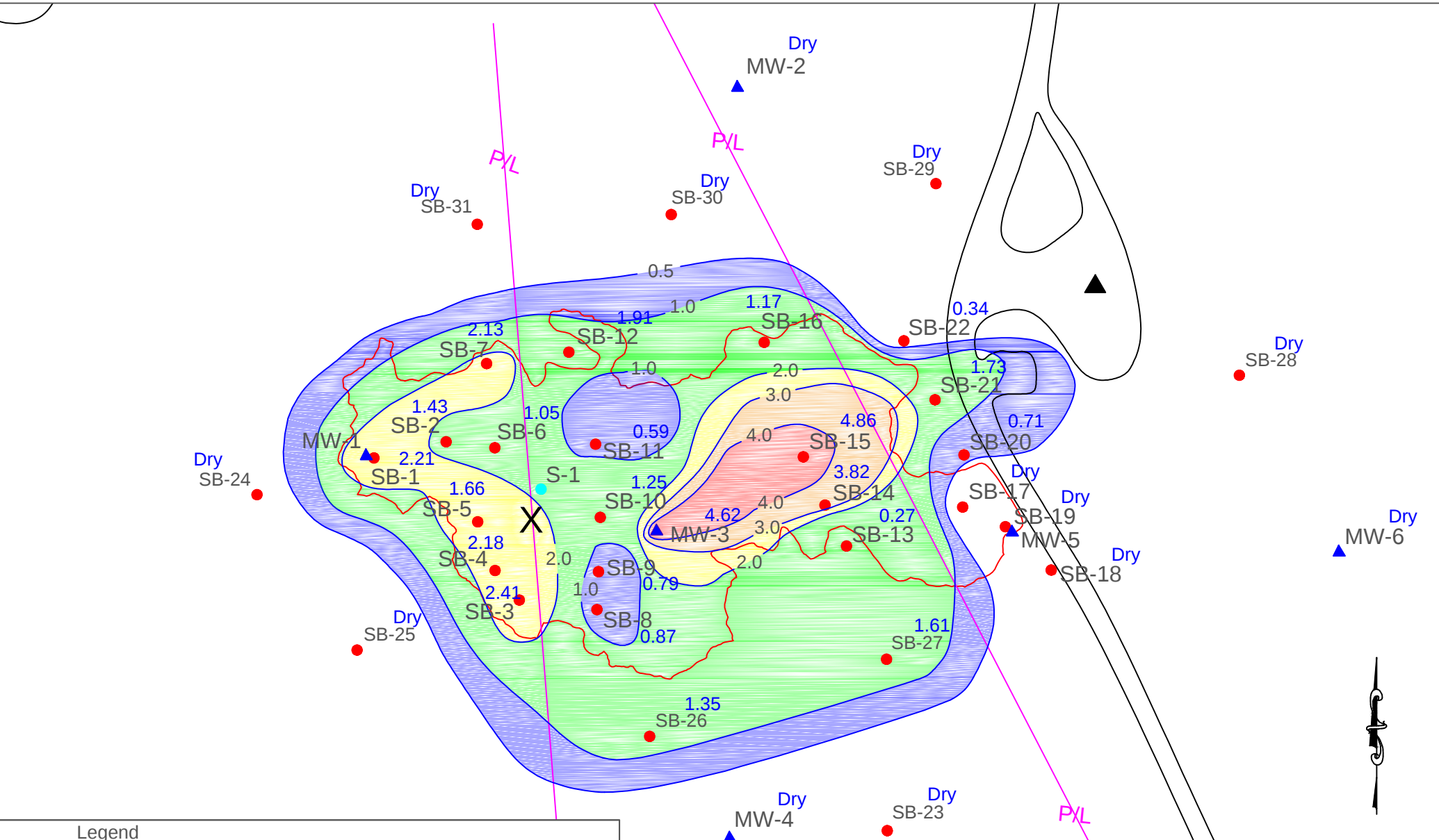


Figure 10 - Contour Map of Top of Sandy Clay Unit



X

- Spill Location

SB-1

- Soil Boring Location

S-1

- Soil Sample Location

MW-3

- Temporary Monitoring Well Location

-0.5-

- Contour of Produced Water Thickness, feet, November 27, 2017

P/L

- Pipeline

-X-X-

- Fence

-

- Spill Area

-

- Area of Distressed Vegetation

-0.5 -1.0 feet

-1.0 -2.0 feet

-2.0 -3.0 feet

-3.0 -4.0 feet

->4.0 feet

125 0 125

Graphic Scale in Feet

XTO Energy, Inc.

EMSU B Produced Water Release

Unit P (SE 1/4, SE 1/4)

Sec. 14, T. 20 S., R. 36 E.

Lea County, New Mexico

32° 34' 02.07" N

103 19' 13.29" W

Larson & Associates, Inc.

Environmental Consultants

Figure 11 - Site Map Showing Soil Boring (Shallow Well) Locations and Produced Water Column Thickness, November 27, 2017

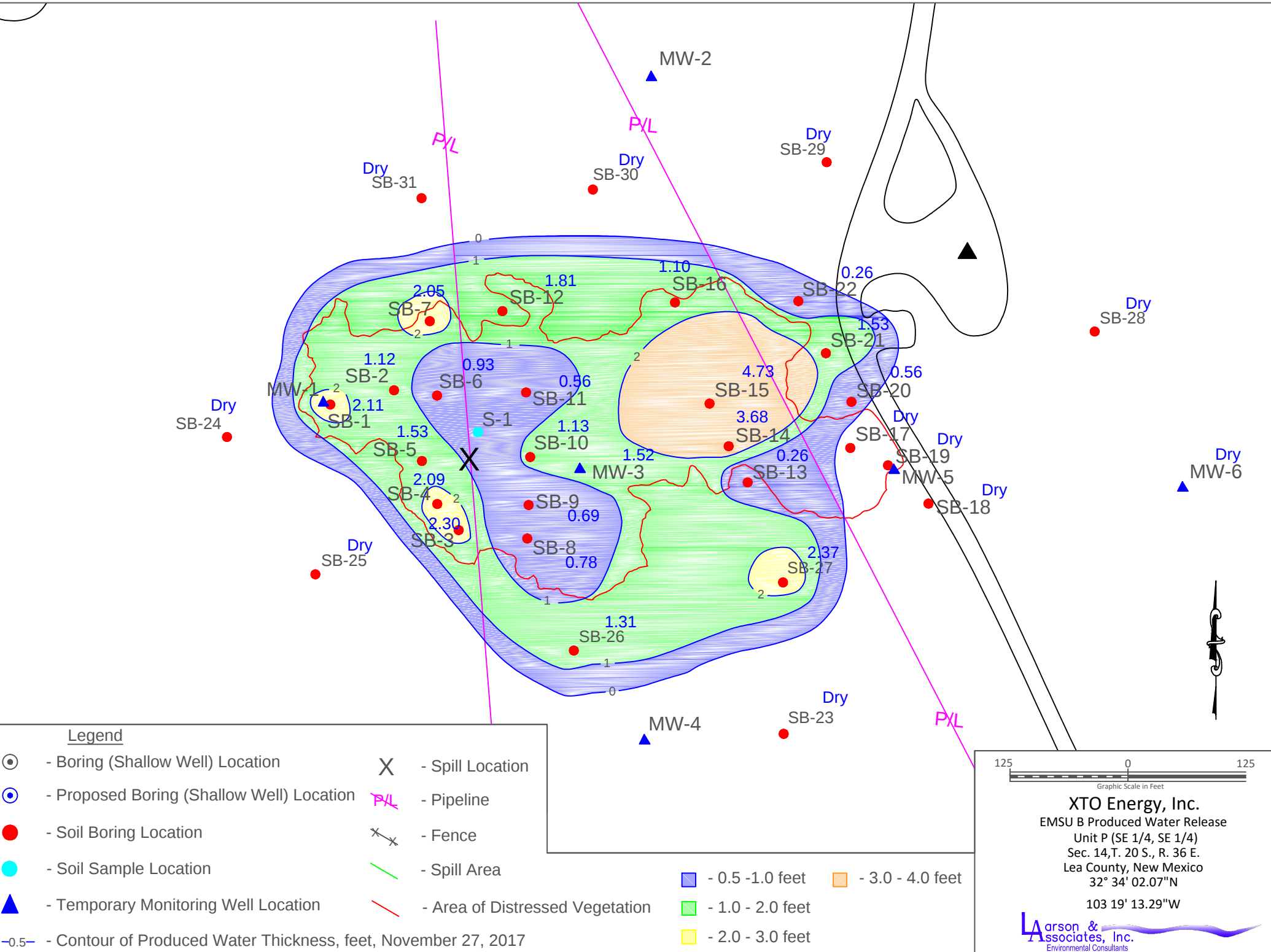


Figure 12 - Site Map Showing Soil Boring (Shallow Well) Locations and Produced Water Column Thickness, December 4, 2017

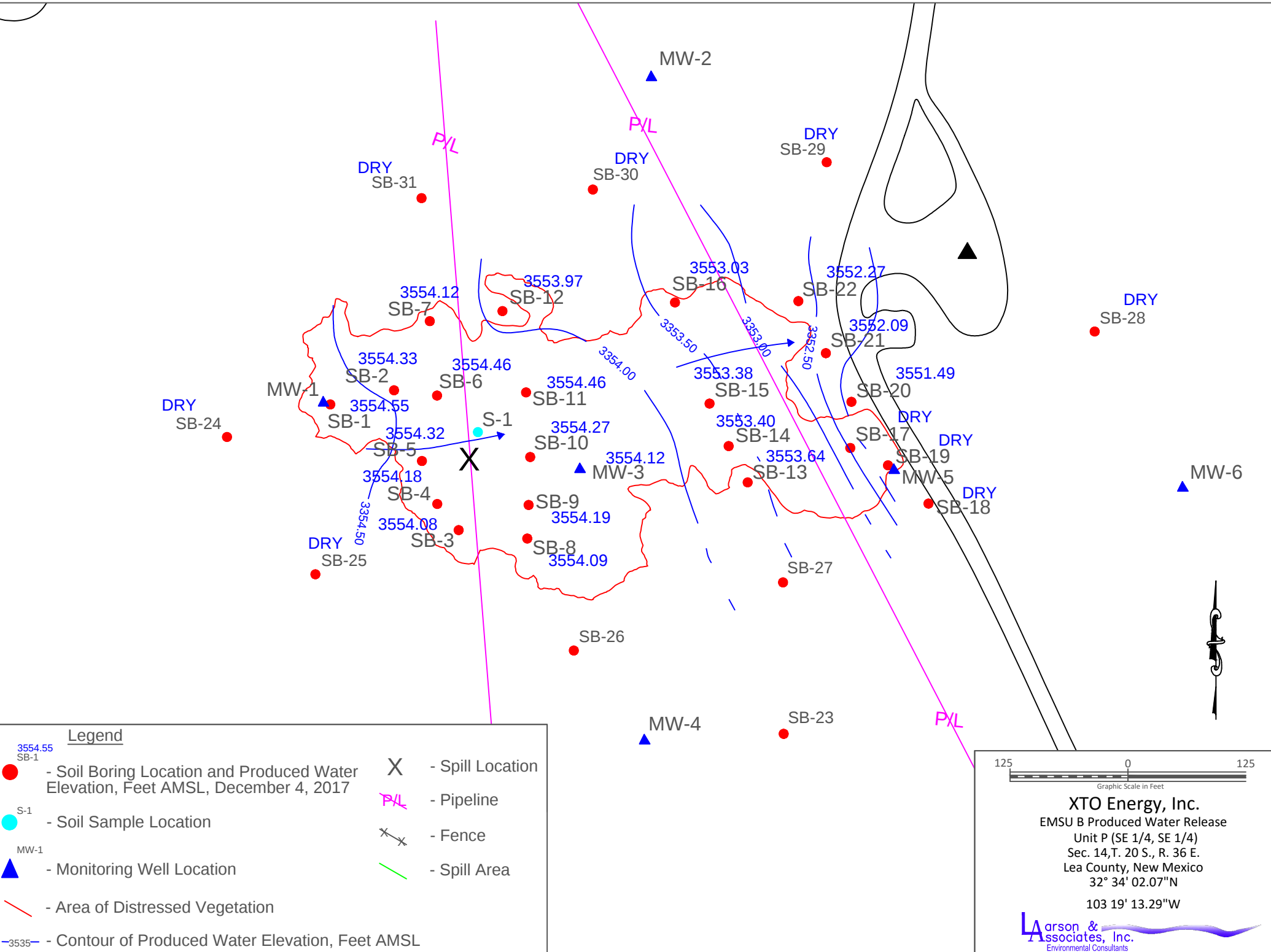


Figure 13 - Flow Map for Produced Water Elevation, Feet AMSL, December 4, 2017

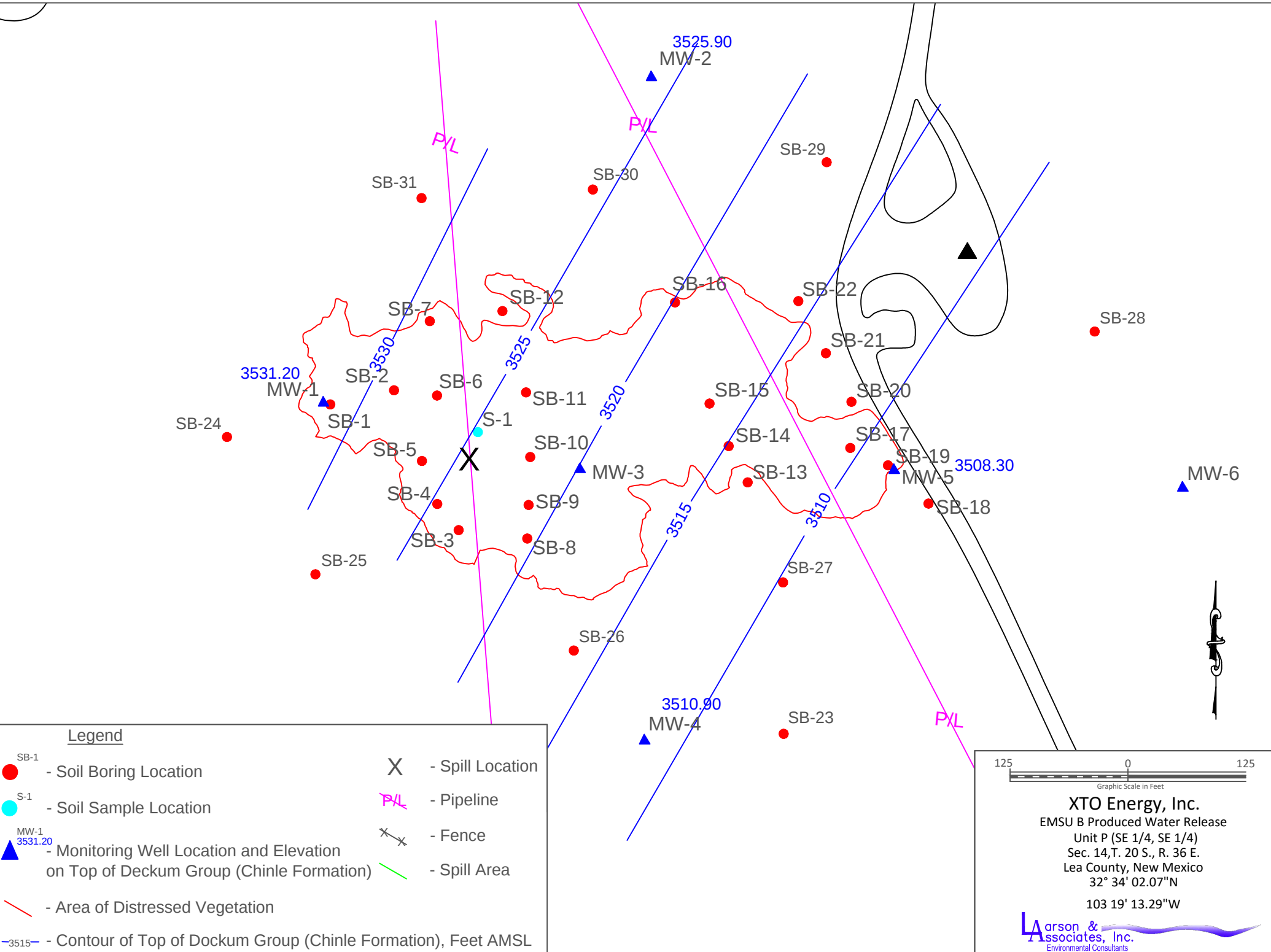


Figure 14 - Structure Contour Map on Top of Dockum Group (Chinle Formation)

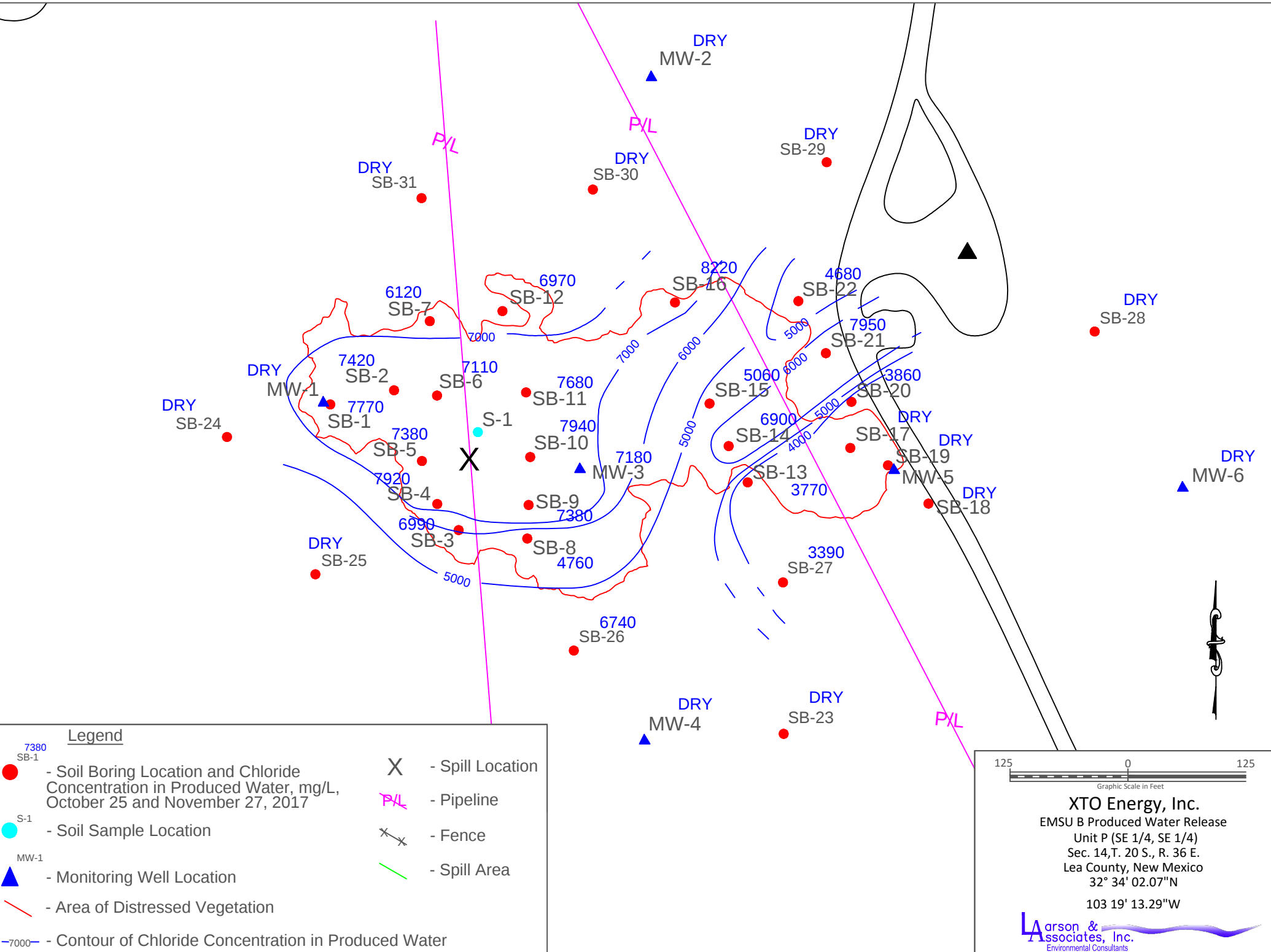


Figure 15 - Isopleth Map of Chloride Concentration in Produced Water

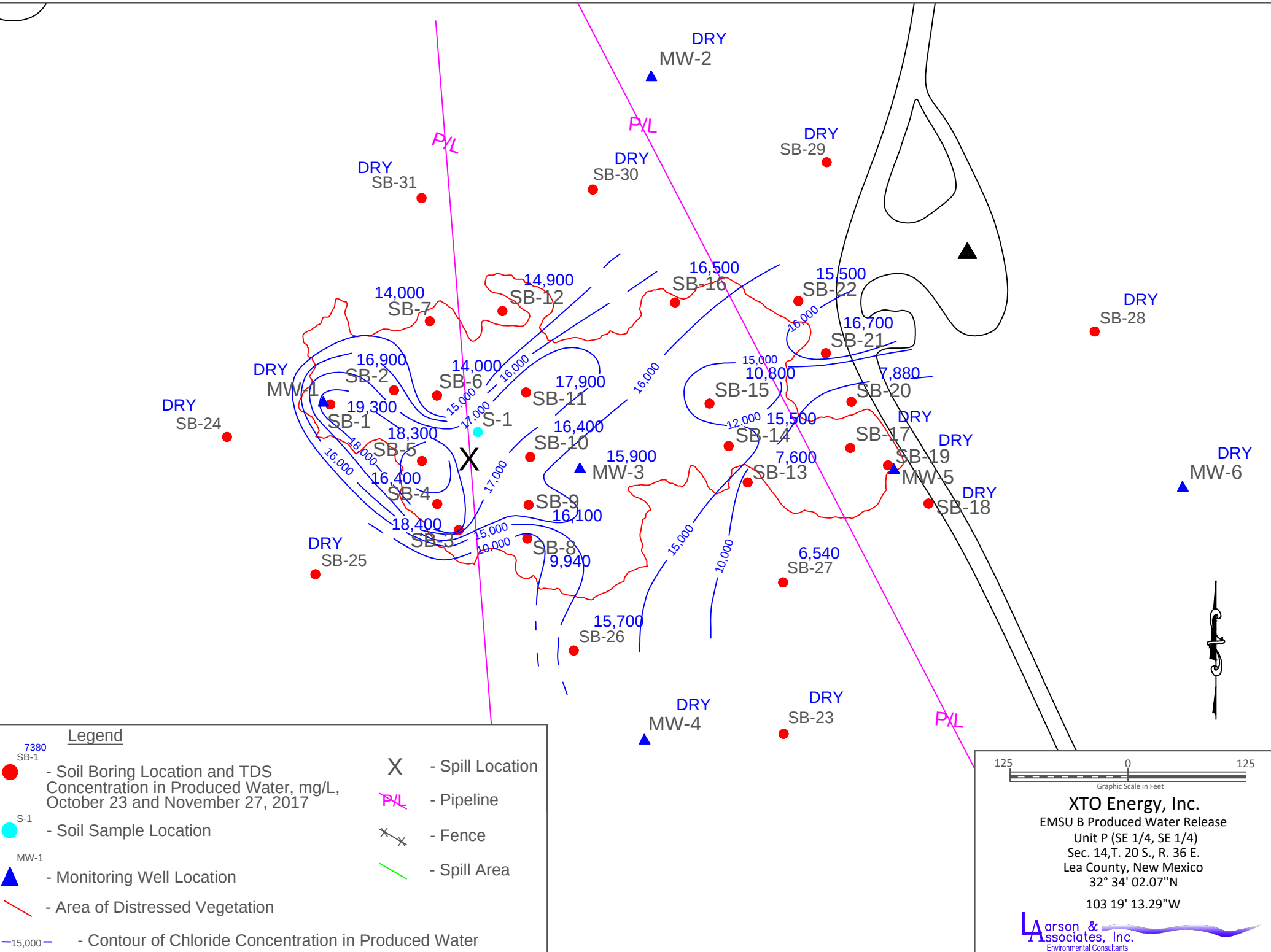


Figure 16 - Isopleth Map of TDS Concentration in Produced Water

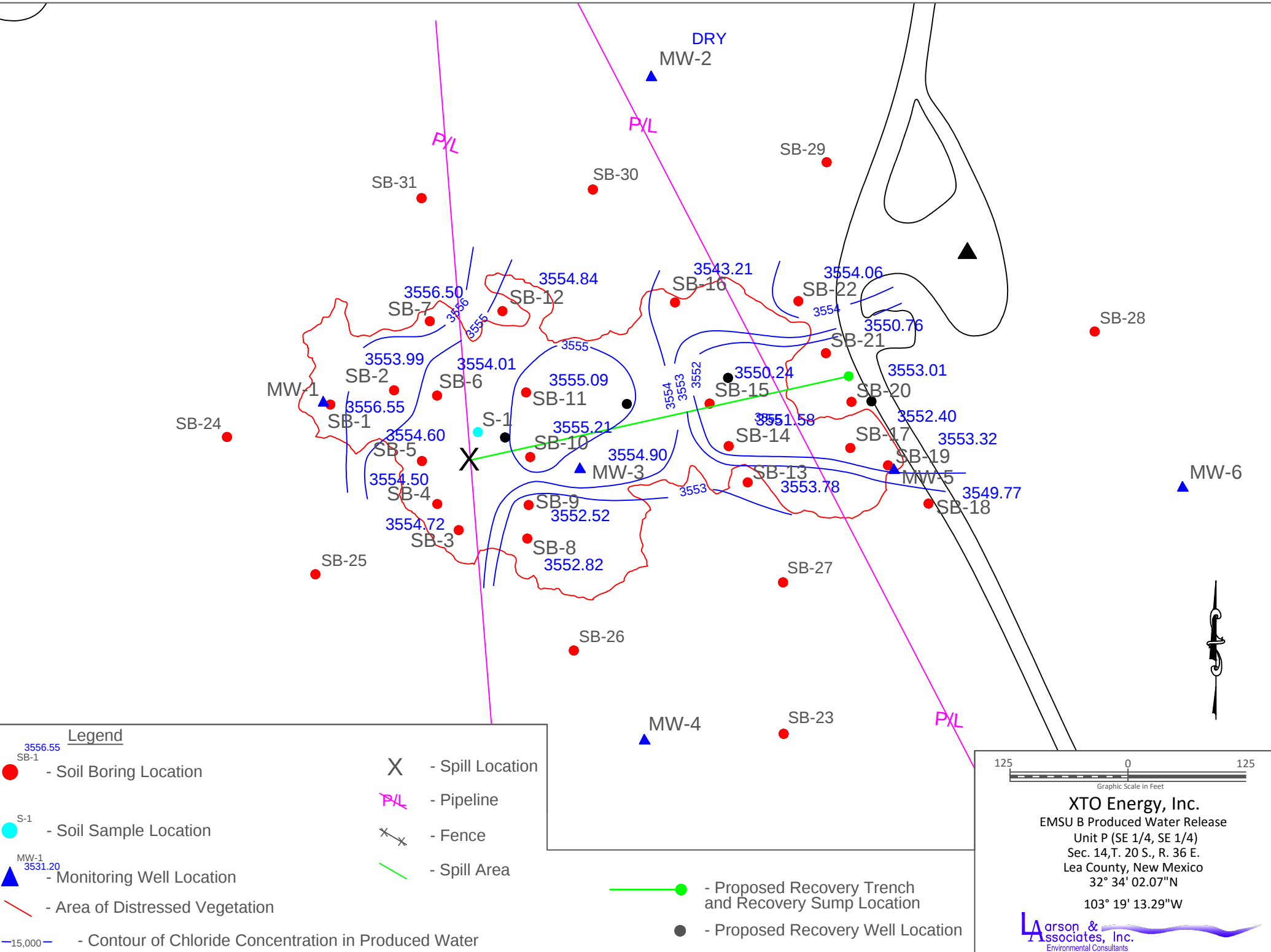


Figure 17 - Proposed Recovery Trench (Shallow) and Recovery Well Locations

APPENDIX A

Initial C-141

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

State of New Mexico
Energy Minerals and Natural Resources

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

Form C-141
Revised April 3, 2017

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

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company: XTO Energy	Contact: Shannon Walker
Address 500 W. Illinois Suite 100 Midland, TX 79701	Telephone No. : 432-661-4649
Facility Name: EMSU B Injection System	Facility Type: Water Injection

Surface Owner: BLM	Mineral Owner: BLM	API No.
---------------------------	---------------------------	---------

LOCATION OF RELEASE

Unit Letter P	Section 14	Township 20 S	Range 36 E	Feet from the	North/South Line	Feet from the	East/West Line	County
------------------	---------------	------------------	---------------	---------------	------------------	---------------	----------------	--------

Latitude 32°34'03.40"N Longitude 103°19'13.08"W NAD83

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: Not Yet Determined [see comment below]	Volume Recovered: 11,689 bbls [see comment below]
Source of Release: Injection Line	Date and Hour of Occurrence: Unknown	Date and Hour of Discovery: 6/9/2017
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? On Call Line	
By Whom? Shannon Walker	Date and Hour: 6/9/2017 ~ 1800 hrs MST and again on 6/28/2017	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

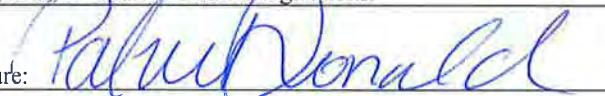
RECEIVED

By Olivia Yu at 4:08 pm, Aug 11, 2017

Describe Cause of Problem and Remedial Action Taken.* 10" cement lined steel line, corrosion. Shut field in to isolate leak point. XTO provided immediate verbal notification of the release on 6/9/17 and began recovering water with vacuum trucks. Affected area measures ~405' x 561'. XTO provided updated verbal notification on June 28, 2017, that it had increased its estimate of the release volume to 1,655 bbls. Contacted Mark Larson w/ Larson & Associates to perform initial evaluation and EM surveys of the area. XTO and Larson & Associates are working to update the estimated volume of the release. XTO will submit delineation plan for OCD approval.

Describe Area Affected and Cleanup Action Taken.*

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

Signature: 	OIL CONSERVATION DIVISION	
Printed Name: Patricia Donald	Approved by Environmental Specialist: 	
Title: Regulatory Analyst	Approval Date: 8/11/2017	Expiration Date:
E-mail Address: Patricia_Donald@xtoenergy.com	Conditions of Approval: see attached directive	Attached ☒
Date: 8/11/2017 Phone: (432) 571-8220		

* Attach Additional Sheets If Necessary

1RP-4789

fOY1722358348

nOY1722358518

pOY1722358879

Operator/Responsible Party,

The OCD has received the form C-141 you provided on 8/11/2017 regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number 1RP-4789 has been assigned. **Please refer to this case number in all future correspondence.**

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

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

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District 1 office in Hobbs on or before 9/11/2017. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

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

- Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C₆ thru C₃₆), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.
- Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C₆ thru C₃₆), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.
- Nominal detection limits for field and laboratory analyses must be provided.
- Composite sampling is not generally allowed.
- Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

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

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

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

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

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

Jim Griswold

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

APPENDIX B

OCD Correspondence

Mark Larson

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Wednesday, September 27, 2017 3:20 PM
To: Mark Larson
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Mr. Larson:

Just to confirm that there is only 1 part for this report. The filename suggests multiple parts to this interim report for 1RP-4789.

Thanks,
Olivia

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Tuesday, September 26, 2017 5:35 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Cc: 'Askin, David' <David_Askin@xtoenergy.com>; 'Lansdown, Scott' <Scott_Lansdown@xtoenergy.com>; 'Nina_Hutton@xtoenergy.com' <Nina_Hutton@xtoenergy.com>; 'Timothy_Friesenhahn@xtoenergy.com' <Timothy_Friesenhahn@xtoenergy.com>; 'Paschal, David' <David_Paschal@xtoenergy.com>; 'James_Fort@xtoenergy.com' <James_Fort@xtoenergy.com>; 'McMinn, Dudley' <Dudley_McMinn@xtoenergy.com>; 'Patricia_Donald@xtoenergy.com' <Patricia_Donald@xtoenergy.com>
Subject: Re: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Dear Olivia and Bradford,

This message is submitted to the NMOCD on behalf of XTO Energy, Inc. (XTO) to submit the interim delineation report for 1RP-4789. Please use the link below to download the report. The report presents the results of electromagnetic (EM-31 and EM-34) terrain conductivity surveys to qualitatively assess the extent of the produced water release. The report also presents the additional measures to delineate the release. Your approval of the plan is requested. Please contact Nina Hutton with XTO at (817) 885-2274 or Nina_Hutton@xtoenergy.com or me if you have questions.

Link: <https://files.acrobat.com/a/preview/ab4153db-3cf7-4c17-910d-24f3ef31354b>

Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-556-8656
Fax – 432-687-0456
mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Friday, August 25, 2017 5:04 PM
To: Mark Larson; Billings, Bradford, EMNRD; Griswold, Jim, EMNRD
Cc: 'Hutton, Nina'; 'Askin, David'
Subject: RE: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

Dear Mr. Larson:

NMOCD approves of the proposed delineation plan and proposed installation of a temporary groundwater monitoring well for 1RP-4789. Please be advised that subsequent to data from EM surveys, soil bores, and potentially more permanent groundwater monitoring wells, the proposed placement of the temporary groundwater monitoring well for background assessment may be altered or additional wells may be necessary to evaluate upgradient hydrology.

Please see the attachment for your records.

Thanks,

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

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

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Tuesday, August 22, 2017 4:04 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us>
Cc: 'Hutton, Nina' <Nina_Hutton@xtoenergy.com>; 'Askin, David' <David_Askin@xtoenergy.com>
Subject: Re: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

All,

Larson & Associates, Inc. (LAI), on behalf of XTO Energy, Inc. (XTO) submits the attached plan to delineate the extent of a produced water release (1RP-4789) from a 10 inch cement line steel line at the Eunice Monument South Unit (EMSU) B in Lea County, New Mexico. LAI, on behalf of XTO, requests approval to begin the delineation according to the attached plan. Please contact Nina Hutton with XTO at Paladin at (817) 885-2274 or Nina.Hutton@xtoenergy.com or me if you have questions.

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mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

Mark Larson

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Thursday, September 28, 2017 8:13 AM
To: Mark Larson
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Good morning Mark:

Thanks much for double checking.

Olivia

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Wednesday, September 27, 2017 4:04 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Dear Olivia,

I downloaded the report and it's complete. The mention of "Part 1" was probably from being sent to XTO for review since I had to send in 2 parts but it's complete when I opened the link. Please let me know if you have any problems opening the link.

Mark

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Wednesday, September 27, 2017 3:20 PM
To: Mark Larson
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

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Cc: 'Askin, David' <David_Askin@xtoenergy.com>; 'Lansdown, Scott' <Scott_Lansdown@xtoenergy.com>; 'Nina_Hutton@xtoenergy.com' <Nina_Hutton@xtoenergy.com>; 'Timothy_Friesenhahn@xtoenergy.com' <Timothy_Friesenhahn@xtoenergy.com>; 'Paschal, David' <David_Paschal@xtoenergy.com>; 'James_Fort@xtoenergy.com' <James_Fort@xtoenergy.com>; 'McMinn, Dudley' <Dudley_McMinn@xtoenergy.com>; 'Patricia_Donald@xtoenergy.com' <Patricia_Donald@xtoenergy.com>
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Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-556-8656
Fax – 432-687-0456
mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

From: Yu, Olivia, EMNRD [mailto:Olivia.Yu@state.nm.us]
Sent: Friday, August 25, 2017 5:04 PM
To: Mark Larson; Billings, Bradford, EMNRD; Griswold, Jim, EMNRD
Cc: 'Hutton, Nina'; 'Askin, David'
Subject: RE: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

Dear Mr. Larson:

NMOCD approves of the proposed delineation plan and proposed installation of a temporary groundwater monitoring well for 1RP-4789. Please be advised that subsequent to data from EM surveys, soil bores, and potentially more permanent groundwater monitoring wells, the proposed placement of the temporary groundwater monitoring well for background assessment may be altered or additional wells may be necessary to evaluate upgradient hydrology.

Please see the attachment for your records.

Thanks,

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

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Subject: Re: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

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Cell – 432- 556-8656
Fax – 432-687-0456
mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

Mark Larson

From: Yu, Olivia, EMNRD [Olivia.Yu@state.nm.us]
Sent: Thursday, October 05, 2017 12:10 PM
To: Mark Larson; Billings, Bradford, EMNRD
Cc: 'Askin, David'; 'Lansdown, Scott'; 'Nina_Hutton@xtoenergy.com'; 'Timothy_Friesenhahn@xtoenergy.com'; 'Paschal, David'; 'James_Fort@xtoenergy.com'; 'McMinn, Dudley'; 'Patricia_Donald@xtoenergy.com'
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Dear All:

FYI, the approved document for 1RP-4789 is uploaded to OCD online. File was rejected by the recipient's server.

Thanks,
Olivia

From: Yu, Olivia, EMNRD
Sent: Thursday, October 5, 2017 11:03 AM
To: 'Mark Larson' <Mark@laenvironmental.com>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Cc: 'Askin, David' <David_Askin@xtoenergy.com>; 'Lansdown, Scott' <Scott_Lansdown@xtoenergy.com>; 'Nina_Hutton@xtoenergy.com' <Nina_Hutton@xtoenergy.com>; 'Timothy_Friesenhahn@xtoenergy.com' <Timothy_Friesenhahn@xtoenergy.com>; 'Paschal, David' <David_Paschal@xtoenergy.com>; 'James_Fort@xtoenergy.com' <James_Fort@xtoenergy.com>; 'McMinn, Dudley' <Dudley_McMinn@xtoenergy.com>; 'Patricia_Donald@xtoenergy.com' <Patricia_Donald@xtoenergy.com>
Subject: RE: 1RP-4789 - Interim Delineation Report, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, September 21, 2017

Dear Mr. Larson:

NMOCD approves of the proposed second stage of delineation and establishment of the groundwater monitoring wells for 1RP-4789. Please note that Figure 10 only have 11 soil sampling locations demarcated.

Also, please be advised that NMOCD prefers 1) the 20 ft. length of the groundwater monitoring wells be placed equally above and below the air-water interface; and 2) top of casing marked for depth to groundwater determination, to which the water table can be measured to 0.01 ft.

Thanks,

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

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Sent: Tuesday, September 26, 2017 5:35 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Cc: 'Askin, David' <David_Askin@xtoenergy.com>; 'Lansdown, Scott' <Scott_Lansdown@xtoenergy.com>; 'Nina_Hutton@xtoenergy.com' <Nina_Hutton@xtoenergy.com>; 'Timothy_Friesenhahn@xtoenergy.com' <Timothy_Friesenhahn@xtoenergy.com>; 'Paschal, David' <David_Paschal@xtoenergy.com>; 'James_Fort@xtoenergy.com' <James_Fort@xtoenergy.com>; 'McMinn, Dudley' <Dudley_McMinn@xtoenergy.com>; 'Patricia_Donald@xtoenergy.com' <Patricia_Donald@xtoenergy.com>
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Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432-556-8656
Fax – 432-687-0456
mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

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To: Mark Larson; Billings, Bradford, EMNRD; Griswold, Jim, EMNRD
Cc: 'Hutton, Nina'; 'Askin, David'
Subject: RE: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

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Olivia.yu@state.nm.us
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Sent: Tuesday, August 22, 2017 4:04 PM
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Cc: 'Hutton, Nina' <Nina_Hutton@xtoenergy.com>; 'Askin, David' <David_Askin@xtoenergy.com>
Subject: Re: 1RP-4789 - Release Delineation Plan, EMSU B Produced Water Release, XTO Energy, Inc., Lea County, New Mexico, August 22, 2017

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mark@laenvironmental.com



"Serving the Permian Basin Since 2000"

APPENDIX C

Laboratory Reports

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



Analytical Report

Prepared for:

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

Project: XTO EMSU B
Project Number: 17-0176-01

Location:

Lab Order Number: 7J23002



NELAP/TCEQ # T104704516-16-7

Report Date: 10/25/17

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-7 0-1'	7J23002-01	Soil	10/19/17 09:20	10-23-2017 09:08
SB-7 3'-4'	7J23002-02	Soil	10/19/17 09:21	10-23-2017 09:08
SB-7 5'-6'	7J23002-03	Soil	10/19/17 09:23	10-23-2017 09:08
SB-8 0-1'	7J23002-04	Soil	10/19/17 11:05	10-23-2017 09:08
SB-8 3'-4'	7J23002-05	Soil	10/19/17 11:10	10-23-2017 09:08
SB-8 5'-6'	7J23002-06	Soil	10/19/17 11:13	10-23-2017 09:08
SB-9 0-1'	7J23002-07	Soil	10/19/17 11:32	10-23-2017 09:08
SB-9 3'-4'	7J23002-08	Soil	10/19/17 11:34	10-23-2017 09:08
SB-9 5'-6'	7J23002-09	Soil	10/19/17 11:38	10-23-2017 09:08
SB-10 0-1'	7J23002-10	Soil	10/19/17 12:32	10-23-2017 09:08
SB-10 3'-4'	7J23002-11	Soil	10/19/17 12:33	10-23-2017 09:08
SB-10 5'-6'	7J23002-12	Soil	10/19/17 12:37	10-23-2017 09:08
SB-11 0-1'	7J23002-13	Soil	10/19/17 13:20	10-23-2017 09:08
SB-11 3'-4'	7J23002-14	Soil	10/19/17 13:23	10-23-2017 09:08
SB-11 5'-6'	7J23002-15	Soil	10/19/17 13:26	10-23-2017 09:08
SB-12 0-1'	7J23002-16	Soil	10/19/17 10:10	10-23-2017 09:08
SB-12 3'-4'	7J23002-17	Soil	10/19/17 10:11	10-23-2017 09:08
SB-12 5'-6'	7J23002-18	Soil	10/19/17 10:19	10-23-2017 09:08
SB-13 0-1'	7J23002-19	Soil	10/19/17 13:52	10-23-2017 09:08
SB-13 3'-4'	7J23002-20	Soil	10/19/17 13:53	10-23-2017 09:08
SB-13 5'-6'	7J23002-21	Soil	10/19/17 13:55	10-23-2017 09:08
SB-13 7'-8'	7J23002-22	Soil	10/19/17 13:57	10-23-2017 09:08
SB-14 0-1'	7J23002-23	Soil	10/19/17 14:16	10-23-2017 09:08
SB-14 3'-4'	7J23002-24	Soil	10/19/17 14:17	10-23-2017 09:08
SB-14 5'-6'	7J23002-25	Soil	10/19/17 14:21	10-23-2017 09:08
SB-15 0-1'	7J23002-26	Soil	10/19/17 14:45	10-23-2017 09:08
SB-15 3'-4'	7J23002-27	Soil	10/19/17 14:47	10-23-2017 09:08
SB-15 5'-6'	7J23002-28	Soil	10/19/17 14:50	10-23-2017 09:08
SB-16 0-1'	7J23002-29	Soil	10/20/17 10:17	10-23-2017 09:08
SB-16 3'-4'	7J23002-30	Soil	10/20/17 10:18	10-23-2017 09:08
SB-16 5'-6'	7J23002-31	Soil	10/20/17 10:21	10-23-2017 09:08
SB-16 7'-8'	7J23002-32	Soil	10/20/17 10:03	10-23-2017 09:08
SB-17 0-1'	7J23002-33	Soil	10/20/17 11:12	10-23-2017 09:08
SB-17 3'-4'	7J23002-34	Soil	10/20/17 11:13	10-23-2017 09:08

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-18 0-1'	7J23002-35	Soil	10/20/17 10:50	10-23-2017 09:08
SB-18 3'-4'	7J23002-36	Soil	10/20/17 10:51	10-23-2017 09:08
SB-18 5'-6'	7J23002-37	Soil	10/20/17 10:53	10-23-2017 09:08
SB-20 0-1'	7J23002-38	Soil	10/20/17 12:22	10-23-2017 09:08
SB-20 3'-4'	7J23002-39	Soil	10/20/17 12:22	10-23-2017 09:08
SB-20 5'-6'	7J23002-40	Soil	10/20/17 12:25	10-23-2017 09:08
SB-21 0-1'	7J23002-41	Soil	10/20/17 12:38	10-23-2017 09:08
SB-21 3'-4'	7J23002-42	Soil	10/20/17 12:39	10-23-2017 09:08
SB-21 5'-6'	7J23002-43	Soil	10/20/17 12:41	10-23-2017 09:08
SB-22 0-1'	7J23002-44	Soil	10/20/17 12:58	10-23-2017 09:08
SB-22 3'-4'	7J23002-45	Soil	10/20/17 12:59	10-23-2017 09:08
SB-22 5'-6'	7J23002-46	Soil	10/20/17 13:00	10-23-2017 09:08
SB-16 7'-8'	7J23002-47	Soil	10/20/17 10:55	10-23-2017 09:08
SB-17 5'-6'	7J23002-48	Soil	10/20/17 11:17	10-23-2017 09:08

DRAFT REPORT

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Permian Basin Environmental Lab.

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-7 0-1'
7J23002-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00215	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00215	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		94.7 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		102 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	4.69	1.08	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		106 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		126 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.9	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-7 3'-4'
7J23002-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	53.4	1.08	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-7 5'-6'
7J23002-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	38.8	1.06	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	6.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-8 0-1'
7J23002-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00105	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00211	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00105	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00211	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00105	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		79.2 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		93.3 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	9.66	1.05	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		107 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		127 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.3	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-8 3'-4'
7J23002-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	8.16	1.06	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	6.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-8 5'-6'
7J23002-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	21.1	1.11	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0
% Moisture	10.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-9 0-1'
7J23002-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00215	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00215	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00108	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		87.1 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		93.4 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	58.3	1.08	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.9	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.7 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		114 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.9	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-9 3'-4'
7J23002-08 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	12.4	1.09	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0
% Moisture	8.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-9 5'-6
7J23002-09 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	195	1.09	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0
% Moisture	9.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-10 0-1'
7J23002-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00213	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00213	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		94.6 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		90.0 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	73.0	1.06	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	6.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.6	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.6	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.6	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		103 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		122 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.6	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-10 3'-4'
7J23002-11 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	64.1	1.05	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-10 5'-6
7J23002-12 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	64.2	1.04	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-11 0-1'
7J23002-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		108 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		89.5 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	31.8	1.03	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		102 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		121 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-11 3'-4'
7J23002-14 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	78.6	1.02	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-11 5'-6
7J23002-15 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	22.0	1.03	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-12 0-1'
7J23002-16 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00202	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00202	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		93.2 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		93.5 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.01	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	1.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.3	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		93.1 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		110 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.3	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-12 3'-4'
7J23002-17 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	7.75	1.01	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	1.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-12 5'-6
7J23002-18 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	10.6	1.03	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-13 0-1'
7J23002-19 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		91.3 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		86.2 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	24.5	1.03	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		102 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		120 %	70-130		P7J2304	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-13 3'-4'
7J23002-20 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.03	mg/kg dry	1	P7J2308	10/23/17	10/23/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-13 5'-6
7J23002-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	32.7	1.10	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	9.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-13 7'-8
7J23002-22 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	108	1.08	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-14 0-1'
7J23002-23 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		103 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		98.8 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	4.23	1.02	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/24/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/24/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/24/17	TPH 8015M	
Surrogate: 1-Chlorooctane		122 %	70-130		P7J2310	10/23/17	10/24/17	TPH 8015M	
Surrogate: o-Terphenyl		141 %	70-130		P7J2310	10/23/17	10/24/17	TPH 8015M	S-GC
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	10/23/17	10/24/17	calc	

DRAFT REPORT

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P.O. Box 50685
Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-14 3'-4'
7J23002-24 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	35.6	1.08	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-14 5'-6
7J23002-25 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.04	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-15 0-1'
7J23002-26 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.6 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		86.1 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	12.0	1.02	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		113 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		129 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-15 3'-4'
7J23002-27 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	62.8	1.02	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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Larson & Associates, Inc.
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Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-15 5'-6
7J23002-28 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	13.1	1.09	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	8.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-16 0-1'
7J23002-29 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		102 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		92.2 %	75-125		P7J2311	10/23/17	10/23/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	22.3	1.03	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		109 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		124 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-16 3'-4'
7J23002-30 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00213	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00213	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00106	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		101 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		109 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.06	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	6.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.6	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.6	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.6	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		107 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		122 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.6	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-16 5'-6
7J23002-31 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	4.27	1.04	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-16 7'-8'
7J23002-32 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	72.3	1.11	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	10.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-17 0-1'
7J23002-33 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00104	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00208	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00104	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00208	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00104	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		103 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		116 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	2.35	1.04	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.0	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		108 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		122 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-17 3'-4'
7J23002-34 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	24.2	1.02	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-18 0-1'
7J23002-35 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00114	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		102 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		89.2 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	1.40	1.14	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.4	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	28.4	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	28.4	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		116 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		132 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	S-GC
Total Petroleum Hydrocarbon C6-C35	ND	28.4	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-18 3'-4'
7J23002-36 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.11	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	10.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-18 5'-6'
7J23002-37 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.04	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-20 0-1'
7J23002-38 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		104 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		112 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.02	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		72.4 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		83.0 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-20 3'-4'
7J23002-39 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	90.1	1.04	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-20 5'-6
7J23002-40 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.03	mg/kg dry	1	P7J2314	10/23/17	10/24/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-21 0-1'
7J23002-41 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		97.3 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		105 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.02	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		83.0 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		94.9 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-21 3'-4'
7J23002-42 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.18	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	15.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-21 5'-6'
7J23002-43 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	2.14	1.04	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-22 0-1'
7J23002-44 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Toluene	ND	0.00202	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Ethylbenzene	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (p/m)	ND	0.00202	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Xylene (o)	ND	0.00101	mg/kg dry	1	P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		104 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		94.3 %	75-125		P7J2311	10/23/17	10/24/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.01	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	1.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.3	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C12-C28	ND	25.3	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
>C28-C35	ND	25.3	mg/kg dry	1	P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: 1-Chlorooctane		111 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Surrogate: o-Terphenyl		126 %	70-130		P7J2310	10/23/17	10/23/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.3	mg/kg dry	1	[CALC]	10/23/17	10/23/17	calc	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-22 3'-4
7J23002-45 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.05	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-22 5'-6'
7J23002-46 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.27	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	21.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-16 7'-8'
7J23002-47 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.04	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB-17 5'-6'
7J23002-48 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	33.3	1.08	mg/kg dry	1	P7J2315	10/23/17	10/24/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2403	10/24/17	10/24/17	ASTM D2216	

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2311 - General Preparation (GC)

Blank (P7J2311-BLK1)

Prepared & Analyzed: 10/23/17

Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 4-Bromofluorobenzene	0.0545		"	0.0600		90.8	75-125			
Surrogate: 1,4-Difluorobenzene	0.0549		"	0.0600		91.5	75-125			

LCS (P7J2311-BS1)

Prepared & Analyzed: 10/23/17

Benzene	0.117	0.00100	mg/kg wet				70-130			
Toluene	0.117	0.00200	"				70-130			
Ethylbenzene	0.116	0.00100	"				70-130			
Xylene (p/m)	0.215	0.00200	"				70-130			
Xylene (o)	0.120	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	0.0681		"	0.0600		113	75-125			
Surrogate: 4-Bromofluorobenzene	0.0638		"	0.0600		106	75-125			

LCS Dup (P7J2311-BS1)

Prepared & Analyzed: 10/23/17

Benzene	0.118	0.00100	mg/kg wet				70-130		20	
Toluene	0.116	0.00200	"				70-130		20	
Ethylbenzene	0.112	0.00100	"				70-130		20	
Xylene (p/m)	0.216	0.00200	"				70-130		20	
Xylene (o)	0.117	0.00100	"				70-130		20	
Surrogate: 1,4-Difluorobenzene	0.0651		"	0.0600		108	75-125			
Surrogate: 4-Bromofluorobenzene	0.0649		"	0.0600		108	75-125			

Calibration Blank (P7J2311-CCB1)

Prepared & Analyzed: 10/23/17

Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 1,4-Difluorobenzene	0.0560		"	0.0600		93.3	75-125			
Surrogate: 4-Bromofluorobenzene	0.0529		"	0.0600		88.2	75-125			

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2311 - General Preparation (GC)

Calibration Blank (P7J2311-CCB2)

Prepared: 10/23/17 Analyzed: 10/24/17

Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 1,4-Difluorobenzene	0.0534		"	0.0600		89.0	75-125			
Surrogate: 4-Bromofluorobenzene	0.0576		"	0.0600		96.0	75-125			

Calibration Check (P7J2311-CCV1)

Prepared & Analyzed: 10/23/17

Benzene	0.115	0.00100	mg/kg wet	0.100		115	80-120			
Toluene	0.107	0.00200	"	0.100		107	80-120			
Ethylbenzene	0.112	0.00100	"	0.100		112	80-120			
Xylene (p/m)	0.219	0.00200	"	0.200		109	80-120			
Xylene (o)	0.117	0.00100	"	0.100		117	80-120			
Surrogate: 4-Bromofluorobenzene	0.0600		"	0.0600		100	75-125			
Surrogate: 1,4-Difluorobenzene	0.0640		"	0.0600		107	75-125			

Calibration Check (P7J2311-CCV2)

Prepared: 10/23/17 Analyzed: 10/24/17

Benzene	0.101	0.00100	mg/kg wet	0.100		101	80-120			
Toluene	0.0972	0.00200	"	0.100		97.2	80-120			
Ethylbenzene	0.0997	0.00100	"	0.100		99.7	80-120			
Xylene (p/m)	0.217	0.00200	"	0.200		108	80-120			
Xylene (o)	0.113	0.00100	"	0.100		113	80-120			
Surrogate: 1,4-Difluorobenzene	0.0624		"	0.0600		104	75-125			
Surrogate: 4-Bromofluorobenzene	0.0625		"	0.0600		104	75-125			

Calibration Check (P7J2311-CCV3)

Prepared: 10/23/17 Analyzed: 10/24/17

Benzene	0.108	0.00100	mg/kg wet	0.100		108	80-120			
Toluene	0.105	0.00200	"	0.100		105	80-120			
Ethylbenzene	0.106	0.00100	"	0.100		106	80-120			
Xylene (p/m)	0.216	0.00200	"	0.200		108	80-120			
Xylene (o)	0.111	0.00100	"	0.100		111	80-120			
Surrogate: 4-Bromofluorobenzene	0.0646		"	0.0600		108	75-125			
Surrogate: 1,4-Difluorobenzene	0.0583		"	0.0600		97.2	75-125			

DRAFT REPORT

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Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2311 - General Preparation (GC)

Matrix Spike (P7J2311-MS1)

Source: 7J23002-10

Prepared: 10/23/17 Analyzed: 10/24/17

Benzene	0.0974	0.00106	mg/kg dry		ND		80-120			
Toluene	0.0931	0.00213	"		ND		80-120			
Ethylbenzene	0.108	0.00106	"		ND		80-120			
Xylene (p/m)	0.196	0.00213	"		ND		80-120			
Xylene (o)	0.0892	0.00106	"		ND		80-120			
Surrogate: 1,4-Difluorobenzene	0.0632		"	0.0638		98.9	75-125			
Surrogate: 4-Bromofluorobenzene	0.0697		"	0.0638		109	75-125			

Matrix Spike Dup (P7J2311-MSD1)

Source: 7J23002-10

Prepared: 10/23/17 Analyzed: 10/24/17

Benzene	0.100	0.00106	mg/kg dry		ND		80-120		20	
Toluene	0.0939	0.00213	"		ND		80-120		20	
Ethylbenzene	0.126	0.00106	"		ND		80-120		20	
Xylene (p/m)	0.226	0.00213	"		ND		80-120		20	
Xylene (o)	0.102	0.00106	"		ND		80-120		20	
Surrogate: 4-Bromofluorobenzene	0.0713		"	0.0638		112	75-125			
Surrogate: 1,4-Difluorobenzene	0.0589		"	0.0638		92.2	75-125			

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2308 - * DEFAULT PREP *****

Blank (P7J2308-BLK1)				Prepared & Analyzed: 10/23/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7J2308-BS1)				Prepared & Analyzed: 10/23/17						
Chloride	424	1.00	mg/kg wet	400		106	80-120			
LCS Dup (P7J2308-BSD1)				Prepared & Analyzed: 10/23/17						
Chloride	418	1.00	mg/kg wet	400		104	80-120	1.45	20	
Duplicate (P7J2308-DUP1)				Source: 7J23002-01		Prepared & Analyzed: 10/23/17				
Chloride	1.42	1.08	mg/kg dry		4.69			107	20	R2
Duplicate (P7J2308-DUP2)				Source: 7J23002-11		Prepared & Analyzed: 10/23/17				
Chloride	63.7	1.05	mg/kg dry		64.1			0.642	20	
Matrix Spike (P7J2308-MS1)				Source: 7J23002-01		Prepared & Analyzed: 10/23/17				
Chloride	1100	1.08	mg/kg dry	1080	4.69	102	80-120			

Batch P7J2314 - * DEFAULT PREP *****

Blank (P7J2314-BLK1)				Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7J2314-BS1)				Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	441	1.00	mg/kg wet	400		110	80-120			
LCS Dup (P7J2314-BSD1)				Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	442	1.00	mg/kg wet	400		110	80-120	0.0747	20	

DRAFT REPORT

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Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2314 - * DEFAULT PREP *****

Duplicate (P7J2314-DUP1)		Source: 7J23002-21		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	28.0	1.10	mg/kg dry		32.7			15.5	20	
Duplicate (P7J2314-DUP2)		Source: 7J23002-31		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	4.29	1.04	mg/kg dry		4.27			0.487	20	
Matrix Spike (P7J2314-MS1)		Source: 7J23002-21		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	1200	1.10	mg/kg dry	1100	32.7	106	80-120			

Batch P7J2315 - * DEFAULT PREP *****

Blank (P7J2315-BLK1)		Prepared: 10/23/17 Analyzed: 10/24/17								
Chloride	ND	1.00	mg/kg wet							
LCS (P7J2315-BS1)		Prepared: 10/23/17 Analyzed: 10/24/17								
Chloride	416	1.00	mg/kg wet	400		104	80-120			
LCS Dup (P7J2315-BSD1)		Prepared: 10/23/17 Analyzed: 10/24/17								
Chloride	415	1.00	mg/kg wet	400		104	80-120	0.111	20	
Duplicate (P7J2315-DUP1)		Source: 7J23002-41		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	ND	1.02	mg/kg dry		ND				20	
Duplicate (P7J2315-DUP2)		Source: 7J23003-03		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	102	1.06	mg/kg dry		99.8			1.94	20	
Matrix Spike (P7J2315-MS1)		Source: 7J23002-41		Prepared: 10/23/17 Analyzed: 10/24/17						
Chloride	1070	1.02	mg/kg dry	1020	ND	105	80-120			

DRAFT REPORT

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Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2403 - * DEFAULT PREP *****

Blank (P7J2403-BLK1)		Prepared & Analyzed: 10/24/17								
% Moisture	ND	0.1	%							
Blank (P7J2403-BLK2)		Prepared & Analyzed: 10/24/17								
% Moisture	ND	0.1	%							
Duplicate (P7J2403-DUP1)		Source: 7J23002-09		Prepared & Analyzed: 10/24/17						
% Moisture	8.0	0.1	%		9.0			11.8	20	
Duplicate (P7J2403-DUP2)		Source: 7J23002-36		Prepared & Analyzed: 10/24/17						
% Moisture	11.0	0.1	%		10.0			9.52	20	
Duplicate (P7J2403-DUP3)		Source: 7J23004-03		Prepared & Analyzed: 10/24/17						
% Moisture	4.0	0.1	%		5.0			22.2	20	R2
Duplicate (P7J2403-DUP4)		Source: 7J23006-05		Prepared & Analyzed: 10/24/17						
% Moisture	4.0	0.1	%		5.0			22.2	20	R2

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2304 - General Preparation (GC)

Blank (P7J2304-BLK1)

Prepared & Analyzed: 10/23/17

C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	107		"	100		107	70-130			
Surrogate: o-Terphenyl	62.8		"	50.0		126	70-130			

LCS (P7J2304-BS1)

Prepared & Analyzed: 10/23/17

C6-C12	928	25.0	mg/kg wet	1000		92.8	75-125			
>C12-C28	927	25.0	"	1000		92.7	75-125			
Surrogate: 1-Chlorooctane	126		"	100		126	70-130			
Surrogate: o-Terphenyl	61.6		"	50.0		123	70-130			

LCS Dup (P7J2304-BSD1)

Prepared & Analyzed: 10/23/17

C6-C12	846	25.0	mg/kg wet	1000		84.6	75-125	9.28	20	
>C12-C28	842	25.0	"	1000		84.2	75-125	9.53	20	
Surrogate: 1-Chlorooctane	116		"	100		116	70-130			
Surrogate: o-Terphenyl	58.8		"	50.0		118	70-130			

Calibration Blank (P7J2304-CCB1)

Prepared & Analyzed: 10/23/17

C6-C12	10.9		mg/kg wet							
>C12-C28	22.6		"							
Surrogate: 1-Chlorooctane	110		"	100		110	70-130			
Surrogate: o-Terphenyl	64.3		"	50.0		129	70-130			

Calibration Check (P7J2304-CCV1)

Prepared & Analyzed: 10/23/17

C6-C12	534	25.0	mg/kg wet	500		107	85-115			
>C12-C28	519	25.0	"	500		104	85-115			
Surrogate: 1-Chlorooctane	121		"	100		121	70-130			
Surrogate: o-Terphenyl	65.4		"	50.0		131	70-130			S-GC

DRAFT REPORT

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Larson & Associates, Inc.
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Midland TX, 79710

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2304 - General Preparation (GC)

Calibration Check (P7J2304-CCV3)

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	550	25.0	mg/kg wet	500		110	85-115			
>C12-C28	501	25.0	"	500		100	85-115			
Surrogate: 1-Chlorooctane	120		"	100		120	70-130			
Surrogate: o-Terphenyl	61.9		"	50.0		124	70-130			

Matrix Spike (P7J2304-MS1)

Source: 7J23002-10

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	1040	26.6	mg/kg dry	1060	12.7	96.3	75-125			
>C12-C28	1010	26.6	"	1060	14.9	94.0	75-125			
Surrogate: 1-Chlorooctane	125		"	106		117	70-130			
Surrogate: o-Terphenyl	64.9		"	53.2		122	70-130			

Matrix Spike Dup (P7J2304-MSD1)

Source: 7J23002-10

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	1020	26.6	mg/kg dry	1060	12.7	95.1	75-125	1.28	20	
>C12-C28	1010	26.6	"	1060	14.9	93.5	75-125	0.510	20	
Surrogate: 1-Chlorooctane	125		"	106		118	70-130			
Surrogate: o-Terphenyl	64.9		"	53.2		122	70-130			

Batch P7J2310 - General Preparation (GC)

Blank (P7J2310-BLK1)

Prepared & Analyzed: 10/23/17

C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	109		"	100		109	70-130			
Surrogate: o-Terphenyl	61.2		"	50.0		122	70-130			

LCS (P7J2310-BS1)

Prepared & Analyzed: 10/23/17

C6-C12	790	25.0	mg/kg wet	1000		79.0	75-125			
>C12-C28	927	25.0	"	1000		92.7	75-125			
Surrogate: 1-Chlorooctane	105		"	100		105	70-130			
Surrogate: o-Terphenyl	54.8		"	50.0		110	70-130			

DRAFT REPORT

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

Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7J2310 - General Preparation (GC)										
LCS Dup (P7J2310-BSD1)				Prepared & Analyzed: 10/23/17						
C6-C12	790	25.0	mg/kg wet	1000		79.0	75-125	0.0696	20	
>C12-C28	938	25.0	"	1000		93.8	75-125	1.18	20	
Surrogate: 1-Chlorooctane	106		"	100		106	70-130			
Surrogate: o-Terphenyl	55.6		"	50.0		111	70-130			
Calibration Blank (P7J2310-CCB1)				Prepared & Analyzed: 10/23/17						
C6-C12	18.2		mg/kg wet							
>C12-C28	13.6		"							
Surrogate: 1-Chlorooctane	112		"	100		112	70-130			
Surrogate: o-Terphenyl	62.7		"	50.0		125	70-130			
Calibration Blank (P7J2310-CCB2)				Prepared & Analyzed: 10/23/17						
C6-C12	17.4		mg/kg wet							
>C12-C28	19.6		"							
Surrogate: 1-Chlorooctane	118		"	100		118	70-130			
Surrogate: o-Terphenyl	66.5		"	50.0		133	70-130			S-GC
Calibration Check (P7J2310-CCV1)				Prepared & Analyzed: 10/23/17						
C6-C12	483	25.0	mg/kg wet	500		96.7	85-115			
>C12-C28	494	25.0	"	500		98.8	85-115			
Surrogate: 1-Chlorooctane	123		"	100		123	70-130			
Surrogate: o-Terphenyl	61.5		"	50.0		123	70-130			
Calibration Check (P7J2310-CCV2)				Prepared & Analyzed: 10/23/17						
C6-C12	516	25.0	mg/kg wet	500		103	85-115			
>C12-C28	555	25.0	"	500		111	85-115			
Surrogate: 1-Chlorooctane	124		"	100		124	70-130			
Surrogate: o-Terphenyl	64.0		"	50.0		128	70-130			

DRAFT REPORT

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Project: XTO EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2310 - General Preparation (GC)

Calibration Check (P7J2310-CCV3)

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	521	25.0	mg/kg wet	500		104	85-115			
>C12-C28	564	25.0	"	500		113	85-115			
Surrogate: 1-Chlorooctane	122		"	100		122	70-130			
Surrogate: o-Terphenyl	63.8		"	50.0		128	70-130			

Matrix Spike (P7J2310-MS1)

Source: 7J23002-38

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	843	25.5	mg/kg dry	1020	24.6	80.2	75-125			
>C12-C28	1030	25.5	"	1020	ND	101	75-125			
Surrogate: 1-Chlorooctane	123		"	102		120	70-130			
Surrogate: o-Terphenyl	63.7		"	51.0		125	70-130			

Matrix Spike Dup (P7J2310-MSD1)

Source: 7J23002-38

Prepared: 10/23/17 Analyzed: 10/24/17

C6-C12	846	25.5	mg/kg dry	1020	24.6	80.5	75-125	0.275	20	
>C12-C28	1030	25.5	"	1020	ND	101	75-125	0.153	20	
Surrogate: 1-Chlorooctane	125		"	102		122	70-130			
Surrogate: o-Terphenyl	63.6		"	51.0		125	70-130			

DRAFT REPORT

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Permian Basin Environmental Lab.

Notes and Definitions

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
R2	The RPD exceeded the acceptance limit.
BULK	Samples received in Bulk soil containers
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By:



Date: 10/25/2017

Brent Barron, Laboratory Director/Technical Director

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-686-7235.

DRAFT REPORT

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Permian Basin Environmental Lab.

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

Data Reported to:

DATE: 10-23-2017 PAGE 1 OF 3
PO #: _____ LAB WORK ORDER # 1503002
PROJECT LOCATION OR NAME: X70 EMS W/IS
LAI PROJECT # 17-0176-01 COLLECTOR: ZLB/SL

Page 63 of 65

TRRP report? ☐ Yes ☒ No	S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER	TIME ZONE: Time zone/State: MST																																	
Containers																																			
PRESERVATION		☐ NaOH ☐																																	
RESERVED																																			
ANALYSES <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">TYPE ☐</td> <td style="width: 30%;">TPH 1005 ☐</td> <td style="width: 30%;">TPH 1006 ☐</td> </tr> <tr> <td>MOD 8015 ☒</td> <td>MOD 8015 ☒</td> <td>MOD 8015 ☒</td> </tr> <tr> <td>PAH 8270 ☐</td> <td>PAH 8270 ☒</td> <td>PAH 8270 ☒</td> </tr> <tr> <td>HERBICIDES ☐</td> <td>8151 HERBICIDES ☐</td> <td>8151 HERBICIDES ☐</td> </tr> <tr> <td>TALS (RCRA) ☐</td> <td>TCLP VOC ☐</td> <td>TCLP VOC ☐</td> </tr> <tr> <td>TALS (RCRA) ☐</td> <td>OTHER LIST ☐</td> <td>OTHER LIST ☐</td> </tr> <tr> <td>TALS (RCRA) ☐</td> <td>FLASHPOINT ☐</td> <td>FLASHPOINT ☐</td> </tr> <tr> <td>% MOISTURE ☐</td> <td>% MOISTURE ☐</td> <td>% MOISTURE ☐</td> </tr> <tr> <td>PEACHLORATE ☐</td> <td>PEACHLORATE ☐</td> <td>PEACHLORATE ☐</td> </tr> <tr> <td>ANIONS ☐</td> <td>ANIONS ☐</td> <td>ANIONS ☐</td> </tr> <tr> <td>ALKALINITY ☐</td> <td>ALKALINITY ☐</td> <td>ALKALINITY ☐</td> </tr> </table>			TYPE ☐	TPH 1005 ☐	TPH 1006 ☐	MOD 8015 ☒	MOD 8015 ☒	MOD 8015 ☒	PAH 8270 ☐	PAH 8270 ☒	PAH 8270 ☒	HERBICIDES ☐	8151 HERBICIDES ☐	8151 HERBICIDES ☐	TALS (RCRA) ☐	TCLP VOC ☐	TCLP VOC ☐	TALS (RCRA) ☐	OTHER LIST ☐	OTHER LIST ☐	TALS (RCRA) ☐	FLASHPOINT ☐	FLASHPOINT ☐	% MOISTURE ☐	% MOISTURE ☐	% MOISTURE ☐	PEACHLORATE ☐	PEACHLORATE ☐	PEACHLORATE ☐	ANIONS ☐	ANIONS ☐	ANIONS ☐	ALKALINITY ☐	ALKALINITY ☐	ALKALINITY ☐
TYPE ☐	TPH 1005 ☐	TPH 1006 ☐																																	
MOD 8015 ☒	MOD 8015 ☒	MOD 8015 ☒																																	
PAH 8270 ☐	PAH 8270 ☒	PAH 8270 ☒																																	
HERBICIDES ☐	8151 HERBICIDES ☐	8151 HERBICIDES ☐																																	
TALS (RCRA) ☐	TCLP VOC ☐	TCLP VOC ☐																																	
TALS (RCRA) ☐	OTHER LIST ☐	OTHER LIST ☐																																	
TALS (RCRA) ☐	FLASHPOINT ☐	FLASHPOINT ☐																																	
% MOISTURE ☐	% MOISTURE ☐	% MOISTURE ☐																																	
PEACHLORATE ☐	PEACHLORATE ☐	PEACHLORATE ☐																																	
ANIONS ☐	ANIONS ☐	ANIONS ☐																																	
ALKALINITY ☐	ALKALINITY ☐	ALKALINITY ☐																																	

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Co
					HCl
					HNO ₃
					H ₂ SO ₄
					ICE
					UNPRE
ANAL					
BTEX ☒ MET					
TRPH 418.1					
GASOLINE					
DIESEL - MET					
VOC 8260					
SVOC 8270					
8081 PEST					
8082 PCBs					
TCLP - MET					
TCLP - PEST					
TOTAL MET					
LEAD - TOT					
RCI ☐ TOX					
TDS ☐ TSS					
pH ☐ HEXA					
EXPLOSIVE					
CHLORIDE					
M300					
FIELD NOTES					

SB-70-1	1	10-14-79:20	5	1	✓	✓	✓	✓	✓
---------	---	-------------	---	---	---	---	---	---	---

[illegible]

5:10	3	9:23
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[illegible][illegible]

5-6	9	11.3	1
5-6	9	11.3	1

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

RECEIVED BY: (Signature) DATE/TIME
RECEIVED BY: (Signature)
TURN AROUND TIME
LABORATORY USE ONLY:
28

RECEIVING TEMP: 5.0 THERM #:
 NORMAL ☒ 1 DAY ☐
 DATE/TIME / RECEIVED BY: (Signature)
 (RELINQUISHED BY: (Signature))

RECEIVED BY: Signature 02/01/2011
DATE/TIME
REINQUISHED BY: Signature
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED

☒ OTHER
0-23-11 908
WELL

Hand Delivered 11/1/91

DATE

7020

Aarson &
associates, Inc.
Environmental Consultants

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

Data Reported to:

DATE: 10-23-17 PAGE 2 OF 3
PO #: _____ LAB WORK ORDER #:
PROJECT LOCATION OR NAME: KTD Emsu B
LAI PROJECT # 17-0710-01 COLLECTOR: SJ 172B

Page 64 of 65

TRRP report?		P=PAINT	
☐ Yes	☒ No	SL=SLUDGE	OT=OTHER
TIME ZONE:			
Time zone/State:			
Field Sample I.D.		Lab #	Date
			Time
		Matrix	
# of Containers		HCl	
		HNO ₃	
		H ₂ SO ₄ ☐ NaOH ☐	
		ICE	
		UNPRESERVED	
ANALYSES			
BTEX ☐ MTBE ☐			
TPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐			
GASOLINE MOD 8015 ☐ DIESEL - MOD 8015 ☐			
VOC 8260 ☐ SVOC 8270 ☐			
8081 PESTICIDES ☐ PAH 8270 ☐ HOLDPAH ☐			
8082 PCBs ☐ TCLP - METALS (RCRA) ☐ TCLP VOC ☐			
TCLP - PEST ☐ HERB ☐ Semi-VOC ☐			
TOTAL METALS (RCRA) ☐ OTHER LIST ☐			
LEAD - TOTAL ☐ D.W 200.8 ☐ TCLP ☐			
RCL ☐ TOX ☐ FLASHPOINT ☐			
TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐			
PH ☐ HEXAVALENT CHROMIUM ☐			
EXPLOSIVES ☐ PECHLORATE ☐			
CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐			
FIELD NOTES			

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



Revised Analytical Report

Prepared for:

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

Project: EMSU B
Project Number: 17-0176-01

Location:

Lab Order Number: 7J19002



NELAP/TCEQ # T104704516-16-7

Report Date: 11/02/17

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW1 0-1'	7J19002-01	Soil	10/16/17 11:35	10-19-2017 07:57
MW1 5'-6'	7J19002-02	Soil	10/16/17 11:40	10-19-2017 07:57
MW1 10'-11'	7J19002-03	Soil	10/16/17 11:45	10-19-2017 07:57
MW1 15'-16'	7J19002-04	Soil	10/16/17 11:50	10-19-2017 07:57
MW1 20'-21'	7J19002-05	Soil	10/16/17 11:55	10-19-2017 07:57
MW1 25'-26'	7J19002-06	Soil	10/16/17 12:00	10-19-2017 07:57
MW1 30'-31'	7J19002-07	Soil	10/16/17 12:07	10-19-2017 07:57
MW3 0-1'	7J19002-09	Soil	10/16/17 13:36	10-19-2017 07:57
MW3 5'-6'	7J19002-10	Soil	10/16/17 13:37	10-19-2017 07:57
SB19 0-1'	7J19002-12	Soil	10/16/17 15:02	10-19-2017 07:57
SB19 3'-4'	7J19002-13	Soil	10/16/17 15:03	10-19-2017 07:57
SB19 5'-6'	7J19002-14	Soil	10/16/17 15:05	10-19-2017 07:57
SB19 7'-8'	7J19002-15	Soil	10/16/17 15:08	10-19-2017 07:57
SB19 9'-10'	7J19002-16	Soil	10/16/17 15:14	10-19-2017 07:57
MW5 10'-11'	7J19002-17	Soil	10/17/17 09:53	10-19-2017 07:57
MW5 15'-16'	7J19002-18	Soil	10/17/17 10:00	10-19-2017 07:57
MW5 20'-21'	7J19002-19	Soil	10/17/17 10:06	10-19-2017 07:57
MW5 25'-26'	7J19002-20	Soil	10/17/17 10:15	10-19-2017 07:57
MW5 30'-31'	7J19002-21	Soil	10/17/17 10:22	10-19-2017 07:57
MW5 35'-36'	7J19002-22	Soil	10/17/17 10:30	10-19-2017 07:57
MW5 40'-41'	7J19002-23	Soil	10/17/17 10:41	10-19-2017 07:57
MW2 0-1'	7J19002-24	Soil	10/17/17 13:37	10-19-2017 07:57
MW2 5'-6'	7J19002-25	Soil	10/17/17 13:42	10-19-2017 07:57
MW2 10'-11'	7J19002-26	Soil	10/17/17 13:46	10-19-2017 07:57
MW2 15'-16'	7J19002-27	Soil	10/17/17 13:51	10-19-2017 07:57
MW2 20'-21'	7J19002-28	Soil	10/17/17 13:53	10-19-2017 07:57
MW2 25'-26'	7J19002-29	Soil	10/17/17 14:01	10-19-2017 07:57
MW2 30'-31'	7J19002-30	Soil	10/17/17 14:09	10-19-2017 07:57
MW2 35'-36'	7J19002-31	Soil	10/17/17 14:16	10-19-2017 07:57
SB1 0-1'	7J19002-32	Soil	10/17/17 15:15	10-19-2017 07:57
SB1 3'-4'	7J19002-33	Soil	10/17/17 15:16	10-19-2017 07:57
SB1 5'-6'	7J19002-34	Soil	10/17/17 15:18	10-19-2017 07:57
SB1 7'-8'	7J19002-35	Soil	10/17/17 15:22	10-19-2017 07:57
SB2 0-1'	7J19002-36	Soil	10/18/17 09:52	10-19-2017 07:57

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB2 3'-4'	7J19002-37	Soil	10/18/17 09:53	10-19-2017 07:57
SB2 5'-6'	7J19002-38	Soil	10/18/17 09:57	10-19-2017 07:57
MW4 0-1'	7J19002-40	Soil	10/18/17 11:36	10-19-2017 07:57
MW4 5'-6'	7J19002-41	Soil	10/18/17 11:39	10-19-2017 07:57
MW4 10'-11'	7J19002-42	Soil	10/18/17 11:41	10-19-2017 07:57
MW4 15'-16'	7J19002-43	Soil	10/18/17 11:48	10-19-2017 07:57
MW4 20'-21'	7J19002-44	Soil	10/18/17 11:52	10-19-2017 07:57
MW4 25'-26'	7J19002-45	Soil	10/18/17 11:58	10-19-2017 07:57
MW4 30'-31'	7J19002-46	Soil	10/18/17 12:00	10-19-2017 07:57
MW4 35'-36'	7J19002-47	Soil	10/18/17 12:01	10-19-2017 07:57
MW4 40'-41'	7J19002-48	Soil	10/18/17 12:03	10-19-2017 07:57
MW4 45'-46'	7J19002-49	Soil	10/18/17 12:06	10-19-2017 07:57
MW4 50'-51'	7J19002-50	Soil	10/18/17 12:08	10-19-2017 07:57
SB3 0-1'	7J19002-51	Soil	10/18/17 13:08	10-19-2017 07:57
SB3 3'-4'	7J19002-52	Soil	10/18/17 13:09	10-19-2017 07:57
SB3 5'-6'	7J19002-53	Soil	10/18/17 13:12	10-19-2017 07:57
SB4 0-1'	7J19002-55	Soil	10/18/17 13:45	10-19-2017 07:57
SB4 3'-4'	7J19002-56	Soil	10/18/17 13:45	10-19-2017 07:57
SB4 5'-6'	7J19002-57	Soil	10/18/17 13:48	10-19-2017 07:57
SB5 0-1'	7J19002-60	Soil	10/18/17 14:10	10-19-2017 07:57
SB5 3'-4'	7J19002-61	Soil	10/18/17 14:11	10-19-2017 07:57
SB5 5'-6'	7J19002-62	Soil	10/18/17 14:13	10-19-2017 07:57
SB6 0-1'	7J19002-65	Soil	10/18/17 14:40	10-19-2017 07:57
SB6 3'-4'	7J19002-66	Soil	10/18/17 14:41	10-19-2017 07:57
SB6 5'-6'	7J19002-67	Soil	10/18/17 14:42	10-19-2017 07:57
Exc. E 2'	7J19002-69	Soil	10/18/17 15:10	10-19-2017 07:57
Exc. E 4'	7J19002-70	Soil	10/18/17 15:06	10-19-2017 07:57
Exc. W 2'	7J19002-71	Soil	10/18/17 15:07	10-19-2017 07:57
Exc. W 4'	7J19002-72	Soil	10/18/17 15:10	10-19-2017 07:57
Exc. S 2'	7J19002-73	Soil	10/18/17 15:10	10-19-2017 07:57
Exc. S 4'	7J19002-74	Soil	10/18/17 15:06	10-19-2017 07:57
Exc. N 2'	7J19002-75	Soil	10/18/17 15:12	10-19-2017 07:57
Exc. N 4'	7J19002-76	Soil	10/18/17 15:06	10-19-2017 07:57
W. Comp	7J19002-77	Soil	10/18/17 15:25	10-19-2017 07:57

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E. Comp	7J19002-78	Soil	10/18/17 15:27	10-19-2017 07:57
S1	7J19002-79	Soil	10/18/17 15:32	10-19-2017 07:57

9 samples listed on the COC were not received at the laboratory, PBELAB staff was advised that these samples represented the deeper depths that were not collected.

On November 2, 2017 PBELAB staff was advised that Samples SB12 should be designated as SB19. It appears that the number had been changed on the COC, but it was not very legible. This affects samples 7J19002-12 through -16. The email correspondence for this change is attached behind the COC.

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 0-1'
7J19002-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	7.71	1.25	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0
% Moisture	20.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 5'-6'
7J19002-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.05	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 10'-11'
7J19002-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	909	1.11	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0
% Moisture	10.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 15'-16'
7J19002-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	43.6	1.10	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0	
% Moisture	90.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 20'-21'
7J19002-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	57.5	1.05	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 25'-26'
7J19002-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	151	1.33	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0	
% Moisture	25.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW1 30'-31'
7J19002-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	85.5	1.04	mg/kg dry	1	P7J1907	10/19/17	10/19/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW3 0-1'
7J19002-09 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	27.1	1.27	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0
% Moisture	21.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW3 5'-6'
7J19002-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	30.5	1.23	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0
% Moisture	19.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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SB19 0-1'
7J19002-12 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.0260	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Toluene	ND	0.0519	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Ethylbenzene	ND	0.0260	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (p/m)	ND	0.0519	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (o)	ND	0.0260	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.2 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		82.7 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	15.7	1.30	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	23.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	32.5	mg/kg dry	1	P7J1901	10/19/17	10/20/17	TPH 8015M	
>C12-C28	ND	32.5	mg/kg dry	1	P7J1901	10/19/17	10/20/17	TPH 8015M	
>C28-C35	ND	32.5	mg/kg dry	1	P7J1901	10/19/17	10/20/17	TPH 8015M	
Surrogate: 1-Chlorooctane		104 %	70-130		P7J1901	10/19/17	10/20/17	TPH 8015M	
Surrogate: o-Terphenyl		120 %	70-130		P7J1901	10/19/17	10/20/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	32.5	mg/kg dry	1	[CALC]	10/19/17	10/20/17	calc	

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SB19 3'-4'
7J19002-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.23	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	19.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB19 5'-6'
7J19002-14 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	5.91	1.27	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	21.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB19 7'-8'
7J19002-15 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	54.2	1.15	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	13.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB19 9'-10'
7J19002-16 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	129	1.10	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	9.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 10'-11'
7J19002-17 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	599	1.14	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 15'-16'
7J19002-18 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	525	1.20	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	17.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 20'-21'
7J19002-19 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	719	1.11	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	10.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 25'-26'
7J19002-20 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	254	1.22	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	18.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 30'-31'
7J19002-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	235	1.05	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 35'-36'
7J19002-22 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	230	1.08	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW5 40'-41'
7J19002-23 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	538	1.12	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 0-1'
7J19002-24 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.03	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 5'-6'
7J19002-25 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.09	mg/kg dry	1	P7J1907	10/19/17	10/20/17	EPA 300.0	
% Moisture	8.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 10'-11'
7J19002-26 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	23.8	1.12	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 15'-16'
7J19002-27 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	81.4	1.05	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 20'-21'
7J19002-28 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	60.7	1.02	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 25'-26'
7J19002-29 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	17.1	1.01	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0
% Moisture	1.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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MW2 30'-31'
7J19002-30 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	74.5	1.15	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	13.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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MW2 35'-36'
7J19002-31 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	162	1.12	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB1 0-1'
7J19002-32 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00256	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00256	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		94.4 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		90.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.28	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	22.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		99.6 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		109 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	32.1	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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SB1 3'-4'
7J19002-33 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.15	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	13.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB1 5'-6'
7J19002-34 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.27	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	21.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB1 7'-8'
7J19002-35 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	454	1.27	mg/kg dry	1	P7J1908	10/19/17	10/20/17	EPA 300.0	
% Moisture	21.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB2 0-1'
7J19002-36 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00256	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00256	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00128	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		110 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		94.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	31.4	1.28	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	22.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	32.1	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		107 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		120 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	32.1	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB2 3'-4'
7J19002-37 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.27	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	21.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB2 5'-6'
7J19002-38 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	12.0	1.25	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	20.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 0-1'
7J19002-40 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	9.51	1.02	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
Project Manager: Mark Larson

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MW4 5'-6'
7J19002-41 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	1.82	1.04	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
Project Manager: Mark Larson

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MW4 10'-11'
7J19002-42 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	6.60	1.04	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 15'-16'
7J19002-43 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	110	1.12	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 20'-21'
7J19002-44 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	61.1	1.11	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	10.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
Project Manager: Mark Larson

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MW4 25'-26'
7J19002-45 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	51.7	1.06	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	6.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 30'-31'
7J19002-46 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	253	1.09	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	8.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 35'-36'
7J19002-47 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	204	1.08	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	7.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 40'-41'
7J19002-48 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	88.9	1.04	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW4 45'-46'
7J19002-49 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	111	1.14	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
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MW4 50'-51'
7J19002-50 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	74.3	1.10	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	9.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB3 0-1'
7J19002-51 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.0217	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B
Toluene	ND	0.0435	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B
Ethylbenzene	ND	0.0217	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B
Xylene (p/m)	ND	0.0435	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B
Xylene (o)	ND	0.0217	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B
Surrogate: 4-Bromofluorobenzene		94.3 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B
Surrogate: 1,4-Difluorobenzene		95.0 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.09	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0
% Moisture	8.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	27.2	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
>C12-C28	ND	27.2	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
>C28-C35	ND	27.2	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
Surrogate: 1-Chlorooctane		97.4 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M
Total Petroleum Hydrocarbon C6-C35	ND	27.2	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc

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SB3 3'-4'
7J19002-52 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.03	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project Number: 17-0176-01
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SB3 5'-6'
7J19002-53 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	9.78	1.14	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0
% Moisture	12.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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SB4 0-1'
7J19002-55 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00102	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00204	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00102	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00204	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00102	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		98.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		107 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	17.0	1.02	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	25.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	25.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		98.1 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		108 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.5	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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SB4 3'-4'
7J19002-56 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	2.32	1.25	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0	
% Moisture	20.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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SB4 5'-6'
7J19002-57 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	42.7	1.14	mg/kg dry	1	P7J1905	10/19/17	10/19/17	EPA 300.0
% Moisture	12.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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SB5 0-1'
7J19002-60 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00114	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		92.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		94.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	3.61	1.14	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.4	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	28.4	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	28.4	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		95.7 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.4	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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SB5 3'-4'
7J19002-61 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	7.70	1.03	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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SB5 5'-6'
7J19002-62 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	5.08	1.25	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	20.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB6 0-1'
7J19002-65 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00122	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B
Toluene	ND	0.00244	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B
Ethylbenzene	ND	0.00122	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B
Xylene (p/m)	ND	0.00244	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B
Xylene (o)	ND	0.00122	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B
Surrogate: 4-Bromofluorobenzene		89.5 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B
Surrogate: 1,4-Difluorobenzene		85.2 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B

General Chemistry Parameters by EPA / Standard Methods

Chloride	13.4	1.22	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0
% Moisture	18.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	30.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
>C12-C28	ND	30.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
>C28-C35	ND	30.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M
Surrogate: 1-Chlorooctane		95.6 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M
Surrogate: o-Terphenyl		107 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M
Total Petroleum Hydrocarbon C6-C35	ND	30.5	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc

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Project Manager: Mark Larson

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SB6 3'-4'
7J19002-66 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	64.6	1.02	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	2.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Larson & Associates, Inc.
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Midland TX, 79710

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

SB6 5'-6'
7J19002-67 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Chloride	26.6	1.05	mg/kg dry	1	P7J1906	10/19/17	10/20/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Larson & Associates, Inc.
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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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Exc. E 2'
7J19002-69 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		103 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		94.2 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	3.12	1.03	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.8 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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Exc. E 4'
7J19002-70 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00220	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00220	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		103 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		105 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	389	1.10	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	9.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		95.7 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	27.5	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
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Exc. W 2'
7J19002-71 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00220	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00220	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00110	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		83.4 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		81.8 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	1.99	1.10	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	9.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	27.5	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.2 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	27.5	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Exc. W 4'
7J19002-72 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00111	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00222	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00111	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00222	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00111	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		101 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		98.2 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	95.5	1.11	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	10.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	27.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	27.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	27.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.1 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	27.8	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Exc. S 2'
7J19002-73 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00104	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00208	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00104	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00208	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00104	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		99.8 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		107 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	2.22	1.04	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	4.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.0	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	26.0	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	26.0	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.2 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.0	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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Exc. S 4'
7J19002-74 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00105	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00211	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00105	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00211	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00105	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		105 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		95.5 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	8.72	1.05	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	5.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	26.3	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	26.3	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	26.3	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		94.6 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		104 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	26.3	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
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Exc. N 2'
7J19002-75 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		103 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		87.6 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	1.78	1.03	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		93.7 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		103 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Exc. N 4'
7J19002-76 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00123	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.00247	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.00123	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.00247	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.00123	mg/kg dry	1	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		100 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.0 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	4.48	1.23	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	19.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	30.9	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	30.9	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	30.9	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.3 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		106 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	30.9	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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W. Comp
7J19002-77 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/20/17	EPA 8021B	
Toluene	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/20/17	EPA 8021B	
Ethylbenzene	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (p/m)	ND	0.00206	mg/kg dry	1	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (o)	ND	0.00103	mg/kg dry	1	P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		109 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		94.0 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	11.7	1.03	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		98.8 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		108 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	25.8	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

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E. Comp
7J19002-78 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/19/17	EPA 8021B	
Toluene	ND	0.0412	mg/kg dry	20	P7J1902	10/19/17	10/19/17	EPA 8021B	
Ethylbenzene	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (p/m)	ND	0.0412	mg/kg dry	20	P7J1902	10/19/17	10/19/17	EPA 8021B	
Xylene (o)	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		93.7 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.3 %	75-125		P7J1902	10/19/17	10/19/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	1080	5.15	mg/kg dry	5	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	30.0	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	ND	25.8	mg/kg dry	1	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		95.9 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		105 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	30.0	25.8	mg/kg dry	1	[CALC]	10/19/17	10/19/17	calc	

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S1
7J19002-79 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Toluene	ND	0.0412	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Ethylbenzene	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (p/m)	ND	0.0412	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Xylene (o)	ND	0.0206	mg/kg dry	20	P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		106 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		110 %	75-125		P7J1902	10/19/17	10/20/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	1.91	1.03	mg/kg dry	1	P7J1906	10/19/17	10/19/17	EPA 300.0	
% Moisture	3.0	0.1	%	1	P7J2001	10/20/17	10/20/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	129	mg/kg dry	5	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C12-C28	2390	129	mg/kg dry	5	P7J1901	10/19/17	10/19/17	TPH 8015M	
>C28-C35	535	129	mg/kg dry	5	P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: 1-Chlorooctane		96.9 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Surrogate: o-Terphenyl		108 %	70-130		P7J1901	10/19/17	10/19/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	2920	129	mg/kg dry	5	[CALC]	10/19/17	10/19/17	calc	

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Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1902 - General Preparation (GC)

Blank (P7J1902-BLK1)

Prepared & Analyzed: 10/19/17

Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 4-Bromofluorobenzene	0.0606		"	0.0600		101	75-125			
Surrogate: 1,4-Difluorobenzene	0.0584		"	0.0600		97.3	75-125			

LCS (P7J1902-BS1)

Prepared & Analyzed: 10/19/17

Benzene	0.116	0.00100	mg/kg wet	0.100		116	70-130			
Toluene	0.111	0.00200	"	0.100		111	70-130			
Ethylbenzene	0.110	0.00100	"	0.100		110	70-130			
Xylene (p/m)	0.213	0.00200	"				70-130			
Xylene (o)	0.117	0.00100	"				70-130			
Surrogate: 4-Bromofluorobenzene	0.0642		"	0.0600		107	75-125			
Surrogate: 1,4-Difluorobenzene	0.0623		"	0.0600		104	75-125			

LCS Dup (P7J1902-BSD1)

Prepared & Analyzed: 10/19/17

Benzene	0.0982	0.00100	mg/kg wet	0.100		98.2	70-130	16.8	20	
Toluene	0.0953	0.00200	"	0.100		95.3	70-130	14.9	20	
Ethylbenzene	0.114	0.00100	"	0.100		114	70-130	4.07	20	
Xylene (p/m)	0.218	0.00200	"				70-130		20	
Xylene (o)	0.105	0.00100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	0.0546		"	0.0600		91.0	75-125			
Surrogate: 1,4-Difluorobenzene	0.0578		"	0.0600		96.4	75-125			

Calibration Check (P7J1902-CCV1)

Prepared & Analyzed: 10/19/17

Benzene	0.115	0.00100	mg/kg wet	0.100		115	80-120			
Toluene	0.108	0.00200	"	0.100		108	80-120			
Ethylbenzene	0.112	0.00100	"	0.100		112	80-120			
Xylene (p/m)	0.219	0.00200	"	0.200		109	80-120			
Xylene (o)	0.117	0.00100	"	0.100		117	80-120			
Surrogate: 4-Bromofluorobenzene	0.0566		"	0.0600		94.3	75-125			
Surrogate: 1,4-Difluorobenzene	0.0594		"	0.0600		99.0	75-125			

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Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1902 - General Preparation (GC)

Calibration Check (P7J1902-CCV2)

Prepared & Analyzed: 10/19/17

Benzene	0.0960	0.00100	mg/kg wet	0.100		96.0	80-120			
Toluene	0.0950	0.00200	"	0.100		95.0	80-120			
Ethylbenzene	0.0931	0.00100	"	0.100		93.1	80-120			
Xylene (p/m)	0.200	0.00200	"	0.200		100	80-120			
Xylene (o)	0.0998	0.00100	"	0.100		99.8	80-120			
Surrogate: 4-Bromofluorobenzene	0.0549		"	0.0600		91.5	75-125			
Surrogate: 1,4-Difluorobenzene	0.0547		"	0.0600		91.2	75-125			

Calibration Check (P7J1902-CCV3)

Prepared: 10/19/17 Analyzed: 10/20/17

Benzene	0.104	0.00100	mg/kg wet	0.100		104	80-120			
Toluene	0.0962	0.00200	"	0.100		96.2	80-120			
Ethylbenzene	0.0973	0.00100	"	0.100		97.3	80-120			
Xylene (p/m)	0.212	0.00200	"	0.200		106	80-120			
Xylene (o)	0.104	0.00100	"	0.100		104	80-120			
Surrogate: 4-Bromofluorobenzene	0.0615		"	0.0600		102	75-125			
Surrogate: 1,4-Difluorobenzene	0.0626		"	0.0600		104	75-125			

Matrix Spike (P7J1902-MS1)

Source: 7J19002-55

Prepared: 10/19/17 Analyzed: 10/20/17

Benzene	0.0554	0.00102	mg/kg dry	0.102	ND	54.3	80-120			QM-07
Toluene	0.0455	0.00204	"	0.102	ND	44.6	80-120			QM-07
Ethylbenzene	0.0539	0.00102	"	0.102	ND	52.8	80-120			QM-07
Xylene (p/m)	0.103	0.00204	"		ND		80-120			
Xylene (o)	0.0493	0.00102	"		ND		80-120			
Surrogate: 4-Bromofluorobenzene	0.0374		"	0.0612		61.0	75-125			S-GC
Surrogate: 1,4-Difluorobenzene	0.0476		"	0.0612		77.7	75-125			

Matrix Spike Dup (P7J1902-MSD1)

Source: 7J19002-55

Prepared: 10/19/17 Analyzed: 10/20/17

Benzene	0.0838	0.00102	mg/kg dry	0.102	ND	82.1	80-120	40.8	20	R3
Toluene	0.0826	0.00204	"	0.102	ND	80.9	80-120	58.0	20	R3
Ethylbenzene	0.0896	0.00102	"	0.102	ND	87.8	80-120	49.8	20	R3
Xylene (p/m)	0.213	0.00204	"		ND		80-120		20	
Xylene (o)	0.0826	0.00102	"		ND		80-120		20	
Surrogate: 1,4-Difluorobenzene	0.0621		"	0.0612		101	75-125			
Surrogate: 4-Bromofluorobenzene	0.0613		"	0.0612		100	75-125			

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1905 - * DEFAULT PREP *****

Blank (P7J1905-BLK1)				Prepared & Analyzed: 10/19/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7J1905-BS1)				Prepared & Analyzed: 10/19/17						
Chloride	425	1.00	mg/kg wet	400		106	80-120			
LCS Dup (P7J1905-BSD1)				Prepared & Analyzed: 10/19/17						
Chloride	417	1.00	mg/kg wet	400		104	80-120	2.05	20	
Duplicate (P7J1905-DUP1)				Source: 7J19002-36		Prepared & Analyzed: 10/19/17				
Chloride	19.8	1.28	mg/kg dry		31.4			45.4	20	R2
Duplicate (P7J1905-DUP2)				Source: 7J19002-47		Prepared & Analyzed: 10/19/17				
Chloride	219	1.08	mg/kg dry		204			6.87	20	
Matrix Spike (P7J1905-MS1)				Source: 7J19002-36		Prepared & Analyzed: 10/19/17				
Chloride	1300	1.28	mg/kg dry	1280	31.4	99.0	80-120			

Batch P7J1906 - * DEFAULT PREP *****

Blank (P7J1906-BLK1)				Prepared & Analyzed: 10/19/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7J1906-BS1)				Prepared & Analyzed: 10/19/17						
Chloride	421	1.00	mg/kg wet	400		105	80-120			
LCS Dup (P7J1906-BSD1)				Prepared & Analyzed: 10/19/17						
Chloride	422	1.00	mg/kg wet	400		106	80-120	0.187	20	

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1906 - * DEFAULT PREP *****

Duplicate (P7J1906-DUP1)		Source: 7J19002-60			Prepared & Analyzed: 10/19/17					
Chloride	2.92	1.14	mg/kg dry		3.61			21.2	20	R2
Duplicate (P7J1906-DUP2)		Source: 7J19002-73			Prepared & Analyzed: 10/19/17					
Chloride	2.41	1.04	mg/kg dry		2.22			8.11	20	
Matrix Spike (P7J1906-MS1)		Source: 7J19002-60			Prepared & Analyzed: 10/19/17					
Chloride	1140	1.14	mg/kg dry	1140	3.61	99.6	80-120			

Batch P7J1907 - * DEFAULT PREP *****

Blank (P7J1907-BLK1)		Prepared & Analyzed: 10/19/17								
Chloride	ND	1.00	mg/kg wet							
LCS (P7J1907-BS1)		Prepared & Analyzed: 10/19/17								
Chloride	431	1.00	mg/kg wet	400		108	80-120			
LCS Dup (P7J1907-BSD1)		Prepared & Analyzed: 10/19/17								
Chloride	426	1.00	mg/kg wet	400		107	80-120	1.06	20	
Duplicate (P7J1907-DUP1)		Source: 7J19002-02			Prepared & Analyzed: 10/19/17					
Chloride	ND	1.05	mg/kg dry		ND				20	
Duplicate (P7J1907-DUP2)		Source: 7J19002-16			Prepared: 10/19/17 Analyzed: 10/20/17					
Chloride	127	1.10	mg/kg dry		129			1.46	20	
Matrix Spike (P7J1907-MS1)		Source: 7J19002-02			Prepared & Analyzed: 10/19/17					
Chloride	1130	1.05	mg/kg dry	1050	ND	107	80-120			

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1908 - * DEFAULT PREP *****

Blank (P7J1908-BLK1)

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride ND 1.00 mg/kg wet

LCS (P7J1908-BS1)

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride 388 1.00 mg/kg wet 400 96.9 80-120

LCS Dup (P7J1908-BSD1)

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride 399 1.00 mg/kg wet 400 99.7 80-120 2.77 20

Duplicate (P7J1908-DUP1)

Source: 7J19002-26

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride 22.4 1.12 mg/kg dry 23.8 5.79 20

Duplicate (P7J1908-DUP2)

Source: 7J19013-01

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride ND 1.12 mg/kg dry ND 20

Matrix Spike (P7J1908-MS1)

Source: 7J19002-26

Prepared: 10/19/17 Analyzed: 10/20/17

Chloride 942 1.12 mg/kg dry 1120 23.8 81.8 80-120

Batch P7J2001 - * DEFAULT PREP *****

Blank (P7J2001-BLK1)

Prepared & Analyzed: 10/20/17

% Moisture ND 0.1 %

Duplicate (P7J2001-DUP1)

Source: 7J19002-28

Prepared & Analyzed: 10/20/17

% Moisture 2.0 0.1 % 2.0 0.00 20

Duplicate (P7J2001-DUP2)

Source: 7J19002-29

Prepared & Analyzed: 10/20/17

% Moisture 1.0 0.1 % 1.0 0.00 20

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J2001 - * DEFAULT PREP *****

Duplicate (P7J2001-DUP3)		Source: 7J19002-57		Prepared & Analyzed: 10/20/17						
% Moisture	13.0	0.1	%		12.0			8.00	20	
Duplicate (P7J2001-DUP4)		Source: 7J19013-26		Prepared & Analyzed: 10/20/17						
% Moisture	10.0	0.1	%		11.0			9.52	20	

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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1901 - General Preparation (GC)

Blank (P7J1901-BLK1)

Prepared & Analyzed: 10/19/17

C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	117		"	100		117	70-130			
Surrogate: o-Terphenyl	66.0		"	50.0		132	70-130			S-GC

LCS (P7J1901-BS1)

Prepared & Analyzed: 10/19/17

C6-C12	881	25.0	mg/kg wet	1000		88.1	75-125			
>C12-C28	1120	25.0	"	1000		112	75-125			
Surrogate: 1-Chlorooctane	127		"	100		127	70-130			
Surrogate: o-Terphenyl	49.2		"	50.0		98.3	70-130			

LCS Dup (P7J1901-BSD1)

Prepared & Analyzed: 10/19/17

C6-C12	868	25.0	mg/kg wet	1000		86.8	75-125	1.48	20	
>C12-C28	1100	25.0	"	1000		110	75-125	1.20	20	
Surrogate: 1-Chlorooctane	126		"	100		126	70-130			
Surrogate: o-Terphenyl	56.4		"	50.0		113	70-130			

Calibration Check (P7J1901-CCV1)

Prepared & Analyzed: 10/19/17

C6-C12	481	25.0	mg/kg wet	500		96.1	85-115			
>C12-C28	510	25.0	"	500		102	85-115			
Surrogate: 1-Chlorooctane	107		"	100		107	70-130			
Surrogate: o-Terphenyl	53.6		"	50.0		107	70-130			

Calibration Check (P7J1901-CCV2)

Prepared & Analyzed: 10/19/17

C6-C12	458	25.0	mg/kg wet	500		91.6	85-115			
>C12-C28	495	25.0	"	500		99.0	85-115			
Surrogate: 1-Chlorooctane	102		"	100		102	70-130			
Surrogate: o-Terphenyl	48.7		"	50.0		97.5	70-130			

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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7J1901 - General Preparation (GC)

Calibration Check (P7J1901-CCV3)

Prepared & Analyzed: 10/19/17

C6-C12	465	25.0	mg/kg wet	500		93.0	85-115			
>C12-C28	505	25.0	"	500		101	85-115			
Surrogate: 1-Chlorooctane	104		"	100		104	70-130			
Surrogate: o-Terphenyl	48.8		"	50.0		97.6	70-130			

Matrix Spike (P7J1901-MS1)

Source: 7J19002-55

Prepared & Analyzed: 10/19/17

C6-C12	790	25.5	mg/kg dry	1020	15.1	75.9	75-125			
>C12-C28	977	25.5	"	1020	ND	95.7	75-125			
Surrogate: 1-Chlorooctane	128		"	102		125	70-130			
Surrogate: o-Terphenyl	54.6		"	51.0		107	70-130			

Matrix Spike Dup (P7J1901-MSD1)

Source: 7J19002-55

Prepared & Analyzed: 10/19/17

C6-C12	823	25.5	mg/kg dry	1020	15.1	79.1	75-125	4.17	20	
>C12-C28	1000	25.5	"	1020	ND	98.1	75-125	2.48	20	
Surrogate: 1-Chlorooctane	109		"	102		107	70-130			
Surrogate: o-Terphenyl	55.3		"	51.0		108	70-130			

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Notes and Definitions

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

R3 The RPD exceeded the acceptance limit due to sample matrix effects.

R2 The RPD exceeded the acceptance limit.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

BULK Samples received in Bulk soil containers

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

LCS Laboratory Control Spike

MS Matrix Spike

Dup Duplicate

Report Approved By:



Date:

11/2/2017

Brent Barron, Laboratory Director/Technical Director

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

Project: EMSU B
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-686-7235.

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7024

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

Data Reported to:

DATE: 10-19-17 PAGE 2 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: EMSU B
LAI PROJECT #: 17-017U-01 COLLECTOR: SJ ZBML

Page 86 of 92

TRRP report? ☐ Yes ☒ No						S=SOIL W=WATER A=AIR		P-PAINT SL=SLUDGE OT=OTHER			
TIME ZONE: Time zone/State:											
NM/Maintenance		Field Sample I.D.		Lab #	Date	Time	Matrix	# of Containers	PRESERVATION		
									HCl	☐	
									HNO ₃		
									H ₂ SO ₄ ☐ NaOH ☐		
									ICE		
									UNPRESERVED		
ANALYSES											
BTX ☐ MTBE ☐											
TPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐											
GASOLINE MOD 8015 ☐ CRO											
DIESEL - MOD 8015 ☐											
VOC 8260 ☐											
SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐											
8081 PESTICIDES ☐ 8151 HERBICIDES ☐											
TCDF - METALS (RCRA) ☐ TCDF VOC ☐											
TOTAL METALS (RCRA) ☐ SEMI-VOC ☐											
LEAD - TOTAL ☐ D.W. 200.8 ☐ TCDF ☐											
TDS ☐ TOX ☐ FLASHPOINT ☐											
PH ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐											
EXPLOSIVES ☐ PECHLORATE ☐											
CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐											
M300											
FIELD NOTES											

RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	TURN AROUND TIME	LABORATORY USE ONLY:
RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	NORMAL ☐	RECEIVING TEMP: 8:8
RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	1 DAY ☐	THERM #: _____
RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	2 DAY ☐	CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	OTHER ☒	☐ CARRIER BILL # _____
RECEIVED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	Rush	☒ HAND DELIVERED

Data Reported to:

DATE: 10-19-17 LAB WORK ORDER #: PAGE 3 OF 6
PO #:
PROJECT LOCATION OR NAME: EMSU B
LAI PROJECT #: 17-0170 - 01 COLLECTOR: SJ ZG ML

CHAIN-OF-CUSTODY

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION				ANALYSES		FIELD NOTES
						HCl	HNO ₃	H ₂ SO ₄ ☐ NaOH ☐	ICE			
TRRP report? ☐ Yes ☒ No	S=SOIL W=WATER A=AIR	P=PAINT SL=SLUDGE OT=OTHER	TIME ZONE: Time zone/State:									
nmj mountain DATE: 10-19-17 TIME: 14:16												
MM 2 35-36	31	10-17-17	14:16	S	1							
SB 1 0-1'	30		15:15	S	1							
3-4'	33		15:16	S	1							
5-16'	34		15:18	S	1							
7-8'	35		15:22	S	1							
SR 2 0-1'	36	10-18-17	9:52	S	1							
3-4'	37		9:53	S	1							
5-16'	38		9:57	S	1							
7-8'	39		10:01	S	1							
MM 4 0-1'	40		11:36	S	1							
5-16'	41		11:39	S	1							
10-11'	42		11:41	S	1							
15-16'	43		11:46	S	1							
20-21'	44		11:52	S	1							
25-26'	45		11:58	S	1							
TOTAL												

Aarson &
associates, inc.
Environmental Consultants

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

DATE: 10.19.17 PAGE 4 OF 10
PO #: LAB WORK ORDER #:
PROJECT LOCATION OR NAME: EMSU B
LAI PROJECT #: 17-0176-01 COLLECTOR: SJML 2B

Data Reported to:

[illegible]

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2072

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

Data Reported to:

DATE: 10/19/17 PAGE 5 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: EMSU B
LAI PROJECT # 17-01716-01 COLLECTOR SJ CB ML

Page 89 of 92

TRRP report?		S=SOIL W=WATER A=AIR		P=PAINT SL=SLUDGE OT=OTHER	
☐ Yes ☒ No					
TIME ZONE:					
Time zone/State:					
Maintenance/M					
Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers
PRESERVATION					
HCl					
HNO ₃					
H ₂ SO ₄ ☐ NaOH ☐					
ICE					
UNPRESERVED					
ANALYSES					
BTEX ☒ MTBE ☐					
TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐					
GASOLINE MOD 8015 ☒ ☒ ☒					
DIESEL - MOD 8015 ☒ ☒ ☒					
VOC 8260 ☐					
SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐					
8081 PESTICIDES ☐ 8151 HERBICIDES ☐					
TCLP - METALS (RCRA) ☐ TCLP VOC ☐					
TCLP - PEST ☐ HERB ☐ Semi-VOC ☐					
TOTAL METALS (RCRA) ☐ OTHER LIST ☐					
LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐					
RCI ☐ TOX ☐ FLASHPOINT ☐					
TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐					
pH ☐ HEXAVALENT CHROMIUM ☐					
EXPLOSIVES ☐ PENTACHLORATE ☐					
CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐					
M202					
FIELD NOTES					
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)					
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)					
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)					
TURN AROUND TIME					
NORMAL ☐					
1 DAY ☐					
2 DAY ☐					
OTHER ☒					
rush					
LABORATORY USE ONLY					
RECEIVING TEMP: 818 THERM #:					
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED					
☐ CARRIER BILL #					
HAND DELIVERED					

LA arson &
associates, inc.
Environmental Consultants

Associates, LLC.
Environmental Consultants

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

Data Reported to:

DATE: 10-19-17 PAGE 6 OF 6
PO #: _____ LAB WORK ORDER #: _____
PROJECT LOCATION OR NAME: EMSU B
LAI PROJECT # 17-0176-01 COLLECTOR: Sd ZB M.

Page 90 of 92

[illegible]



Brent Barron <brentbarron@pbelab.com>

Report for EMSU B 17-0176-01

Mark Larson <Mark@laenvironmental.com>
To: Brent Barron <brentbarron@pbelab.com>

Thu, Nov 2, 2017 at 10:04 AM

Brent,

Would you please change the sample designation from "SB-12" to "SB-19" for the following samples:

7J19002-12, 0-1'

7J19002-13, 3-4'

7J19002-14, 5-6'

7J19002-15, 7-8'

7J19002-16, 9-10'

Thanks,

Mark

From: Brent Barron [<mailto:brentbarron@pbelab.com>]

Sent: Friday, October 20, 2017 4:58 PM

To: Mark Larson; Sara Gotcher; Candace Hughes; Carson Hughes; Sarah Johnson

Subject: Report for EMSU B 17-0176-01

Complete, please let us know if there are any additions!

--

Brent Barron

Technical Director

Permian Basin Environmental Lab, LP

Office: [432-686-7235](tel:432-686-7235)

Cell: [432-661-4184](tel:432-661-4184)

Please take time to fill out our survey if you are one of our Clients!

<https://www.surveymonkey.com/r/GWKDG3P>



December 06, 2017

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456
RE: XTO EMSU B

Order No.: 1712026

Dear Mark Larson:

DHL Analytical, Inc. received 1 sample(s) on 12/2/2017 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in red ink, appearing to read "John DuPont".

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-17-19



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Larson & Associates, Inc.
Environmental Consultants

DATE: 12/1/17 PAGE 1 OF 1
PO #: _____ LAB WORK ORDER #: 1712026
PROJECT LOCATION OR NAME: XTO EMSU B
LAI PROJECT #: 17-0176-01 COLLECTOR: ZB

[illegible]



WWW.LSO.COM
Questions? Call 800-800-8984

Airbill No. LSO065WU



LSO065WU

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1. To: Print Name (Person) <u>J. PARKER</u> Phone (Important) <u>812 506 1182</u>		2. From: Print Name (Person) <u>JOHN WHITE</u> Phone (Important) <u>432-687-0901</u>	
Company Name <u>DAL ANNOTICAL</u>		Company Name <u>LARSON & ASSOCIATES</u>	
Street Address (No P.O. Box or P.O. Box Zip Code Deliveries) <u>1000 South ...</u>		Street Address <u>507 NORTH MARLENFELD</u>	
Suite / Floor <u>...</u>		Suite / Floor <u>2050</u>	
City <u>ROUND ROCK</u> State <u>TX</u> Zip <u>78664</u>		City <u>MIDLAND</u> State <u>TX</u> Zip <u>79701</u>	
3. Service: Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online. ☐ LSO Priority Overnight* By 10:30 a.m. to most cities ☐ LSO Early Overnight* By 8:30 a.m. select cities ☐ LSO Economy Next Day* By 3 p.m. to most cities ☐ LSO 2nd Day* ☐ LSO Ground ☒ LSO Saturday* ☐ Other _____ *Check commitment times and availability at www.lso.com Assumed LSO Priority Overnight service unless otherwise noted. ☐ Deliver Without Delivery Signature (See Limits of Liability below) Release Signature <u>LSC</u> L <u> </u> x W <u> </u> x H <u> </u>		4. Package: Weight: <u>10.5</u> Your Company's Billing Reference Information Ship Date: (mm/dd/yy) <u>12 / 01 / 17</u> 5. Payment:	
		FOR DRIVER USE ONLY Driver Number <u>1007</u> ☐ Check here if LSO Supplies are used with LSO Ground Service. Pick-up Location <u>12</u> Date: <u>12/1/17</u> Time: <u>1710</u> City Code: <u>AW5</u>	

072653

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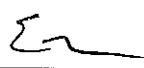
Sample Receipt Checklist

Client Name **Larson & Associates**

Date Received: **12/2/2017**

Work Order Number **1712026**

Received by **AH**

Checklist completed by: 

12/4/2017

Signature

Date

Reviewed by 

12/4/2017

Initials

Date

Carrier name **LoneStar**

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☒	No ☐	2.9 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☒
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	
Water - pH>9 (S) or pH>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Larson & Associates**Project:** XTO EMSU B**Lab Order:** 1712026**CASE NARRATIVE**

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition, E300 and Standard Methods.

All method blanks, sample duplicates, laboratory spikes, and/or matrix spikes met quality assurance objectives except where noted in the following. For Metals analysis by method SW6020A the matrix spike and matrix spike duplicate recoveries were out of control limits for a total of three analytes. These are flagged accordingly in the enclosed QC summary report. The "S" flag denotes spike recovery was outside control limits. The LCS was within control limits for these analytes. No further corrective actions were taken.

DHL Analytical, Inc.

Date: 06-Dec-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No:
Lab Order: 1712026

Client Sample ID: MW-5
Lab ID: 1712026-01
Collection Date: 11/30/17 08:41 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
VOLATILE AROMATICS BY GC/MS		SW8260C		Analyst: BTJ			
Benzene	<0.000800	0.000800	0.00200		mg/L	1	12/05/17 11:16 AM
Ethylbenzene	<0.00200	0.00200	0.00600		mg/L	1	12/05/17 11:16 AM
Toluene	<0.00200	0.00200	0.00600		mg/L	1	12/05/17 11:16 AM
Total Xylenes	<0.00200	0.00200	0.00600		mg/L	1	12/05/17 11:16 AM
Surr: 1,2-Dichloroethane-d4	103	0	72-119		%REC	1	12/05/17 11:16 AM
Surr: 4-Bromofluorobenzene	104	0	76-119		%REC	1	12/05/17 11:16 AM
Surr: Dibromofluoromethane	101	0	85-115		%REC	1	12/05/17 11:16 AM
Surr: Toluene-d8	101	0	81-120		%REC	1	12/05/17 11:16 AM
METALS-ICPMS (0.45µ FILTERED)		SW6020A		Analyst: SP			
Dissolved Calcium	711	5.00	15.0		mg/L	50	12/05/17 02:01 PM
Dissolved Magnesium	493	5.00	15.0		mg/L	50	12/05/17 02:01 PM
Dissolved Potassium	46.6	5.00	15.0		mg/L	50	12/05/17 02:01 PM
Dissolved Sodium	1870	50.0	150		mg/L	500	12/05/17 02:05 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	3320	30.0	100		mg/L	100	12/04/17 02:49 PM
Sulfate	3540	100	300		mg/L	100	12/04/17 02:49 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	191	10.0	20.0		mg/L @ pH 4.54	1	12/05/17 09:48 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	12/05/17 09:48 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	12/05/17 09:48 AM
Alkalinity, Total (As CaCO3)	191	20.0	20.0		mg/L @ pH 4.54	1	12/05/17 09:48 AM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	11200	200	200		mg/L	1	12/06/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Larson & Associates

Work Order: 1712026

Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS3_171205A

The QC data in batch 83453 applies to the following samples: 1712026-01A

Sample ID	LCS-83453	Batch ID:	83453	TestNo:	SW8260C	Units:	mg/L
SampType:	LCS	Run ID:	GCMS3_171205A	Analysis Date:	12/5/2017 10:27:00 AM	Prep Date:	12/5/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0447	0.00200	0.0464	0	96.3	81	122			
Ethylbenzene	0.0430	0.00600	0.0464	0	92.7	73	127			
Toluene	0.0439	0.00600	0.0464	0	94.6	77	122			
Total Xylenes	0.135	0.00600	0.139	0	97.1	80	121			
Surr: 1,2-Dichloroethane-d4	49.8		50.00		99.5	72	119			
Surr: 4-Bromofluorobenzene	51.4		50.00		103	76	119			
Surr: Dibromofluoromethane	50.1		50.00		100	85	115			
Surr: Toluene-d8	50.4		50.00		101	81	120			

Sample ID	MB-83453	Batch ID:	83453	TestNo:	SW8260C	Units:	mg/L
SampType:	MBLK	Run ID:	GCMS3_171205A	Analysis Date:	12/5/2017 10:51:00 AM	Prep Date:	12/5/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.000800	0.00200								
Ethylbenzene	<0.00200	0.00600								
Toluene	<0.00200	0.00600								
Total Xylenes	<0.00200	0.00600								
Surr: 1,2-Dichloroethane-d4	50.2		50.00		100	72	119			
Surr: 4-Bromofluorobenzene	52.7		50.00		105	76	119			
Surr: Dibromofluoromethane	50.2		50.00		100	85	115			
Surr: Toluene-d8	50.6		50.00		101	81	120			

Sample ID	1712028-01AMS	Batch ID:	83453	TestNo:	SW8260C	Units:	mg/L
SampType:	MS	Run ID:	GCMS3_171205A	Analysis Date:	12/5/2017 8:37:00 PM	Prep Date:	12/5/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.516	0.0100	0.232	0.282	101	81	122			
Ethylbenzene	0.238	0.0300	0.232	0	103	73	127			
Toluene	0.278	0.0300	0.232	0.0429	101	77	122			
Total Xylenes	0.726	0.0300	0.695	0.0126	103	80	121			
Surr: 1,2-Dichloroethane-d4	265		250.0		106	72	119			
Surr: 4-Bromofluorobenzene	261		250.0		104	76	119			
Surr: Dibromofluoromethane	252		250.0		101	85	115			
Surr: Toluene-d8	253		250.0		101	81	120			

Sample ID	1712028-01AMSD	Batch ID:	83453	TestNo:	SW8260C	Units:	mg/L
SampType:	MSD	Run ID:	GCMS3_171205A	Analysis Date:	12/5/2017 9:01:00 PM	Prep Date:	12/5/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
---------	--------	----	-----------	---------	------	----------	-----------	------	----------	------

Qualifiers:

B Analyte detected in the associated Method Blank

J Analyte detected between MDL and RL

ND Not Detected at the Method Detection Limit

RL Reporting Limit

J Analyte detected between SDL and RL

DF Dilution Factor

MDL Method Detection Limit

R RPD outside accepted control limits

S Spike Recovery outside control limits

N Parameter not NELAC certified

CLIENT: Larson & Associates

Work Order: 1712026

Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS3_171205A

Sample ID	1712028-01AMSD	Batch ID:	83453	TestNo:	SW8260C	Units:	mg/L			
SampType:	MSD	Run ID:	GCMS3_171205A	Analysis Date:	12/5/2017 9:01:00 PM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.490	0.0100	0.232	0.282	89.6	81	122	5.22	20	
Ethylbenzene	0.214	0.0300	0.232	0	92.3	73	127	10.6	20	
Toluene	0.254	0.0300	0.232	0.0429	91.0	77	122	8.81	20	
Total Xylenes	0.648	0.0300	0.695	0.0126	91.4	80	121	11.4	20	
Surr: 1,2-Dichloroethane-d4	265		250.0		106	72	119	0	0	
Surr: 4-Bromofluorobenzene	259		250.0		104	76	119	0	0	
Surr: Dibromofluoromethane	253		250.0		101	85	115	0	0	
Surr: Toluene-d8	254		250.0		101	81	120	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL

DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1712026
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171205A

The QC data in batch 83464 applies to the following samples: 1712026-01B

Sample ID	MB-83456-FILTER	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L				
SampType:	MBLK	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 1:47:00 PM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	<0.100	0.300									
Dissolved Magnesium	<0.100	0.300									
Dissolved Potassium	<0.100	0.300									
Dissolved Sodium	<0.100	0.300									

Sample ID	MB-83464	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L				
SampType:	MBLK	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 1:49:00 PM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	<0.100	0.300									
Dissolved Magnesium	<0.100	0.300									
Dissolved Potassium	<0.100	0.300									
Dissolved Sodium	<0.100	0.300									

Sample ID	LCS-83464	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L				
SampType:	LCS	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 1:51:00 PM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	5.47	0.300	5.00	0	109	80	120				
Dissolved Magnesium	4.95	0.300	5.00	0	99.0	80	120				
Dissolved Potassium	4.76	0.300	5.00	0	95.2	80	120				
Dissolved Sodium	4.93	0.300	5.00	0	98.6	80	120				

Sample ID	LCSD-83464	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L				
SampType:	LCSD	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 1:53:00 PM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	5.38	0.300	5.00	0	108	80	120	1.66	15		
Dissolved Magnesium	4.85	0.300	5.00	0	97.0	80	120	2.02	15		
Dissolved Potassium	4.66	0.300	5.00	0	93.1	80	120	2.22	15		
Dissolved Sodium	4.81	0.300	5.00	0	96.2	80	120	2.40	15		

Sample ID	1711246-02A SD	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L				
SampType:	SD	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 1:59:00 PM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	<25.0	75.0	0	18.3					0	10	
Dissolved Magnesium	<25.0	75.0	0	14.2					0	10	
Dissolved Potassium	<25.0	75.0	0	9.72					0	10	
Dissolved Sodium	187	75.0	0	191					2.09	10	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1712026
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171205A

Sample ID	1711246-02A PDS	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L			
SampType:	PDS	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 2:07:00 PM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	306	15.0	250	18.3	115	80	120			
Dissolved Magnesium	265	15.0	250	14.1	100	80	120			
Dissolved Potassium	258	15.0	250	9.71	99.3	80	120			
Dissolved Sodium	486	15.0	250	191	118	80	120			

Sample ID	1711246-02A MS	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L			
SampType:	MS	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 2:09:00 PM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	22.1	15.0	5.00	18.3	76.3	80	120			S
Dissolved Magnesium	18.0	15.0	5.00	14.1	77.1	80	120			S
Dissolved Potassium	13.8	15.0	5.00	9.71	80.8	80	120			
Dissolved Sodium	185	15.0	5.00	191	-115	80	120			S

Sample ID	1711246-02A MSD	Batch ID:	83464	TestNo:	SW6020A	Units:	mg/L			
SampType:	MSD	Run ID:	ICP-MS4_171205A	Analysis Date:	12/5/2017 2:11:00 PM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	23.2	15.0	5.00	18.3	97.6	80	120	4.70	15	
Dissolved Magnesium	18.5	15.0	5.00	14.1	87.5	80	120	2.86	15	
Dissolved Potassium	14.0	15.0	5.00	9.71	86.6	80	120	2.09	15	
Dissolved Sodium	190	15.0	5.00	191	-8.00	80	120	2.85	15	S

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1712026
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171204A

The QC data in batch 83424 applies to the following samples: 1712026-01C

Sample ID	MB-83424	Batch ID:	83424	TestNo:	E300	Units:	mg/L			
SampType:	MBLK	Run ID:	IC4_171204A	Analysis Date:	12/4/2017 10:08:35 AM	Prep Date:	12/4/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

Sample ID	LCS-83424	Batch ID:	83424	TestNo:	E300	Units:	mg/L			
SampType:	LCS	Run ID:	IC4_171204A	Analysis Date:	12/4/2017 10:20:35 AM	Prep Date:	12/4/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	9.65	1.00	10.00	0	96.5	90	110			
Sulfate	28.9	3.00	30.00	0	96.3	90	110			

Sample ID	LCSD-83424	Batch ID:	83424	TestNo:	E300	Units:	mg/L			
SampType:	LCSD	Run ID:	IC4_171204A	Analysis Date:	12/4/2017 10:32:35 AM	Prep Date:	12/4/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	9.72	1.00	10.00	0	97.2	90	110	0.766	20	
Sulfate	29.1	3.00	30.00	0	96.9	90	110	0.656	20	

Sample ID	1711241-05CMS	Batch ID:	83424	TestNo:	E300	Units:	mg/L			
SampType:	MS	Run ID:	IC4_171204A	Analysis Date:	12/4/2017 12:03:03 PM	Prep Date:	12/4/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	22000	1000	20000	594.6	107	90	110			
Sulfate	22500	3000	20000	1093	107	90	110			

Sample ID	1711241-05CMSD	Batch ID:	83424	TestNo:	E300	Units:	mg/L			
SampType:	MSD	Run ID:	IC4_171204A	Analysis Date:	12/4/2017 12:15:03 PM	Prep Date:	12/4/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	21800	1000	20000	594.6	106	90	110	1.24	20	
Sulfate	21400	3000	20000	1093	102	90	110	4.78	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1712026
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_171205A

The QC data in batch 83458 applies to the following samples: 1712026-01C

Sample ID	MB-83458	Batch ID:	83458	TestNo:	M2320 B	Units:	mg/L @ pH 4.49			
SampType:	MBLK	Run ID:	TITRATOR_171205A	Analysis Date:	12/5/2017 8:48:00 AM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0
Alkalinity, Total (As CaCO3)	<20.0	20.0

Sample ID	LCS-83458		Batch ID:	83458		TestNo:	M2320 B		Units:	mg/L @ pH 4.49	
SampType:	LCS		Run ID:	TITRATOR_171205A		Analysis Date:	12/5/2017 8:52:00 AM		Prep Date:	12/5/2017	
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Alkalinity, Total (As CaCO3)	47.4	20.0	50.00	0	94.9	74	129
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Sample ID	1712026-01C-DUP	Batch ID:	83458	TestNo:	M2320 B	Units:	mg/L @ pH 4.54			
SampType:	DUP	Run ID:	TITRATOR_171205A	Analysis Date:	12/5/2017 9:57:00 AM	Prep Date:	12/5/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	191	20.0	0	190.8				0.157	20
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Total (As CaCO3)	191	20.0	0	190.8				0.157	20

Sample ID	1712028-01D-DUP			Batch ID:	83458		TestNo:	M2320 B		Units:	mg/L @ pH 4.55	
SampType:	DUP			Run ID:	TITRATOR_171205A		Analysis Date:	12/5/2017 10:41:00 AM		Prep Date:	12/5/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Alkalinity, Bicarbonate (As CaCO3)	464	20.0	0	461.7				0.389	20
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Total (As CaCO3)	464	20.0	0	461.7				0.389	20

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1712026
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: WC_171205B

The QC data in batch 83474 applies to the following samples: 1712026-01C

Sample ID	MB-83474	Batch ID:	83474	TestNo:	M2540C	Units:	mg/L				
SampType:	MBLK	Run ID:	WC_171205B	Analysis Date:	12/6/2017 9:00:00 AM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera <10.0 10.0

Sample ID	LCS-83474	Batch ID:	83474	TestNo:	M2540C	Units:	mg/L				
SampType:	LCS	Run ID:	WC_171205B	Analysis Date:	12/6/2017 9:00:00 AM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera 732 10.0 745.6 0 98.2 90 113

Sample ID	1711245-04B-DUP	Batch ID:	83474	TestNo:	M2540C	Units:	mg/L				
SampType:	DUP	Run ID:	WC_171205B	Analysis Date:	12/6/2017 9:00:00 AM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera 1180 50.0 0 1140 3.45 5

Sample ID	1711245-05B-DUP	Batch ID:	83474	TestNo:	M2540C	Units:	mg/L				
SampType:	DUP	Run ID:	WC_171205B	Analysis Date:	12/6/2017 9:00:00 AM	Prep Date:	12/5/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera 1810 50.0 0 1820 0.551 5

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified



November 30, 2017

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456
RE: XTO EMSU "B"

Order No.: 1711217

Dear Mark Larson:

DHL Analytical, Inc. received 2 sample(s) on 11/29/2017 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in red ink, appearing to read "John DuPont".

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-17-19



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CLIENT: Larson's Associates, Inc
ADDRESS: 507 N. Marienfeld, St. 205
PHONE: 432-687-0901 FAX/E-MAIL: _____
DATA REPORTED TO: Mark Larson
ADDITIONAL REPORT COPIES TO: Zach Byars

DATE: 11-28-2017 PAGE 1 OF 1
PO #: _____ DHL WORK ORDER #: 1711217
PROJECT LOCATION OR NAME: XTD EMSU "B"
CLIENT PROJECT #: 17-0176-01 COLLECTOR: ZB / AT

[illegible]



WWW.LSO.COM
Questions? Call 800-800-8984

Airbill No. LSO065WT



LSO065WT

1. To:		2. From:	
Print Name (Person)	Phone (Important)	Print Name (Person)	Phone (Important)
John Dupont (512) 345-8222		John Dupont (512) 345-8222	
Company Name		Company Name	
DHL Analytical		TARSON & ASSOCIATES	
Street Address (No P.O. Box or P.O. Box Zip Code Deliveries)		Street Address	
2300 Double Creek Dr.		507 WILSON DR	
Suite / Floor		Suite / Floor	
		205	
City	State	City	State
Round Rock TX	76766	MILWAUKEE WI	53103
3. Service:		4. Package:	
Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online.		Weight: 5	
☒ LSO Priority Overnight* By 10:30 a.m. to most cities		Your Company's Billing Reference Information	
☐ LSO Ground		Ship Date: (mm/dd/yyyy) 11/28/2017	
☐ LSO Early Overnight* By 8:30 a.m. select cities		5. Payment:	
☐ LSO Saturday*			
☐ Other _____			
*Check commitment times and availability at www.lso.com			
☐ LSO Economy Next Day* By 3 p.m. to most cities			
☐ LSO 2nd Day*			
Assumed LSO Priority Overnight service unless otherwise noted.			
☐ Deliver Without Delivery Signature (See Limits of Liability below)			
Release Signature			
L _____ x W _____ x H _____			

ILLEGIBLE HANDWRITING ON AIRBILL MAY DELAY TRANSIT TIMES OR RESULT IN NON-DELIVERY. LIMIT OF LIABILITY: We are not responsible for claims in excess of \$100 for any reason unless you: 1) declare a greater value (not to exceed \$25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. "Signature Required" service is only available when printing a label online at LSO.com. NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. Packaging provided by LSO is for EXPRESS USE ONLY - NEVER TO BE USED FOR LSO GROUND SERVICE. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY. See LSO Service Guide for further details.

Sample Receipt Checklist

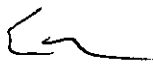
Client Name **Larson & Associates**

Date Received: **11/29/2017**

Work Order Number **1711217**

Received by **CVD**

Checklist completed by:


Signature

11/29/2017

Date

Reviewed by


Initials

11/29/2017

Date

Carrier name **LoneStar**

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☒	No ☐	1.1 °C
Water - VOA vials have zero headspace?	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #

Adjusted? _____

Checked by _____

Water - pH>9 (S) or pH>10 (CN) acceptable upon receipt?

Yes ☐

No ☐

NA ☒

LOT #

Adjusted? _____

Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____

Date contacted: _____

Person contacted _____

Contacted by: _____

Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Larson & Associates**Project:** XTO EMSU "B"**Lab Order:** 1711217**CASE NARRATIVE**

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition, EPA and Standard Methods.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives except where noted in the following. For Anions Analysis, the recoveries of two anions for the Matrix Spike and Matrix Spike Duplicate (1711212-01 MS/MSD) were below the method control limits. These are flagged accordingly in the QC Summary Report. These anions were within method control limits in the associated LCS. No further corrective action was taken.

DHL Analytical, Inc.

Date: 30-Nov-17

CLIENT: Larson & Associates
Project: XTO EMSU "B"
Project No: 17-0176-01
Lab Order: 1711217

Client Sample ID: SB-26
Lab ID: 1711217-01
Collection Date: 11/27/17 02:25 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
VOLATILE AROMATICS BY GC/MS		SW8260C		Analyst: BTJ			
Benzene	<0.000800	0.000800	0.00200		mg/L	1	11/29/17 06:02 PM
Ethylbenzene	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:02 PM
Toluene	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:02 PM
Total Xylenes	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:02 PM
Surr: 1,2-Dichloroethane-d4	107	0	72-119		%REC	1	11/29/17 06:02 PM
Surr: 4-Bromofluorobenzene	105	0	76-119		%REC	1	11/29/17 06:02 PM
Surr: Dibromofluoromethane	101	0	85-115		%REC	1	11/29/17 06:02 PM
Surr: Toluene-d8	101	0	81-120		%REC	1	11/29/17 06:02 PM
METALS-ICPMS (0.45µ FILTERED)		SW6020A		Analyst: RO			
Dissolved Calcium	1060	50.0	150		mg/L	50	11/30/17 11:20 AM
Dissolved Magnesium	367	50.0	150		mg/L	50	11/30/17 11:20 AM
Dissolved Potassium	58.9	1.00	3.00		mg/L	1	11/30/17 10:57 AM
Dissolved Sodium	4390	50.0	150		mg/L	50	11/30/17 11:20 AM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	6740	300	1000		mg/L	1000	11/29/17 12:55 PM
Sulfate	1810	100	300		mg/L	100	11/29/17 01:19 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	449	10.0	20.0		mg/L @ pH 4.53	1	11/29/17 01:44 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	11/29/17 01:44 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	11/29/17 01:44 PM
Alkalinity, Total (As CaCO3)	449	20.0	20.0		mg/L @ pH 4.53	1	11/29/17 01:44 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	15700	200	200		mg/L	1	11/30/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 30-Nov-17

CLIENT: Larson & Associates
Project: XTO EMSU "B"
Project No: 17-0176-01
Lab Order: 1711217

Client Sample ID: SB-27
Lab ID: 1711217-02
Collection Date: 11/27/17 02:40 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
VOLATILE AROMATICS BY GC/MS		SW8260C		Analyst: BTJ			
Benzene	<0.000800	0.000800	0.00200		mg/L	1	11/29/17 06:26 PM
Ethylbenzene	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:26 PM
Toluene	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:26 PM
Total Xylenes	<0.00200	0.00200	0.00600		mg/L	1	11/29/17 06:26 PM
Surr: 1,2-Dichloroethane-d4	105	0	72-119		%REC	1	11/29/17 06:26 PM
Surr: 4-Bromofluorobenzene	103	0	76-119		%REC	1	11/29/17 06:26 PM
Surr: Dibromofluoromethane	102	0	85-115		%REC	1	11/29/17 06:26 PM
Surr: Toluene-d8	101	0	81-120		%REC	1	11/29/17 06:26 PM
METALS-ICPMS (0.45µ FILTERED)		SW6020A		Analyst: RO			
Dissolved Calcium	1230	10.0	30.0		mg/L	10	11/30/17 11:24 AM
Dissolved Magnesium	189	1.00	3.00		mg/L	1	11/30/17 11:01 AM
Dissolved Potassium	22.9	1.00	3.00		mg/L	1	11/30/17 11:01 AM
Dissolved Sodium	654	10.0	30.0		mg/L	10	11/30/17 11:24 AM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	3390	30.0	100		mg/L	100	11/29/17 01:31 PM
Sulfate	207	100	300	J	mg/L	100	11/29/17 01:31 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	83.6	10.0	20.0		mg/L @ pH 4.5	1	11/29/17 01:24 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	11/29/17 01:24 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	11/29/17 01:24 PM
Alkalinity, Total (As CaCO3)	83.6	20.0	20.0		mg/L @ pH 4.5	1	11/29/17 01:24 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	6540	200	200		mg/L	1	11/30/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Larson & Associates

Work Order: 1711217

Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS3_171129A

The QC data in batch 83391 applies to the following samples: 1711217-01A, 1711217-02A

Sample ID	LCS-83391			Batch ID:	83391		TestNo:	SW8260C		Units:	mg/L	
SampType:	LCS			Run ID:	GCMS3_171129A		Analysis Date:	11/29/2017 10:33:00 A		Prep Date:	11/29/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Benzene	0.0439	0.00200	0.0464	0	94.7	81	122			
Ethylbenzene	0.0457	0.00600	0.0464	0	98.5	73	127			
Toluene	0.0461	0.00600	0.0464	0	99.5	77	122			
Total Xylenes	0.137	0.00600	0.139	0	98.7	80	121			
Surr: 1,2-Dichloroethane-d4	44.6		50.00		89.3	72	119			
Surr: 4-Bromofluorobenzene	47.9		50.00		95.9	76	119			
Surr: Dibromofluoromethane	49.9		50.00		99.8	85	115			
Surr: Toluene-d8	50.1		50.00		100	81	120			

Sample ID	MB-83391			Batch ID:	83391			TestNo:	SW8260C			Units:	mg/L		
SampType:	MBLK			Run ID:	GCMS3_171129A			Analysis Date:	11/29/2017 10:56:00 A			Prep Date:	11/29/2017		
Analyte	Result			RL	SPK value		Ref Val	%REC		LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Benzene	<0.000800	0.00200								
Ethylbenzene	<0.00200	0.00600								
Toluene	<0.00200	0.00600								
Total Xylenes	<0.00200	0.00600								
Surr: 1,2-Dichloroethane-d4	50.3		50.00		101	72	119			
Surr: 4-Bromofluorobenzene	50.4		50.00		101	76	119			
Surr: Dibromofluoromethane	50.4		50.00		101	85	115			
Surr: Toluene-d8	50.3		50.00		101	81	120			

Sample ID	1711192-02AMS	Batch ID:	83391	TestNo:	SW8260C	Units:	mg/L			
SampType:	MS	Run ID:	GCMS3_171129A	Analysis Date:	11/29/2017 12:50:00 P	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Benzene	0.0458	0.00200	0.0464	0	98.7	81	122			
Ethylbenzene	0.0452	0.00600	0.0464	0	97.3	73	127			
Toluene	0.0458	0.00600	0.0464	0	98.8	77	122			
Total Xylenes	0.136	0.00600	0.139	0	97.7	80	121			
Surr: 1,2-Dichloroethane-d4	51.0		50.00		102	72	119			
Surr: 4-Bromofluorobenzene	50.2		50.00		100	76	119			
Surr: Dibromofluoromethane	50.8		50.00		102	85	115			
Surr: Toluene-d8	50.4		50.00		101	81	120			

Sample ID	1711192-02AMSD	Batch ID:	83391	TestNo:	SW8260C	Units:	mg/L			
SampType:	MSD	Run ID:	GCMS3_171129A	Analysis Date:	11/29/2017 1:13:00 PM	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B Analyte detected in the associated Method Blank

J Analyte detected between MDL and RL

ND Not Detected at the Method Detection Limit

RL Reporting Limit

J Analyte detected between SDL and RL

DF Dilution Factor

MDL Method Detection Limit

R RPD outside accepted control limits

S Spike Recovery outside control limits

N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS3_171129A

Sample ID	1711192-02AMSD	Batch ID:	83391	TestNo:	SW8260C	Units:	mg/L			
SampType:	MSD	Run ID:	GCMS3_171129A	Analysis Date:	11/29/2017 1:13:00 PM	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0449	0.00200	0.0464	0	96.7	81	122	2.03	20	
Ethylbenzene	0.0441	0.00600	0.0464	0	95.1	73	127	2.28	20	
Toluene	0.0451	0.00600	0.0464	0	97.1	77	122	1.66	20	
Total Xylenes	0.132	0.00600	0.139	0	94.9	80	121	2.92	20	
Surr: 1,2-Dichloroethane-d4	51.8		50.00		104	72	119	0	0	
Surr: 4-Bromofluorobenzene	50.2		50.00		100	76	119	0	0	
Surr: Dibromofluoromethane	51.2		50.00		102	85	115	0	0	
Surr: Toluene-d8	50.7		50.00		101	81	120	0	0	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171130A

The QC data in batch 83397 applies to the following samples: 1711217-01B, 1711217-02B

Sample ID	MB-83397		Batch ID:	83397		TestNo:	SW6020A		Units:	mg/L	
SampType:	MBLK		Run ID:	ICP-MS4_171130A		Analysis Date:	11/30/2017 10:47:00 A		Prep Date:	11/29/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	<0.100	0.300
Dissolved Magnesium	<0.100	0.300
Dissolved Potassium	<0.100	0.300
Dissolved Sodium	<0.100	0.300

Sample ID	MB-83396-FILTER	Batch ID:	83397	TestNo:	SW6020A	Units:	mg/L			
SampType:	MBLK	Run ID:	ICP-MS4_171130A	Analysis Date:	11/30/2017 10:49:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	<0.100	0.300
Dissolved Magnesium	<0.100	0.300
Dissolved Potassium	<0.100	0.300
Dissolved Sodium	<0.100	0.300

Sample ID	LCS-83397		Batch ID:	83397		TestNo:	SW6020A		Units:	mg/L	
SampType:	LCS		Run ID:	ICP-MS4_171130A		Analysis Date:	11/30/2017 10:51:00 A		Prep Date:	11/29/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	5.30	0.300	5.00	0	106	80	120
Dissolved Magnesium	5.18	0.300	5.00	0	104	80	120
Dissolved Potassium	4.91	0.300	5.00	0	98.3	80	120
Dissolved Sodium	5.38	0.300	5.00	0	108	80	120

Sample ID	LCSD-83397	Batch ID:	83397	TestNo:	SW6020A	Units:	mg/L			
SampType:	LCSD	Run ID:	ICP-MS4_171130A	Analysis Date:	11/30/2017 10:53:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Calcium	5.19	0.300	5.00	0	104	80	120	2.12	15
Dissolved Magnesium	4.87	0.300	5.00	0	97.4	80	120	6.18	15
Dissolved Potassium	4.70	0.300	5.00	0	94.1	80	120	4.36	15
Dissolved Sodium	5.05	0.300	5.00	0	101	80	120	6.35	15

Sample ID	1711217-01B SD			Batch ID:	83397		TestNo:	SW6020A		Units:	mg/L	
SampType:	SD			Run ID:	ICP-MS4_171130A		Analysis Date:	11/30/2017 10:59:00 A		Prep Date:	11/29/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Potassium	59.2	15.0	0	58.9				0.505	10
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Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171130A

Sample ID	1711217-01B PDS	Batch ID:	83397	TestNo:	SW6020A	Units:	mg/L			
SampType:	PDS	Run ID:	ICP-MS4_171130A	Analysis Date:	11/30/2017 11:03:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	110	3.00	50.0	58.9	102	80	120			

Sample ID	1711217-01B SD	Batch ID:	83397	TestNo:	SW6020A	Units:	mg/L			
SampType:	SD	Run ID:	ICP-MS4_171130A	Analysis Date:	11/30/2017 11:22:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	1030	750	0	1060				2.63	10	
Magnesium	364	750	0	367				0.836	10	
Sodium	4170	750	0	4390				5.13	10	

Sample ID	1711217-01B PDS	Batch ID:	83397	TestNo:	SW6020A	Units:	mg/L			
SampType:	PDS	Run ID:	ICP-MS4_171130A	Analysis Date:	11/30/2017 11:26:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	3660	150	2500	1060	104	80	120			
Magnesium	2870	150	2500	367	100	80	120			
Sodium	6910	150	2500	4390	101	80	120			

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171129A

The QC data in batch 83389 applies to the following samples: 1711217-01C, 1711217-02C

Sample ID	MB-83389	Batch ID:	83389	TestNo:	E300	Units:	mg/L				
SampType:	MBLK	Run ID:	IC4_171129A	Analysis Date:	11/29/2017 10:18:44 A	Prep Date:	11/29/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	<0.300	1.00									
Sulfate	<1.00	3.00									

Sample ID	LCS-83389	Batch ID:	83389	TestNo:	E300	Units:	mg/L				
SampType:	LCS	Run ID:	IC4_171129A	Analysis Date:	11/29/2017 10:30:44 A	Prep Date:	11/29/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	9.34	1.00	10.00	0	93.4	90	110				
Sulfate	28.3	3.00	30.00	0	94.3	90	110				

Sample ID	LCSD-83389	Batch ID:	83389	TestNo:	E300	Units:	mg/L				
SampType:	LCSD	Run ID:	IC4_171129A	Analysis Date:	11/29/2017 10:42:44 A	Prep Date:	11/29/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	9.43	1.00	10.00	0	94.3	90	110	0.939	20		
Sulfate	28.5	3.00	30.00	0	94.9	90	110	0.637	20		

Sample ID	1711212-01BMS	Batch ID:	83389	TestNo:	E300	Units:	mg/L				
SampType:	MS	Run ID:	IC4_171129A	Analysis Date:	11/29/2017 11:24:52 A	Prep Date:	11/29/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	77.4	1.00	20.00	73.48	19.5	90	110				S
Sulfate	156	3.00	20.00	142.4	70.2	90	110				S

Sample ID	1711212-01BMSD	Batch ID:	83389	TestNo:	E300	Units:	mg/L				
SampType:	MSD	Run ID:	IC4_171129A	Analysis Date:	11/29/2017 11:36:52 A	Prep Date:	11/29/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	77.4	1.00	20.00	73.48	19.5	90	110	0.001	20	S	
Sulfate	157	3.00	20.00	142.4	71.7	90	110	0.187	20	S	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_171129A

The QC data in batch 83388 applies to the following samples: 1711217-01C, 1711217-02C

Sample ID	MB-83388	Batch ID:	83388	TestNo:	M2320 B	Units:	mg/L @ pH 4.38			
SampType:	MBLK	Run ID:	TITRATOR_171129A	Analysis Date:	11/29/2017 9:38:00 AM	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID	LCS-83388			Batch ID:	83388		TestNo:	M2320 B		Units:	mg/L @ pH 4.5	
SampType:	LCS			Run ID:	TITRATOR_171129A		Analysis Date:	11/29/2017 9:43:00 AM		Prep Date:	11/29/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Alkalinity, Total (As CaCO3)	47.8	20.0	50.00	0	95.7	74	129			
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Sample ID	1711189-01A-DUP	Batch ID:	83388	TestNo:	M2320 B	Units:	mg/L @ pH 4.53			
SampType:	DUP	Run ID:	TITRATOR_171129A	Analysis Date:	11/29/2017 10:25:00 A	Prep Date:	11/29/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	169	20.0	0	171.7				1.58	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	169	20.0	0	171.7				1.58	20	

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL

DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1711217
Project: XTO EMSU "B"

ANALYTICAL QC SUMMARY REPORT

RunID: WC_171129A

The QC data in batch 83395 applies to the following samples: 1711217-01C, 1711217-02C

Sample ID	MB-83395	Batch ID:	83395	TestNo:	M2540C	Units:	mg/L
SampType:	MBLK	Run ID:	WC_171129A	Analysis Date:	11/30/2017 9:00:00 AM	Prep Date:	11/29/2017
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids (Residue, Filtera <10.0 10.0

Sample ID	LCS-83395	Batch ID:	83395	TestNo:	M2540C	Units:	mg/L
SampType:	LCS	Run ID:	WC_171129A	Analysis Date:	11/30/2017 9:00:00 AM	Prep Date:	11/29/2017
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids (Residue, Filtera 731 10.0 745.6 0 98.0 90 113

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified



October 27, 2017

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456
RE: XTO EMSU B

Order No.: 1710222

Dear Mark Larson:

DHL Analytical, Inc. received 1 sample(s) on 10/25/2017 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in blue ink, appearing to read "John DuPont", with a stylized flourish at the end.

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-17-19



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Larson &
Associates, Inc.
Environmental Consultants

Data Reported to:

PAGE 1 OF 1

PO #: LAB WORK ORDER #: 1710222

PROJECT LOCATION OR NAME: XTO/EMSU B

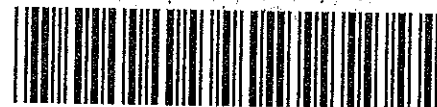
LAI PROJECT #: 17-070-01 COLLECTOR: SJ/ZB

[illegible]



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State

Zip

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TX

78664

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Print Name (Person)

Phone (Important)

Company Name

LARSON & ASSOCIATES

Street Address

507 NORTH WATKINSFIELD

Suite / Floor

205

City

State

Zip

MIDLAND

TX

79701

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Ship Date: (mm/dd/yy)

10 ' 24 ' 17

5. Payment:

FOR DRIVER USE ONLY

Driver Number

☐ Check here if LSO Supplies are used with LSO Ground Service.

Pick-up Location

Date:

Time:

City Code:

LIMIT OF LIABILITY: We are not responsible for claims in excess of \$100 for any reason unless you: 1) declare a greater value (not to exceed \$25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claims in excess of the actual loss. We are not liable for any special or consequential damages. Additional limitations of liability are contained in our current Service Guide. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. PACKAGING PROVIDED BY LSO IS NOT INTENDED FOR USE ON LSO GROUND SERVICE. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY.

Sample Receipt Checklist

Client Name **Larson & Associates**Date Received: **10/25/2017**Work Order Number **1710222**Received by **EL**Checklist completed by:  10/25/2017
Signature DateReviewed by  10/25/2017
Initials DateCarrier name LoneStar

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☒	No ☐	2.1 °C
Water - VOA vials have zero headspace?	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	
Water - pH>9 (S) or pH>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Larson & Associates
Project: XTO EMSU B
Lab Order: 1710222

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition, E300 and Standard Methods.

For Volatiles analysis an MS/MSD was not performed due to insufficient sample volume. An LCS/LCSD was performed instead.

All method blanks, sample duplicates, laboratory spikes, and/or matrix spikes met quality assurance objectives except where noted in the following. For Metals analysis by method SW6020A the matrix spike and matrix spike duplicate recoveries were out of control limits for all analytes. This was due to the concentration of target analytes in the parent sample. These are flagged accordingly in the enclosed QC summary report. The "S" flag denotes spike recovery was outside control limits. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Anions analysis by method E300 the matrix spike and matrix spike duplicate recoveries (1710214-02 MS/MSD) were slightly below control limits for Chloride. These are flagged accordingly. The "S" flag denotes spike recovery was outside control limits. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Volatiles analysis by method SW8260C the surrogate recoveries for the LCS and LCSD were slightly above control limits for 1,2-Dichloroethane-d4. These are flagged accordingly. The remaining surrogates were within control limits. No further corrective actions were taken.

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710222

Client Sample ID: Produced Water
Lab ID: 1710222-01
Collection Date: 10/23/17 11:16 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	717	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Magnesium	402	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Potassium	224	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Sodium	5560	40.0	120		mg/L	200	10/26/17 04:05 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.207	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Ethylbenzene	0.100	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Toluene	0.413	0.00600	0.0200		mg/L	10	10/25/17 08:34 PM
Total Xylenes	0.366	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Surr: 1,2-Dichloroethane-d4	111	0	72-119		%REC	10	10/25/17 08:34 PM
Surr: 4-Bromofluorobenzene	104	0	76-119		%REC	10	10/25/17 08:34 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	10	10/25/17 08:34 PM
Surr: Toluene-d8	97.2	0	81-120		%REC	10	10/25/17 08:34 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	10600	300	1000		mg/L	1000	10/25/17 04:42 PM
Sulfate	951	10.0	30.0		mg/L	10	10/25/17 05:06 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	1190	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Total (As CaCO3)	1190	20.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	20000	1000	1000		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710222

Client Sample ID: Produced Water
Lab ID: 1710222-01
Collection Date: 10/23/17 10:15 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	717	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Magnesium	402	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Potassium	224	20.0	60.0		mg/L	100	10/26/17 03:46 PM
Dissolved Sodium	5560	40.0	120		mg/L	200	10/26/17 04:05 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.207	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Ethylbenzene	0.100	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Toluene	0.413	0.00600	0.0200		mg/L	10	10/25/17 08:34 PM
Total Xylenes	0.366	0.00300	0.0100		mg/L	10	10/25/17 08:34 PM
Surr: 1,2-Dichloroethane-d4	111	0	72-119		%REC	10	10/25/17 08:34 PM
Surr: 4-Bromofluorobenzene	104	0	76-119		%REC	10	10/25/17 08:34 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	10	10/25/17 08:34 PM
Surr: Toluene-d8	97.2	0	81-120		%REC	10	10/25/17 08:34 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	10600	300	1000		mg/L	1000	10/25/17 04:42 PM
Sulfate	951	10.0	30.0		mg/L	10	10/25/17 05:06 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	1190	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
Alkalinity, Total (As CaCO3)	1190	20.0	20.0		mg/L @ pH 4.55	1	10/26/17 01:58 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	20000	1000	1000		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Larson & Associates

Work Order: 1710222

Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171025B

The QC data in batch 82947 applies to the following samples: 1710222-01C

Sample ID	MB-82948-FILTER	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	MBLK	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 5:30:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Calcium	<0.100	0.300
Dissolved Magnesium	<0.100	0.300
Dissolved Potassium	<0.100	0.300

Sample ID	MB-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	MBLK	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 5:32:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Calcium	<0.100	0.300
Dissolved Magnesium	<0.100	0.300
Dissolved Potassium	<0.100	0.300

Sample ID	LCS-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	LCS	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 5:34:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Calcium	5.46	0.300	5.00	0	109	80	120
Dissolved Magnesium	5.28	0.300	5.00	0	106	80	120
Dissolved Potassium	5.31	0.300	5.00	0	106	80	120

Sample ID	LCSD-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	LCSD	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 5:36:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Calcium	5.43	0.300	5.00	0	109	80	120	0.466	15
Dissolved Magnesium	5.21	0.300	5.00	0	104	80	120	1.37	15
Dissolved Potassium	5.27	0.300	5.00	0	105	80	120	0.779	15

Qualifiers:

B Analyte detected in the associated Method Blank

J Analyte detected between MDL and RL

ND Not Detected at the Method Detection Limit

RL Reporting Limit

J Analyte detected between SDL and RL

DF Dilution Factor

MDL Method Detection Limit

R RPD outside accepted control limits

S Spike Recovery outside control limits

N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171026C

The QC data in batch 82947 applies to the following samples: 1710222-01C

Sample ID	MB-82948-FILTER	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	MBLK	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:36:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Sodium	<0.100	0.300									
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Sample ID	MB-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	MBLK	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:38:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Sodium	<0.100	0.300									
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Sample ID	LCS-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	LCS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:40:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Sodium	5.22	0.300	5.00	0	104	80	120				
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Sample ID	LCSD-82947	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	LCSD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:42:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Dissolved Sodium	5.15	0.300	5.00	0	103	80	120	1.36	15		
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Sample ID	1710222-01C SD	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	SD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:48:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Calcium	699	300	0	717					2.50	10
Magnesium	394	300	0	402					2.04	10
Potassium	216	300	0	224					3.84	10

Sample ID	1710222-01C PDS	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	PDS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:49:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Calcium	1830	60.0	1000	717	111	80	120				
Magnesium	1420	60.0	1000	402	101	80	120				
Potassium	1260	60.0	1000	224	103	80	120				

Sample ID	1710222-01C MS	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	MS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:51:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171026C

Sample ID	1710222-01C MS	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	MS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:51:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	720	60.0	10.0	717	30.1	80	120			S
Dissolved Magnesium	406	60.0	10.0	402	42.9	80	120			S
Dissolved Potassium	230	60.0	10.0	224	63.6	80	120			S
Dissolved Sodium	5470	60.0	10.0	5560	-932	80	120			S

Sample ID	1710222-01C MSD	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L			
SampType:	MSD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 3:53:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	720	60.0	10.0	717	32.3	80	120	0.031	15	S
Dissolved Magnesium	404	60.0	10.0	402	27.0	80	120	0.391	15	S
Dissolved Potassium	227	60.0	10.0	224	29.3	80	120	1.50	15	S
Dissolved Sodium	5510	60.0	10.0	5560	-487	80	120	0.810	15	S

Sample ID	1710222-01C SD	Batch ID:	82947	TestNo:	SW6020A	Units:	mg/L				
SampType:	SD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 4:07:00 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium		5490	600	0	5560				1.22	10	

Sample ID	1710222-01C PDS			Batch ID:	82947		TestNo:	SW6020A		Units:	mg/L	
SampType:	PDS			Run ID:	ICP-MS4_171026C		Analysis Date:	10/26/2017 4:09:00 PM		Prep Date:	10/25/2017	
Analyte	Result		RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Sodium	7710		120	2000	5560	108	80	120				

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_171025A

The QC data in batch 82945 applies to the following samples: 1710222-01A

Sample ID	LCS-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L			
SampType:	LCS	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 3:11:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0241	0.00100	0.0232	0	104	81	122			
Ethylbenzene	0.0219	0.00100	0.0232	0	94.5	80	120			
Toluene	0.0244	0.00200	0.0232	0	105	80	120			
Total Xylenes	0.0660	0.00100	0.0696	0	94.8	80	120			
Surr: 1,2-Dichloroethane-d4	247		200.0		123	72	119			S
Surr: 4-Bromofluorobenzene	210		200.0		105	76	119			
Surr: Dibromofluoromethane	219		200.0		110	85	115			
Surr: Toluene-d8	190		200.0		94.9	81	120			

Sample ID	MB-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L			
SampType:	MBLK	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 3:35:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.000300	0.00100								
Ethylbenzene	<0.000300	0.00100								
Toluene	<0.000600	0.00200								
Total Xylenes	<0.000300	0.00100								
Surr: 1,2-Dichloroethane-d4	230		200.0		115	72	119			
Surr: 4-Bromofluorobenzene	204		200.0		102	76	119			
Surr: Dibromofluoromethane	216		200.0		108	85	115			
Surr: Toluene-d8	192		200.0		96.1	81	120			

Sample ID	LCSD-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L			
SampType:	LCSD	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 4:24:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0241	0.00100	0.0232	0	104	81	120	0.033	20	
Ethylbenzene	0.0231	0.00100	0.0232	0	99.4	80	120	5.12	20	
Toluene	0.0241	0.00200	0.0232	0	104	80	120	0.961	20	
Total Xylenes	0.0697	0.00100	0.0696	0	100	80	120	5.44	20	
Surr: 1,2-Dichloroethane-d4	241		200.0		120	72	119	0	0	S
Surr: 4-Bromofluorobenzene	204		200.0		102	76	119	0	0	
Surr: Dibromofluoromethane	221		200.0		111	85	115	0	0	
Surr: Toluene-d8	195		200.0		97.5	81	120	0	0	

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171025A

The QC data in batch 82930 applies to the following samples: 1710222-01D

Sample ID	MB-82930	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	MBLK	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 10:25:35 A	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	<0.300	1.00									
Sulfate	<1.00	3.00									

Sample ID	LCS-82930	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	LCS	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 10:37:35 A	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	9.89	1.00	10.00	0	98.9	90	110				
Sulfate	29.3	3.00	30.00	0	97.8	90	110				

Sample ID	LCSD-82930	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	LCSD	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 10:49:35 A	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	10.0	1.00	10.00	0	100	90	110	1.49	20		
Sulfate	29.5	3.00	30.00	0	98.5	90	110	0.696	20		

Sample ID	1710175-26CMS	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	MS	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 12:23:02 P	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	3840	100	2000	1843	99.8	90	110				
Sulfate	1920	300	2000	0	96.2	90	110				

Sample ID	1710175-26CMSD	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	MSD	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 12:35:02 P	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	3880	100	2000	1843	102	90	110	1.12	20		
Sulfate	1960	300	2000	0	97.9	90	110	1.71	20		

Sample ID	1710214-02EMS	Batch ID:	82930	TestNo:	E300	Units:	mg/L				
SampType:	MS	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 3:11:18 PM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	49.2	1.00	20.00	32.05	85.9	90	110				S
Sulfate	66.0	3.00	20.00	46.43	97.9	90	110				

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171025A

Sample ID	1710214-02EMSD	Batch ID:	82930	TestNo:	E300	Units:	mg/L			
SampType:	MSD	Run ID:	IC4_171025A	Analysis Date:	10/25/2017 3:23:18 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	49.7	1.00	20.00	32.05	88.3	90	110	0.972	20	S
Sulfate	66.8	3.00	20.00	46.43	102	90	110	1.18	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_171026B

The QC data in batch 82962 applies to the following samples: 1710222-01D

Sample ID	MB-82962	Batch ID:	82962	TestNo:	M2320 B	Units:	mg/L @ pH 4.5			
SampType:	MBLK	Run ID:	TITRATOR_171026B	Analysis Date:	10/26/2017 12:40:00 P	Prep Date:	10/26/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0
Alkalinity, Total (As CaCO3)	<20.0	20.0

Sample ID	LCS-82962			Batch ID:	82962		TestNo:	M2320 B		Units:	mg/L @ pH 4.52	
SampType:	LCS			Run ID:	TITRATOR_171026B		Analysis Date:	10/26/2017 12:46:00 P		Prep Date:	10/26/2017	
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Alkalinity, Total (As CaCO3)	48.7	20.0	50.00	0	97.4	74	129
------------------------------	------	------	-------	---	------	----	-----

Sample ID	1710186-01C-DUP	Batch ID:	82962	TestNo:	M2320 B	Units:	mg/L @ pH 4.53			
SampType:	DUP	Run ID:	TITRATOR_171026B	Analysis Date:	10/26/2017 12:58:00 P	Prep Date:	10/26/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3)	140	20.0	0	140.2				0.214	20
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20
Alkalinity, Total (As CaCO3)	140	20.0	0	140.2				0.214	20

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL

DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710222
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: WC_171025A

The QC data in batch 82949 applies to the following samples: 1710222-01D

Sample ID	MB-82949	Batch ID:	82949	TestNo:	M2540C	Units:	mg/L				
SampType:	MBLK	Run ID:	WC_171025A	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera <10.0 10.0

Sample ID	LCS-82949	Batch ID:	82949	TestNo:	M2540C	Units:	mg/L				
SampType:	LCS	Run ID:	WC_171025A	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera 745 10.0 745.6 0 99.9 90 113

Sample ID	1710222-01D-DUP	Batch ID:	82949	TestNo:	M2540C	Units:	mg/L				
SampType:	DUP	Run ID:	WC_171025A	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filtera 20600 1000 0 20000 2.96 5

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified



October 27, 2017

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456
RE: XTO EMSU B

Order No.: 1710209

Dear Mark Larson:

DHL Analytical, Inc. received 20 sample(s) on 10/25/2017 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in blue ink, appearing to read "John DuPont".

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-17-19



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CHAIN-OF-CUSTODY

Arson & Associates, Inc.
Environmental Consultants

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

DATE: 10/24/17

PAGE 1 OF 2

PO #:

LAB WORK ORDER #: 1760209

PROJECT LOCATION OR NAME: XTO / EMSU B

LAI PROJECT #: 17-0176-01

COLLECTOR: SJ/ZB

Data Reported to:

TRRP report?		S=SOIL <u>W=WATER</u> A=AIR		P=PAINT SL=SLUDGE OT=OTHER		PRESERVATION					ANALYSES															FIELD NOTES											
☐ Yes	☒ No						HCl	HNO ₃	H ₂ SO ₄ □ NaOH □	ICE	UNPRESERVED	BTEX	MTBE	TPH 418-1	TPH 1005	DIESEL - MOD 8015	VOC 8260	SVOC 8270	8081 PESTICIDES	8082 PESTICIDES	TCIP - METALS (RCRA)	TCIP - PEST (RCRA)	TCIP - HERB	TCIP - VOC	TCIP - SEMI-VOC		OTHER VOC	OTHER LST	PH	TOX	FLASHPOINT	% MOISTURE	EXPLOSIVES	CHROMIUM	CHLORIDE	ANIONS	PECHLORATED
TIME ZONE: Time zone/State:						# of Containers																															
Field Sample I.D.	Lab #	Date	Time	Matrix																																	
SB-2	02	10/23/17	10:35	W	3	✓				✓	✓																										
SB-1	01		10:42		3	✓				✓	✓																										
SB-6	06		10:50		3	✓				✓	✓																										
SB-7	07		10:55		3	✓				✓	✓																										
SB-5	05		11:00		3	✓				✓	✓																										
SB-4	04		11:05		3	✓				✓	✓																										
SB-3	03		11:11		3	✓				✓	✓																										
SB-11	11		11:16		3	✓				✓	✓																										
SB-10	10		11:20		3	✓				✓	✓																										
SB-9	09		11:26		3	✓				✓	✓																										
SB-8	08		11:31		3	✓				✓	✓																										
SB-12	12		11:36		3	✓				✓	✓																										
SB-16	16		11:40		3	✓				✓	✓																										
SB-15	15		11:46		3	✓				✓	✓																										
SB-14	14		11:51		3	✓				✓	✓																										
TOTAL						45																															

RELINQUISHED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>10/24/17 8:47</u>	RECEIVED BY: (Signature) <u>L.S.O.</u>	TURN AROUND TIME NORMAL ☐ 1 DAY ☐ 2 DAY ☐ OTHER ☒ <u>Push 1 day</u>	LABORATORY USE ONLY: RECEIVING TEMP: <u>2.1</u> THERM # <u>78</u> CUSTODY SEALS - ☐ BROKEN ☐ INTACT ☒ NOT USED ☒ CARRIER BILL # <u>L.S.O.</u> ☐ HAND DELIVERED
RELINQUISHED BY: (Signature) <u>L.S.O.</u>	DATE/TIME <u>10/25/17 9:30</u>	RECEIVED BY: (Signature) <u>[Signature]</u>		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)		

DHL - filter & measure for Mg, Na, K, Ca

Larson & Associates, Inc.
Environmental Consultants

Data Reported to:

PAGE 2 OF 2

LAB WORK ORDER #: 1710209

LAI PROJECT #: 17-0176-Q1

COLLECTOR: SJ / ZB

[illegible]



WWW.LSO.COM
Questions? Call 800-800-8984
Airbill No. 49614881



49614881

1. To: *Print Name (Person) Phone (Important) J. BARKER 512.388.8222		2. From: *Print Name (Person) Phone (Important) LARSON & ASSOCIATES 432-687-0901	
Company Name DML ANALYTICAL		Company Name LARSON & ASSOCIATES	
Street Address (No P.O. Box or P.O. Box Zip Code*Deliveries) 2300 DOUBLE CREEK DRIVE		Street Address 507 NORTH MARLENEFIELD	
Suite / Floor		Suite / Floor 205	
City State Zip ROUND ROCK TX 78664		City State Zip MIDLAND TX 79701	
3. Service: Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online.			
☒ ISO Priority Overnight* By 10:30 a.m. to most cities		☐ ISO Ground	
☐ ISO Early Overnight* By 8:30 a.m. select cities		☐ ISO Saturday*	
☐ ISO Economy Next Day* By 3 p.m. to most cities		☐ Other _____	
☐ ISO 2nd Day*		*Check commitment times and availability at www.lso.com	
☐ Deliver Without Delivery Signature (See Limits of Liability below)			
Release Signature _____ L _____ x W _____ x H _____			
4. Package: Weight: 15 lbs		FOR DRIVER USE ONLY	
Your Company's Billing Reference Information		Driver Number 1127	
Ship Date: (mm/dd/yy) 10 '24' 17		☐ Check here if LSO Supplies are used with LSO Ground Service.	
5. Payment:		Pick-up Location	
		Date: 10/24/17	
		Time: 1:05	
		City Code:	

LIMIT OF LIABILITY: We are not responsible for claims in excess of \$100 for any reason unless you: 1) declare a greater value (not to exceed \$25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. Additional limitations of liability are contained in our current Service Guide. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. PACKAGING PROVIDED BY LSO IS NOT INTENDED FOR USE ON LSO GROUND SERVICE. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY.

Sample Receipt Checklist

Client Name **Larson & Associates**
Work Order Number **1710209**

Date Received: **10/25/2017**
Received by **EL**

Checklist completed by:  **10/25/2017**
Signature Date

Reviewed by:  **10/25/2017**
Initials Date

Carrier name LoneStar

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☒	No ☐	2.1 °C
Water - VOA vials have zero headspace?	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	
Water - pH>9 (S) or pH>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☒ LOT #
	Adjusted? _____	Checked by _____	

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Larson & Associates
Project: XTO EMSU B
Lab Order: 1710209

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition, EPA and Standard Methods.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives except where noted in the following. For Dissolved Metals Analysis, the recoveries of four analytes for the Matrix Spike and Matrix Spike Duplicate (1710209-05 MS/MSD) were outside of the method control limits. These are flagged accordingly in the QC Summary Report. These analytes were within method control limits in the associated LCS. No further corrective action was taken.

For Volatiles Analysis, the recovery of surrogate 1,2-Dichloroethane-d4 for the Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD-82945) was above the method control limits. These are flagged accordingly in the QC Summary Report. The remaining surrogates for these samples were within method control limits. No further corrective action was taken.

For Volatiles Analysis, for Batches 82945 and 82946, an MS/MSD was not performed due to insufficient sample volume. An LCS/LCSD was performed as Batch QC.

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-1
Lab ID: 1710209-01
Collection Date: 10/23/17 10:42 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	1060	20.0	60.0		mg/L	100	10/26/17 02:26 PM
Dissolved Magnesium	446	20.0	60.0		mg/L	100	10/26/17 02:26 PM
Dissolved Potassium	144	20.0	60.0		mg/L	100	10/26/17 02:26 PM
Dissolved Sodium	4770	20.0	60.0		mg/L	100	10/26/17 02:26 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00108	0.000300	0.00100		mg/L	1	10/25/17 03:59 PM
Ethylbenzene	0.000858	0.000300	0.00100	J	mg/L	1	10/25/17 03:59 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 03:59 PM
Total Xylenes	0.00312	0.000300	0.00100		mg/L	1	10/25/17 03:59 PM
Surr: 1,2-Dichloroethane-d4	118	0	72-119		%REC	1	10/25/17 03:59 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	10/25/17 03:59 PM
Surr: Dibromofluoromethane	110	0	85-115		%REC	1	10/25/17 03:59 PM
Surr: Toluene-d8	96.5	0	81-120		%REC	1	10/25/17 03:59 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7770	300	1000		mg/L	1000	10/25/17 02:55 PM
Sulfate	4220	100	300		mg/L	100	10/25/17 10:23 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	392	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 12:58 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 12:58 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 12:58 PM
Alkalinity, Total (As CaCO3)	392	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 12:58 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	19300	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-2
Lab ID: 1710209-02
Collection Date: 10/23/17 10:35 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	1290	20.0	60.0		mg/L	100	10/26/17 02:28 PM
Dissolved Magnesium	259	20.0	60.0		mg/L	100	10/26/17 02:28 PM
Dissolved Potassium	36.3	0.200	0.600		mg/L	1	10/25/17 04:35 PM
Dissolved Sodium	4730	20.0	60.0		mg/L	100	10/26/17 02:28 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:49 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:49 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 04:49 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:49 PM
Surr: 1,2-Dichloroethane-d4	117	0	72-119		%REC	1	10/25/17 04:49 PM
Surr: 4-Bromofluorobenzene	103	0	76-119		%REC	1	10/25/17 04:49 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	1	10/25/17 04:49 PM
Surr: Toluene-d8	96.5	0	81-120		%REC	1	10/25/17 04:49 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7420	300	1000		mg/L	1000	10/25/17 03:37 PM
Sulfate	1520	100	300		mg/L	100	10/25/17 10:37 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	687	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 01:45 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 01:45 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 01:45 PM
Alkalinity, Total (As CaCO3)	687	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 01:45 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16900	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-3
Lab ID: 1710209-03
Collection Date: 10/23/17 11:11 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A					Analyst: SP
Dissolved Calcium	896	20.0	60.0		mg/L	100	10/26/17 02:30 PM
Dissolved Magnesium	405	20.0	60.0		mg/L	100	10/26/17 02:30 PM
Dissolved Potassium	150	20.0	60.0		mg/L	100	10/26/17 02:30 PM
Dissolved Sodium	4920	20.0	60.0		mg/L	100	10/26/17 02:30 PM
8260 WATER VOLATILES BY GC/MS		SW8260C					Analyst: DEW
Benzene	0.0395	0.000300	0.00100		mg/L	1	10/25/17 05:14 PM
Ethylbenzene	0.0253	0.000300	0.00100		mg/L	1	10/25/17 05:14 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 05:14 PM
Total Xylenes	0.0476	0.000300	0.00100		mg/L	1	10/25/17 05:14 PM
Surr: 1,2-Dichloroethane-d4	116	0	72-119		%REC	1	10/25/17 05:14 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	10/25/17 05:14 PM
Surr: Dibromofluoromethane	107	0	85-115		%REC	1	10/25/17 05:14 PM
Surr: Toluene-d8	96.9	0	81-120		%REC	1	10/25/17 05:14 PM
ANIONS BY IC METHOD - WATER		E300					Analyst: JL
Chloride	6990	300	1000		mg/L	1000	10/25/17 04:19 PM
Sulfate	3720	100	300		mg/L	100	10/25/17 10:51 PM
ALKALINITY		M2320 B					Analyst: BTJ
Alkalinity, Bicarbonate (As CaCO3)	562	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 02:36 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 02:36 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 02:36 PM
Alkalinity, Total (As CaCO3)	562	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 02:36 PM
TOTAL DISSOLVED SOLIDS		M2540C					Analyst: JW
Total Dissolved Solids (Residue, Filterable)	18400	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-4
Lab ID: 1710209-04
Collection Date: 10/23/17 11:05 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	851	20.0	60.0		mg/L	100	10/26/17 02:32 PM
Dissolved Magnesium	325	20.0	60.0		mg/L	100	10/26/17 02:32 PM
Dissolved Potassium	78.2	20.0	60.0		mg/L	100	10/26/17 02:32 PM
Dissolved Sodium	4650	20.0	60.0		mg/L	100	10/26/17 02:32 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00976	0.000300	0.00100		mg/L	1	10/25/17 05:55 PM
Ethylbenzene	0.00503	0.000300	0.00100		mg/L	1	10/25/17 05:55 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 05:55 PM
Total Xylenes	0.0102	0.000300	0.00100		mg/L	1	10/25/17 05:55 PM
Surr: 1,2-Dichloroethane-d4	90.6	0	72-119		%REC	1	10/25/17 05:55 PM
Surr: 4-Bromofluorobenzene	95.0	0	76-119		%REC	1	10/25/17 05:55 PM
Surr: Dibromofluoromethane	89.3	0	85-115		%REC	1	10/25/17 05:55 PM
Surr: Toluene-d8	95.9	0	81-120		%REC	1	10/25/17 05:55 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7920	300	1000		mg/L	1000	10/25/17 04:33 PM
Sulfate	1620	100	300		mg/L	100	10/25/17 11:05 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	845	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:09 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:09 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:09 PM
Alkalinity, Total (As CaCO3)	845	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:09 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16400	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-5
Lab ID: 1710209-05
Collection Date: 10/23/17 11:00 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	937	20.0	60.0		mg/L	100	10/26/17 02:23 PM
Dissolved Magnesium	243	20.0	60.0		mg/L	100	10/26/17 02:23 PM
Dissolved Potassium	71.4	20.0	60.0		mg/L	100	10/26/17 02:23 PM
Dissolved Sodium	3670	20.0	60.0		mg/L	100	10/26/17 02:23 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 06:20 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 06:20 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 06:20 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 06:20 PM
Surr: 1,2-Dichloroethane-d4	94.2	0	72-119		%REC	1	10/25/17 06:20 PM
Surr: 4-Bromofluorobenzene	95.2	0	76-119		%REC	1	10/25/17 06:20 PM
Surr: Dibromofluoromethane	91.5	0	85-115		%REC	1	10/25/17 06:20 PM
Surr: Toluene-d8	94.8	0	81-120		%REC	1	10/25/17 06:20 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7380	300	1000		mg/L	1000	10/25/17 04:47 PM
Sulfate	666	100	300		mg/L	100	10/25/17 11:19 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	528	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:30 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:30 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:30 PM
Alkalinity, Total (As CaCO3)	528	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:30 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	18300	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-6
Lab ID: 1710209-06
Collection Date: 10/23/17 10:50 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	934	20.0	60.0		mg/L	100	10/26/17 02:34 PM
Dissolved Magnesium	247	20.0	60.0		mg/L	100	10/26/17 02:34 PM
Dissolved Potassium	31.5	0.200	0.600		mg/L	1	10/25/17 04:41 PM
Dissolved Sodium	4010	20.0	60.0		mg/L	100	10/26/17 02:34 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00149	0.000300	0.00100		mg/L	1	10/25/17 06:45 PM
Ethylbenzene	0.000650	0.000300	0.00100	J	mg/L	1	10/25/17 06:45 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 06:45 PM
Total Xylenes	0.00120	0.000300	0.00100		mg/L	1	10/25/17 06:45 PM
Surr: 1,2-Dichloroethane-d4	94.3	0	72-119		%REC	1	10/25/17 06:45 PM
Surr: 4-Bromofluorobenzene	95.7	0	76-119		%REC	1	10/25/17 06:45 PM
Surr: Dibromofluoromethane	93.4	0	85-115		%REC	1	10/25/17 06:45 PM
Surr: Toluene-d8	96.1	0	81-120		%REC	1	10/25/17 06:45 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7110	300	1000		mg/L	1000	10/25/17 05:01 PM
Sulfate	1660	100	300		mg/L	100	10/25/17 11:33 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	718	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:58 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:58 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:58 PM
Alkalinity, Total (As CaCO3)	718	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 03:58 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	14000	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-7
Lab ID: 1710209-07
Collection Date: 10/23/17 10:55 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	919	20.0	60.0		mg/L	100	10/26/17 02:36 PM
Dissolved Magnesium	309	20.0	60.0		mg/L	100	10/26/17 02:36 PM
Dissolved Potassium	107	20.0	60.0		mg/L	100	10/26/17 02:36 PM
Dissolved Sodium	3500	20.0	60.0		mg/L	100	10/26/17 02:36 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:09 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:09 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 07:09 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:09 PM
Surr: 1,2-Dichloroethane-d4	95.1	0	72-119		%REC	1	10/25/17 07:09 PM
Surr: 4-Bromofluorobenzene	96.2	0	76-119		%REC	1	10/25/17 07:09 PM
Surr: Dibromofluoromethane	94.7	0	85-115		%REC	1	10/25/17 07:09 PM
Surr: Toluene-d8	96.0	0	81-120		%REC	1	10/25/17 07:09 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	6120	300	1000		mg/L	1000	10/25/17 05:15 PM
Sulfate	2730	100	300		mg/L	100	10/25/17 11:47 PM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	176	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 04:08 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 04:08 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 04:08 PM
Alkalinity, Total (As CaCO3)	176	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 04:08 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	14000	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-8
Lab ID: 1710209-08
Collection Date: 10/23/17 11:31 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	391	20.0	60.0		mg/L	100	10/26/17 02:38 PM
Dissolved Magnesium	150	20.0	60.0		mg/L	100	10/26/17 02:38 PM
Dissolved Potassium	50.4	20.0	60.0	J	mg/L	100	10/26/17 02:38 PM
Dissolved Sodium	2860	20.0	60.0		mg/L	100	10/26/17 02:38 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.0102	0.000300	0.00100		mg/L	1	10/25/17 05:39 PM
Ethylbenzene	0.0109	0.000300	0.00100		mg/L	1	10/25/17 05:39 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 05:39 PM
Total Xylenes	0.0209	0.000300	0.00100		mg/L	1	10/25/17 05:39 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	10/25/17 05:39 PM
Surr: 4-Bromofluorobenzene	98.5	0	76-119		%REC	1	10/25/17 05:39 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	1	10/25/17 05:39 PM
Surr: Toluene-d8	97.9	0	81-120		%REC	1	10/25/17 05:39 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	4760	30.0	100		mg/L	100	10/26/17 12:01 AM
Sulfate	476	100	300		mg/L	100	10/26/17 12:01 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	612	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 04:32 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 04:32 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 04:32 PM
Alkalinity, Total (As CaCO3)	612	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 04:32 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	9940	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-9
Lab ID: 1710209-09
Collection Date: 10/23/17 11:26 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	949	20.0	60.0		mg/L	100	10/26/17 02:40 PM
Dissolved Magnesium	211	20.0	60.0		mg/L	100	10/26/17 02:40 PM
Dissolved Potassium	78.4	20.0	60.0		mg/L	100	10/26/17 02:40 PM
Dissolved Sodium	4640	20.0	60.0		mg/L	100	10/26/17 02:40 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00146	0.000300	0.00100		mg/L	1	10/25/17 06:03 PM
Ethylbenzene	0.00299	0.000300	0.00100		mg/L	1	10/25/17 06:03 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 06:03 PM
Total Xylenes	0.00676	0.000300	0.00100		mg/L	1	10/25/17 06:03 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	10/25/17 06:03 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	10/25/17 06:03 PM
Surr: Dibromofluoromethane	107	0	85-115		%REC	1	10/25/17 06:03 PM
Surr: Toluene-d8	96.1	0	81-120		%REC	1	10/25/17 06:03 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7380	300	1000		mg/L	1000	10/25/17 05:43 PM
Sulfate	1540	100	300		mg/L	100	10/26/17 12:15 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	496	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:09 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:09 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:09 PM
Alkalinity, Total (As CaCO3)	496	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:09 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16100	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-10
Lab ID: 1710209-10
Collection Date: 10/23/17 11:20 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	714	20.0	60.0		mg/L	100	10/26/17 02:47 PM
Dissolved Magnesium	332	20.0	60.0		mg/L	100	10/26/17 02:47 PM
Dissolved Potassium	122	20.0	60.0		mg/L	100	10/26/17 02:47 PM
Dissolved Sodium	4820	20.0	60.0		mg/L	100	10/26/17 02:47 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.000931	0.000300	0.00100	J	mg/L	1	10/25/17 06:28 PM
Ethylbenzene	0.000416	0.000300	0.00100	J	mg/L	1	10/25/17 06:28 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 06:28 PM
Total Xylenes	0.000447	0.000300	0.00100	J	mg/L	1	10/25/17 06:28 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	10/25/17 06:28 PM
Surr: 4-Bromofluorobenzene	99.9	0	76-119		%REC	1	10/25/17 06:28 PM
Surr: Dibromofluoromethane	108	0	85-115		%REC	1	10/25/17 06:28 PM
Surr: Toluene-d8	96.3	0	81-120		%REC	1	10/25/17 06:28 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7940	300	1000		mg/L	1000	10/25/17 05:57 PM
Sulfate	1460	100	300		mg/L	100	10/26/17 12:29 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	894	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:34 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:34 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:34 PM
Alkalinity, Total (As CaCO3)	894	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 05:34 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16400	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-11
Lab ID: 1710209-11
Collection Date: 10/23/17 11:16 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A					Analyst: SP
Dissolved Calcium	798	20.0	60.0		mg/L	100	10/26/17 03:04 PM
Dissolved Magnesium	359	20.0	60.0		mg/L	100	10/26/17 03:04 PM
Dissolved Potassium	152	20.0	60.0		mg/L	100	10/26/17 03:04 PM
Dissolved Sodium	4650	20.0	60.0		mg/L	100	10/26/17 03:04 PM
8260 WATER VOLATILES BY GC/MS		SW8260C					Analyst: DEW
Benzene	0.0459	0.000300	0.00100		mg/L	1	10/25/17 06:53 PM
Ethylbenzene	0.0208	0.000300	0.00100		mg/L	1	10/25/17 06:53 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 06:53 PM
Total Xylenes	0.0401	0.000300	0.00100		mg/L	1	10/25/17 06:53 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	10/25/17 06:53 PM
Surr: 4-Bromofluorobenzene	102	0	76-119		%REC	1	10/25/17 06:53 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	1	10/25/17 06:53 PM
Surr: Toluene-d8	96.2	0	81-120		%REC	1	10/25/17 06:53 PM
ANIONS BY IC METHOD - WATER		E300					Analyst: JL
Chloride	7680	300	1000		mg/L	1000	10/26/17 11:56 AM
Sulfate	2750	100	300		mg/L	100	10/26/17 01:39 AM
ALKALINITY		M2320 B					Analyst: BTJ
Alkalinity, Bicarbonate (As CaCO3)	267	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:44 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:44 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:44 PM
Alkalinity, Total (As CaCO3)	267	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:44 PM
TOTAL DISSOLVED SOLIDS		M2540C					Analyst: JW
Total Dissolved Solids (Residue, Filterable)	17900	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-12
Lab ID: 1710209-12
Collection Date: 10/23/17 11:36 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	1500	20.0	60.0		mg/L	100	10/26/17 03:06 PM
Dissolved Magnesium	359	20.0	60.0		mg/L	100	10/26/17 03:06 PM
Dissolved Potassium	23.4	0.200	0.600		mg/L	1	10/25/17 05:06 PM
Dissolved Sodium	3290	20.0	60.0		mg/L	100	10/26/17 03:06 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:34 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:34 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 07:34 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:34 PM
Surr: 1,2-Dichloroethane-d4	95.4	0	72-119		%REC	1	10/25/17 07:34 PM
Surr: 4-Bromofluorobenzene	95.4	0	76-119		%REC	1	10/25/17 07:34 PM
Surr: Dibromofluoromethane	94.9	0	85-115		%REC	1	10/25/17 07:34 PM
Surr: Toluene-d8	96.4	0	81-120		%REC	1	10/25/17 07:34 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	6970	300	1000		mg/L	1000	10/25/17 07:21 PM
Sulfate	1940	100	300		mg/L	100	10/26/17 01:53 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	229	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:53 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:53 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:53 PM
Alkalinity, Total (As CaCO3)	229	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 05:53 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	14900	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-13
Lab ID: 1710209-13
Collection Date: 10/23/17 11:56 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	442	20.0	60.0		mg/L	100	10/26/17 03:08 PM
Dissolved Magnesium	187	20.0	60.0		mg/L	100	10/26/17 03:08 PM
Dissolved Potassium	164	20.0	60.0		mg/L	100	10/26/17 03:08 PM
Dissolved Sodium	2850	20.0	60.0		mg/L	100	10/26/17 03:08 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00412	0.000300	0.00100		mg/L	1	10/25/17 07:18 PM
Ethylbenzene	0.00420	0.000300	0.00100		mg/L	1	10/25/17 07:18 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 07:18 PM
Total Xylenes	0.00999	0.000300	0.00100		mg/L	1	10/25/17 07:18 PM
Surr: 1,2-Dichloroethane-d4	110	0	72-119		%REC	1	10/25/17 07:18 PM
Surr: 4-Bromofluorobenzene	102	0	76-119		%REC	1	10/25/17 07:18 PM
Surr: Dibromofluoromethane	108	0	85-115		%REC	1	10/25/17 07:18 PM
Surr: Toluene-d8	97.8	0	81-120		%REC	1	10/25/17 07:18 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	3770	30.0	100		mg/L	100	10/26/17 02:07 AM
Sulfate	2560	100	300		mg/L	100	10/26/17 02:07 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	269	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 06:03 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 06:03 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 06:03 PM
Alkalinity, Total (As CaCO3)	269	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 06:03 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	7600	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-14
Lab ID: 1710209-14
Collection Date: 10/23/17 11:51 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	702	20.0	60.0		mg/L	100	10/26/17 03:10 PM
Dissolved Magnesium	249	20.0	60.0		mg/L	100	10/26/17 03:10 PM
Dissolved Potassium	163	20.0	60.0		mg/L	100	10/26/17 03:10 PM
Dissolved Sodium	4260	20.0	60.0		mg/L	100	10/26/17 03:10 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00219	0.000300	0.00100		mg/L	1	10/25/17 07:43 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:43 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 07:43 PM
Total Xylenes	0.00130	0.000300	0.00100		mg/L	1	10/25/17 07:43 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	10/25/17 07:43 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	10/25/17 07:43 PM
Surr: Dibromofluoromethane	108	0	85-115		%REC	1	10/25/17 07:43 PM
Surr: Toluene-d8	96.0	0	81-120		%REC	1	10/25/17 07:43 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	6900	300	1000		mg/L	1000	10/25/17 07:49 PM
Sulfate	1370	100	300		mg/L	100	10/26/17 02:21 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	547	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:19 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:19 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:19 PM
Alkalinity, Total (As CaCO3)	547	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:19 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	15500	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-15
Lab ID: 1710209-15
Collection Date: 10/23/17 11:46 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	705	20.0	60.0		mg/L	100	10/26/17 03:12 PM
Dissolved Magnesium	163	20.0	60.0		mg/L	100	10/26/17 03:12 PM
Dissolved Potassium	23.4	0.200	0.600		mg/L	1	10/25/17 05:11 PM
Dissolved Sodium	2970	20.0	60.0		mg/L	100	10/26/17 03:12 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:58 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:58 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 07:58 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 07:58 PM
Surr: 1,2-Dichloroethane-d4	94.0	0	72-119		%REC	1	10/25/17 07:58 PM
Surr: 4-Bromofluorobenzene	96.9	0	76-119		%REC	1	10/25/17 07:58 PM
Surr: Dibromofluoromethane	94.1	0	85-115		%REC	1	10/25/17 07:58 PM
Surr: Toluene-d8	96.4	0	81-120		%REC	1	10/25/17 07:58 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	5060	300	1000		mg/L	1000	10/25/17 08:03 PM
Sulfate	1310	100	300		mg/L	100	10/26/17 02:35 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	409	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:31 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:31 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:31 PM
Alkalinity, Total (As CaCO3)	409	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:31 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	10800	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-16
Lab ID: 1710209-16
Collection Date: 10/23/17 11:40 AM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	1120	20.0	60.0		mg/L	100	10/26/17 03:17 PM
Dissolved Magnesium	332	20.0	60.0		mg/L	100	10/26/17 03:17 PM
Dissolved Potassium	44.4	0.200	0.600		mg/L	1	10/25/17 05:13 PM
Dissolved Sodium	4390	20.0	60.0		mg/L	100	10/26/17 03:17 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.00883	0.000300	0.00100		mg/L	1	10/25/17 08:23 PM
Ethylbenzene	0.00466	0.000300	0.00100		mg/L	1	10/25/17 08:23 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 08:23 PM
Total Xylenes	0.0105	0.000300	0.00100		mg/L	1	10/25/17 08:23 PM
Surr: 1,2-Dichloroethane-d4	96.6	0	72-119		%REC	1	10/25/17 08:23 PM
Surr: 4-Bromofluorobenzene	96.5	0	76-119		%REC	1	10/25/17 08:23 PM
Surr: Dibromofluoromethane	94.8	0	85-115		%REC	1	10/25/17 08:23 PM
Surr: Toluene-d8	95.7	0	81-120		%REC	1	10/25/17 08:23 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	8220	300	1000		mg/L	1000	10/25/17 08:17 PM
Sulfate	1890	100	300		mg/L	100	10/26/17 02:49 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	703	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:52 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:52 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:52 PM
Alkalinity, Total (As CaCO3)	703	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 06:52 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16500	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-20
Lab ID: 1710209-17
Collection Date: 10/23/17 12:11 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	448	20.0	60.0		mg/L	100	10/26/17 03:19 PM
Dissolved Magnesium	102	20.0	60.0		mg/L	100	10/26/17 03:19 PM
Dissolved Potassium	36.3	0.200	0.600		mg/L	1	10/25/17 05:15 PM
Dissolved Sodium	2340	20.0	60.0		mg/L	100	10/26/17 03:19 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:16 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:16 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 04:16 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 04:16 PM
Surr: 1,2-Dichloroethane-d4	94.3	0	72-119		%REC	1	10/25/17 04:16 PM
Surr: 4-Bromofluorobenzene	96.6	0	76-119		%REC	1	10/25/17 04:16 PM
Surr: Dibromofluoromethane	92.1	0	85-115		%REC	1	10/25/17 04:16 PM
Surr: Toluene-d8	95.2	0	81-120		%REC	1	10/25/17 04:16 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	3860	30.0	100		mg/L	100	10/26/17 03:03 AM
Sulfate	667	100	300		mg/L	100	10/26/17 03:03 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	516	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:07 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:07 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:07 PM
Alkalinity, Total (As CaCO3)	516	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:07 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	7880	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-21
Lab ID: 1710209-18
Collection Date: 10/23/17 12:25 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	1310	20.0	60.0		mg/L	100	10/26/17 03:21 PM
Dissolved Magnesium	285	20.0	60.0		mg/L	100	10/26/17 03:21 PM
Dissolved Potassium	34.6	0.200	0.600		mg/L	1	10/25/17 05:17 PM
Dissolved Sodium	4210	20.0	60.0		mg/L	100	10/26/17 03:21 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:06 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:06 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 05:06 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:06 PM
Surr: 1,2-Dichloroethane-d4	95.5	0	72-119		%REC	1	10/25/17 05:06 PM
Surr: 4-Bromofluorobenzene	92.8	0	76-119		%REC	1	10/25/17 05:06 PM
Surr: Dibromofluoromethane	95.3	0	85-115		%REC	1	10/25/17 05:06 PM
Surr: Toluene-d8	94.4	0	81-120		%REC	1	10/25/17 05:06 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7950	300	1000		mg/L	1000	10/25/17 08:45 PM
Sulfate	1250	100	300		mg/L	100	10/26/17 03:17 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	744	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 07:29 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 07:29 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 07:29 PM
Alkalinity, Total (As CaCO3)	744	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 07:29 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	16700	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: SB-22
Lab ID: 1710209-19
Collection Date: 10/23/17 12:32 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	869	20.0	60.0		mg/L	100	10/26/17 03:23 PM
Dissolved Magnesium	274	20.0	60.0		mg/L	100	10/26/17 03:23 PM
Dissolved Potassium	70.9	20.0	60.0		mg/L	100	10/26/17 03:23 PM
Dissolved Sodium	4010	20.0	60.0		mg/L	100	10/26/17 03:23 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:30 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:30 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 05:30 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	10/25/17 05:30 PM
Surr: 1,2-Dichloroethane-d4	94.7	0	72-119		%REC	1	10/25/17 05:30 PM
Surr: 4-Bromofluorobenzene	95.3	0	76-119		%REC	1	10/25/17 05:30 PM
Surr: Dibromofluoromethane	94.8	0	85-115		%REC	1	10/25/17 05:30 PM
Surr: Toluene-d8	95.3	0	81-120		%REC	1	10/25/17 05:30 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	4680	30.0	100		mg/L	100	10/26/17 03:31 AM
Sulfate	4070	100	300		mg/L	100	10/26/17 03:31 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	337	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:48 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:48 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:48 PM
Alkalinity, Total (As CaCO3)	337	20.0	20.0		mg/L @ pH 4.54	1	10/25/17 07:48 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	15500	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: 27-Oct-17

CLIENT: Larson & Associates
Project: XTO EMSU B
Project No: 17-0176-01
Lab Order: 1710209

Client Sample ID: MW-3
Lab ID: 1710209-20
Collection Date: 10/23/17 12:06 PM
Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS-ICPMS (0.45µ)		SW6020A		Analyst: SP			
Dissolved Calcium	713	20.0	60.0		mg/L	100	10/26/17 03:25 PM
Dissolved Magnesium	320	20.0	60.0		mg/L	100	10/26/17 03:25 PM
Dissolved Potassium	91.3	20.0	60.0		mg/L	100	10/26/17 03:25 PM
Dissolved Sodium	4580	20.0	60.0		mg/L	100	10/26/17 03:25 PM
8260 WATER VOLATILES BY GC/MS		SW8260C		Analyst: DEW			
Benzene	0.0470	0.000300	0.00100		mg/L	1	10/25/17 08:09 PM
Ethylbenzene	0.0361	0.000300	0.00100		mg/L	1	10/25/17 08:09 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	10/25/17 08:09 PM
Total Xylenes	0.0675	0.000300	0.00100		mg/L	1	10/25/17 08:09 PM
Surr: 1,2-Dichloroethane-d4	114	0	72-119		%REC	1	10/25/17 08:09 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	10/25/17 08:09 PM
Surr: Dibromofluoromethane	109	0	85-115		%REC	1	10/25/17 08:09 PM
Surr: Toluene-d8	96.2	0	81-120		%REC	1	10/25/17 08:09 PM
ANIONS BY IC METHOD - WATER		E300		Analyst: JL			
Chloride	7180	300	1000		mg/L	1000	10/25/17 09:13 PM
Sulfate	1760	100	300		mg/L	100	10/26/17 03:45 AM
ALKALINITY		M2320 B		Analyst: BTJ			
Alkalinity, Bicarbonate (As CaCO3)	722	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 08:08 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 08:08 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	10/25/17 08:08 PM
Alkalinity, Total (As CaCO3)	722	20.0	20.0		mg/L @ pH 4.55	1	10/25/17 08:08 PM
TOTAL DISSOLVED SOLIDS		M2540C		Analyst: JW			
Total Dissolved Solids (Residue, Filterable)	15900	200	200		mg/L	1	10/26/17 09:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Larson & Associates

Work Order: 1710209

Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171025B

The QC data in batch 82943 applies to the following samples: 1710209-01C, 1710209-02C, 1710209-03C, 1710209-04C, 1710209-05C, 1710209-06C, 1710209-07C, 1710209-08C, 1710209-09C, 1710209-10C, 1710209-11C, 1710209-12C, 1710209-13C, 1710209-14C, 1710209-15C, 1710209-16C, 1710209-17C, 1710209-18C, 1710209-19C, 1710209-20C

Sample ID	MB-82941-FILTER	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 4:20:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	<0.100	0.300								
Dissolved Magnesium	<0.100	0.300								
Dissolved Potassium	<0.100	0.300								

Sample ID	MB-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 4:22:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	<0.100	0.300								
Dissolved Magnesium	<0.100	0.300								
Dissolved Potassium	<0.100	0.300								

Sample ID	LCS-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L
SampType:	LCS	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 4:24:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	5.34	0.300	5.00	0	107	80	120			
Dissolved Magnesium	5.23	0.300	5.00	0	105	80	120			
Dissolved Potassium	5.15	0.300	5.00	0	103	80	120			

Sample ID	LCSD-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L
SampType:	LCSD	Run ID:	ICP-MS4_171025B	Analysis Date:	10/25/2017 4:26:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	5.29	0.300	5.00	0	106	80	120	1.01	15	
Dissolved Magnesium	5.16	0.300	5.00	0	103	80	120	1.48	15	
Dissolved Potassium	5.11	0.300	5.00	0	102	80	120	0.824	15	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171026C

The QC data in batch 82943 applies to the following samples: 1710209-01C, 1710209-02C, 1710209-03C, 1710209-04C, 1710209-05C, 1710209-06C, 1710209-07C, 1710209-08C, 1710209-09C, 1710209-10C, 1710209-11C, 1710209-12C, 1710209-13C, 1710209-14C, 1710209-15C, 1710209-16C, 1710209-17C, 1710209-18C, 1710209-19C, 1710209-20C

Sample ID	MB-82941-FILTER	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	MBLK	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:13:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Sodium	<0.100	0.300								
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Sample ID	MB-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	MBLK	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:15:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Sodium	<0.100	0.300								
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Sample ID	LCS-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	LCS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:17:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Sodium	5.23	0.300	5.00	0	105	80	120			
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Sample ID	LCSD-82943	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	LCSD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:19:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Dissolved Sodium	5.18	0.300	5.00	0	104	80	120	1.12	15	
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Sample ID	1710209-05C SD	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	SD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:25:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Calcium	998	300	0	936					6.36	10
Magnesium	260	300	0	243					6.96	10
Potassium	<100	300	0	71.4					0	10
Sodium	3890	300	0	3670					5.87	10

Sample ID	1710209-05C PDS	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	PDS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:49:00 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Calcium	1950	60.0	1000	937	101	80	120			
Magnesium	1260	60.0	1000	243	101	80	120			
Potassium	1050	60.0	1000	71.4	98.3	80	120			
Sodium	4840	60.0	1000	3670	117	80	120			

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171026C

Sample ID	1710209-05C MS	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	MS	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:51:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	891	60.0	10.0	937	-455	80	120			S
Dissolved Magnesium	240	60.0	10.0	243	-26.3	80	120			S
Dissolved Potassium	77.4	60.0	10.0	71.4	59.9	80	120			S
Dissolved Sodium	3460	60.0	10.0	3670	-2060	80	120			S

Sample ID	1710209-05C MSD	Batch ID:	82943	TestNo:	SW6020A	Units:	mg/L			
SampType:	MSD	Run ID:	ICP-MS4_171026C	Analysis Date:	10/26/2017 2:53:00 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	900	60.0	10.0	937	-367	80	120	0.986	15	S
Dissolved Magnesium	242	60.0	10.0	243	-11.0	80	120	0.634	15	S
Dissolved Potassium	78.4	60.0	10.0	71.4	70.1	80	120	1.31	15	S
Dissolved Sodium	3510	60.0	10.0	3670	-1560	80	120	1.42	15	S

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_171025A

The QC data in batch 82945 applies to the following samples: 1710209-01A, 1710209-02A, 1710209-03A, 1710209-08A, 1710209-09A, 1710209-10A, 1710209-11A, 1710209-13A, 1710209-14A, 1710209-20A

Sample ID	LCS-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L
SampType:	LCS	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 3:11:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0241	0.00100	0.0232	0	104	81	122			
Ethylbenzene	0.0219	0.00100	0.0232	0	94.5	80	120			
Toluene	0.0244	0.00200	0.0232	0	105	80	120			
Total Xylenes	0.0660	0.00100	0.0696	0	94.8	80	120			
Surr: 1,2-Dichloroethane-d4	247		200.0		123	72	119			S
Surr: 4-Bromofluorobenzene	210		200.0		105	76	119			
Surr: Dibromofluoromethane	219		200.0		110	85	115			
Surr: Toluene-d8	190		200.0		94.9	81	120			

Sample ID	MB-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L
SampType:	MBLK	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 3:35:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.000300	0.00100								
Ethylbenzene	<0.000300	0.00100								
Toluene	<0.000600	0.00200								
Total Xylenes	<0.000300	0.00100								
Surr: 1,2-Dichloroethane-d4	230		200.0		115	72	119			
Surr: 4-Bromofluorobenzene	204		200.0		102	76	119			
Surr: Dibromofluoromethane	216		200.0		108	85	115			
Surr: Toluene-d8	192		200.0		96.1	81	120			

Sample ID	LCSD-82945	Batch ID:	82945	TestNo:	SW8260C	Units:	mg/L
SampType:	LCSD	Run ID:	GCMS5_171025A	Analysis Date:	10/25/2017 4:24:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0241	0.00100	0.0232	0	104	81	120	0.033	20	
Ethylbenzene	0.0231	0.00100	0.0232	0	99.4	80	120	5.12	20	
Toluene	0.0241	0.00200	0.0232	0	104	80	120	0.961	20	
Total Xylenes	0.0697	0.00100	0.0696	0	100	80	120	5.44	20	
Surr: 1,2-Dichloroethane-d4	241		200.0		120	72	119	0	0	S
Surr: 4-Bromofluorobenzene	204		200.0		102	76	119	0	0	
Surr: Dibromofluoromethane	221		200.0		111	85	115	0	0	
Surr: Toluene-d8	195		200.0		97.5	81	120	0	0	

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS7_171025A

The QC data in batch 82946 applies to the following samples: 1710209-04A, 1710209-05A, 1710209-06A, 1710209-07A, 1710209-12A, 1710209-15A, 1710209-16A, 1710209-17A, 1710209-18A, 1710209-19A

Sample ID	LCS-82946	Batch ID:	82946	TestNo:	SW8260C	Units:	mg/L
SampType:	LCS	Run ID:	GCMS7_171025A	Analysis Date:	10/25/2017 3:27:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0236	0.00100	0.0232	0	102	81	122			
Ethylbenzene	0.0231	0.00100	0.0232	0	99.4	80	120			
Toluene	0.0244	0.00200	0.0232	0	105	80	120			
Total Xylenes	0.0697	0.00100	0.0696	0	100	80	120			
Surr: 1,2-Dichloroethane-d4	193		200.0		96.3	72	119			
Surr: 4-Bromofluorobenzene	189		200.0		94.4	76	119			
Surr: Dibromofluoromethane	197		200.0		98.4	85	115			
Surr: Toluene-d8	187		200.0		93.5	81	120			

Sample ID	MB-82946	Batch ID:	82946	TestNo:	SW8260C	Units:	mg/L
SampType:	MBLK	Run ID:	GCMS7_171025A	Analysis Date:	10/25/2017 3:52:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.000300	0.00100								
Ethylbenzene	<0.000300	0.00100								
Toluene	<0.000600	0.00200								
Total Xylenes	<0.000300	0.00100								
Surr: 1,2-Dichloroethane-d4	186		200.0		92.8	72	119			
Surr: 4-Bromofluorobenzene	197		200.0		98.3	76	119			
Surr: Dibromofluoromethane	185		200.0		92.5	85	115			
Surr: Toluene-d8	189		200.0		94.3	81	120			

Sample ID	LCSD-82946	Batch ID:	82946	TestNo:	SW8260C	Units:	mg/L
SampType:	LCSD	Run ID:	GCMS7_171025A	Analysis Date:	10/25/2017 4:41:00 PM	Prep Date:	10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0250	0.00100	0.0232	0	108	81	120	5.88	20	
Ethylbenzene	0.0242	0.00100	0.0232	0	104	80	120	4.57	20	
Toluene	0.0259	0.00200	0.0232	0	112	80	120	5.73	20	
Total Xylenes	0.0737	0.00100	0.0696	0	106	80	120	5.65	20	
Surr: 1,2-Dichloroethane-d4	195		200.0		97.5	72	119	0	0	
Surr: 4-Bromofluorobenzene	183		200.0		91.6	76	119	0	0	
Surr: Dibromofluoromethane	195		200.0		97.3	85	115	0	0	
Surr: Toluene-d8	185		200.0		92.3	81	120	0	0	

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_171025A

The QC data in batch 82937 applies to the following samples: 1710209-01D, 1710209-02D, 1710209-03D, 1710209-04D, 1710209-05D, 1710209-06D, 1710209-07D, 1710209-08D, 1710209-09D, 1710209-10D, 1710209-11D, 1710209-12D, 1710209-13D, 1710209-14D, 1710209-15D, 1710209-16D, 1710209-17D, 1710209-18D, 1710209-19D, 1710209-20D

Sample ID	MB-82937	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	MBLK	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 1:19:42 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

Sample ID	LCS-82937	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	LCS	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 1:33:42 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	9.87	1.00	10.00	0	98.7	90	110			
Sulfate	29.6	3.00	30.00	0	98.6	90	110			

Sample ID	LCSD-82937	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	LCSD	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 1:47:42 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	9.95	1.00	10.00	0	99.5	90	110	0.819	20	
Sulfate	29.6	3.00	30.00	0	98.8	90	110	0.241	20	

Sample ID	1710209-01DMS	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	MS	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 3:09:30 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	29300	1000	20000	7773	108	90	110			
Sulfate	25200	3000	20000	4228	105	90	110			

Sample ID	1710209-01DMSD	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	MSD	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 3:23:30 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	29100	1000	20000	7773	107	90	110	0.601	20	
Sulfate	25100	3000	20000	4228	104	90	110	0.560	20	

Sample ID	1710209-02DMS	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	MS	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 3:51:30 PM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Chloride	28700	1000	20000	7419	106	90	110			
Sulfate	21900	3000	20000	1440	103	90	110			

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_171025A

Sample ID	1710209-02DMSD	Batch ID:	82937	TestNo:	E300	Units:	mg/L			
SampType:	MSD	Run ID:	IC2_171025A	Analysis Date:	10/25/2017 4:05:30 PM	Prep Date:	10/25/2017			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	28800	1000	20000	7419	107	90	110	0.500	20	
Sulfate	22200	3000	20000	1440	104	90	110	1.37	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_171026A

The QC data in batch 82959 applies to the following samples: 1710209-11D

Sample ID	MB-82959	Batch ID:	82959	TestNo:	E300	Units:	mg/L				
SampType:	MBLK	Run ID:	IC2_171026A	Analysis Date:	10/26/2017 11:08:55 A	Prep Date:	10/26/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	<0.300	1.00									
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Sample ID	LCS-82959	Batch ID:	82959	TestNo:	E300	Units:	mg/L				
SampType:	LCS	Run ID:	IC2_171026A	Analysis Date:	10/26/2017 11:22:55 A	Prep Date:	10/26/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	10.0	1.00	10.00	0	100	90	110				
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Sample ID	LCSD-82959	Batch ID:	82959	TestNo:	E300	Units:	mg/L				
SampType:	LCSD	Run ID:	IC2_171026A	Analysis Date:	10/26/2017 11:36:55 A	Prep Date:	10/26/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	9.87	1.00	10.00	0	98.7	90	110	1.37	20		
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Sample ID	1710209-11DMS	Batch ID:	82959	TestNo:	E300	Units:	mg/L				
SampType:	MS	Run ID:	IC2_171026A	Analysis Date:	10/26/2017 1:53:48 PM	Prep Date:	10/26/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	28400	1000	20000	7680	104	90	110				
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Sample ID	1710209-11DMSD	Batch ID:	82959	TestNo:	E300	Units:	mg/L				
SampType:	MSD	Run ID:	IC2_171026A	Analysis Date:	10/26/2017 2:07:48 PM	Prep Date:	10/26/2017				
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Chloride	28600	1000	20000	7680	105	90	110	0.798	20		
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Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_171025A

The QC data in batch 82938 applies to the following samples: 1710209-01D, 1710209-02D, 1710209-03D, 1710209-04D, 1710209-05D, 1710209-06D, 1710209-07D, 1710209-08D, 1710209-09D, 1710209-10D, 1710209-11D, 1710209-12D, 1710209-13D, 1710209-14D, 1710209-15D, 1710209-16D, 1710209-17D, 1710209-18D, 1710209-19D, 1710209-20D

Sample ID MB-82938	Batch ID: 82938	TestNo: M2320 B	Units: mg/L @ pH 4.51
SampType: MBLK	Run ID: TITRATOR_171025A	Analysis Date: 10/25/2017 12:01:00 P	Prep Date: 10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID LCS-82938	Batch ID: 82938	TestNo: M2320 B	Units: mg/L @ pH 4.52
SampType: LCS	Run ID: TITRATOR_171025A	Analysis Date: 10/25/2017 12:07:00 P	Prep Date: 10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	47.9	20.0	50.00	0	95.8	74	129			

Sample ID 1710209-01D-DUP	Batch ID: 82938	TestNo: M2320 B	Units: mg/L @ pH 4.54
SampType: DUP	Run ID: TITRATOR_171025A	Analysis Date: 10/25/2017 1:16:00 PM	Prep Date: 10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	396	20.0	0	391.9				1.14	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	396	20.0	0	391.9				1.14	20	

Sample ID 1710209-02D-DUP	Batch ID: 82938	TestNo: M2320 B	Units: mg/L @ pH 4.54
SampType: DUP	Run ID: TITRATOR_171025A	Analysis Date: 10/25/2017 2:13:00 PM	Prep Date: 10/25/2017

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	681	20.0	0	687.2				0.862	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	681	20.0	0	687.2				0.862	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- J Analyte detected between MDL and RL
- ND Not Detected at the Method Detection Limit
- RL Reporting Limit
- J Analyte detected between SDL and RL

- DF Dilution Factor
- MDL Method Detection Limit
- R RPD outside accepted control limits
- S Spike Recovery outside control limits
- N Parameter not NELAC certified

CLIENT: Larson & Associates
Work Order: 1710209
Project: XTO EMSU B

ANALYTICAL QC SUMMARY REPORT

RunID: WC_171025B

The QC data in batch 82944 applies to the following samples: 1710209-01D, 1710209-02D, 1710209-03D, 1710209-04D, 1710209-05D, 1710209-06D, 1710209-07D, 1710209-08D, 1710209-09D, 1710209-10D, 1710209-11D, 1710209-12D, 1710209-13D, 1710209-14D, 1710209-15D, 1710209-16D, 1710209-17D, 1710209-18D, 1710209-19D, 1710209-20D

Sample ID	MB-82944	Batch ID:	82944	TestNo:	M2540C	Units:	mg/L			
SampType:	MBLK	Run ID:	WC_171025B	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Total Dissolved Solids (Residue, Filtera <10.0 10.0

Sample ID	LCS-82944	Batch ID:	82944	TestNo:	M2540C	Units:	mg/L			
SampType:	LCS	Run ID:	WC_171025B	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Total Dissolved Solids (Residue, Filtera 750 10.0 745.6 0 101 90 113

Sample ID	1710209-10D-DUP	Batch ID:	82944	TestNo:	M2540C	Units:	mg/L			
SampType:	DUP	Run ID:	WC_171025B	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Total Dissolved Solids (Residue, Filtera 16600 200 0 16420 0.849 5

Sample ID	1710209-20D-DUP	Batch ID:	82944	TestNo:	M2540C	Units:	mg/L			
SampType:	DUP	Run ID:	WC_171025B	Analysis Date:	10/26/2017 9:00:00 AM	Prep Date:	10/25/2017			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Total Dissolved Solids (Residue, Filtera 16000 200 0 15900 0.627 5

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected between MDL and RL
ND Not Detected at the Method Detection Limit
RL Reporting Limit
J Analyte detected between SDL and RL

DF Dilution Factor
MDL Method Detection Limit
R RPD outside accepted control limits
S Spike Recovery outside control limits
N Parameter not NELAC certified

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



Analytical Report

Prepared for:

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

Project: EMSU B PW Leak

Project Number: 17-0176-01

Location:

Lab Order Number: 7L11001



NELAP/TCEQ # T104704516-16-7

Report Date: 12/13/17

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-6	7L11001-01	Water	12/07/17 09:20	12-11-2017 08:53
MW-6	7L11001-02	Water	12/07/17 09:20	12-11-2017 08:53

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW-6
7L11001-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

Total Alkalinity	160	10.0	mg/L	1	P7L1205	12/12/17	12/12/17	EPA 310.1M
Carbonate Alkalinity	ND	10.0	mg/L	1	P7L1205	12/12/17	12/12/17	EPA 310.1M
Bicarbonate Alkalinity	160	10.0	mg/L	1	P7L1205	12/12/17	12/12/17	EPA 310.1M
Hydroxide Alkalinity	ND	10.0	mg/L	1	P7L1205	12/12/17	12/12/17	EPA 310.1M
Chloride	3400	50.0	mg/L	100	P7L1204	12/12/17	12/12/17	EPA 300.0
Total Dissolved Solids	10600	20.0	mg/L	1	P7L1216	12/12/17	12/12/17	EPA 160.1
Sulfate	3610	100	mg/L	100	P7L1204	12/12/17	12/12/17	EPA 300.0

Total Metals by EPA / Standard Methods

Calcium	577	0.0810	mg/L	1	P7L1201	12/12/17	12/12/17	EPA 6010B	QAL2
Magnesium	447	0.0360	mg/L	1	P7L1201	12/12/17	12/12/17	EPA 6010B	QAL2
Potassium	77.7	0.0600	mg/L	1	P7L1201	12/12/17	12/12/17	EPA 6010B	QAL2
Sodium	2330	0.0430	mg/L	1	P7L1201	12/12/17	12/12/17	EPA 6010B	QAL2

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

MW-6
7L11001-02 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00100	mg/L	1	P7L1207	12/11/17	12/11/17	EPA 8021B	
Toluene	ND	0.00100	mg/L	1	P7L1207	12/11/17	12/11/17	EPA 8021B	
Ethylbenzene	ND	0.00100	mg/L	1	P7L1207	12/11/17	12/11/17	EPA 8021B	
Xylene (p/m)	ND	0.00200	mg/L	1	P7L1207	12/11/17	12/11/17	EPA 8021B	
Xylene (o)	ND	0.00100	mg/L	1	P7L1207	12/11/17	12/11/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		101 %	80-120		P7L1207	12/11/17	12/11/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		76.0 %	80-120		P7L1207	12/11/17	12/11/17	EPA 8021B	S-GC

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7L1207 - General Preparation (GC)

Blank (P7L1207-BLK1)

Prepared & Analyzed: 12/11/17

Benzene	ND	0.00100	mg/L							
Toluene	ND	0.00100	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 4-Bromofluorobenzene	0.0626		"	0.0600		104	80-120			
Surrogate: 1,4-Difluorobenzene	0.0531		"	0.0600		88.5	80-120			

LCS (P7L1207-BS1)

Prepared & Analyzed: 12/11/17

Benzene	0.0988	0.00100	mg/L	0.100		98.8	80-120			
Toluene	0.107	0.00100	"	0.100		107	80-120			
Ethylbenzene	0.105	0.00100	"	0.100		105	80-120			
Xylene (p/m)	0.205	0.00200	"				80-120			
Xylene (o)	0.118	0.00100	"				80-120			
Surrogate: 4-Bromofluorobenzene	0.0638		"	0.0600		106	80-120			
Surrogate: 1,4-Difluorobenzene	0.0572		"	0.0600		95.2	80-120			

LCS Dup (P7L1207-BSD1)

Prepared & Analyzed: 12/11/17

Benzene	0.103	0.00100	mg/L	0.100		103	80-120	3.76	20	
Toluene	0.110	0.00100	"	0.100		110	80-120	2.91	20	
Ethylbenzene	0.119	0.00100	"	0.100		119	80-120	12.6	20	
Xylene (p/m)	0.213	0.00200	"				80-120		20	
Xylene (o)	0.118	0.00100	"				80-120		20	
Surrogate: 4-Bromofluorobenzene	0.0592		"	0.0600		98.6	80-120			
Surrogate: 1,4-Difluorobenzene	0.0601		"	0.0600		100	80-120			

Calibration Blank (P7L1207-CCB1)

Prepared & Analyzed: 12/11/17

Benzene	0.00		mg/L							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	0.0585		"	0.0600		97.6	80-120			
Surrogate: 1,4-Difluorobenzene	0.0507		"	0.0600		84.5	80-120			

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7L1207 - General Preparation (GC)

Calibration Check (P7L1207-CCV1)				Prepared & Analyzed: 12/11/17						
Benzene	0.108	0.00100	mg/L	0.100		108	80-120			
Toluene	0.117	0.00100	"	0.100		117	80-120			
Ethylbenzene	0.120	0.00100	"	0.100		120	80-120			
Xylene (p/m)	0.220	0.00200	"	0.200		110	80-120			
Xylene (o)	0.120	0.00100	"	0.100		120	80-120			
Surrogate: 4-Bromofluorobenzene	0.0623		"	0.0600		104	80-120			
Surrogate: 1,4-Difluorobenzene	0.0524		"	0.0600		87.4	80-120			

Calibration Check (P7L1207-CCV2)				Prepared & Analyzed: 12/11/17						
Benzene	0.110	0.00100	mg/L	0.100		110	80-120			
Toluene	0.117	0.00100	"	0.100		117	80-120			
Ethylbenzene	0.109	0.00100	"	0.100		109	80-120			
Xylene (p/m)	0.218	0.00200	"	0.200		109	80-120			
Xylene (o)	0.119	0.00100	"	0.100		119	80-120			
Surrogate: 4-Bromofluorobenzene	0.0656		"	0.0600		109	80-120			
Surrogate: 1,4-Difluorobenzene	0.0602		"	0.0600		100	80-120			

Matrix Spike (P7L1207-MS1)				Source: 7L11006-02		Prepared & Analyzed: 12/11/17				
Benzene	0.110	0.00100	mg/L	0.100	ND	110	80-120			
Toluene	0.117	0.00100	"	0.100	ND	117	80-120			
Ethylbenzene	0.113	0.00100	"	0.100	ND	113	80-120			
Xylene (p/m)	0.218	0.00200	"		ND		80-120			
Xylene (o)	0.117	0.00100	"		ND		80-120			
Surrogate: 4-Bromofluorobenzene	0.0705		"	0.0600		117	80-120			
Surrogate: 1,4-Difluorobenzene	0.0602		"	0.0600		100	80-120			

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

Project: EMSU B PW Leak
Project Number: 17-0176-01
Project Manager: Mark Larson

Fax: (432) 687-0456

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7L1204 - * DEFAULT PREP *****

Blank (P7L1204-BLK1)

Prepared & Analyzed: 12/12/17

Sulfate	ND	1.00	mg/L							
Chloride	ND	0.500	"							

LCS (P7L1204-BS1)

Prepared & Analyzed: 12/12/17

Sulfate	40.4	1.00	mg/L	40.0		101	85-115			
Chloride	40.5	0.500	"	40.0		101	85-115			

LCS Dup (P7L1204-BSD1)

Prepared & Analyzed: 12/12/17

Sulfate	40.8	1.00	mg/L	40.0		102	85-115	0.913	20	
Chloride	40.9	0.500	"	40.0		102	85-115	0.895	20	

Duplicate (P7L1204-DUP1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Chloride	3420	50.0	mg/L		3400			0.367	20	
Sulfate	3620	100	"		3610			0.249	20	

Matrix Spike (P7L1204-MS1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Sulfate	4560	100	mg/L	1000	3610	94.4	80-120			
Chloride	4350	50.0	"	1000	3400	94.5	80-120			

Batch P7L1205 - * DEFAULT PREP *****

Blank (P7L1205-BLK1)

Prepared & Analyzed: 12/12/17

Total Alkalinity	ND	10.0	mg/L							
Carbonate Alkalinity	ND	10.0	"							
Bicarbonate Alkalinity	ND	10.0	"							
Hydroxide Alkalinity	ND	10.0	"							

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7L1205 - * DEFAULT PREP *****

Duplicate (P7L1205-DUP1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Total Alkalinity	160	10.0	mg/L		160			0.00	20	
Carbonate Alkalinity	ND	10.0	"		ND				20	
Bicarbonate Alkalinity	160	10.0	"		160			0.00	20	
Hydroxide Alkalinity	ND	10.0	"		ND				20	

Batch P7L1216 - * DEFAULT PREP *****

Blank (P7L1216-BLK1)

Prepared & Analyzed: 12/12/17

Total Dissolved Solids	ND	20.0	mg/L							
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Duplicate (P7L1216-DUP1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Total Dissolved Solids	10700	20.0	mg/L		10600			0.788	20	
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Project: EMSU B PW Leak
Project Number: 17-0176-01
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Fax: (432) 687-0456

Total Metals by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7L1201 - * DEFAULT PREP *****

Blank (P7L1201-BLK1)

Prepared & Analyzed: 12/12/17

Calcium	ND	0.0810	mg/L							QAL2
Magnesium	0.0766	0.0360	"							QAL2
Potassium	ND	0.0600	"							QAL2
Sodium	ND	0.0430	"							QAL2

LCS (P7L1201-BS1)

Prepared & Analyzed: 12/12/17

Calcium	101	0.0810	mg/L	100	101	80-120				QAL2
Magnesium	98.9	0.0360	"	100	98.9	80-120				QAL2
Potassium	99.5	0.0600	"	100	99.5	80-120				QAL2
Sodium	111	0.0430	"	100	111	80-120				QAL2

LCS Dup (P7L1201-BSD1)

Prepared & Analyzed: 12/12/17

Calcium	103	0.0810	mg/L	100	103	80-120	2.62	20		QAL2
Magnesium	101	0.0360	"	100	101	80-120	2.52	20		QAL2
Potassium	102	0.0600	"	100	102	80-120	2.83	20		QAL2
Sodium	111	0.0430	"	100	111	80-120	0.239	20		QAL2

Duplicate (P7L1201-DUP1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Calcium	580	0.0810	mg/L		577			0.519	20	QAL2
Magnesium	447	0.0360	"		447			0.00	20	QAL2
Potassium	77.4	0.0600	"		77.7			0.313	20	QAL2
Sodium	2290	0.0430	"		2330			1.55	20	QAL2

Matrix Spike (P7L1201-MS1)

Source: 7L11001-01

Prepared & Analyzed: 12/12/17

Calcium	211	0.0202	mg/L	100	577	NR	75-125			QAL2, QM-07
Magnesium	172	0.00900	"	100	447	NR	75-125			QAL2, QM-07
Potassium	166	0.0300	"	100	77.7	87.9	75-125			QAL2
Sodium	2430	0.0430	"	100	2330	103	75-125			QAL2

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Notes and Definitions

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QAL2 Certification in process for this analyte.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

LCS Laboratory Control Spike

MS Matrix Spike

Dup Duplicate

Report Approved By:



Date: 12/13/2017

Brent Barron, Laboratory Director/Technical Director

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-686-7235.

Aarson &
associates, inc.
Environmental Consultants

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

Data Reported to:

DATE: 12.11.2017 PAGE 1 OF 1
PO #: _____ LAB WORK ORDER #: 7C11001
PROJECT LOCATION OR NAME: Basin 6 Pin Leake
LAI PROJECT #: 17-0176-01 COLLECTOR: 28 AT

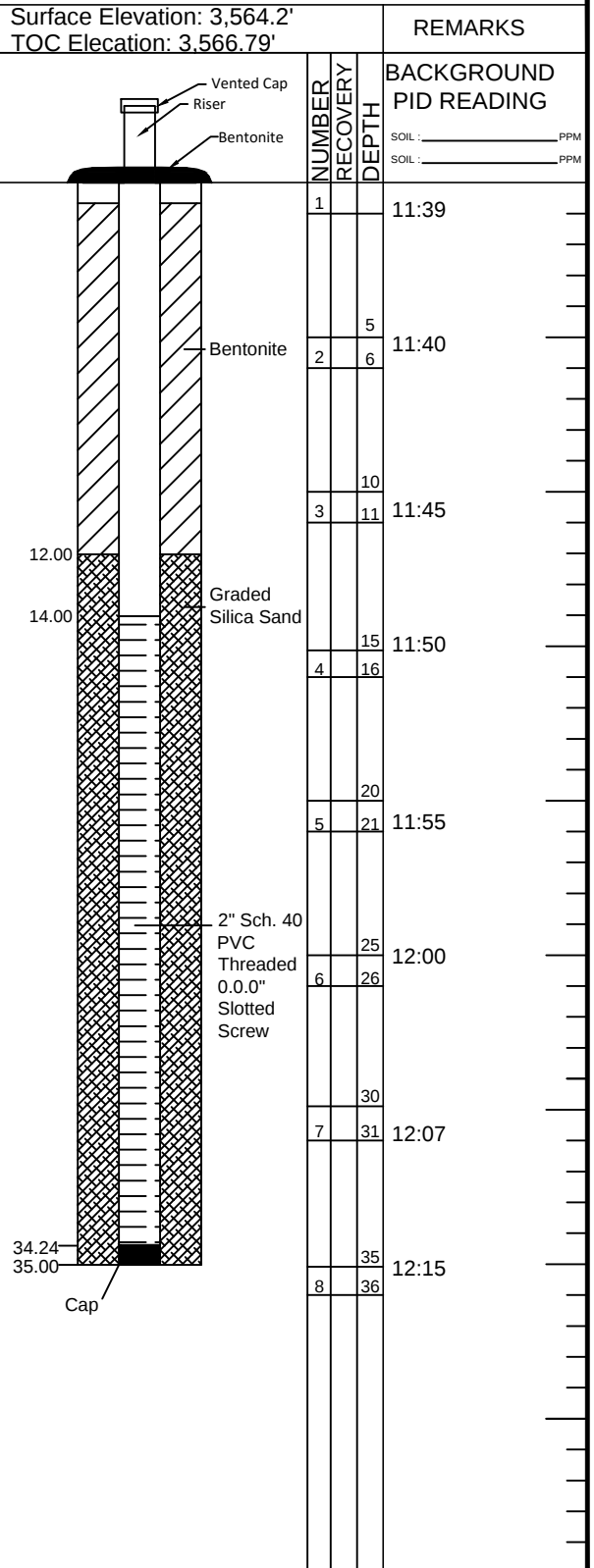
TRRP report? ☐ Yes ☒ No		S=SOIL W=WATER A=AIR		P=PAINT SL=SLUDGE OT=OTHER									
TIME ZONE: Time zone/State: West		Lab #		Date		Time		Matrix		# of Containers		PRESERVATION HCl HNO ₃ H ₂ SO ₄ ☐ NaOH ☐ ICE UNPRESERVED	
MW-6		1		12/7		9:20		W		2		X	
MW-6		2		12/7		9:20		W		2		X	
TOTAL													
REINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)	
REINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)	
REINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)	
TURN AROUND TIME NORMAL ☐ 1 DAY ☒ 2 DAY ☐ OTHER ☐		LABORATORY USE ONLY: RECEIVING TEMP: -3.4 THERM #: CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED ☐ CARRIER BILL # ☒ HAND DELIVERED											
ANALYSES BTEX ☒ MTBE ☐ TPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐ GASOLINE MOD 8015 ☐ DIESEL - MOD 8015 ☐ VOC 8260 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐ 8081 PESTICIDES ☐ 8151 HERBICIDES ☐ TCLP - METALS (RCRA) ☐ TCLP VOC ☐ TCLP - PEST ☐ HERB ☐ Semi-VOC ☐ TOTAL METALS (RCRA) ☐ OTHER LIST ☐ LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐ ROCI ☐ TOX ☐ FLASHPOINT ☐ TDS ☐ TSS ☐ % MOISTURE ☐ pH ☐ HEXAVALENT CHROMIUM ☐ EXPLOSIVES ☐ PECHLORATE ☐ CHLORIDES ☐ ANIONS ☐ ALKALINITY ☐ FIELD NOTES Mg Na K Ca													

APPENDIX D

Boring Logs and Well Diagrams

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:30 Finish: 12:15	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,564.2' TOC Elevation: 3,566.79'		REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING
	0	Sand, 7.5YR 5/6, Light Brown, Very Fine Grain Quartz Sand, Well Graded, Sub-Round, Loose	SW					11:39
	5	5YR 6/6, Reddish Yellow, Below 3'						11:40
	7	Sandy Clay, 7.5YR 7/1, Light Gray to 7.5YR 5/8, Strong Brown, Very Fine Grain Quartz Sand, Mottled, Moist, Medium Stiff to Soft	SC CL					11:45
	12	Caliche, 7.5YR 8/3, Pink, Very Fine Grain Quartz Sand, Medium Soft to Medium Hard, Moist to Wet at Lower Contact, Some Quartzite	Caliche					11:50
	15							11:55
	20							12:00
	25	Sand, 7.5YR 6/8, Reddish Yellow, Very Fine Grain Quartz Sand, Poorly Graded, Round, Loosely Cemented, Friable, Wet at 29'						12:07
	30							12:15
	33	Shale (Claystone), 2.5YR 4/6, Red, Very Fine Grain Quartz Sand, Silty, Blocky, Slickenside	Shale					
	35							
	40	TD: 35'						



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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : M.J.L
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:36 Finish: 14:21	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.9' TOC Elevation: 3,562.54'			REMARKS	
		DESCRIPTION LITHOLOGIC						BACKGROUND PID READING	
								SOIL : _____ PPM SOIL : _____ PPM	
	0	Sand, 7.5YR 4/4, Brown, Very Fine Grain Quartz Sand, Well Graded, Sub-Round	SW						13:37
	4								
	5	Clayey Sand, 7.5YR 6/6, Reddish Yellow, Very Fine Grain Quartz Sand, Sub Rounded, Well Graded	SC						13:42
	10	Sandy Clay, 10YR 7/4, Very Pale Brown, Very Fine Grain Quartz Sand							13:46
	12								
	15	Caliche, 7.5YR 6/4, Light Brown, Very Fine Grain Quartz Sand, Sub-Rounded	Caliche		14.00 15.59				13:51
	18								
	20	Sand, 7.5YR 6/6, Reddish Yellow, Very Fine Grain Quartz Sand, Sub-Rounded, Well Graded	SW						
	25								
	29								
	30	Sandstone, 2.5YR 5/6, Very Fine Grain Quartz Sand, Friable, Sub-Rounded, Well Graded	SW						14:01
	34								
	35	Shale (Claystone), 2.5YR 4/6, Silty, Blocky	Shale		35.24 35.75				14:09
	38.75				38.75				14:15
	40	TD: 38.75"							

- ☐ ONE CONTINUOUS AUGER SAMPLER
☐ STANDARD PENETRATION TEST
☐ UNDISTURBED SAMPLE
☐ WATER TABLE (24 HRS)

- ☐ WATER TABLE (TIME OF BORING)
☐ LABORATORY TEST LOCATION
☐ PENETROMETER (TONS/ SQ. FT)
☐ NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : Z.B
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 10:17 Finish: 10:35	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.5' TOC Elevation: 3,562.15'			REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
5.03 Depth of Water	0	Sand, 7.5YR 5/3, Brown, Very Fine Grain Quartz Sand, Sub-Rounded	SW		1.55	1			10:18
	5.03				2		3		
	6.39				3		5		
	6.59				4		7		
	5	Clayey Sand, 7.5YR 6/4, Light Brown, Very Fine Grain Quartz Sand, Sub Rounded	SC		9.5				
7									
	9.58	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain Quartz Sand, Mottled							
	10								
	15	TD: 9.5'							
	20								
	25								
	30								
	35								
	40								

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

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : Z.B
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

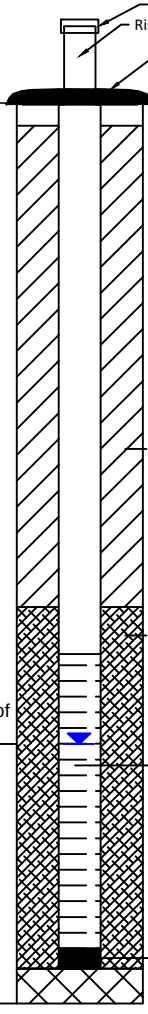
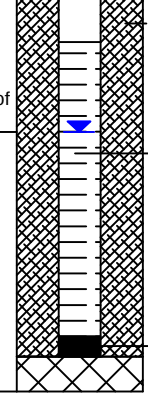
GEOLOGIC UNIT	DEPTH	Start: 11:35 Finish: 12:10	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,561.9' TOC Elevation: 3,564.74'			REMARKS	
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	0	Sand, 7.5YR 5/4, Brown, Medium Grain Quartz Dominant, Well Graded, Sub-Rounded	SW						
	10					1			11:36
	11	7.5YR 6/4, Light Brown, Loose Sand, Quartz Dominant	SC			2	5		11:39
			CL				6		
		Sandy Clay, 2.5YR 8/4, Pale Yellow, Fine Grain, Stiff				3	10		11:41
							11		
		Sandy Clay, 7.5YR 6/6, Reddish Yellow,				4	15		11:48
							16		
	20	5YR 5/4, Reddish Brown, Rounded, Quartz Rich				5	20		11:52
							21		
	25					6	25		11:58
							26		
	30	Sand, 7.5YR 6/4, Light Brown, Loose, Sub-Angular to Rounded, Quartz Dominated, Well Graded	SW			7	30		12:00
							31		
		5YR 6/4, Light Reddish Brown				8	35		12:01
		2.5YR 4/8, Red, Very Fine Grain					36		
	40						40		12:03
		2.5YR 4/8, Red, Very Fine, Loose Sand	SC				41		
			CL				45		12:06
							46		
	50	Sandy Clay, 2.5YR 3/6, Dark Red, Very Fine Grain, Quartz Rich	Shale				50		12:08
							51		
		Clay Stone 2.5YR 3/6, Dark Red, Very Fine Grain							
	60								
		TD: 51'							
	70								
	80								

- ☐ ONE CONTINUOUS AUGER SAMPLER
☐ STANDARD PENETRATION TEST
☐ UNDISTURBED SAMPLE
☐ WATER TABLE (24 HRS)

- ☐ WATER TABLE (TIME OF BORING)
☐ LABORATORY TEST LOCATION
☐ PENETROMETER (TONS/ SQ. FT)
☐ NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : S.J
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 9:40 Finish: 12:00	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.3' TOC Elevation: 3,563.02'			REMARKS	
		DESCRIPTION LITHOLOGIC						BACKGROUND PID READING	
	0	Sandy Clay, 10YR 7/1, Very Fine Grain Quartz Sand	SW			NUMBER	RECOVERY	DEPTH	
	8					1	10	9:54	
	10	Sandy Clay, 7.5YR 6/4, Light Brown, Sub Rounded, Well Graded, Quartz, Moderately Stiff	SC			2	15	10:00	
	11	Caliche, 2.5Y 8/3, Pale Yellow, Very Fine Grain	Caliche			3	20	10:06	
	20	Clayey Caliche, 7.5YR 6/4, Light Brown				4	25	10:15	
	22	Clayey Caliche, 7.5YR 7/2, Pinkish Gray, Clay Nodules, Very Fine Grain				5	30	10:22	
	30	Sand, 7.5YR 6/6, Reddish Yellow, Very Fine Grain Quartz Sand, Sub-Rounded, Well Graded	SW			6	35	10:30	
	40	Sand with Caliche Nodules, 7.5YR 6/6, Reddish Yellow				7	40	10:41	
	50	Sand, 2.5YR 5/6, Red, Very Fine Grain Quartz Sand, Sub-Rounded							
	52	Sand, 2.5YR 4/6, Red, Very Fine Grain Quartz Sand, Sub-Rounded, Silty	Shale						
	57	Sand, 2.5YR 5/6, Red, Very Fine Grain Quartz Sand, Sub-Rounded							
	60	Claystone, 2.5YR 4/6, Very Fine Grain Quartz Sand, Blocky, Silty							
	70								
	80								

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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:35 Finish: 12:05	DESCRIPTION USCS	GRAPHIC LOG		REMARKS		
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	BACKGROUND PID READING
	0	Sand, 7.5YR 5/4, Brown, Med Grain Quartz Dominant, Sub-Round, Poorly Graded	SW			1	1	11:36
						2	3	11:37
						3	5	11:38
						4	7	11:40
	10	Sand, 7.5YR 6/3, Light Brown, Quartz Dominant	CL - SW			5	10	11:43
	11	Clayey Sand, 7.5YR 7/2, Pinkish Gray	SC CL			6	15	11:46
	20	Sandy Clay, 7.5YR 6/6, Reddish Yellow, Fine Grain Sand with Clay Nodules, Lithic Fragments	Caliche			7	20	11:47
	23	Caliche, 7.5YR 8/2, Pinkish White, Fine Grain, Quartz Dominant	SC CL			8	25	11:50
	30	Sand, 2.5YR 6/4, Light Reddish Brown, Larger Clay Nodules, Fine Grain	SC CL			9	30	11:52
						10	35	11:55
	40	Sandy Clay, 2.5YR 5/6, Red				11	40	11:57
		Sandy Clay, 2.5YR 4/6, Red						
	48	Sandy Clay, 2.5YR 4/6, Red, Fine Grain, Quartz Dominant	Shale				50	12:03
	50							
	55	Shale, 2.5YR 3/6, Dark Red, Stiff, Fine-Very Fine Grain					55	12:05
	60							
		TD: 55'						
	70							
	80							

46.53
Depth of
Water

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : S.J
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 15:14 Finish: 15:30	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,563.55' TOC Elecation: 3,566.19'			REMARKS	
		DESCRIPTION LITHOLOGIC			BACKGROUND PID READING				
8.11 Depth of Water	0								SOIL : _____ PPM SOIL : _____ PPM
	1	Sand, 7.5YR 5/6, Light Brown, Very Fine Grain Quartz Sand, Sub-Rounded	SW		2.24		1	1'	15:15
	3		SW				2	3'	15:16
	5	Sand, 7.5YR 5/4, Brown, Very Fine Grain Quartz Sand, Sub-Rounded, Well Graded	SW				3	5'	15:18
	7		SW		7.75		4	7'	15:22
	10	Sand, 7.5YR 6/6, Reddish Yellow, Very Fine Grain Quartz Sand, Sub-Rounded, Well Graded	SC CL		8.11 Depth of Water		5		
		Sandy Clay, 7.5YR 7/1, Light Gray to 7.5YR 6/8, Mottled, Very Fine, Moist			10.75				
		TD: 10.75'							

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD									
GEOLOGIC UNIT	DEPTH	Start: 9:50 Finish: 10:02 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.99' TOC Elecation: 3,563.66' 	REMARKS			
						BACKGROUND PID READING			
						NUMBER	RECOVERY	DEPTH	
	0	7.5YR 5/4, Brown Quartz Sand Fine-Medium Grain Sub-Rounded, Loose				1			9:52
						2	3		9:53
	5	7.5YR 6/4, Yellowish Brown Quartz Sand Fine-Medium Grain, Well Graded, Wet	SW			3	5		9:57
	7					4	7		10:01
	8	Sandy Clay, 2.5YR 7/4, Pale Yellow, Iron Oxide Clay, Fine Grain , Some Quartz, Sub-Rounded Grain, Stiff	Sandy Clay				8		
	10								
		TD: 10.45'							
	15								
	20								
	25								
	30								
	35								
	40								

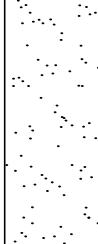
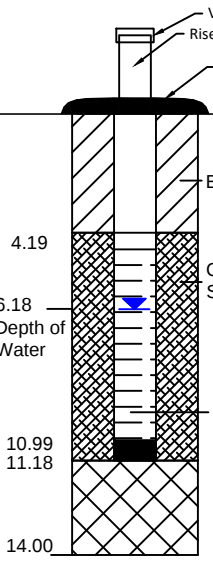
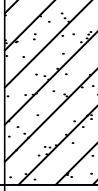
☐ ONE CONTINUOUS AUGER SAMPLER WATER TABLE (TIME OF BORING)
☐ STANDARD PENETRATION TEST LABORATORY TEST LOCATION
☐ UNDISTURBED SAMPLE PENETROMETER (TONS/ SQ. FT)
 WATER TABLE (24 HRS) NR NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : S.J.
 DRILLING CONTRACTOR : Scarbrough Drilling
 DRILLING METHOD : Air Rotary

DRILL DATE : **10-18-17**

BORING NUMBER : **SB-2**

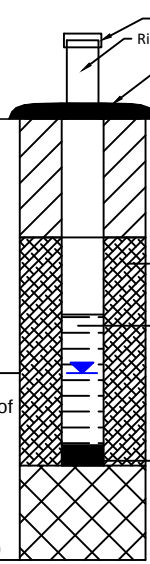
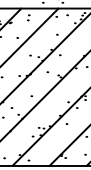
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:05 Finish: 13:18	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,566.22' TOC Elevation: 3,565.97'			REMARKS
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	
	0	Sand, 7.5YR 5/6, Brown Medium Fine Grain Quartz Sand, Rounded, Well Graded 7.5YR 6/4, Light Brown 5YR 6/2, Pinkish Gray, Loose Fine Grain	SW			1	1	13:08
	2					3	13:09	
	3					5	13:12	
	4					7	13:15	
	5					9	13:18	
	10	Sandy Clay, 5YR 6/8, Reddish Yellow Fine Grain, Slightly Compacted Quartz, Rich	SC CL		10			
	14							
	15							
	20							
	25							
30	TD: 14'							
35								
40								

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

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : S.J.
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:40 Finish: 13:57	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,563.50' TOC Elecation: 3,566.23'					REMARKS
		DESCRIPTION LITHOLOGIC					NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING
	0	Sand, 5YR 5/4, Reddish Brown, Medium - Fine Grain Quartz Sand, Loose, Sub-Rounded	SW		6.14	Graded Silica Sand	1		1	13:45
	5	7.5YR 6/6, Reddish Yellow, Wet			2		3	13:46		
		7.5YR 6/1, Grey Quartz Dominated, Fine Grain, Wet			3		4	13:48		
					4		5	13:51		
	9		SC CL		8.47	2" Sch. 40 PVC Threaded 0.00" Slotted Screw	5		6	13:55
	10	Sandy Clay, 2.5YR 8/4, Pale Yellow, Fine Grain, Stiff, Quartz Dominated			6		7			
					7		8			
					8		9			
	14				9		10			
	15	TD: 14'			10		11			
					11		12			
	20									
	25									
	30									
	35									
	40									

- ONE CONTINUOUS AUGER SAMPLER

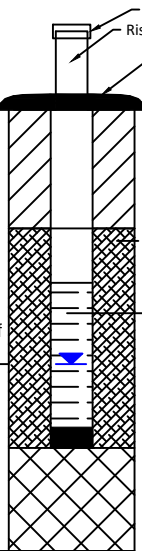
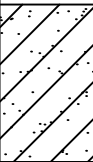
STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/ SQ. FT)
- NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : S.J.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 14:09 Finish: 14:20	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,563.60' TOC Elecation: 3,566.36'		REMARKS		
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
8.43 Depth of Water 	0	Sand, 7.5YR 6/4, Light Brown, Loose, Quartz Dominated, Medium -Fine, Sub-Rounded	SW			1		1	14:10
							2	3	14:11
								4	
	5	10YR 6/4, Light Yellowish Brown, Quartz Dominated, Rounded Grains, Well, Graded				3	5	14:13	
						6			
				4		7	14:16		
						8			
	9	10YR 6/6, Brownish Yellow, Wet	5	9		14:20			
						10			
		10	Sandy Clay, 10YR 8/4, Very Fine Grain, Stiff, Quartz, Rich, Sub-Rounded	SC CL					
	14								
	15	TD: 14'							
	20								
	25								
	30								
	35								
	40								

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

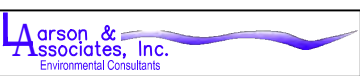
WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

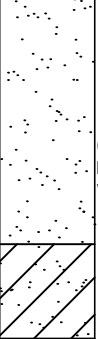
JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : S.J.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

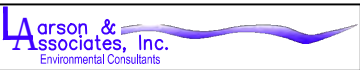


DRILL DATE :
10-18-17

BORING NUMBER :
SB-5

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 14:36 Finish: 14:50	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,562.01' TOC Elevation: 3,564.72'			REMARKS		
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING		
 6.58 Depth of Water	0	Sand, 7.5YR 5/3, Brown, Loose, Quartz Dominated, Sub-Angular, Round, Well Graded 7.5YR 6/4, Light Brown, Quartz Dominated, Sub-Rounded Grains, Loose Sand/Wet	SW		1.21			1	1	14:40
	3.21						2	3	14:41	
	6.58						3	5	14:42	
	8.01						4	7	14:48	
	8.21						5	9		
	11.00							10		
8	Sandy Clay, 10YR 7/6, Yellow, Fine Grain, Stiff	SC CL								
11	TD: 11'									
15										
20										
25										
30										
35										
40										

ONE CONTINUOUS AUGER SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HRS) WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/ SQ. FT) NR NO RECOVERY	JOB NUMBER : <u>XTO EMSU B / 17-0176-01</u> HOLE DIAMETER : <u>5"</u> LOCATION : <u>Lea County, NM</u> LAI GEOLOGIST : <u>S.J.</u> DRILLING CONTRACTOR : <u>Scarborough Drilling</u> DRILLING METHOD : <u>Air Rotary</u>
 DRILL DATE : 10-18-17 BORING NUMBER : SB-6	

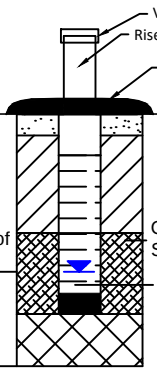
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 9:20 Finish: 9:30	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,563.50' TOC Elecation: 3,566.22'			REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
	0	Sand, 7.5YR 5/3, Brown, Quartz, Sub-Rounded, Moist	SW			1	1	9:20	
	2					3	9:21		
	3					5	9:23		
	4					7	9:24		
	5	7.5YR 6/4, Light Brown, Quartz, Sub-Rounded, Wet	SW			6			
	6								
	7	Sandy Clay, 10YR 7/6, Yellow, Fine Grain, Stiff	SC CL			7			
	8								
	9								
	10								
	11	TD: 11'						9:26	
	15								
	20								
	25								
	30								
	35								
	40								

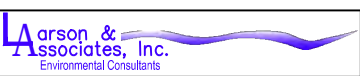
☐ ONE CONTINUOUS AUGER SAMPLER WATER TABLE (TIME OF BORING)
☐ STANDARD PENETRATION TEST LABORATORY TEST LOCATION
☐ UNDISTURBED SAMPLE PENETROMETER (TONS/ SQ. FT)
 WATER TABLE (24 HRS) NR NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : S.J.
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:00 Finish: 11:20	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.82' TOC Elecation: 3,562.58'			REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
	0	Sand, 7.5YR 5/3, Brown, Quartz, Sub-Rounded, Well Graded	SW		1	1	11:05		
	2				3	11:10			
5	3				5	11:13			
7	7				11:16				
	8	Sandy Clay, 10YR 7/6, Yellow, Mottled, Fine Grain Quartz Sand	SC-CL						
	10	TD: 8'				10			

☐ ONE CONTINUOUS AUGER SAMPLER ☐ STANDARD PENETRATION TEST ☐ UNDISTURBED SAMPLE ☐ WATER TABLE (24 HRS)	☐ WATER TABLE (TIME OF BORING) ☐ LABORATORY TEST LOCATION ☐ PENETROMETER (TONS/ SQ. FT) ☐ NR NO RECOVERY	JOB NUMBER : <u>XTO EMSU B / 17-0176-01</u> HOLE DIAMETER : <u>5"</u> LOCATION : <u>Lea County, NM</u> LAI GEOLOGIST : <u>Z.B.</u> DRILLING CONTRACTOR : <u>Scarbrough Drilling</u> DRILLING METHOD : <u>Air Rotary</u>
DRILL DATE : <u>10-19-17</u>		BORING NUMBER : <u>SB-8</u>



BORING RECORD											
GEOLOGIC UNIT	DEPTH	Start: 11:30 Finish: 11:40 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.52' TOC Elevation: 3,562.15'			REMARKS			
					NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM			
4.34 Depth of Water	0	Sand, 7.5YR 6/3, Light Brown, Quartz, Very Fine Grain, Sub-Rounded, Well Graded	SW		0.74			1	1	11:32	
	5	Sand, 7.5YR 5/3, Brown, Fine Grain Quartz Sand, Sub-Rounded, Wet			4.34 Depth of Water				2	3	11:34
	7				5.53				3	5	11:38
	8				8.00					7	
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Mottled	SC—CL								
		TD: 8'									
	15										
	20										
	25										
	30										
	35										
	40										

ONE CONTINUOUS AUGER SAMPLER
 STANDARD PENETRATION TEST
 UNDISTURBED SAMPLE
 WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)
 LABORATORY TEST LOCATION
 PENETROMETER (TONS/ SQ. FT)
 NR NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarbrough Drilling
DRILLING METHOD : Air Rotary

DRILL DATE :
10-19-17

BORING NUMBER :
SB-9

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:30 Finish: 12:50	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,562.21' TOC Elecation: 3,563.96'		REMARKS		
		DESCRIPTION LITHOLOGIC			BACKGROUND PID READING				
5.95 Depth of Water	0	Sand, 7.5YR 6/4, Light Brown, Quartz, Sub-Rounded	SW			NUMBER	RECOVERY	DEPTH	
	5	Sand, 7.5YR 5/2, Brown, Possible Oil, Fine Quartz, Sub-Rounded, Wet				1	1	12:32	
	7	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Mottled, Very Fine Sand, Sub-Rounded, Stiff	SC SL			2	3	12:33	
	10					3	5	12:37	
	11	TD: 7.82'							
15									
20									
25									
30									
35									
40									

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/ SQ. FT)
- NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

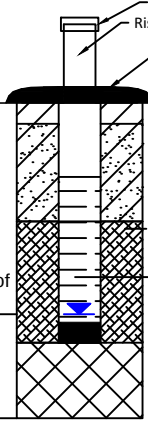
LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:20 Finish: 13:35	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,562.09' TOC Elevation: 3,564.39'			REMARKS	
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	0	Sand, 7.5YR 6/3, Light Brown, Very Fine, Quartz, Sub-Rounded, Well Graded				1	1		13:20
	2.39					2	3		13:23
	5	Sand, 7.5YR 6/4, Light Brown, Very Fine, Quartz, Sub-Rounded	SW			3	5		13:26
	7	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Mottled, Very Fine Sand, Sub-Rounded, Stiff	SC CL				7		13:32
	10								
	15								
	20								
	25								
	30								
	35								
	40								

6.74
Depth of
Water

TD: 10'

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)

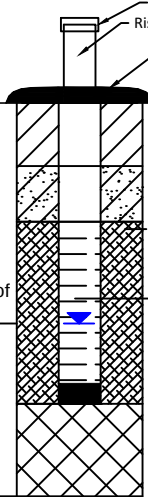
LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 10:10 Finish: 10:25	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,561.84' TOC Elecation: 3,564.66'	REMARKS		
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH
	0	Sand, 7.5YR 6/4, Light Brown, Very Fine, Quartz, Sub-Rounded, Well Graded			2.0			
	5	Sand, 7.5YR 5/4, Brown, Very Fine, Quartz, Sub-Rounded, Wet	SW		4.0			
	7				7.09 Depth of Water			
	10	Sandy Clay, 7.5YR 6/8, Yellow Red to 7.5YR 7/1, Light Gray, Mottled, Very Fine Sand, Quartz, Sub-Rounded	SC CL		9.5			
	12.5				12.5			
		TD: 12.5'						
	15							
	20							
	25							
	30							
	35							
	40							

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/ SQ. FT)
- NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 13:52 Finish: 14:05	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,562.78' TOC Elecation: 3,565.63'			REMARKS	
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	0	Sand, 7.5YR 6/4, Light Brown, Very Fine, Quartz, Sub-Rounded				1	1	1	13:52
	5	Sand, 7.5YR 6/6, Reddish Yellow, Very Fine, Quartz, Sub-Rounded, Wet	SW		2.9 4.9	2	3	3	13:53
	7	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Fine Grain Quartz Sand, Sub-Rounded, Stiff	SC		8.70 Depth of Water	3	5	5	13:55
	10				9.9	4	7	7	13:57
	15	TD: 13'			12.9				
	20								
	25								
	30								
	35								
	40								

8.70
Depth of
Water

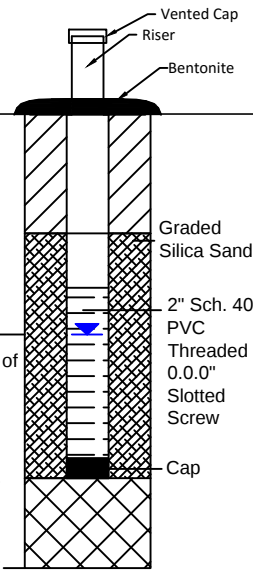
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|--|------------------------------|--|--------------------------------|
| | ONE CONTINUOUS AUGER SAMPLER | | WATER TABLE (TIME OF BORING) |
| | STANDARD PENETRATION TEST | | LABORATORY TEST LOCATION |
| | UNDISTURBED SAMPLE | | PENETROMETER (TONS/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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 14:15 Finish: 14:22	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,561.58' TOC Elecation: 3,564.22'	REMARKS		
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH
	0	Sand, 7.5YR 6/4, Light Brown, Very Fine, Quartz, Sub-Rounded				1	1	14:16
	5	Sand, 7.5YR 7/6, Reddish Yellow, Very Fine, Quartz, Sub-Rounded, Wet	SW		4.0	2	3	14:18
	7	Not Able to Collect Sample in Bit			6.0	3	5	14:21
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Fine Sand, Quartz, Sub-Rounded, Stiff	SC CL		7.08 Depth of Water			
	14.5				11.5			
	15	TD: 14.5'			14.5			
	20							
	25							
	30							
	35							
	40							

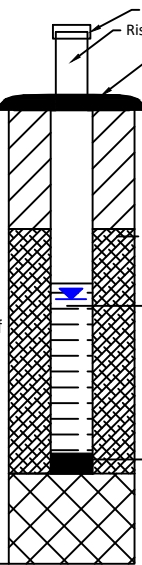
7.08
Depth of
Water



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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 14:45 Finish: 15:05	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.24' TOC Elecation: 3.563.20'					REMARKS
		DESCRIPTION LITHOLOGIC			BACKGROUND PID READING					
	0	Sand, 7.5YR 6/3, Light Brown, Very Fine, Quartz, Sub-Rounded	SW			6.12 Depth of Water	NUMBER	RECOVERY	DEPTH	
		1					1	14:45		
		2					3	14:47		
	5	Sand, 7.5YR 6/4, Light Brown, Very Fine, Quartz, Sub-Rounded, Light Moisture, Wet					3	5	14:50	
		10	Not Able to Collect Sample in Bit							
	14.5	Sandy Clay, 7.5YR 7/1, Light Gray to 7.5YR 6/8, Reddish Yellow, Fine Sand Sand, Quartz, Stiff	SC CL							
	15	TD: 14.55								
	20									
	25									
	30									
	35									
	40									

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 10:15 Finish: 10:30	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,562.21' TOC Elecation: 3,565.21'	REMARKS		
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	BACKGROUND PID READING
	0							SOIL : _____ PPM SOIL : _____ PPM
	3	Sand, 7.5YR 6/4, Light Brown, Fine Grained, Quartz, Sub-Rounded	SW		2.77	1	1	10:17
	5				4.77	2	3	10:18
	7	Wet			8.70	3	5	10:21
	9				Depth of Water	4		10:23
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Fine Grain, Quartz Sand, Sub-Rounded, Stiff, Mottled	SC CL		10.0			10:27
	13.5				13.28			
	15	TD: 13.50'						
	20							
	25							
	30							
	35							
	40							

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- L

LABORATORY TEST LOCATION
- +

PENETROMETER (TONS/ SQ. FT)
- NR

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

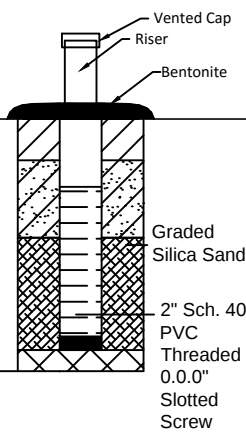
LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:10 Finish: 11:20	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.40' TOC Elecation: 3.562.00'				REMARKS
		DESCRIPTION LITHOLOGIC					BACKGROUND PID READING		
	0	Sand, 7.5YR 5/3, Brown, Fine Grain, Quartz, Sub-Rounded	SW			NUMBER	RECOVERY	DEPTH	SOIL : _____ PPM SOIL : _____ PPM
3	11:12								
5	11:13								
	7	Sand, 7.5YR 6/3, Light Brown, Fine Grain, Quartz, Sub-Rounded, Dry				3		5	11:17
	8	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Fine Grain, Quartz, Sub-Rounded, Stiff, Mottled	SC—CL		7.39				11:20
	10				8.0				
	15								
	20								
	25								
	30								
	35								
	40								

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)
- L

LABORATORY TEST LOCATION
- +

PENETROMETER (TONS/ SQ. FT)
- NR

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

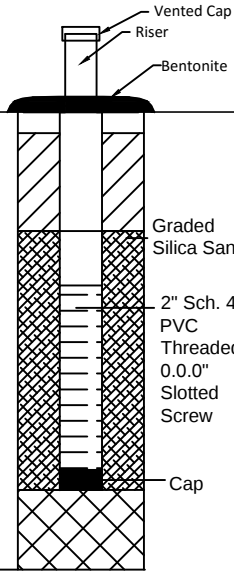
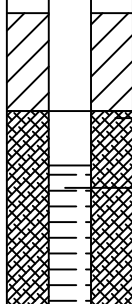
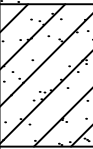
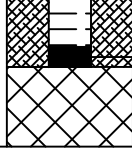
LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 10:50 Finish: 10:59	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,559.77' TOC Elevation: 3,562.00'			REMARKS	
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	0								
	3	Sand, 7.5YR 6/3, Light Brown, Fine Grain, Quartz, Sub-Rounded	SW			1		1	10:50
	5	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded				2		3	10:51
	7	Sand, 7.5YR 7/2, Pinkish Gray, Fine Grain, Quartz, Sub-Rounded, Dry				3		5	10:53
	10	Sandy Clay, 7.5YR 6/6, Reddish Yellow to 7.5YR 7/1, Light Gray, Stiff, Fine Grain, Quartz, Sub-Rounded				4		7	10:55
	14.5		SC CL					10	10:58
	15	TD: 14.5'							
	20								
	25								
	30								
	35								
	40								

- 

 ONE CONTINUOUS AUGER SAMPLER



 WATER TABLE (TIME OF BORING)
- 

 STANDARD PENETRATION TEST



 LABORATORY TEST LOCATION
- 

 UNDISTURBED SAMPLE



 PENETROMETER (TONS/ SQ. FT)
- 

 WATER TABLE (24 HRS)



 NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

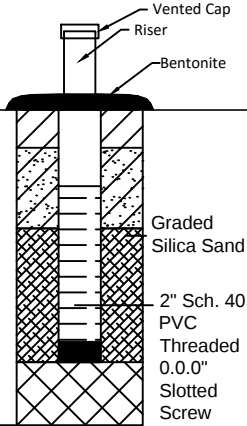
LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start:	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.32' TOC Elecation: 3,562.94'			REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
									SOIL : _____ PPM SOIL : _____ PPM
	0					1	1		
	3	Sand, 7.5YR 6/3, Light Brown, Fine Grain, Quartz, Sub-Rounded	SW			2	3		
	5	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded				3	5		
	7					4	7		
	10	Sandy Clay, 7.5YR 6/6, Reddish Yellow to 7.5YR 7/1, Light Gray, Stiff, Fine Grain, Quartz, Sub-Rounded	SC CL				10		
		TD: 10'							
	15								
	20								
	25								
	30								
	35								
	40								

- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)

WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

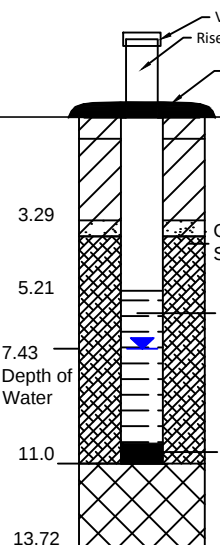
LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

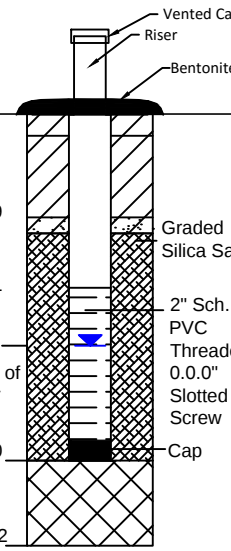
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 12:20 Finish: 12:30	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.01' TOC Elecation: 3,562.90'			REMARKS	
		DESCRIPTION LITHOLOGIC			BACKGROUND PID READING				
	0					NUMBER	RECOVERY	DEPTH	
		Sand, 7.5YR 6/4, Light Brown, Fine Grain, Quartz, Sub-Rounded				1		1	12:22
		Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded	SW			2		3	12:22
	5					3		5	12:25
	7		Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Well Indurated, Fine Grain, Quartz, Sub-Rounded, Mottled	SC CL				7	12:27
	10								
	13.75								
	15	TD: 13.75'							
	20								
	25								
	30								
	35								
	40								

7.43
Depth of
Water



7.43
Depth of Water



- ONE CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HRS)
- WATER TABLE (TIME OF BORING)

LABORATORY TEST LOCATION

PENETROMETER (TONS/ SQ. FT)

NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

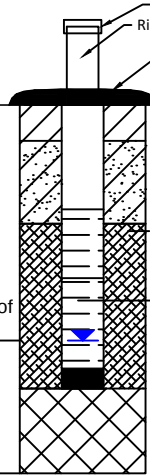
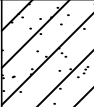
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 12:36 Finish: 12:45	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,560.76' TOC Elecation: 3,563.42'		REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING
	0	Sand, 7.5YR 6/4, Light Brown, Fine Grain, Quartz, Sub-Rounded	SW		1	1	12:38	
	2							3
	5	Wet			3	5	12:41	
	7							
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain Sand, Quartz, Sub-Rounded, Mottled	SC CL					
	12.86							
	15	TD: 13.0'						
	20							
	25							
	30							
	35							
	40							

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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 12:55 Finish: 13:05	DESCRIPTION USCS	GRAPHIC LOG	Surface Elevation: 3,561.00' TOC Elecation: 3,563.62'			REMARKS	
		DESCRIPTION LITHOLOGIC			NUMBER	RECOVERY	DEPTH	BACKGROUND PID READING	
7.40 Depth of Water	0	Sand, 7.5YR 5/3, Brown, Fine Grain, Quartz, Sub-Rounded	SW			1	1	12:58	
	3					2	3	12:59	
	5					3	5	13:00	
	7			13:05					
	10								
	11.6	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain Sand, Quartz, Sub-Rounded, Mottled	SC CL						
	15	TD: 11.6'							
	20								
	25								
	30								
	35								
	40								

- 

 ONE CONTINUOUS AUGER SAMPLER



 WATER TABLE (TIME OF BORING)
- 

 STANDARD PENETRATION TEST



 LABORATORY TEST LOCATION
- 

 UNDISTURBED SAMPLE



 PENETROMETER (TONS/ SQ. FT)
- 

 WATER TABLE (24 HRS)



 NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01

HOLE DIAMETER : 5"

LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B.

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

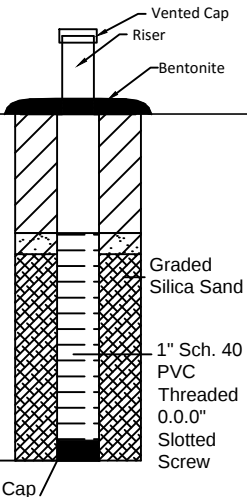
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 12:45 Finish: 12:55 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
					NUMBER	RECOVERY	DEPTH	
	0							BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	1	Sand, 7.5YR 4/4, Brown, Fine Grain, Quartz, Sub-Rounded, Poorly Graded	SW		1		1	
	3				2		3	
	5	Sand, 7.5YR 6/4, Light Brown, Fine Grain, Quartz, Sub-Rounded			3		5	
	7	Clayey Sand, 7.5YR 6/4, Light Brown, Dry			4		7	
	10		SC-CL		5		10	
	10.5	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray						
	15	TD: 10.5'						
	20							
	25							
	30							
	35							
	40							

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

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : Z.B.
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 3:15 Finish: 3:45	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
		DESCRIPTION LITHOLOGIC				NUMBER	RECOVERY	DEPTH
	0					1	1	12:58
	3	Sand, 7.5YR 5/6, Strong Brown, Fine Grain, Quartz, Sub-Rounded	SW			2	3	12:59
	5	Sand, 7.5YR 7/4, Pink				3	5	13:00
	9	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded						13:05
	10	Sand, 7.5YR 7/4, Pink, Fine Grain, Quartz, Sub-Rounded, Dry	SC CL					
	11	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Fine Grain, Quartz, Sub-Rounded						
	15							
	20							
	25							
	30							
	35							
	40							

TD: 11'

-  ONE CONTINUOUS AUGER SAMPLER
-  STANDARD PENETRATION TEST
-  UNDISTURBED SAMPLE
-  WATER TABLE (24 HRS)

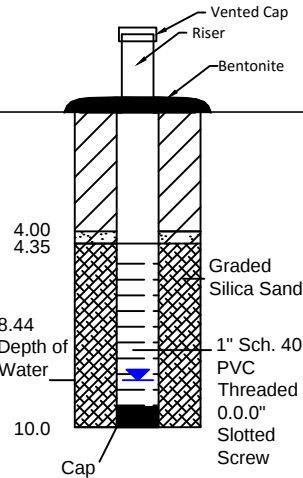
-  WATER TABLE (TIME OF BORING)
-  LABORATORY TEST LOCATION
-  PENETROMETER (TONS/ SQ. FT)
-  NR NO RECOVERY

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:15 Finish: 12:30 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
					NUMBER	RECOVERY	DEPTH	
	0	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Rounded						BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	5	Sand, 7.5YR 7/6, Pink, Fine Grain, Quartz, Sub-Rounded, Wet	SW					
	8							
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain, Quartz, Mottled	SC CL					
	15	TD: 10'						
	20							
	25							
	30							
	35							
	40							

8.44
Depth of
Water



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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

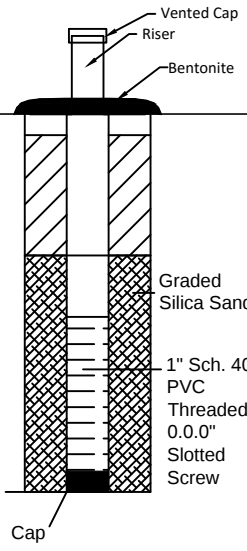
GEOLOGIC UNIT	DEPTH	Start: 13:08 Finish: 13:15	DESCRIPTION USCS	GRAPHIC LOG		NUMBER	RECOVERY	DEPTH	REMARKS
		DESCRIPTION LITHOLOGIC							
	0							0	
	5	Sand, 7.5YR 5/4, Brown, Medium Grain, Quartz Dominated, Well Graded, Sub-Rounded	SW					4	
		Sandy Clay, 2.5YR 8/4, Pale Yellow, Moderately Stiff	CL					8	
	10	TD: 6.7'						10.5	
	15								
	20								
	25								
	30								
	35								
	40								

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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B.
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 11:20 Finish: 12:40 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
					NUMBER	RECOVERY	DEPTH	
	0	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Rounded						BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	4	Sand, 7.5YR 6/8	SW					
	5	Sand, 7.5YR 6/4, Light Brown, Fine Grain, Quartz, Sub-Rounded						
	9	Clayey Sand, 7.5YR 7/4, Very Fine Grain, Quartz, SUB-Rounded Dry	SC CL					
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Quartz						
	12	TD: 12'						
	15							
	20							
	25							
	30							
	35							
	40							

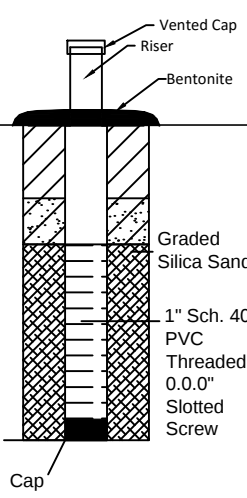


- | | |
|---|---|
| ☐ ONE CONTINUOUS AUGER SAMPLER | ☐ WATER TABLE (TIME OF BORING) |
| ☐ STANDARD PENETRATION TEST | ☐ LABORATORY TEST LOCATION |
| ☐ UNDISTURBED SAMPLE | ☐ PENETROMETER (TONS/ SQ. FT) |
| ☐ WATER TABLE (24 HRS) | ☐ NO RECOVERY |

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : Z.B.
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 12:10 Finish: 12:30 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
					NUMBER	RECOVERY	DEPTH	
	0	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Rounded						BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	4	Sand, 7.5YR 7/4, Pink, Fine Grain, Quartz, Sub-Rounded	SW					
	5	Sand, 7.5YR 7/7, Pinkish Gray, Dry						
	8	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain, Quartz	SC CL					
	10	TD: 10'						
	15							
	20							
	25							
	30							
	35							
	40							



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

JOB NUMBER : XTO EMSU B / 17-0176-01

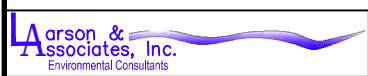
HOLE DIAMETER : 5"

LOCATION : Lea County, NM

LAI GEOLOGIST : Z.B. A.T

DRILLING CONTRACTOR : Scarborough Drilling

DRILLING METHOD : Air Rotary

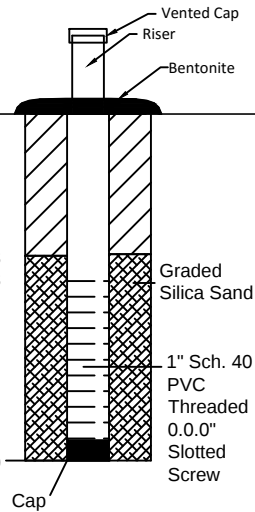


DRILL DATE : 11-20-17

BORING NUMBER : SB-29

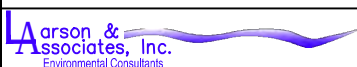
BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 1:15 Finish: 1:45 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG				REMARKS
					NUMBER	RECOVERY	DEPTH	
	0	Sand, 7.5YR 6/8, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded						BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM
	5	Sand, 7.5YR 6/4	SW					
	10	Clayey Sand, 7.5YR 6/6, Fine Grain, Quartz, Sub-Rounded, Dry						
	11	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray, Very Fine Grain, Quartz	SC-CL					
	15	TD: 11'						
	20							
	25							
	30							
	35							
	40							



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

JOB NUMBER : XTO EMSU B / 17-0176-01
 HOLE DIAMETER : 5"
 LOCATION : Lea County, NM
 LAI GEOLOGIST : Z.B. A.T
 DRILLING CONTRACTOR : Scarborough Drilling
 DRILLING METHOD : Air Rotary



DRILL DATE :
11-20-17

BORING NUMBER :
SB-30

BORING RECORD

GEOLOGIC UNIT	DEPTH	Start: 2:05 Finish: 2:20 DESCRIPTION LITHOLOGIC	DESCRIPTION USCS	GRAPHIC LOG	REMARKS		
					BACKGROUND PID READING SOIL : _____ PPM SOIL : _____ PPM		
	0	Sand, 7.5YR 6/6, Reddish Yellow, Fine Grain, Quartz, Sub-Rounded	SW		NUMBER	RECOVERY	DEPTH
	3				1	3	0
	5	Clayey Sand, 7.5YR 7/2, Pinkish Gray Fine Grain, Quartz, Sub-Rounded, Dry			N/R	4	
	9					8	
	10	Sandy Clay, 7.5YR 6/8, Reddish Yellow to 7.5YR 7/1, Light Gray	SC-CL			9	
	10					10	
	15	TD: 10'					
	20						
	25						
	30						
	35						
	40						

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

JOB NUMBER : XTO EMSU B / 17-0176-01
HOLE DIAMETER : 5"
LOCATION : Lea County, NM
LAI GEOLOGIST : Z.B. A.T
DRILLING CONTRACTOR : Scarborough Drilling
DRILLING METHOD : Air Rotary

APPENDIX E
Photographs



Site Viewing South



Site Viewing Southeast



Site Viewing Northeast



Site Viewing North

APPENDIX F

Release Calculations

Spill Volume Estimate

December 4, 2017

PW Thickness (ft)	Area (sq. ft.)	Average Thickness (ft)	Estimated Void Space (Ratio)	Estimated PW Volume (cu. ft.)
0.5 - 1.0 ft	67167	0.75	0.65	32744
1.0 - 2.0 ft	121052	1.5	0.65	118026
2.0 - 3.0 ft	32458	2.5	0.65	52744
3.0 - 4.0 ft	13182	3.5	0.65	29989
>4.0 ft	8773	4.5	0.65	25661
Total (Cubic Feet):				259164
Total (Gallons):				1938681
Total (Barrels)				46159
Volume Recovered (Barrels):				11689
Total Released (Barrels):				57848